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A Guide to Implementing Inclusive and Accessible Virtual Poster Sessions

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INTRODUCTION

Poster sessions provide unique opportunities for researchers to present their ideas to an audience that spans a broad range of experiences, backgrounds, interests, and career stages (1–3). They also prepare students for graduate school and science careers. For example, during undergraduate poster sessions, students receive effective peer feedback and knowledge synthesis while improving skills in science communication (4–6). Similarly, at scientific conferences, poster sessions have the potential to provide growth of scientific skills because researchers receive feedback on projects, brainstorm solutions to problems, and network for future collaborations (1, 3). Conversations that happen during poster sessions can have powerful effects on the direction and quality of the final research product and can also be profoundly impactful to researchers; however, poster sessions need to be thoughtfully designed with these aims in mind to be effective (3).

In 2020, many US-based poster sessions were abruptly canceled along with in-person conferences because of travel and health restrictions related to the coronavirus disease 2019 (COVID-19) pandemic. We sampled meeting proceedings of conferences in U.S. life-science societies during the COVID-19 pandemic from March 2020 to March 2021 to determine whether conferences were canceled or held virtually (Table S1). We collected a list of professional and scientific societies associated with the American Association for the Advancement of Science (7) and the National Association of Biology Teachers (8). We then selected all the societies that were related to life science and biology, excluding any medical fields. In our haphazard sampling of 47 out of the resulting 95 life science and biology societies, we found that a few societies did not have a planned meeting or were able to have an in-person meeting in March. However, 13 (36%) Societies canceled their annual meetings altogether and 23 (49%) societies shifted to a virtual meeting model in response to the COVID pandemic, with at least 3 societies canceling their poster sessions altogether. Overall, many societies turned to paid virtual conferencing platforms (e.g., https://confex.com; https://www.ctimeetingtech.com/; https://xcdsystem.com; https://pathable.com; e-Attend). We also found a few conferences that used a combination of openly accessible platforms (e.g., https://qubeshub.org, https://vimeo.com, https://youtube.com, https://figshare.com) to swiftly organize virtual poster sessions that allowed presenters to disseminate their research in an unconventional year.

While virtual poster sessions are not new (5, 9), they often have limited opportunities for feedback (e.g., comments, assessing interest) or effective networking interactions because they usually ask presenters to upload a PDF document to a repository and have fully asynchronous question and answer (Q&A) sessions (10). In our perusal of conferences held during the COVID-19 pandemic, we found that of the 30 virtual conferences that held a poster session, 22 were asynchronous with a poster file upload (sometimes with accompanied short video/audio upload), and only 8 held synchronous components (typically in the form of a live discussion of Q&A via Zoom or the conference website). While conference hosts and participants might worry about the diminishing networking and feedback opportunities offered by virtual poster sessions (11), a combination of creativity and the use of technological tools can allow peer-to-peer feedback and facilitate effective networking (1, 11, 12). Furthermore, virtual poster sessions can be accessible and inclusive to a wider audience by sharing scientific knowledge online, using text-to-speech technology, and reducing the need to travel (1, 10, 13, 14).

The same feedback and accessibility benefits of virtual poster sessions in conferences can also extend into science

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TABLE 1
Glossary of terms related to designing effective and equitable virtual poster sessions

