

# ASCE's Response to the Pandemic: A Virtual ExCEED Community Exchange

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# **ASCE's Response to the Pandemic: A Virtual ExCEED Community Exchange**

## **Abstract**

The American Society of Civil Engineers (ASCE) Excellence in Civil Engineering Education (ExCEED) Teaching Workshop (ETW) started in 1999, and it has produced 1035 graduates from 266 colleges and universities throughout the world. ASCE has conducted 44 week-long, in-person workshops without interruption for over two decades. ExCEED graduates have returned to their home universities and applied the lessons of this workshop to the classes they teach. The details and success of the ETW have been reported in many venues.

In Spring 2020, the COVID-19 pandemic swept across the nation and remained a persistent threat throughout 2021. As a result, the in-person workshops scheduled for Summer 2020 were canceled and in Summer 2021 was reimagined as a virtual offering. This paper is the first in a three-part series that describe and assess how ASCE modified and continued the ExCEED program during this difficult period.

This paper specifically overviews the response by the ASCE Committee on Faculty Development (CFD) to create the virtual ExCEED Community Exchange (ECX) following the cancellation of the Summer 2020 ASCE ExCEED Teaching Workshop. The ECX program is a virtual venue for civil engineering educators to meet and share their ideas and lessons-learned with a broader community. The paper covers the creation of the ECX program, including its motivation, vision, and implementation, and presents opportunities and challenges for the continued success of this virtual community program. Details are provided on the format of these ECX sessions and the topics discussed, along with feedback from ECX presenters, moderators, and attendees. Information from this paper will be helpful to professional societies and other organizations looking for meaningful ways to engage and strengthen communities of engineering educators through virtual professional development programming.

## **Background and Introduction**

The American Society of Civil Engineers (ASCE) has conducted the Excellence in Civil Engineering Education (ExCEED) Teaching Workshop since 1999 as a way for civil engineering and technology faculty to receive pedagogical and instructional training. This six-day-long immersive workshop includes seminars on effective teaching practices and the ExCEED Teaching Model, demonstration classes from expert teachers serving as ExCEED faculty, and multiple practice classes for participants to apply and get feedback on the techniques they learn in the workshop. The ExCEED Teaching Workshop (ETW) and its implementation into civil engineering classes has been well documented (e.g., [1-4], to name a few). The workshop is typically held two to three times each summer, relying on different universities to serve as in-

person site hosts. With 24 participants per site, the ETW typically engages 48-72 new ETW graduates annually.

In Spring 2020, the worldwide outbreak of the COVID-19 pandemic caused institutions to shift to emergency online teaching [5-10]. Similarly, nearly all in-person workshops and conferences were either canceled or pivoted to virtual platforms [11]. Due to the persistence of COVID-19 into the summer of 2020, the ASCE Committee on Faculty Development (CFD), which manages the ExCEED program, decided to cancel the three planned 2020 ETWs. The CFD explored ways to engage the civil engineering educator community in new virtual formats.

With the threat of the pandemic lingering and many institutions already planning for online course delivery in Fall 2020, the CFD identified a need for a venue in which the civil engineering education community could share the best practices and lessons-learned from the shift to emergency online teaching. In particular, many instructors were applying the effective teaching practices taught at the ETW in new virtual teaching environments and were employing novel techniques to engage students remotely, and the CFD wanted to create a virtual space for instructors to share their new ideas and experiences. From this need, the ExCEED Community Exchange (ECX) was born.

While the ECX program was initiated out of an acute need to share ideas for effective online teaching practices in the midst of a pandemic, the CFD envisioned ECX to serve as a long term virtual program to connect the broad and geographically dispersed community of civil engineering educators and to facilitate discussions around important civil engineering education topics, such as those outlined in the ASCE Civil Engineering Education Summit report [12], well beyond online teaching. Like other learning communities and communities of practice [13,14], including those developed in response to the COVID-19 pandemic [15], ECX aims to engage and connect community members in discussions around shared interests; however, unlike traditional learning communities that require participation over extended periods of time, community members can select which ECX sessions to join based on topical interest and availability. Additionally, ECX could serve as a mechanism for ASCE to continue to engage the over one thousand ETW graduates worldwide and grow the community of people impacted by ExCEED programs. Being an ETW graduate was not required to attend an ECX event, although the ideas shared and topics discussed in many of the ECX sessions build on elements of the ExCEED Teaching Model [16], which is covered in depth at the ETW.

