

Reimagining Learning Spaces of the Future: An Interprofessional, Virtual Workshop Utilizing Rapid Idea Generation and Lean Startup Methodologies

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Abstract

Introduction: The needs and expectations of health professional educators and learners are evolving. Therefore, physical and virtual learning environments will look and function differently in the future. Understanding desirable, feasible options for educators and learners, including online, in-person, hybrid, and extended realities, is critical. We designed and facilitated a faculty development workshop that adapted Lean Startup methodologies and role-modeled effective virtual teaching skills to engage stakeholders in generating ideas to inform future development of learning spaces within one national academic medical center. **Methods:** We facilitated the 3-hour workshop with an interprofessional group of health professional educators, learners, and administrative staff. The workshop included asynchronous prework and synchronous microlectures, small-group activities, and large-group report-outs. We employed Lean Startup methodologies to promote divergent thinking. Each small group had a dedicated convener and scribe. A designated chat moderator, social media facilitator, and several audiovisual staff provided support during the workshop. **Results:** More than 4,000 ideas were generated by the 350 participants. Participants reported that prework, microlectures, and small-group activities were successful in preparing them to engage in rapid idea generation and propose potential solutions for future learning spaces within health professions education. **Discussion:** The workshop, which utilized a rapid idea generation and Lean Startup methodologies format, was successful in producing an abundance of original ideas and potential solutions for future learning spaces within health professions education. As reported through postsession evaluation, participants valued the opportunity to contribute ideas and co-create potential solutions to guide future planning and feasibility studies.

Keywords

Faculty Development, Learning Environment, Virtual Learning, Interprofessional Education

Educational Objectives

By the end of this activity, participants will be able to:

1. Outline the purpose and possible application of Lean Startup methodologies within the context of health professions learning environments.
2. Describe the four steps in the Lean Startup methodology.
3. Contribute ideas and compose a list of essential components for future learning spaces within health professions education.

4. Generate consensus for potential solutions for future learner spaces within health professions education using Lean Startup methodologies.

Introduction

The needs and expectations of health professional educators and learners are evolving rapidly; continuous adaptation is essential as learning spaces transcend physical, virtual, simulated, and augmented environments.¹⁻⁴ The growth of information; dynamic social, technological, and economic environments; and the increase of personalized and adaptive learning will influence physical and virtual spaces for learning.⁵⁻¹⁰ Understanding desirable, feasible options for educators and learners, including online, in-person, hybrid, and extended realities, is critical.¹¹⁻¹³ Health professions education (HPE) must transform to provide skills necessary

Citation:

Billings H, Malin T, Allen J, et al. Reimagining learning spaces of the future: an interprofessional, virtual workshop utilizing rapid idea generation and Lean Startup methodologies. *MedEdPORTAL*. 2022;18:11217. https://doi.org/10.15766/mep_2374-8265.11217

for teaching, learning, adapting, and thriving in these environments.^{3,5,14,15}

With the rapid growth of health care needs, demand for more health professionals—as well as the expanding network of our own academic medical center—makes reimagining and investing in learning spaces a strategic priority. Recent literature supports the prevalence of similar pressures and advanced planning across higher education institutions. However, a review of medical education literature and *MedEdPORTAL* did not provide a model for an idea-generation, consensus-building, workshop-style session designed to produce solutions for future learning spaces in HPE. Therefore, we developed and facilitated a faculty development workshop to inform future development of learning spaces within one national academic medical center. Our goals were to generate ideas from stakeholders representing different learner levels, specialty areas, and professional roles and to build consensus for possible solutions for the development of future learning spaces. The workshop brought together an interprofessional group of educators who utilized rapid idea generation and Lean Startup methodologies to engage more than 350 participants, solicit ideas from a variety of stakeholders, and role-model effective virtual teaching and consensus-building skills.^{6,16-19}

To advance beyond mere brainstorming of ideas, we worked through the four stages of the Lean Startup methodology, an abbreviated model of design thinking that is grounded in qualitative methods. This method was designed to help entrepreneurs efficiently validate products and decrease risk of failure within their business plan.²⁰ Through a sequential process, stakeholder needs are defined, potential solutions are generated, and minimal viable products are tested and evaluated for scale. This methodology allowed us to gather input around a defined problem space from a diverse group of stakeholders within a short time frame. The synchronous, divergent-thinking session promoted the co-creation of ideas and moved participants beyond solutions closest to the assumed problem.²¹ Examples of such strategies included stakeholder interviews, persona development, problem space definition, and rapid idea generation.