Term	Definition
Accessible	Every community member has an equitable opportunity to obtain materials and participate regardless of income level, geographical location, ability status, or schedule availability. For further discussion of accessibility, refer to this discussion of Universal Design for Instruction (24).
Backwards design	A goal-oriented approach to instructional and experiential design occurs in three stages: (i) identifying desired outcomes, (ii) determining acceptable evidence for assessing outcomes, and (iii) creating activities and experiences that support assessments and goals (18).
Inclusivity	All community members feel welcome, safe to participate, and valued for the contributions that they make, regardless of race, ethnicity, gender identity, sexual orientation, ability status, income, or any other identity. For further discussion of the scope and definition of inclusivity, refer to this evidence-based guide on inclusive teaching (25) and this book chapter on creating inclusive classrooms (26).
Asynchronous	Content and engagement opportunities are available over a broad period, such that attendees can access content and interact with presenters at a time that suits individual schedules, either within or outside scheduled conference time. Sometimes referred to as on-demand content in virtual conferences.
Synchronous	Content and engagement opportunities are presented in real-time to attendees within a predetermined period, allowing opportunities for face-to-face engagement with presenters and contemporaneous communication. Sometimes referred to as live content in virtual conferences.
Poster attendees	Community members who view posters, comment on posters, interact with poster presenters, either during an asynchronous or synchronous poster session. Attendees may choose to browse posters haphazardly, or they may identify posters they wish to view based on posted titles, keywords, and/or abstracts.
Poster presenters	Individuals who apply for and are accepted to share their research in the form of a digital or physical poster at an academic societal meeting. During in-person poster sessions, presenters typically stand nearby their poster and interact with poster attendees as they walk by and view their poster. Virtual poster sessions vary in format, such that a poster presenter's role can vary from sharing a digital poster image file, including a prerecorded poster introduction, responding to written comments about their poster, or engaging in face-to-face virtual communication about their poster content.
Padlet	Padlet (https://www.padlet.com) is a collaborative content visualization online tool that allows users to access and share video, image, and text-based content, easily accessible within a single web address. Padlet offers a free plan (with 3 customizable Padlets) with no limit to the no. of users that can access or post on any Padlet (up to 10 MB per post). Premium plans offer extra security, privacy, and other benefits.

classrooms, by providing an engaging, no-cost opportunity for students to share research and conclusions from capstone projects and course-based research experiences (CUREs) within and across institutions (9, 12). Classroom-based virtual poster sessions empower students to actively engage in conversations with other student presenters, faculty, stakeholders, and other poster attendees. The virtual format also enables students to share their research and receive feedback from a broader departmental and community audience, which has the potential benefit of increasing interest in science, technology, engineering, and mathematics (STEM) careers, enhancing the sense of belonging to a broader community, and increasing science identity (15, 16).

Virtual poster sessions are often described as more accessible and inclusive compared to in-person poster sessions (1, 10, 17). Yet, we found very few examples of evidence-based education literature assessing the effectiveness of networking, inclusivity, and cost-free virtual poster sessions that allow the participation of bigger audiences. Here, we provided have a novel example of a successful virtual poster session design that we implemented on a free online platform. We have also detailed our suggested practices to foster engagement and increase accessibility for poster presenters and attendees. Our main goal was to share our model for an inclusive, accessible, and engaging virtual poster session (see definitions of inclusive and accessible in Table 1), and describe how we implemented a virtual space for the conference members to (i) engage with others by sharing their research, (ii) cultivate interpersonal connections within their scientific society, and (iii) receive constructive feedback on their research.

VIRTUAL POSTER SESSIONS WITH A BACKWARD DESIGN

After switching from an in-person meeting to a virtual meeting in 2020, the Society for the Advancement of Biology Education Research (SABER) sought to host a virtual poster session that captured the engaging interactions of an in-person session while taking advantage of the accessibility and asynchronous viewing options available through a virtual platform (Table 1). The authors of this paper proposed the following three goals for the virtual poster session to provide an opportunity for conference members to (i) present their research to an audience that spans a broad range of experiences, backgrounds, interests, and career stages, (ii) receive feedback on