### **ECX 2020: The First Iteration of the ExCEED Community Exchange (ECX)**

The initial iteration of the ExCEED Community Exchange (ECX) sessions in summer and Fall of 2020 were focused on providing a platform showcasing how instructors responded to the transition to emergency online teaching earlier in the year, highlighting best practices and lessons learned to guide others into the era of remote and virtual teaching continuing into the 2020-21

academic year. To this end, CFD surveyed current and former ETW mentors and assistant mentors to solicit interest in participating in the program and feedback on proposed session topics. Ultimately, six ECX sessions, described below, were planned for Summer and Fall 2020: three sessions in August 2020 before most instructors had started the Fall term, and three sessions distributed monthly throughout the fall term. Through generosity of sponsors and ASCE-led fundraising efforts, ECX was made free of charge for any ASCE member (or \$75 per ECX session for non-members).

Each ECX session was 90-minutes long, comprising four presenters and one member of CFD who served as moderator. Presenters were recruited from current and former ETW mentors to share their own ideas and lessons learned around a session-specific topic. Presenters were not paid for their contributions developing content for the ECX program. The sessions were scheduled to occur on different days of the week with the goal of accommodating educators with different teaching schedules across three US-centric time zones. Table 1 shows the title and presenters for each ECX session, as well as a list of topics discussed in the session, while Figure 1 shows some example photos from these ECX sessions. The presenters were tasked to include structured participant discussion throughout the session, as one of the goals of the ECX program was to engage community members. For this, some used interactive online tools (e.g., Google Jamboard, Google Slides, Poll Everywhere, etc.) and breakout rooms for smaller, topic-specific group discussions, while others used a format where each presenter's discussion of their experiences and ideas was followed directly by a moderated question and answer session. Each session was wrapped up by the moderator with an advertisement of future ECX sessions and other ASCE ExCEED programs.

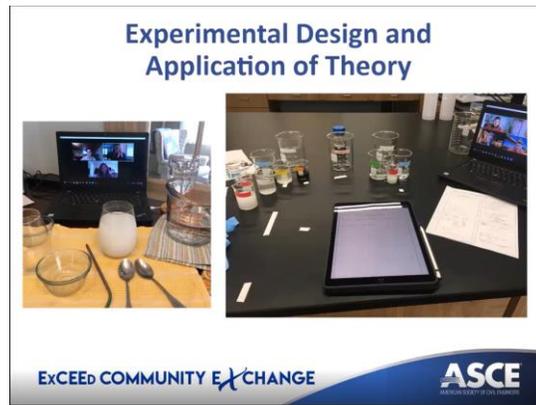
**Table 1:** Details on 2020 ECX sessions

<b>Date</b>	<b>Session Title</b>	<b>Presenters (CFD Moderator)</b>	<b>Topics discussed</b>	<b>No. registered</b>
Aug. 3, 2020	Maintaining High Student Engagement in an Online Environment	Al Estes, Monica Palomo, Carolyn Rodak, Camilla Saviz (Patricia Clayton)	Structured organization of asynchronous content; discussion boards; questioning in online environment; live demonstrations	263
Aug. 5, 2020	Strategies for Building Interpersonal Rapport with Students in Different Learning Environments	Vicki May, Fethiye Ozis, David Saftner, Ronald Welch (Aaron Hill)	Ice breakers & games; sharing personal stories; soliciting anonymous feedback; student choice in projects; flexible deadlines; non-verbal communication	260
Aug. 6, 2020	Projects, Labs, and Experiential Learning in an Online Environment	Jacob Henschen, Alison Kennicutt, Tara Kulkarni, Jennifer Retherford (Tanya Kunberger)	At-home lab kits; pre-recorded lab experiments; learning management systems for structured organization; service learning projects; remote outreach	268
Sept. 1, 2020	Reimagining Exams and Assessments	Daniel Castaneda, Norm Dennis, Eric Fitzsimmons, Kelly Keselica (Patricia Clayton)	Problem-based at-home assessments; assessments in capstone classes; outcomes-based grading; assessments in learning management systems	71
Oct. 1, 2020	Adapting Models to an Online Environment	Brock Barry, Rachel Chicchi, Pinar Omur-Ozbek, Kelly Salyards (Aaron Hill)	Do-it-yourself at-home demos; pre-packaged demos; online resources; edible demos; experiential demos; real-world examples	71
Nov.4, 2020	Debrief the semester: Lessons learned from the term	Alison Kennicutt, Vicki May, Jennifer Retherford, Kelly Salyards (Patricia Clayton)	Strengths and areas for improvement for new techniques implemented; what techniques to continue “post-pandemic”	78