To inform workshop design and advance outcomes, we employed the community of inquiry (CoI) framework to promote shared experiences and social construction of knowledge among participants. The CoI framework focuses on fostering critical inquiry through dialogue and reflection with a group of individuals. This was achieved by deliberate development and implementation of the three CoI presences; teaching, social,

and cognitive.²²⁻²⁵ Table 1 describes how CoI presence was integrated and applied within the workshop.

This work provided the workshop design, instructions for facilitation, and templates for implementation, while also contributing to the growing body of knowledge on the evolution of health professions learning spaces and the needs of learners and educators.

Methods

Our workshop was promoted and implemented as part of an annual Education and Technology Forum (ETF) series familiar within our institution. The 2021 ETF, *Our Voices, Our Ideas, Our Designs for Learning Spaces of the Future*, was designed to build knowledge and skills, engage participants, role-model effective use of education technologies and digital pedagogies, and promote community. Although the Centers for Disease Control guidelines at the time necessitated our workshop be facilitated virtually, the materials and methodologies are easily adapted for in-person or hybrid delivery.

The workshop planning committee included faculty developers, curriculum and instructional designers, multimedia specialists, health professions educators, and program evaluators, many of whom served in the roles of workshop cohosts, facilitators, conveners, scribes, virtual chat moderators, social media facilitators, and tech support staff.

Virtual Workshop Design

The 3-hour workshop included prework microlectures, small-group activities, large-group report-outs, and postsession evaluation. We carefully aligned technologies with the workshop goals and activities. In addition to a videoconferencing platform, we incorporated technology-facilitated video-based discussion, content authoring, collaborative coauthoring, evaluation, and feedback, as described in Table 2. Considerations underlying the choice of these technologies included the following:

- Defining the goals and objectives of the workshop before selecting the technology.²⁶
- Assessing usability of the technology with the desired audience.²⁶
- Identifying if the technology (or similar) was available at the institution.
- Determining the technology support required and whether it was available.
- Pilot-testing the technology with diverse stakeholders (e.g., assessing the flow of the learning experience, identifying barriers given institutional security requirements).²⁶

Table 1. Definitions, Applications, and Evaluation of Community of Inquiry Presences

Details	Teaching Presence	Social Presence	Cognitive Presence
Definition	Teaching presence is the design and organization of an experience to facilitate social and cognitive processes to achieve learning outcomes.	Social presence focuses on how personal characteristics impact group connectedness and communication.	Cognitive presence is grounded in the social construction of meaning through deliberate engagement in an inquiry cycle, collaborative discussion, and continuous reflection.
Integration and application within the workshop	<p>Organization of the workshop agenda.</p> <p>Sequenced large-group and small-group activities and interactions.</p> <p>Provided direct instruction before the event via virtual hub workshop readings and materials.</p> <p>Facilitated discussion during the event by training small-group conveners and preparation of facilitator visual and verbal prompts.</p>	<p>Promoted individual expression by video introductions of group members prior to the workshop.</p> <p>Maintained consistent small groups throughout the workshop to foster group cohesion.</p> <p>Opened communication through discussion prompts for participants to share reactions and engage in large-group synchronous chat functionality.</p>	<p>Focused workshop via a common problem space.</p> <p>Provided common ground for discussion via prework.</p> <p>Utilized Lean Startup methodologies to explore ideas, share diverse perspectives, and construct solutions.</p>
Evaluation and outcomes	<p>Postevent online poll questions:</p> <p>91% = This was a good use of my time.</p> <p>92% = I learned something I will use.</p> <p>88% = The pace of the evening was perfect.</p> <p>1-week postsurvey questions:</p> <p>68% = Prework prepared me to participate.</p> <p>91% = I felt comfortable utilizing the virtual tools (Zoom features).</p>	<p>Testimonials via chat and evaluations of group cohesion:</p> <p>“Connectedness, engagement, and additive communications and discussions.”</p> <p>Indicators of individual expression and open communication:</p> <p>198 videos created, with 270 comments.</p> <p>1,500 chat messages.</p> <p>470 tweets.</p> <p>Postevent online poll question:</p> <p>83% = I made one new personal connection as a result of the workshop.</p> <p>1-week postsurvey question:</p> <p>83% = I felt comfortable participating.</p>	<p>Creation of small-group artifacts:</p> <p>Over 40 problem space statements.</p> <p>4,000 ideas generated from subsequent rounds of ideation and consensus building.</p> <p>Large-group verbal and written (via the chat) report-outs:</p> <p>“After the large group convened following breakout sessions, I was very curious to hear other groups share and to be inspired by all the fantastic ideas of others.”</p> <p>1-week postsurvey questions:</p> <p>87% = Small-group activities help me appreciate different perspectives.</p> <p>“Listening to the two main speakers. I liked having the information given to us in ‘bites’ and then go to our breakouts and put it into practice.”</p>