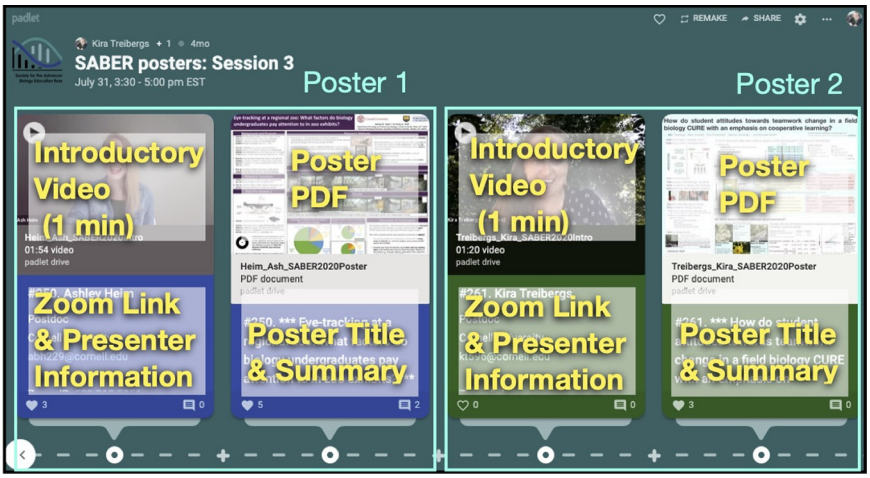

FIG 1. Overview of virtual poster session design on Padlet. Presenter introduction videos and contact information are displayed beside poster images, poster titles, and poster summaries, which are text-searchable. Presenter names, poster ID numbers, career stage, institutional affiliation, email address, and Zoom IDs were listed beneath each presenter's introduction video. Poster ID, poster title, presenter name, email, institutional affiliation, and a brief poster summary were listed beneath each poster file. Each Padlet page represents one poster session date, and all poster presentations are arranged horizontally, organized by poster ID.

projects, brainstorm solutions to problems and discover opportunities for future collaborations, and (iii) engage in conversations that can have powerful impacts on the direction and quality of the final research product. We also highlighted the specific importance of poster sessions to early-stage researchers, many of whom often use poster sessions as an initial venue to present their work for the first time at an academic society meeting.

We used a backward design approach to create an inclusive and accessible poster session (18) (Table 1). After working with a group of conference organizers to outline the above goals, we aligned our poster session structure to these goals. At the end of the virtual meeting, we analyzed user interaction data along with a suite of postmeeting survey items to assess the experience of presenters and attendees to determine whether our goals were achieved. We determined that our poster session would be most accessible and engaging if it included both synchronous (to facilitate face-to-face conversations and networking) and an asynchronous component (to allow more time for critical feedback and expand participation and viewership of the posters while accommodating interested attendees who were not able to attend synchronously). To foster greater interpersonal connection in our virtual space, we asked presenters to share a short informal video introduction that would allow attendees to get to know them better asynchronously. To support our goals, we determined that our virtual platform would need to be easy to access and browse, be able to support asynchronous commenting, and display videos alongside virtual poster images.

We identified Padlet and Zoom to be two virtual tools that would best support our goals of usability, accessibility, and of no-cost to organizers or participants. Padlet (https://www.padlet.com) is a virtual visualization and collaboration tool that is known for its usability and ability to promote classroom engagement and communication (19, 20). At the time of our conference, Padlet was not WCAG 2.1 AA compliant (see https://www.w3.org/TR/WCAG21/); however, Padlet pages were screen-reader accessible, and posters could be downloaded as PDF files and used on text-to-read software. As of December 2021, the Padlet team is in the process of making improvements to the software and testing Padlet for WCAG 2.1 level AA compliance (see https://padlet.com/about/accessibility). Through a single link to our Padlet poster session, attendees were able to browse posters, watch the presenter's introductory videos, and leave written comments. For the synchronous, face-to-face portion of the virtual poster session, we utilized Zoom, a virtual communication platform familiar to many conference attendees. Below, we have described the final design for an interactive and cost-free virtual poster session and have shared our lessons learned.

Virtual poster session design

Digital poster images were displayed linearly alongside prerecorded video introductions of poster presenters using a free version of the digital collaboration tool Padlet (Fig. 1, https://www.padlet.com). Posters were viewed in both an asynchronous and synchronous format, with three synchronous poster sessions held on three consecutive Fridays in July, for 90 min each during three of the conference meeting dates. Due to logistical scheduling constraints to host a virtual meeting for attendees in different time zones, the poster