(a)

(b)



(c)

**Figure 1:** Example photos from ECX 2020: (a) home set-up viewing ECX welcome slide and gallery view of participants; (b) ECX presenter (given with permission) conducting at-home live demonstrations during August 3, 2020 session; (c) slide showing strategies for students to conduct experiments at home in August 6, 2020 session

While each session had its own focus, as shown in Table 1, an overarching theme from all sessions was the critical need for structured organization in an online learning environment. This structured organization was both discussed and modeled through the ECX sessions. All ECX sessions highlighted the need to be clear regarding student expectations (or expectations of ECX attendees, as was modeled during the session). Additionally, ECX sessions emphasized the importance of establishing a clear and structured protocol in the online classroom. Despite the additional time investment required from faculty in planning and preparing online instruction, the ECX sessions emphasized that this was an opportunity to invest more time in creating content that can be reused for future needs. Reuse is inherently obvious in asynchronous classes; however, well prepared synchronous lectures may also provide future valuable content. For example, a short video created as a hook to engage students with the upcoming material may be

reused for both virtual or in-person classes. A physical model created with the materials found in students' homes during virtual teaching may be recreated in class with the instructor providing those materials. This reuse of asynchronous content was modeled by the ECX sessions, where video recordings of the sessions made were available to participants who registered for any session via the ASCE Collaborate webpage, thus they need not attend all live sessions to benefit from the ideas presented in the ECX. A final theme was the opportunity to be more flexible for our students in an online environment. Certainly this flexibility exists when considering allowing asynchronous participation. Faculty may also integrate effective use of technology to encourage flexible class participation, such as the use of virtual emojis, chats, or built in polls so that students who prefer to keep their cameras off and/or mute their microphones can still engage with the class. While participation in an ETW was not required to attend ECX, much of the content presented at ECX was tied to the ExCEED Teaching Model. In general, these ECX sessions highlighted that the ExCEED Teaching Model can be implemented in a virtual environment and remains the backbone of effective teaching regardless of modality.

Table 1 shows the number of participants who registered for each session, with approximately 260 registered for each Summer 2020 session and around 70 registered for each Fall 2020 session. Actual turnout, which varied throughout each session as attendees came and went as their schedules allowed, was not as high as the registration numbers, indicating that some participants may have opted to watch the session recording asynchronously; however, the attendance numbers followed the trends observed in the registration data with the largest attendance being in the Summer sessions and dwindling as the academic term progressed. The large number of attendees in the earlier sessions did pose some logistical challenges in terms of reaching user limits on online polling and collaborative document sites (e.g. Google Slides). In later Fall 2020 sessions with dozens (as opposed to hundreds) of participants, presenter-moderated breakout rooms were more effective in terms of engaging participants in discussion around the presented topics. Beyond attending the actual ECX sessions, 18 distinct individuals engaged in online discussion via the ECX Discussion Board on the ASCE Collaborate web page, generating 39 replies across seven non-logistics-related discussion threads directly related to the ECX session topics. While the number of participants engaging in the online discussion board was significantly lower than the total attendance, the online discussion board does show promise for continued asynchronous engagement with the virtual community beyond the synchronous session, so long as the discussion board is easily accessible and participants are reminded of its existence.

Following the Summer 2020 ECX sessions, a feedback survey was sent out to those who registered for any of the Summer 2020 ECX sessions, and seventeen responded, resulting in a less than 10% response rate. The survey asked participants to indicate their satisfaction with each of the three Summer 2020 ECX sessions, along with strengths and areas of improvement for each session. 97.5% of the responses indicated a "Satisfied" or "Very Satisfied" response, and 16 of

the 17 respondents indicated they would be likely to attend a Fall 2020 ECX session. The strengths most commonly noted included the presenters' energy and enthusiasm, the quality of ideas discussed and demonstrated in the sessions, and the consistency with the ExCEED Teaching Model. The most common areas for improvement noted centered around the breakout rooms discussions being too short, dominated by one or two people, or too unstructured. While the participant survey response rate was low and potentially biased, the strengths and areas for improvement suggested by attendees provided valuable insights to inform future ECX planning.