To facilitate the workshop, we developed a PowerPoint slide deck and presenter notes (Appendix A), convener slides with facilitation instructions for small-group activities (Appendix B), and a stakeholder personas catalogue (Appendix C). In addition, we created a backstage workshop agenda with roles and responsibilities for each section and/or task and prewritten chat posts (Appendix D). We hosted a dress rehearsal with the entire workshop team 1 week prior to the event.

Prework, Introductions, and Community Building
 Prior to the workshop, we emailed registered participants instructions on accessing prework activities, joining the workshop through Zoom, and locating resources to be utilized during the workshop. We also preassigned registrants to one of 40 small groups; each group included one convener, one scribe, and six to eight participants. We used shared online documents to record outputs from small-group activities. The chat moderator posted

Table 2. Virtual Workshop Technologies

Technology	Purpose	Activity
Zoom	Virtual conferencing platform	Hosted using Zoom meeting with increased breakout rooms. Utilized tools and features including synchronous chat option, reactions, and polling functionality.
FlipGrid (Microsoft) Articulate RISE 360 (Articulate Global)	Video-based discussion Content authoring	Recorded, posted, and responded to introductory videos. Created a virtual resource hub populated with prework instructions, workshop materials, reference resources, postworkshop communications, and biographies of facilitators and workshop staff.
Google Docs Qualtrics	Collaborative coauthoring Evaluation and feedback	Shared access and editing of documents for planning, facilitating, and assessing the workshop. Created and disseminated evaluation survey. Collected and analyzed feedback data.

instructions, engagement prompts, and hyperlinks to referenced resources in the chat feature.

At the start of the workshop, participants answered several demographic poll questions, which created transparency for the diversity of roles, learner levels, and professions in attendance and reinforced relevance for all stakeholders. Next, we reviewed workshop objectives, introduced team members, and provided a microlecture to build shared understanding of learning spaces, the need for future planning, and potential for impact at the institution and across HPE as a whole.

Microlectures

Facilitators kicked off with a short exercise to establish the collaborative brainstorming mindset needed to generate solutions. They then presented a series of microlectures to introduce the four phases of the Lean Startup methodology, a framework successfully utilized in HPE to promote idea generation and solution germination.²⁷ The *learn* phase included stakeholder interviews and analysis, defining a problem space, and creating problem statements. The *ideate* phase leveraged mindset and ground rules behind rapid idea generation through an exercise called “6-ups” to structure divergent brainstorming. The *test* phase included assumption generation, assumption mapping, and working through the cyclic process of build, measure, and learn in an application to minimal viable product experimentation. The *scale* phase worked toward operationalizing innovations and sustainability. Details for facilitating the microlectures are included in Appendices A, B, and D.

Small-Group Activities

Conveners led small groups through a progressive series of five activities and large-group report-outs. Participants were encouraged to reference online resources (e.g., personas; Appendix C) as needed through the virtual hub. Preassigned scribes captured discussions and recorded more than 4,000 ideas for future analysis. Complete instructions and examples for the small-group activities can be found in Appendices B and E.

Pitch deck: The objective was to shift participants to the creative, storytelling side of their brains. We provided two types of cards to each group—one included the name or description of an app or technology, and the other included an image and descriptor of a topic. We charged participants with pairing an app or technology with a topic and creating a quick pitch for a new product.

Stakeholder interview: During this activity, small groups composed open-ended questions to collect information and understand needs/challenges of stakeholders. We created stakeholder personas that served as real-life examples of the learners, educators, and education support staff who represent our diverse community (Appendix C). The use of diverse personas allowed the small groups to reflect upon different wants and needs of our stakeholders and promoted awareness of the diversity of stakeholders. Open-ended questions allowed individuals to learn more than anticipated, such as stakeholder motivations, behaviors, and concerns.