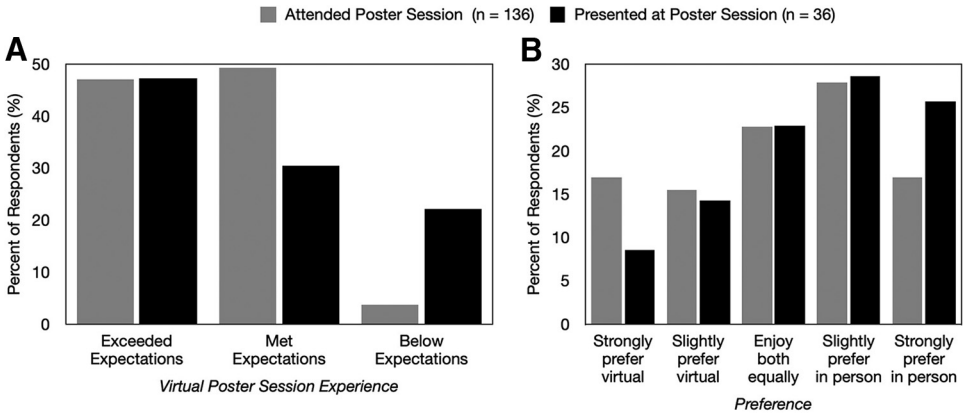

FIG 2. Survey respondents' reflections on their poster session experience. (A) Percent of survey respondents who noted their experience at the virtual poster session exceeded, met, or fell below their expectations and (B) percentage of respondents who noted their preference for virtual or in-person poster sessions after comparing this virtual poster session to their experiences with previously attended in-person poster sessions.

sessions were held at the end of each meeting day, following a series of virtual talks, breaks, and periods of discussion with presenters. Once conference attendees received the link to each poster session's Padlet page, they could view and publicly comment on posters asynchronously (anywhere from 24 h before the synchronous poster session through the end of the meeting) or could interact with poster presenters via zoom during the synchronous poster session periods. A brief poster summary was included alongside each poster file to allow session attendees to search for posters by topic using standard text-based search functions on the webpage. Synchronous sessions were mostly unstructured to best suit the needs of each presenter and the audience at their poster; however, etiquette guidelines were established for the 2021 meeting (Text S1) to provide general guidance for equitable and inclusive use of the shared zoom conference space. (For a description of organizational timeline and poster session logistics, see Text S1).

Virtual poster session feedback

Posters from all three sessions in 2020 received a total of 113 comments and 725 reactions on Padlet, coming from 222 unique contributors, as calculated by the Padlet platform (Fig. S1, for interactions by date in 2021, see Fig. S2). At the end of the meeting, poster session attendees and presenters were surveyed about their experiences with the virtual poster session, as part of a follow-up survey administered by meeting organizers (Text S1). This survey and data have been determined to be exempt from human subject research by the Cornell University Institutional Review Board. While we are not able to calculate an accurate attendance estimate for our poster session because participants could view posters without commenting or reacting to them, our survey data indicate that 70% of 198 survey respondents attended the virtual poster session. Of these respondents that attended the session, 100 attended as viewers only (72%), 7 as presenters only (5%), and 32 as both viewers and presenters (23%). Most survey respondents (96% of viewers and 77% of presenters) indicated that their experience either met or exceeded their expectations (Fig. 2A). While in-person poster sessions were still preferred (slightly or strongly) by both attendees (45%) and presenters (54%), surprisingly, some attendees and presenters (23%) enjoyed virtual sessions and in-person sessions equally. Furthermore, 32% of respondents who viewed posters and 23% of respondents who presented posters expressed either a strong or slight preference for virtual poster sessions (Fig. 2B). We were intrigued by the high percentage of attendees that found unique benefits offered by virtual poster sessions compared to in-person poster sessions. For future in-person conferences, we see an exciting potential to incorporate beneficial elements of virtual poster sessions (such as digital presentations of posters, asynchronous viewing and commenting, and opportunities for remote participation), that could improve the experience for conference attendees and presenters alike. Additionally, we see valuable opportunities to incorporate inclusive design elements from our virtual session into future in-person sessions (such as etiquette guidelines, sign-ups for community members to visit first-time presenters, making the posters available ahead of the poster session, and minimizing the number of posters per session).

Evidence of virtual poster session success

Evidence from social media platforms (tweets/likes/retweets and comments on the conference Slack channels) indicate that poster session attendees had a positive overall experience with the poster session. For example, the following Tweet was liked 72 times, retweeted 15 times, and retweeted with quotes (all positive) 8 times:

"FANTASTIC organization & #design of the online poster session at #SABER2020, using @padlet for #synchronous & #asynchronous. Congrats @SABERcommunity on showing us all how to do this well!" Megan Barker (@meganbarkerase),

4:22 PM, Jul 17, 2020, Twitter Web App (shared with author permission).

In addition to posts and comments on social media, five people have contacted us directly to discuss aspects of our virtual poster session design and guidelines and one subsequent conference has adopted the model that we are presenting here.