In late 2021, a survey was sent to all ECX presenters to document their experiences and observations during the Summer and Fall 2020 ECX series. The survey questions are included as an Appendix at the end of this paper. Of the 22 individuals who participated as an ECX presenter or moderator in 2020, 20 replied to the survey resulting in a 91% response rate. Some of the major themes emerging from this survey are summarized below:

- **Preparation time:** The amount of time ECX presenters spent preparing for ECX varied but the most common amount of time spent preparing individually for the session was 4-8 hours, with another 4-8 hours coordinating and practicing with their panel. Several ECX facilitators indicated that the sessions should be delivered more than once, since the time invested in preparing the material was significant for a single delivery. When reflecting on what they might do differently in preparing for their ECX session, some panelists indicated that they would spend less time preparing materials for their ECX session and more rehearsing to have the opportunity to receive feedback prior to the session. Lastly, it was suggested that ASCE provide stipends to presenters of newly-developed ECX sessions.
- **Participant engagement:** The majority (75%) of ECX facilitators felt the time allotted for the ECX sessions was adequate, but 45% felt participants were not given sufficient time to reflect on the material, noting that breakout room activities felt rushed. For some sessions, the content could be reduced to allow participants more time to reflect and discuss. Additionally, some panelists indicated that while breakout rooms were intended to be a place for unstructured participant discussion, they would have a better plan to engage participants and guide discussion in the breakout rooms.
- **ECX session scheduling:** The number of participants varied dramatically between sessions, such that ECX facilitators from earlier sessions held in Summer 2020 were more likely to say the number of participants was too large, while those presenting at later sessions in Fall 2020 stated the participant pool was too small. Some suggested the sessions be held multiple times throughout the term and at different times to distribute participants more evenly and promote accessibility. It was also suggested to avoid hosting ECX events late in the semester when participants are likely already overcommitted.

- **Future of ECX:** 95% of respondents agreed or strongly agreed that the ECX sessions should continue being offered, noting that they engage and connect ETW graduates and are a good way to introduce non-ETW graduates to ExCEED concepts and to welcome them to the ASCE education community. Some suggested that ASCE should change marketing to reach more people who have not been previously involved with ETW. Lastly, it was suggested that future ECX panels should be used to engage more “rising stars” in civil engineering and technology education, as opposed to long-time ETW mentors.

### **ECX 2021-22: A Second, Revised Iteration of the ExCEED Community Exchange (ECX)**

Recognizing the first iteration of ECX in 2020 required significant work from presenters to prepare materials beforehand and, at times, limited the ability to have open-ended discussions amongst participants, the second iteration of ECX in Fall 2021 and Spring 2022 took on a more moderated-discussion approach. In the Fall 2021 and Spring 2022 ECX sessions, the CFD selected topics of interest, and a CFD member served as the session moderator, preparing questions and activities to engage the audience in meaningful discussion. The motivation for this shift toward more community-centered discussions, as opposed to presenter-focused content delivery, made the ECX program more sustainable for CFD to manage and execute in the longer term, as it did not require tremendous effort from volunteer presenters, while also establishing ECX as a value-added program for ASCE members, justifying the free cost for ASCE members and precluding the need for external fundraising to support the program.

The CFD hosted two ECX sessions throughout Fall 2021 and two sessions in Spring 2022. The sessions were limited to 60-minutes to more easily fit into attendees’ busy schedules across multiple time zones. The details and example topics discussed at these sessions are summarized in Table 2. Each session began with “Rules of Engagement” (Figure 2a) to guide participant behavior and respect for others, motivated by emergent best practices in mental health and wellness precipitated by the persistent fatigue of COVID-19 pandemic [17, 18]. The moderator used virtual collaboration tools (e.g., MURAL, shown in Figure 2b) to allow participants to anonymously share ideas and to facilitate group discussion.

**Table 2:** Details on Fall 2021 and Spring 2022 ECX sessions

<b>Date</b>	<b>Session Title</b>	<b>CFD Moderator</b>	<b>Topics discussed</b>	<b>No. registered</b>
Sept. 30, 2021	Strengthening Student Critical Thinking Skills in the Ocean of (Mis-)Information	Daniel Castaneda	Ill-structured problems; open-ended problems; evaluating if solutions make sense; evaluating reliability of informations sources	32
Oct. 28, 2021	Manifestation of Diversity, Equity, and Inclusion (DEI) in the Civil Engineering Classroom	Daniel Castaneda	Institutional DEI definitions and statements; student experiences with inclusion and belonging; accessibility; diverse examples of engineers in the classroom; recruitment and retention	29
Feb. 24, 2022	Incorporating and Assessing Creativity in Civil Engineering Education	Patricia Clayton	Defining creativity; benefits to student learning and development; modeling creativity for students; assessing creativity; grounding creativity with a technical base	22
March 24, 2022	Motivating and Empowering Students	Pinar Omur-Ozbek	Instructional techniques for motivating and empowering students, including growth mindset, self efficacy, feedback, rubrics and scaffolding.	14



across different academic settings [19], several attendees could not readily locate their own institution's specific language on DEI instead relying on other sourced definitions of DEI; and (2) that DEI efforts are often understood and approached as requiring service efforts to institutions, organizations, and national societies, yet DEI-centered instructional practices are not as widely recognized nor actualized. This latter point suggests a promising series of future ECX topics that can invite civil engineering and technology faculty to explore how to synergize their instructional practices toward DEI-oriented institutional goals, rising to the call of several leaders in engineering education research to diversify the engineering curriculum to meet the societal needs that 21st century engineers must support [20-22].