Problem space development: The goal of this activity was to familiarize learners with analyzing and synthesizing stakeholder research to develop a concise problem statement. Groups collaboratively developed a problem statement for learning spaces of the future. Participants used a template to identify stakeholders, needs, and surprising insights that drive the need.

Rapid idea generation: The goal of this activity was divergent thinking. Individually, participants came up with as many ideas as possible to share back with the small group. Participants were then coached to propose outside-the-box ideas and encouraged to build on the ideas of others. Therefore, all ideas were embraced, and no one idea was more important than another.

Assumption generation: The goal of this activity was to generate true/false statements regarding the defined problem space. We informed participants that assumptions were most often unconscious and the process of making them conscious could be hard; the statements were often things taken for granted. We provided a helpful example to participants about flipping the approach by thinking about what things would guarantee failure rather than success.

Workshop Staff/Team

All members of the workshop planning team had a role during the workshop. Descriptions and responsibilities are outlined in Appendix F. Key roles included the conveners, scribes, chat moderators and social media facilitators.

Conveners and scribes: Our workshop included 43 conveners and 43 scribes. Two lead conveners and one lead scribe provided preworkshop training to prepare team members to facilitate small-group activities and role-model the effective use of education technologies. That preworkshop training is beyond the scope of this publication.

A primary objective of our workshop was to capture ideas shared within small groups. Scribes documented discussions using the

scribe notes template (Appendix G). This allowed participants and conveners to focus on engaging in discussion.

Chat moderator and social media facilitators: A designated chat moderator welcomed participants by name; built a sense of excitement and community; posted precomposed instructions, questions, and discussion prompts; and facilitated engagement during the workshop within the Zoom synchronous chat feature.

Two social media facilitators predrafted tweets based on the planned activities, and posts were scheduled and disseminated before, during, and after the workshop through Twitter, Instagram, and Facebook using a common hashtag (e.g., #MayoClinicETF; Appendix H). Pre-event posts were designed to stimulate interest and encourage registration. During the event, posts included selected images from presentations and hyperlinks to key resources, as well as questions intended to reinforce learning points. Postevent posts included key takeaways, strategies shared, and insights on creating learning spaces of the future.

Wrap-up and Reflection

The workshop concluded with a microlecture describing the theoretical frameworks and deliberate workshop design. We called out role-modeling of effective large-group and small-group virtual facilitation strategies, such as the invitation for recording introductory videos to establish a social presence. This presentation created an opportunity for reflection on practical implications of building community and facilitating collaborative learning online. We invited all participants to share their reflection through chat and verbal report-outs.

Evaluation Strategy and Instrumentation

To evaluate satisfaction, perceived value, and intent to apply new knowledge or skills, we invited participants to complete a synchronous online poll during the last 2 minutes of the workshop. We then sent a postworkshop online survey (Appendix I) to all registrants 1 week later to control for confirmation bias. The survey consisted of nine open- and closed-ended questions. We formatted the first four questions to gain an understanding of participants' perceived value of the workshop and their intent to apply new skills or knowledge. The next three questions examined participants' level of engagement and feelings of inclusion and community. A matrix-type question with a 5-point Likert scale solicited responses specific to participants' satisfaction with the content, activities, and format of the workshop. The last two questions were invitations to volunteer to

help plan or facilitate future events. Using an iterative grounded theory approach, two authors analyzed the quantitative and qualitative data collected to identify themes, with confirmation review by all authors.

To evaluate engagement and community, we analyzed the number of (1) prerecorded introductory videos and responses; (2) posts to the synchronous chat; (3) tweets, likes, and retweets to #MayoClinicETF; and (4) notes submitted by the scribes.

Results

The Figure includes the results of the initial workshop demographic poll questions about the roles, learner levels, and professions in attendance for the 350 participants at our institution. Most participants had 75%-100% of their role in education, were affiliated with the College of Medicine and Science, and identified as faculty/educators. Of participants, 229 responded to the synchronous online poll at the end of the workshop. Of respondents, 92% specified that they learned something new they intended to share with others, 91% replied that participating was a good use of their time, 88% thought the pace was perfect, and 83% responded that they had (121 of 229) or may have (69 of 229) made one personal connection during the workshop.