Our survey evidence suggests the experience of attendees and presenters differed. Many respondents who viewed posters commented that they enjoyed the virtual poster session experience. When asked to share open-ended feedback about the virtual poster session, unprompted, 14 respondents commented that they enjoyed the ability to view and comment on the posters asynchronously before the synchronous session and 12 respondents mentioned that the conversations they had during the virtual format were more meaningful than their prior experience with in-person poster sessions. While many poster presenters reported having a positive experience with the poster session, several presenters commented that it was difficult to wait by themselves in their Zoom sessions, and several expressed regret that they were not able to mingle and see the other presenters during their session. We would like to address this feedback in future poster sessions because one of our original intentions was to ensure a positive experience for early career researchers and first-time presenters. Below, we provide several recommendations that we believe will improve the experience of poster session presenters, attendees, and organizers.

SUGGESTED PRACTICES FOR VIRTUAL POSTER SESSIONS

We draw on our experiences implementing a virtual poster session for an academic society meeting in Summer 2020 and Summer 2021 (see Text S1 for our reflections). Below, we highlight the successful elements of our poster session and offer suggestions for improvements to networking and feedback in future virtual and in-person poster sessions.

Use combined asynchronous and synchronous sessions

Attendees enjoyed being able to view and interact with posters synchronously and asynchronously. Padlet is a free, user-friendly software that allows for viewing before the session and interactions while maintaining the browsable gallery walk format of an in-person session. We encourage conference organizers to use Padlet or similar platforms to share posters at future in-person meetings. Early viewing online can also provide the ability to use text-to-speech tools and can decrease mobility and hearing barriers for attendees. The use of this platform at both future virtual and in-person conferences will help increase accessibility by providing an opportunity for attendees to review posters before speaking with the presenter, thus leading to more meaningful conversations.

Use short video or audio introductions

We recommend that organizers identify clear goals for the poster session, and then align the content and guidelines for supplemental presenter videos to those goals. The content of presenter videos may differ according to poster session goals. For example, a poster session to build community and support new members in sharing their research may ask presenters to record personal introductions and ice-breaker questions, whereas a poster session to broadly disseminate research findings may ask presenters to instead summarize research findings. Other societies that have included a video component in virtual poster sessions had presenters record a summary of their poster. Some of our participants thought that presenting a short talk on their poster would be helpful and accessible. Alternatively, this could potentially lead to less traffic at the poster itself, thus posing a problem for presenters seeking verbal feedback, networking opportunities, and the opportunity to present their poster to a live audience.

Utilize Zoom features that allow attendees to enter and exit breakout rooms for synchronous sessions

A 2020 Zoom feature (update: version 5.5.0 [3353.0130]) allows participants to enter and exit breakout rooms freely, without additional facilitation from the meeting host. We recommend organizers provide a single Zoom link for all poster presenters in one session so poster attendees can enter and exit breakout rooms (labeled with presenter names and poster ID) as they wish. This will not only streamline logistics for session organizers, but attendees can make decisions about which presenter to speak with based on which poster rooms are crowded or empty. We recommend posting a session organizer or two to be present in the main room to guide attendees as needed.

Use video and live demonstrations on how to use the different poster platforms

Organizers should post presentation guidelines on the conference calendar along with brief videos that demonstrate how to view posters and access Zoom rooms. Guidelines should also be incorporated into the general live introduction to the meeting. Conference organizers may wish to host an information session for poster presenters before the conference begins to go over formatting and answer questions. Slack channels could serve as a useful way for organizers to communicate efficiently with presenters and attendees about logistics. Organizers should encourage conference members to embrace the use of Slack or a similar platform for informal communication and an efficient means of synchronous or asynchronous interaction.

TABLE 2
Timeline in 2020 and recommended timeline for future planning and implementation of the virtual poster session[a]