The first of the spring 2022 ECX sessions was focused on student creativity. Participants identified many cognitive, motivational, and societal benefits to incorporating creativity into their own engineering courses. When asked about challenges, some common themes included ensuring technical knowledge and fundamentals remains at the heart of meaningful creative engineering solutions, how to model creativity in the classroom, and how to assess student creativity. Ultimately, participants identified at least one activity to foster student creativity that they could implement in their own courses. The second spring ECX session was focused on instructional techniques that support the students to become and stay motivated, and curious through the (still challenging) academic year. The participants brainstormed on practices that would empower the students. The discussions centered around instilling a growth mindset and self efficacy as well as giving autonomy to the students in making course related decisions, constructive and timely feedback and scaffolding assignments. Even though the attendance was lower in these sessions, there was a lively discussion with every participant being able to contribute to the roundtable by sharing their expertise.

There were approximately 30 people registered to attend each of the Fall 2021 ECX sessions. Actual attendance ranged from one-third to one-half the number of attendees, with attendance numbers fluctuating throughout the sessions as participants had to come and go. The smaller group sizes allowed for more intimate discussions amongst participants, with all attendees contributing to the conversation verbally, via virtual collaboration tools, and/or via the Zoom chat. At the end of the October 28, 2021 ECX session, a poll was administered to participants via Zoom, with nine participants responding. Seven of these nine respondents had previously participated in the ETW. The poll contained questions asking participants to respond to questions using a Likert scale with 1 being the lowest rating and 5 being the highest rating. When asked "How likely are you to recommend ECX Roundtable Discussions to a colleague?," the average response was 4.6, suggesting that participants value and support the program. For the question, "Do you feel like you gained new insights or new knowledge from the ECX Roundtable Discussion(s)?" the average response was slightly lower, at 4.2, suggesting that participants who self-selected to attend the session based on their interest in the topic may have had some previous awareness of the ideas discussed in the session.

## **The Future of ECX**

The 2020 and 2021 offerings of ECX support the CFD's mission of providing programs to support excellence in education for civil engineering and technology faculty. The CFD intends to continue offering ECX programming, acknowledging potential opportunities and challenges. These opportunities and challenges, summarized in the sections below, can be used to inform future ECX planning.

### *Opportunities*

- **Engage ETW graduates:** For many civil engineering and technology educators, their only experience with ASCE Education programs may be from participating in an ExCEED Teaching Workshop (ETW). While some ETW graduates remain involved in ExCEED programming as ETW assistant mentors and mentors in future offerings, many do not. Adding ECX to the repertoire of ExCEED programming will provide opportunities for ETW graduates from different cohorts to continuously engage with the lessons-learned from ETW throughout the academic year, long after they complete the ETW. ASCE and CFD can leverage ECX as a way to re-engage former ETW graduates, beyond the pool of those who have continued on to assistant mentor and mentor roles.
- **Grow and diversify the ASCE ExCEED community:** Historically, the ExCEED community has largely comprised ETW graduates. ECX provides a new venue for people to join the ExCEED community. With ECX being on a virtual platform and free to ASCE members, it is more accessible to people who perhaps cannot or prefer to not attend in-person events and workshops. To ensure even greater inclusion and accessibility, ASCE and CFD should explore opportunities to incentivize and remove financial barriers for non-ASCE members to participate in ECX and join the ExCEED community.
- **Address timely, emerging and important topics:** ECX provides a way to facilitate sharing of knowledge and evidence-based ideas for rapid dissemination and adoption across a national network of civil engineering educators. ECX provides a venue for ExCEED community members to discuss, learn about, and share evidence-based practices around topics that may not naturally fit within the other ExCEED workshops, such as ETW. ASCE and CFD can use ECX as an opportunity to address some of the persistent challenges identified in educating the 21st-century engineer, such as those that emerged from the 2019 ASCE Civil Engineering Education Summit [12].
- **Additional resources for educators:** As more ECX sessions are conducted, CFD can create a library of recordings that could be curated and made available to ASCE members to access at any point in the future. People watching these recordings asynchronously can continue to engage in discussions around the discussed topics via the ASCE Collaborate discussion board.