One hundred ninety-nine of 444 registrants responded to the postworkshop survey (45% response rate). Of respondents, 88% indicated the workshop was a good use of time, 80% planned to incorporate one thing learned into their teaching and/or assessment, and 63% had already shared one thing learned with someone else. In addition, 68% responded that the prework prepared them to participate, 83% felt comfortable participating, 87% indicated the small-group activities were valuable in helping them appreciate different perspectives, 91% responded they felt comfortable utilizing the tools in Zoom, and 92% agreed the overall quality of the virtual experience was high.

An analysis of comments shared suggested the majority of respondents (73%; 105 of 143) were most engaged during the breakout sessions, although microlectures and large-group summaries were also valued:

- “The small-group discussions within the breakout rooms were fantastic. We had participants from a variety of backgrounds, which offered different viewpoints and ultimately helped to enrich the discussion and ideas put forth. It was helpful to have a convener to lead the activities and answer questions we had.”

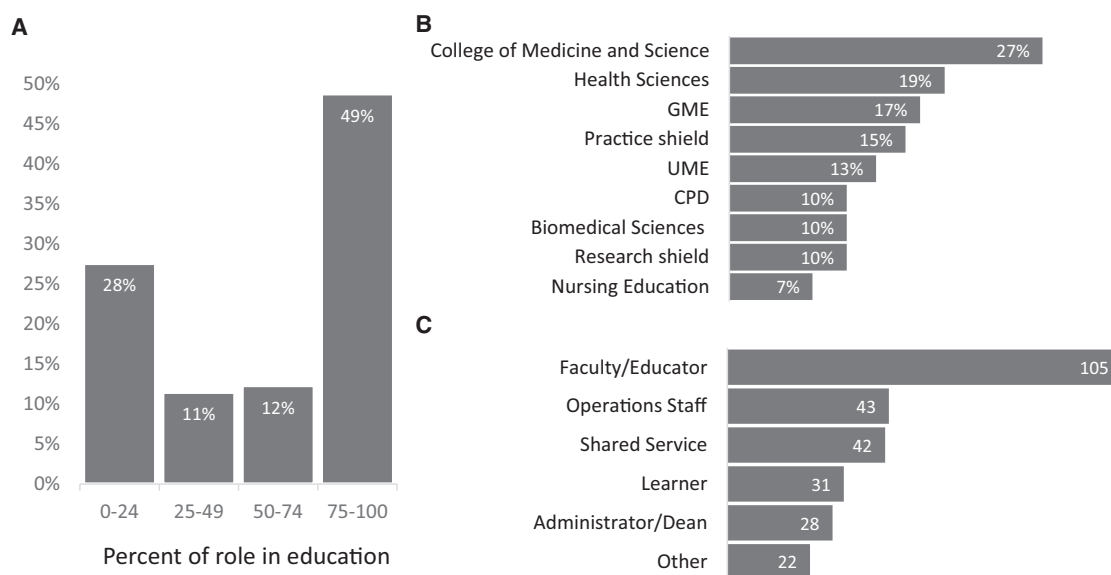


Figure 1. Demographics of workshop participants ($n = 350$). A: Percent effort in education. B: Affiliated school(s). C: Primary role(s) in education. Abbreviation: CPD, continuing professional development.

- “Listening to the two main speakers. I liked having the information given to us in ‘bites’ and then go to our breakouts and put it into practice.”
- “After the large group convened following breakout sessions, I was very curious to hear other groups share and to be inspired by all the fantastic ideas of others.”
- “I don’t think there was a point at which I wasn’t engaged. Wonderful evening.”

Engagement levels, relevance of content, and contribution to community were also measured through (1) number of introductory videos (198, 57% of participants), which generated 270 comments and 3,256 views pre-event; (2) number of participants posting to the #MayoClinicETF hashtag (56); (3) number of tweets published via Twitter (470); and (4) total impressions generated (770,636). Participants contributed 1,500 chat messages during the 3-hour workshop, and the qualitative data collected from scribes produced over 4,000 ideas and possible solutions for learner spaces of the future.

Discussion

Our workshop was designed to build knowledge and skills, engage participants, solicit stakeholder input, offer opportunities to use education technology, and role-model digital pedagogies and virtual facilitation methods while promoting community. Through thoughtful planning and creation of dynamic learning

experiences, our workshop provided defined time and creative structure to generate 4,000 original ideas for future learning spaces within HPE.