Virtual poster session planning and implementation	2020 timeline	Suggested timeline
Poster session organizers determine details of the poster session and design a suite of user guides for poster presenters (see Text S1)	3 mo[b]	3 mo[b]
Deadline to resubmit poster abstracts and indicate poster presenter availability for one of the poster session dates (if multiple dates are offered)	3 wk[b]	1-2 mo[b]
Poster session organizers contact each poster presenter: -assign them to a poster session(s) time -address any scheduling conflicts -share with them the upload forms and guides Organizers send a follow-up email to conference attendees to confirm receipt of communications from poster session organizers	2-3 wk[b]	1 mo[b]
Deadline for presenters to upload all poster and video files to a shared folder and complete poster submission form (see Text S1)	5 d[c]	2 wk[c]
Poster session organizers: -provide email support to presenters (file uploads and zoom room) -enter the metadata from the submission form onto Padlet -upload posters, videos, and presenter data to Padlet -hold office hours to support presenters with file uploads	3-5 d[c]	1-2 wk[c]
Asynchronous virtual poster session -organizers share the live Padlet poster session page with meeting attendees	1 d[c]	1 wk[c]
Synchronous virtual poster session -Poster session organizers run a zoom-based 'help room' for presenters and attendees during the synchronous poster session (during synchronous presentation time)	—	—

[a]The timeline in 2020 was condensed out of necessity due to the rapid transition from an in-person conference to a virtual conference; however, we recommend a more expanded timeline for future virtual poster session planning and implementation. This timeline is based on our model of three separate virtual poster session dates, held one week apart (in accordance with the existing virtual conference schedule).
[b]Time before the meeting begins.
[c]Time before assigned a poster session date.

Expand poster submission timeline to enable organizers to share virtual poster sessions in Padlet with conference attendees earlier

We recommend expanding submission deadlines to give poster presenters more time between being notified of their presentation date and their file submission date (Table 2). This allows a poster session in Padlet to be shared with conference attendees one week before each synchronous poster session. Additionally, we suggest that Padlet pages remain viewable throughout the conference period, and (if possible) after the conference has ended (along with archived PDFs). These adjustments maximize opportunities for asynchronous engagement and could promote connections and conversations to continue beyond the confines of the conference timeline.

Have a smaller number of posters per session or topic room

We recommend that future iterations of virtual poster sessions have fewer posters per session (perhaps organized by topic as mentioned above), or longer sessions (with breaks) so that each poster presenter has the potential to get more interaction with the attendees. This fosters a more engaging and interactive environment, which is particularly important for first-time or early career presenters. Other ways to improve poster attendee experience could be to position the poster sessions earlier in the day and build in more time for asynchronous conversation with poster presenters before the synchronous sessions.

Incorporate volunteer attendees and topic-based virtual synchronous sessions

In-person and virtual poster session presenters alike may find it challenging when few attendees visit their poster during a session. These challenges could be mitigated by incorporating volunteer viewers (such as senior society members), or judges that are assigned to visit specific posters within a session. This ensures that each poster presenter will engage in face-to-face conversation with at least one or two visitors. All attendees that are interested, but may not be able to attend the session, should be encouraged to engage with the presenter asynchronously through commenting.

Provide online etiquette guidelines

Organizers can support inclusive and accessible in-person and virtual poster sessions by creating and sharing thoughtful etiquette guidelines with attendees (in terms of interacting with presenters and exiting poster presentations) and presenters (in terms of poster formatting and presenting) that align with stated poster session goals. Guidelines should be sent out ahead of the scheduled meeting and be reviewed in a premeeting session or during the opening meeting announcements. We recommend three main ways to improve synchronous poster sessions etiquette:

1. Encourage presenters to share their screens with their posters in the Zoom room.
2. Ensure posters are formatted for virtual poster viewability– more visuals, fewer words, and larger font sizes
3. Attendees should be cognizant of not monopolizing a presenter's time when other attendees are waiting to interact with them. For example, at busy posters, attendees should be encouraged to keep their conversation with presenters under 5 minutes long, or presenters could be encouraged to solicit one or two questions from each guest. Additionally, we recommend instituting a policy of attendees not visiting posters with greater than five guests in a zoom room to avoid overcrowding.

For presenters to quantify the visibility of their poster more accurately during asynchronous viewing, we recommend encouraging practices that support poster attendees to digitally interact with the poster (either by 'liking' the poster or leaving a friendly comment).

VIRTUAL POSTER SESSIONS IN THE UNDERGRADUATE CLASSROOM

Our model for VPS has enormous potential for use in undergraduate classrooms. Research communication is an essential skill for science-related careers. For students, presenting project design and research findings can contribute to an increased sense of research ownership, which can contribute to long-term student success in the sciences (15, 21, 22, 23). A major component of CURE's is that students' work is relevant to a broader scientific community beyond the classroom, a goal often accomplished through presenting work to an outside audience (23). End-of-project presentations are also a common component of Capstone and other project-based courses, where students traditionally share their work using slideshows or in-person posters (4–6). The accessible and shareable nature of the virtual poster platform we outline has the potential to extend the traditional audience beyond the classroom to include members from the university community, the broader scientific community, outside community partners, and other project stakeholders.