## *Challenges*

- **Attendance:** Faculty are balancing the demands from teaching, scholarship, and service. While the ubiquity of virtual events have made it easier to engage in activities that would have been challenging to attend in person, the overabundance of virtual meetings and professional development opportunities can be overwhelming. Initial ECX sessions held in Summer 2020 had over 200 participants. Predictably, ECX attendance waned as sessions were held after the start of classes. In some respects, the smaller attendance facilitated more meaningful discussions and connections between participants; however, ASCE and CFD must identify strategies (e.g. through scheduling, advertising, incentivizing, etc.) to ensure a viable number of participants at ECX events.
- **Workload:** Following on the discussion of increasing faculty demands, the ECX program requires volunteers to serve as presenters and/or moderators, and it requires ASCE staff time to manage advertisements, registration, and event logistics. The time demands on the presenters in 2020 informed a transition to a more community discussion-centered program in 2021; however, it still takes time for the moderator to develop discussion questions and activities to facilitate meaningful discussion and participant engagement. ASCE and CFD must explore ways to continue to provide worthwhile community building and engagement programs without overburdening and/or by appropriately compensating the volunteers who put on the events.
- **Funding:** As many institutions and professional societies are looking for cost-savings in light of budgetary cuts, it is important for ASCE to provide cost-effective professional development programs for civil engineering educators. In its first implementation in 2020, ECX was made free to ASCE members based on generous donations from 15 university departments, industry companies, non-profit organizations, and individuals. In 2021, a shift to more community-centered discussion justified ECX being offered as a value-added program free to ASCE members without requiring external sponsorship. To ensure its long-term viability, ASCE and CFD must determine a sustainable funding mechanism for the ECX program that lowers or eliminates financial barriers for civil engineering educators to engage in the ExCEED community.

## **Conclusions**

Following the emergency conversion to online teaching in Spring 2020 in response to the COVID-19 pandemic, ASCE and the Committee on Faculty Development (CFD) initiated the virtual ExCEED Community Exchange (ECX) program as a means for civil engineering and technology educators to share their experiences and ideas with respect to online teaching. Feedback on ECX from participants, presenters, and moderators thus far suggests that the ECX program provides a valuable opportunity to engage and strengthen the ExCEED community of civil engineering educators beyond the ExCEED Teaching Workshop. Many of the discussions amongst ECX participants are on emergent instructional practices and pedagogies that are not yet covered in other ASCE faculty development programs, such as the ExCEED Teaching

Workshop; thus, ECX serves to fill a gap in current faculty development efforts and could be used to inform updates that strengthen the content of the ExCEED Teaching Workshop. Overall, the ECX program holds promise to be a sustainable faculty development and community-building program for ASCE members who value excellence in civil engineering education.

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Sponsors for 2020 ECX:

- The National Council of Examiners for Engineering and Surveying (NCEES)
- University of Texas at Austin, Department of Civil, Architectural, and Environmental Engineering
- Cal Poly, San Luis Obispo, Department of Architectural Engineering
- Carnegie Mellon University, Department of Civil and Environmental Engineering
- Case Western Reserve University, Department of Civil and Environmental Engineering
- Clark Pacific
- The City College of New York, Department of Civil Engineering
- University of Delaware, Department of Civil and Environmental Engineering
- Colorado School of Mines, Department of Civil and Environmental Engineering
- York College of Pennsylvania, Department of Civil Engineering
- University of the Pacific, Department of Civil Engineering
- University of Wisconsin–Platteville, Department of Civil and Environmental Engineering
- New Mexico State University, Department of Civil Engineering
- Michigan Technical University, Department of Civil, Environmental, and Geospatial Engineering
- University of Hawai'i, Department of Civil and Environmental Engineering

### **References**

- [1] A.C. Estes, et al. (2019) “The ASCE ExCEED Teaching Workshop: Assessing 20 Years of Instructional Development,” *International Journal of Engineering Education*, 35:6A, 1758-1786.
- [2] J.Q. Retherford and A.M. Palomino. (2014) “Departmental Implementation of ASCE’s ExCEED Teaching Principles,” In Proceedings of the American Society of Engineering Education Southeast Section Conference.