The Col framework anchored the event within a virtual environment through a deliberate approach to foster community and co-construct knowledge. The building of community is one of the most essential, albeit sometimes invisible, pieces of creating effective, engaging, and meaningful learning experiences.¹³ Indicators from before, during, and after the workshop reinforced the impact of implementing the Col framework as summarized in Table 2. The prework prepared participants (68% responded positively) to actively engage in the event. Structured asynchronous and synchronous interactions bolstered opportunities for authentic reactions and participant connections with each other. The integration of introductory videos, 198 posts (57% of participants) that generated 270 comments and 3,256 views pre-event, contributed to establishing social presence through effective expression and set the foundation for developing group cohesion. Participant evaluation data highlighted the sense of developing personal connections during the workshop.

Opportunities for dialogue during small-group activities allowed for sharing personal experiences and exploration of divergent ideas to develop shared meaning. Evaluation data provided strong evidence for cognitive presence, with 73% stating they were most engaged during small groups and 87% indicating that

small-group activities were valuable in helping them appreciate different perspectives.

We used the Lean Startup methodology to address challenges within our own institution and engage in rapid idea generation. Challenges to redefine space, both virtual and physical, brought an opportunity to generate 4,000 innovative solutions focused on learner and educator needs now and in the future. Co-construction of knowledge continued after the event as 63% had already shared what they learned with someone else and 92% were planning to share what they learned with others.

Future Directions

We collated, reviewed, coded, and catalogued the 4,000 original ideas collected through chat comments and scribe notes via a thematic analysis conducted by several of the authors. A summary of themes has been shared with key institutional stakeholders and is being used to guide resource allocation, prioritize testing and scalability activities, and launch pilot initiatives such as education technology sandboxes, shared content repositories, and development of microlectures. A more thorough description of the methods used for this analysis is beyond the scope of this publication, but the emergent themes of individualized curriculum and assessment, searchable content management systems, social learning opportunities, coaching networks, and collaborative design and technologies are meaningful in the context of how learners are accessing, interacting with, applying, and retaining information. Further research is needed in this area, specifically regarding innovation implementation, change management practices, and scalability of new approaches.

We also recommend that future evaluations include knowledge acquisition questions. While we achieved our goal of collecting original ideas from a diverse group of educators, only the voices of those who attended the workshop were captured. We collected engagement data and text-based artifacts, through which 92% indicated they learned something new; however, we did not assess what this new knowledge or skill was or whether it was retained.

Limitations

The primary limitations included time, technology, and evaluation. Given the 3-hour time frame, Lean Startup strategies were abbreviated. To maximize synchronous time, a defined problem statement was provided, rounds of rapid idea generation were limited, and convergent phases leading to the action plans were conducted after the event by a small subset of stakeholders.²⁸

In addition, the number of people needed to effectively design and execute the workshop can be a potential limitation. At the beginning of the planning phase, the workshop team should discuss the importance of reasonable roles and responsibilities to accurately align the work with the number of people needed to complete the work.

Although technology can be perceived as leveling the playing field by providing equity in experience across geographic locations, individuals have varying degrees of experience and comfort levels not only with the technology but also with social engagement using technology. Providing opportunities through prework and explaining how and why technology was used for asynchronous and synchronous activities were essential.

Conclusion

A deliberate approach for design and technology integration is important to promote social and cognitive engagement and foster community. Well-defined roles and responsibilities, well-prepared facilitators and participants, and solution-generating methodologies can supersede constraints on time and technologies and contribute to a successful faculty development experience.

Appendices

- A. Workshop Slides and Presenter Notes.pptx
- B. Convener Slides and Facilitation Instructions.pptx
- C. Stakeholder Personas.pdf
- D. Workshop Agenda and Facilitator Guide.docx
- E. Convener Agenda and Notes.docx
- F. Workshop Roles and Responsibilities.docx
- G. Scribe Notes Template.docx
- H. Social Media Timed Tweets.docx
- I. Survey Postworkshop.docx

All appendices are peer reviewed as integral parts of the Original Publication.

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Acknowledgments

The authors would like to acknowledge the following individuals for their efforts: Jeff Poterucha, MA, Jeannie Poterucha-Carter, Richard Zimmerman, MD, Staci Melby, Jeff Ostgaard, Kate Johansen, JD, Carol Prestegard, workshop scribes, and conveners.

Disclosures

None to report.

Funding/Support

None to report.

Ethical Approval

Reported as not applicable.

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Received: July 2, 2021

Accepted: October 27, 2021

Published: February 11, 2022