Our VPS model offers many additional benefits to students and instructors over a more traditional in-person presentation approach. Students benefit from the editability of digital posters and from providing and receiving peer feedback before their presentation date. In addition, VPS presenters actively engage in conversation with attendees through asynchronous and synchronous interaction, rather than a traditional presentation format that can sometimes be tedious for audience members. Another benefit of the VPS format is that students can demonstrate their final product to potential employees or advisors by linking their posters to resumes or CVs. From an instructor perspective, a VPS is a more efficient use of class time as more presentations can occur in a shorter period and can offer more streamlined grading as student questions and comments can be digitally tracked. For instructors who are teaching the same CURE over multiple years, their Padlet can be downloaded to serve as digital records of all CURE projects which presents unique opportunities for course assessment or educational research. Compared to in-person poster sessions within a course, VPS has no financial costs for the course or students compared to expensive poster-printing charges, in addition to being more environmentally sustainable.

When adapting this model for the classroom environment, we encourage instructors and students to take advantage of the opportunities a digital platform provides. We suggest that instructors prepare students with guidelines and scaffolded assignments for creating posters and delivering virtual presentations. Instructors should also adjust the time frame for poster submission according to fit their course. For students, peer-review could go beyond providing strictly research-related feedback to include communication-related comments about design and visual presentations. Students could then practice presenting and responding to attendee questions with smaller groups before the posters are open for viewing to all attendees. Finally, instructors can encourage students to share their posters and videos on social media, facilitating communication with general audiences, scientists, and other stakeholders beyond their institution.

CONCLUSION

Virtual poster sessions are a promising platform for interpersonal scientific communication that has great potential to attract and engage wide and diverse audiences while maintaining a high degree of accessibility. Because online formats are not limited by space, more posters can be accepted, which can lead to opportunities for people new to a society to present posters to get to know the community and get feedback on their proposed projects or preliminary data. Alternatively, they can be used for student research presentations in large-enrollment classes. Currently, there is very little literature about poster sessions at conferences and classrooms and no published data on

conference attendee experiences. However, by clearly identifying the poster session goals and implementing a backward design approach, poster sessions can help accomplish a wide variety of communication and learning outcomes.

We suggest incorporating an asynchronous virtual component into future in-person poster sessions to improve accessibility, increase engagement, and allow presenters to receive a greater diversity of feedback. This way presenters can receive feedback through asynchronous or synchronous means; however, it is important to make sure all presenters feel welcomed and valued during both synchronous and asynchronous sessions. For instance, face-to-face poster sessions can pose challenges for some attendees because they are often large, crowded, noisy sessions. With a virtual component, attendees do not have to worry about navigating a crowded space or hearing people talk. Incorporating a virtual component provides attendees with useful feedback even if they are unable to attend a conference in person. Compared to conference talks or classroom presentations, synchronous poster sessions allow for interaction and feedback with fewer time constraints and scale up well to support interpersonal communication in large groups.

In 2020 many conferences were forced to rapidly transition to a virtual model with the onset of the COVID-19 pandemic. At that time, the format of virtual poster sessions varied broadly suggesting that each society had different goals when rethinking the virtual poster session. Here, we have provided suggestions for future virtual and in-person conferences and have proposed exciting applications for VPS as a science communication tool for use in undergraduate classrooms based on our goals of networking, feedback, accessibility, and inclusion. Given the successes we observed in our virtual poster session implementations in 2020 and 2021, we believe there is much to be gained, including synchronous and asynchronous modes for use in all conferences and research-focused undergraduate courses. We encourage societies and instructors to design poster sessions that align with goals, to use surveys to assess the experiences of both presenters and attendees and to evaluate whether goals were accomplished. We encourage conference organizers and undergraduate instructors to embrace the use of VPS in the future to maximize engagement, increase accessibility, and expand the audiences of scientific presentations.

SUPPLEMENTAL MATERIAL

Supplemental material is available online only.

SUPPLEMENTAL FILE 1, PDF file, 1.4 MB.

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