- [3] A. Morse. (2009) “Application of the ExCEED Teaching Model to Improve Graduate Teaching in Environmental Engineering Courses,” In 2009 ASEE Annual Conference & Exposition, pp. 14-223. 2009.
- [4] A. C. Estes, R.W.Welch, S. J. Ressler, N. Dennis, D. Larson, C. Considine, T. Nilsson, J. O’Brien and T. Lenox (2008) “ExCEED Teaching Workshop: Tenth Anniversary,” Proceedings of the 2008 ASEE Annual Conference and Exposition, Pittsburgh, PA, June 22–25, 2008.
- [5] B. Ansaf, & N.I. Jaksic. (2021) “Transition from the F2F to the Online Teaching Method During Emergency Status (Engineering Emergency Remote Learning),” in 2021 ASEE Virtual Annual Conference Content Access, Virtual Conference. <https://peer.asee.org/37934>
- [6] A. P .Rehma, H. A. Diefes-Dux, G. Panther.. (2021) “Engineering Instructors’ Self-reported Activities to Support Emergency Remote Teaching During the COVID-19 Pandemic,” Paper presented at 2021 ASEE Virtual Annual Conference Content Access, Virtual Conference. 10.18260/1-2-36520.
- [7] D. Castaneda et al., (2020) “24for24: A Virtual Summer Bridge Program in Multiple 24-Minute Sessions for the Collegiate Class of 2024,” 2020 Sixth International Conference on e-Learning (econf), pp. 171-176, doi: 10.1109/econf51404.2020.9385511.
- [8] R. E. Ferdig, E. Baumgartner, R. Hartshorne, R. Kaplan-Rakowski and C. Mouza, "Teaching technology and teacher education during the covid-19 pandemic: Stories from the field", Waynesville NC USA: Association for the Advancement of Computing in Education (AACE), 2020.
- [9] J. R. Morelock, N. W .Sochacka, R. S. Lewis, J. Walther, C. M. Culloty, J. S. Hopkins, , ... & C.K. Ofunne. (2020) “Using a Novel Research Methodology to Study and Respond to Faculty and Student Experiences with COVID-19 in Real Time,” *Advances in Engineering Education*, 8(4).
- [10] N. Johnson, G. Veletsianos and J. Seaman, “Us faculty and administrators' experiences and approaches in the early weeks of the covid-19 pandemic,” *Online Learning*, vol. 24, no. 2, pp. 6-21, 2020.
- [11] D. Kwon. (2020) “How scientific societies are weathering the pandemic's financial storm,” *Nature*, 583(7816), 345-346.
- [12] K.D. Hall, D.G. Linzell, B.S. Minsker, J.F. Hajjar, C.M. Saviz. (2020) *Education Summit: Mapping the Future of Civil Engineering Education*. <https://doi.org/10.1061/9780784483251>

- [13] R. Pimmel, A.F. McKenna, N.L. Fortenberry, B. Yoder, R.C. Chavela Guerra (2013) "Faculty Development Using Virtual Communities of Practice," in 2013 ASEE Annual Conference & Exposition.
- [14] L.K.M. Abigail. (2016) "Do communities of practice enhance faculty development?" *Health Professions Education* 2, 61-74 doi:10.1016/j.hpe.2016.08.004.
- [15] M.W. Liberatore and D. Lepek (2021) "Establishing Virtual Communities of Practice to Support Chemical Engineering Faculty Development During the COVID-19 Pandemic," in ASEE Virtual Annual Conference Content Access, Virtual Conference.
- [16] A.C. Estes, R.W. Welch, S.J. Ressler. (2005) "Teaching Lessons Learned: The ExCEED Teaching Model," *Journal of Professional Issues in Engineering Education and Practice*, ASCE, 131:4, 218-222.
- [17] O. Simonsson, O. Bazin, S.D. Fisher, S.B. Goldberg, (2021) "Effects of an eight-week, online mindfulness program on anxiety and depression in university students during COVID-19: A randomized controlled trial," *Psychiatry research*, 305, 114222.
- [18] I. Miller, and K. Jensen. (2020) "Introduction of Mindfulness in an Online Engineering Core Course during the COVID-19 Pandemic," *Advances in Engineering Education*, 8(4).
- [19] S. Appelhans, T. De Pree, J. Thompson, J. Aviles, A. Cheville, D. Riley, ... & A. Akera. (2019). "From "Leaky Pipelines" to "Diversity of Thought": What Does "Diversity" Mean in Engineering Education?" in 2019 ASEE Annual Conference & Exposition.
- [20] C. Baillie & A. Pawley. (Eds.). (2012). *Engineering and social justice: In the university and beyond*. Purdue University Press.
- [21] J. A. Leydens and J.C. Lucena. (2017) *Engineering justice: Transforming engineering education and practice*. John Wiley & Sons.
- [22] D. Riley. (2008). *Engineering and social justice. Synthesis Lectures on Engineers, Technology, and Society*, 3(1), 1-152.

