COVID Showers Bring Virtual Flowers: Getting Floriculture Curriculum to Bloom Online

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Due to the ever-changing educational environment experienced by the COVID-19 pandemic, the three-day, in-person, lab-based [PROGRAM] conference was transformed into an entirely online program where teachers still had an enriching hands-on, scientific experience, at a distance. The use of novel teaching strategies, such as "experiment cams" and group labs conducted virtually, were utilized to make the virtual conference captivating. Unforeseen benefits to the online format included the teachers' experience of distance education and their knowledge gained by participating in nontraditional virtual instruction. The conference was planned and delivered to ensure all three elements of online engagement (learner to learner, learner to instructor, and learner to content) were a common thread throughout the entire program (Moore, 1989, 1993). This program addressed Research Priority 3, "*Sufficient Scientific and Professional Workforce that Addresses the Challenges of the 21st Century*" (Stripling & Ricketts, 2016, p.29).

How It Works

[PROGRAM] was delivered entirely online via the Zoom platform, while still maintaining engagement in laboratory investigations using inquiry. The content cross walked the Next Generation Science Standards and focused on laboratory investigations in floriculture, inquiry-based instruction, scientific thinking, current research on fresh cut flowers, and distance teaching. Three instructors, consisting of one Ph.D. student and two professors, planned and executed the content. Before the conference, strategic planning was required to make the online experience as seamless as possible. A Canvas Catalog learning classroom was created to organize all online conference materials. A Zoom "script" was created for an undergraduate student who served as the "Zoom expert" during each conference session. The script outlined the daily program itinerary with prompts for which presenter, each in a different geographic location, would be leading each session. Notations on which sessions needed polls or other engagement techniques were included with time stamps for each strategy to be "launched." The Zoom expert managed all the behind-the-scenes tasks such as engaging participants as they logged on, launching polls, controlling breakout rooms, and managing the chat feature in Zoom.

Curricula were delivered through an inquiry-based, hands-on approach using "experiment cameras" where presenters used two devices; one showed their face with the other focused directly on the experiment they were conducting (Figure 1). Teachers participated in labs themselves to engage with the content and put their "student hats" on (Figure 2). Almost half of the conference's 15 hours were dedicated to lab investigation, active participation, and reflection. Participants were emailed a list of materials needed for all the labs ten days prior to the start. An effort was made to ensure all materials were readily available in the participants' homes (such as paper towels, spoons, cooking oil) or easily accessible (celery, food coloring, hairdryer). Instructional materials, like handouts and lesson plans, were provided to participants through the online Canvas classroom. For several labs, agriscience teachers completed the investigation simultaneously while divided into different groups, based on materials they had available.

Participant to participant engagement was encouraged through collaboration in breakout rooms, as well as asynchronous discussion posts at the end of each day. Teachers also created inquiry-based labs in pairs as a conference culminating activity. Pairs were purposefully created with teachers of the same region being matched with teachers of different career stages, such as early with a mid or late stage (Fessler & Christensen, 1992). Instructors discussed a plan of action for implementation into the participants' current program/curricula following each session.

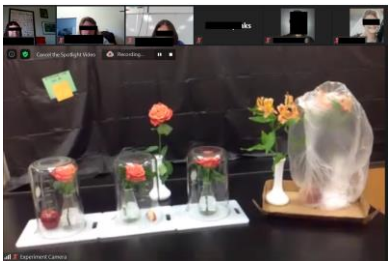
Online engagement tools such as Padlet, Poll Everywhere, and PearDeck were incorporated to encourage engagement and showcase virtual learning strategies for teachers to utilize in their classrooms.

Figure 1

Experiment Cam for Photosynthesis Lab

Figure 2

Experiment Cam for Ethylene Lab



Results and Implications

[PROGRAM] provided teachers with interactions about how to plan and deliver inquiry-based lab investigations through online technology. Teachers observed high-quality virtual instruction and the use of various remote teaching strategies. Although virtual learning was not an initial goal of the [PROGRAM] conference, the COVID-19 pandemic provided a catalyst to use innovative instructional strategies for both the conference instructors and the teacher participants. Teaching methods should not be limited to lectures and discussions when online delivery is utilized. Inquiry-based, hands-on instruction can be delivered effectively across virtual classrooms. Teachers who desire to learn to improve their teaching, or develop their content knowledge, will continue to engage when high-quality instruction is modeled.

Future Plans

Teacher participants are in the process of implementing the curricular resources and materials provided from the training. They also completed six monthly follow-up professional development sessions from July through December. A follow-up content analysis study will be conducted using participant created executive summaries of their participation in the program. All of the program teachers were invited to participate in a study about their intentions to integrate science into the agriculture curriculum to impact their students' motivations to learn science and assess their students' content knowledge. Planning for a third cohort of [PROGRAM] conference is currently in progress with hopes to offer the conference each summer and fall, as funding permits. Future conferences may involve participants bringing a partnering science teacher or may include an international focus.

Resources Needed

Funds were provided through a grant from the American Floral Endowment. Total costs were $5010, which included an e-learning specialist to create the online classroom ($500), USB flash drives ($110), USB microscopes ($600), Bluetooth environmental sensors ($1500), and shipping for all participants ($2200). Presenters needed at least two devices and tripods for the experiment cameras ($100). Additional resources included preparation of curricular materials and laboratory investigations by the conference presenters; lab materials purchased by the participants; faculty, graduate students, and undergraduate students to present the conference; and industry and education professionals to share their research related to the floriculture industry.

References

Fessler, R., & Christensen, J. (1992). *The teacher career cycle: Understanding and guiding the professional development of teachers* (pp. 21-44). Allyn and Bacon.

Moore, M. G. (1989). Three types of interaction. *American Journal of Distance Education*, *3*(2), 1–6.

Moore, M. G. (1993). Three Types of Interaction. In K. Harry, M. John, & D. Keegan (Eds.), *Distance Education: New Perspectives* (pp. 19–24). Routledge.

National Research Council. (2012). A framework for K-12 science education: Practices, crosscutting concepts, and core ideas. In *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. National Academies Press. https://doi.org/10.17226/13165

Stripling, T. C. & Ricketts, C. J. (2016). Research priority 3: Sufficient scientific and professional workforce that addresses the challenges of the 21st century. In T.G. Roberts, A. Harder, M.T. Brashears (Eds), *American Association for Agricultural Education national research agenda: 2016-2020*. Gainesville, FL: Department of Agricultural Education and Communication.