## **Appendix**

### **Page 1: General information**

*This page will collect general information about your participation with ECX and ETW*

**I was a presenter or moderator at the following ECX sessions:** Check all that apply

- Engagement in an online environment
- Interpersonal rapport in different learning environments
- Projects, labs, and experiential learning in an online environment
- Reimagining exams and assessments
- Adapting models to an online environment
- Lessons learned from the term

**At the ECX sessions above, I was a:**

- Presenter
- Moderator
- Both

**My highest participation with the ExCEED Teaching Workshop (ETW) is:**

- None
- Graduate
- Assistant Mentor
- Mentor
- Senior Mentor / Content Provider
- Site coordinator
- Other: \_\_\_\_\_

### **Page 2: ECX Preparation**

*This section of the survey is dedicated to the time and effort spent preparing for your ECX session(s)*

**Approximately how much time did you spend preparing for the ECX workshop INDIVIDUALLY:**

- 0 to 4hrs
- 4 to 8hrs
- 8 to 12hrs
- 12 to 16hrs
- more than 16hrs]
- With the panel (zoom, etc.)

**Approximately how much time did you spend preparing for the ECX workshop WITH YOUR PANEL:**

- 0 to 4hrs
- 4 to 8hrs
- 8 to 12hrs
- 12 to 16hrs

- more than 16hrs]
- With the panel (zoom, etc.)

**The amount of time I spent preparing for the ECX session(s) was \_\_\_\_\_ as expected:**

- Less
- More
- same

**Approximately what percentage of the content you created and presented was developed solely for presentation at the ECX panel?**

- 0 - 10%
- 10 - 20%
- 20 - 30%
- 30 - 40%
- 40 - 50%
- 50 - 60%
- 60 - 70%
- 70 - 80%
- 80 - 90%
- 90 - 100%

**Approximately what percentage of the content you created and presented was directly connected to the ExCEED teaching model?**

- 0 - 10%
- 10 - 20%
- 20 - 30%
- 30 - 40%
- 40 - 50%
- 50 - 60%
- 60 - 70%
- 70 - 80%
- 80 - 90%
- 90 - 100%

**Please provide any additional comments about ECX session preparation here: \_\_\_\_\_**

### **Page 3: ECX Panelists**

*This section is dedicated to learning more about the panels created for the ECX sessions*

**The panel size for my ECX session was...**

- too small
- just right,
- too large

**I knew \_\_\_\_\_ of my ECX panel members prior to ECX.**

- None
- At least one
- 2 or more

**As a result of my ECX faculty/staff experience, my contact with \_\_\_\_\_ of the panelists or moderators has increased.**

- None
- At least one
- 2 or more

**Please provide any additional comments about the ECX session panels here: \_\_\_\_\_**

#### **Page 4: Content Delivery**

*This section of the survey includes questions which intends to assess the ECX session delivery experience*

**Please rank your agreement with the following statement: 1 strongly agree, 2 agree, 3 neutral, 4 disagree, 5 strongly disagree**

- The number of participants at my session was higher than expected.
- I was able to effectively engage with the participants in my ECX session
- Participants were given sufficient time to reflect on material throughout the ECX session
- Participants who had not attended ETW could effectively follow the material as presented
- The moderator adequately involved all panelists and balanced the participants' participation

**The time allocated for the ECX session was:**

- Just right
- More than needed
- Not enough

**I was contacted by participants from my ECX session after the session for further discussion of the topics: Yes/No**

**Please provide any additional comments about ECX session delivery here: \_\_\_\_\_**

#### **Page 5: ECX Session Reflections:**

*This section looks to gather perspective on the full ECX experience. It includes several optional open ended questions.*

**Thinking back to your session, is there anything that you would do differently to prepare?**

**Is there anything you would recommend for future ECX events (e.g. related to modality, topics, size, etc.)?**

**Please list three things that ASCE did that supported your experience**

**Is there anything ASCE could do to improve your preparation / delivery experience?**

**Please list three things that resulted due to collaboration with other presenters**

**I attended other ECX sessions: Yes/No**

**Attending ECX sessions helped me prepare for my session:**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree
- NA

**If the ECX events continue being offered, I plan to attend them if available**

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree