Lessons Learned: Adapting to Aid Faculty for Teaching in a Pandemic

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Lessons Learned: Adapting to Aid Faculty for Teaching in a Pandemic

This **Lessons Learned** paper outlines the post-COVID faculty development offerings from the Leonhard Center for the Enhancement of Engineering Education at Penn State. As was likely the case for many centers for teaching and learning in the Summer 2020, the Leonhard Center pivoted the intended summer programming to better address the needs of our faculty for emergency remote or hybrid teaching during a pandemic. Our approach for Summer 2020 was to host multiple virtual workshop series that solicited the experiences of faculty, assessed their needs for teaching in different instructional modes, then provided both pedagogical and technological development opportunities by teaming up with our College's Office for Digital Learning (ODL). We hope to be able to present our work as a **lightning talk** at the conference.

Pre-COVID

The Leonhard Center is housed within the College of Engineering at Penn State. We work with over 400 faculty at our primary campus and occasionally work with faculty from other university campuses as well. The faculty development element of our Center includes two faculty members with 10-month contracts with the opportunity for summer funding through research and other initiatives and our Executive Director with a 12-month administrative contract. During the Spring and Fall semesters, the Center offers monthly workshops for faculty with selective summer programming. More information about the Leonhard Center is available on our website: https://www.leonhardcenter.psu.edu/

COVID Transition

In March 2020, Penn State transitioned to remote instruction. ODL and other offices on campus provided technical support to faculty during the transition period. For example, ODL attended several department meetings with faculty to provide training as well as general session near the end of the semester relating to remote exams that the Leonhard Center assisted with. Since the transition to remote happened very fast and the Leonhard Center did not want to overwhelm our faculty, we decided to wait until summer to start specific initiatives related to remote teaching. Starting in May 2020 and continuing over the summer, the Leonhard Center coordinated a number of initiatives to help faculty move forward with their teaching. Our process was: Identify what worked during the emergency transition, listen to questions from faculty about things that did not work, then provide faculty development support in targeted areas focusing on the Fall 2020 semester. The overall timeline is displayed in Figure 1.

	May	June	July
Look What Our College Accomplished!	■		
Townhalls		■	
Summer Workshop Series			■

Figure 1. Timeline of Center Pandemic Initiatives

May 2020: Look What Our College Accomplished! Series

As the Spring 2020 semester wrapped-up, the Leonhard Center hosted three debriefing sessions as part of a "Look what our college accomplished!" (LWOCA) Series to help faculty share successes from the spring semester and for the Leonhard Center to learn what challenges faculty were still facing. We focused each session of this series around a course context: Design classes, Large classes, and Labs. We felt that each of these course contexts presented unique challenges for remote teaching and that faculty could learn a lot from each other around how other faculty managed their courses. The number of faculty registered (FR) and the number of faculty who attended (FA) each workshop for this series are displayed in Table 1.

During each session in this series, one member of the Leonhard Center took the lead in facilitating the conversation using a general protocol to keep the conversation going. A second member of the Center took notes, while the third monitored the chat and other Zoom functions. These roles rotated for each session. Each session was 90 minutes.

Table 1. Initial May Workshops: Debriefing Spring 2020 Experiences

Series	Date	Workshop Title	FR	FA
Look What Our College Accomplished!	5.18.20	Successes and Lessons Learned in remote teaching Design Classes!	22	21
	5.27.20	Successes and Lessons Learned in remote teaching Large Classes.	19	16
	5.28.20	Successes and Lessons Learned in remote teaching Labs!	18	16

FR being the number of Faculty Registered & FA being the number of Faculty Attended

Lessons Learned: LWOCA Series

The following Lessons Learned are summarized from the notes taken during the LWOCA sessions. These are directly from the faculty who participated using the notes taken during the session.

- Multiple faculty members emphasized the importance of setting new expectations for their courses during and after the transition to remote teaching in Spring 2020. Linked to this was ensuring that faculty communicated those expectations to their students and kept clear communication channels open.
- Breakout Groups were noted in each session as being very helpful for student engagement across all course contexts.
- Faculty in each session noted challenges connecting with students as part of being engaging via Zoom.
- Faculty also noted that Virtual Office Hours seemed to be well received and more convenient for students, so multiple faculty members were likely to continue using Zoom office hours after the return to face-to-face instruction.

June 2020: Townhalls

In June 2020, the University announced that the Fall 2020 semester would include in-person courses practicing social distancing, remote synchronous courses, remote asynchronous courses, and courses that used a mix of these modes (some students in-person and some joining remote synchronously, for example). Following this announcement and in collaboration with the College's Office for Digital Learning (ODL), we hosted a series of Townhalls where faculty could voice their concerns and highlight topics on which they would like to receive additional information and/or training. The Townhalls were separated into different course content types: Theory/analysis courses, Hands-on courses (like labs and design courses), and First-Year Seminars. Registration and attendance numbers for these workshops are displayed in Table 2.

To help guide these sessions, our Executive Director facilitated each session while a second member of the Center acted as "Zoom Master" monitoring the chat and other Zoom elements, and the third took detailed notes. In place of the traditional discussion protocol used in the LWOCA series, each Townhall discussion was started with a possible scenario for what a Fall 2020 classroom might look like. Then faculty responded to the scenario with suggestions, questions, or challenges. We then used a set list of follow-up questions to help facilitate the discussion and discuss the different potential logistical

challenges of having students socially distanced in the classroom, students on Zoom, and other challenging situations. Each session was 90 minutes.

Table 2. June Townhall Workshops: Reacting to University Decision for Fall 2020

Series	Date	Workshop Title	FR	FA
Townhalls	6.17.20	Theory/Analysis Courses: Instructional Challenges & Opportunities in FA 2020	42	35
	6.19.20	Hand-On Courses (Labs/Design Courses): Instructional Challenges & Opportunities in FA 2020	38	30
	6.25.20	First Year Seminars: Instructional Challenges & Opportunities in FA 2020	31	31

FR being the number of Faculty Registered & FA being the number of Faculty Attended

Lessons Learned from the Townhalls

These Lessons Learned are summarized from the notes from the Townhalls.

- Incorporating elements of mental wellbeing and mental health, e.g., mindfulness and self-care, to help their students was brought up by faculty in multiple sessions.
- Working with remote and in-person (socially distanced) students was presented as a challenge, especially with students potentially in different time zones.

A majority of the notes taken during the Townhalls included more questions than solutions or answers. These sessions provided the faculty an opportunity to voice their questions and concerns. The Center did its best to address these questions in follow-up workshops or by highlighting resources and updated communications from the University. However, during the time of the Townhalls, new information about the Fall 2020 semester was literally changing every day. The information from the university even changed during one of these sessions.

July 2020: Summer Workshop Series

Using what we learned from the first two series, the Leonhard Center and ODL offered a Summer workshop series in July 2020 that highlighted key elements for assisting faculty to prepare to teach in different modes in Fall 2020. The structure of the series was that the Leonhard Center would host a workshop around the pedagogy of the topic on Tuesday, then ODL would follow-up with the digital tools needed for implementation on Thursday. Finally, on Friday, ODL held open Zoom "office hours" for faculty to drop in for one-on-one assistance with technology tools or course design questions. The topics in the series were: student engagement, facilitating student teams, developing community, and assessment. ODL also offered an additional session on remote labs. The Leonhard Center felt the LWOCA and Townhall discussions around labs highlighted many of the pedagogical elements that would be covered in an additional workshop and decided not to host another workshop on remote labs. Registration and attendance numbers are displayed in Table 3. Each session was 90 minutes.

Each session was hosted in Zoom and facilitated as a professional development workshop. The sessions included a poll or chat icebreaker activity, small group discussions in breakout rooms (typically with a guiding Google Doc to help facilitate the breakout room activity), and large group discussions across all participants. Each workshop also set expectations at the beginning of the workshop including learning objectives for the session and ended with a "big reveal" where we noted the places in the workshop that demonstrated the strategies we were recommending to faculty. Each workshop was recorded for faculty who were unable to attend and posted on the ODL website (https://sites.psu.edu/eodl/ in the "Teaching

Strategies" area). Before the fall semester, a "Quick Start Guide" was created relating to each workshop and the associated ODL workshop and provided on the website. The guides are attached as Appendices.

Table 3. July Summer Workshop Series with the College of Engineering Digital Learning Office (ODL)

Series	Date	Workshop Title	FR	FA
Summer Workshop Series from Center & ODL	7.7.20	Student engagement strategies: Setting up your course for engagement in any environment	46	36
	7.9.20	Digital Tools for Student Engagement	58	-
	7.14.20	Effective Student Teams in any Learning Environment	42	36
	7.16.20	Digital Tools for Teamwork and Collaboration	48	-
	7.21.20	A little note goes a long way: Communicating with students to develop community within your classroom	39	30
	7.23.20	Digital Tools for Building Community	44	-
	7.28.20	Rethinking assessments! What other options are there beyond the final exam?	37	30
	7.30.20	Digital Tools for Exams and Other Assessments	47	-
	8.6.20	Digital Tools for Remote Labs	16	-

FR being the number of Faculty Registered & FA being the number of Faculty Attended. Attendance was not taken at the ODL sessions. The Leonhard Center has been working to better track their interactions with faculty, so attendance was taken.

Student Engagement was noted both in the May LWOCA series as well as the Townhalls as a major challenge when working in Zoom. Using active learning and evidence-based practices has always been a core tenant of the Leonhard Center, so translating those into different learning contexts was seen as a key priority by both the Center and the faculty at the previous sessions.

Student Teams presented challenges especially from discussions with faculty leading hands-on courses with the added challenges of potential time zone differences, having some students *in* the lab with others in Zoom, and other new challenges across different learning contexts. The Leonhard Center has supported the integration of student teams into many courses over the years and were well placed to help faculty facilitate student teams across multiple learning contexts.

The "A little note goes a long way: Communicating with students to develop community within your classroom" workshop was inspired by faculty being concerned not just about engaging their students, but also creating a supportive environment for students that were more isolated due to the pandemic. Multiple faculty members wanted their students to still feel a part of the class/college/university, even if they were not on campus.

The Assessment workshop was informed by continued concerns of faculty around Academic Integrity and assessments in remote environments. All final exams in Fall 2020 were conducted remotely. This workshop was created to help faculty start thinking about the structure of their overall course assessments before the start of the semester to help negate challenges at the end of the semester with a remote final.

Lessons Learned from Summer Workshop Series

Since this series was more focused on faculty development and providing faculty with information, these lessons learned are more from our reflections as a Center.

- "There is a thing as too many workshops" at least from the facilitator perspective. In addition to the Summer Workshop Series featured here, we also moved our New Faculty Workshop to Zoom

in July and were facilitating multiple workshops per week. For our small Center (3 faculty members working on both this series as well as the New Faculty Workshop), the large number of workshops led to stress and burnout for our Center members.

- Overall, the workshops were well received by the faculty; multiple faculty members reached out before the end of the summer or fall to thank us for the workshops and for hosting them over the summer because having the workshops in the summer helped to lower their stress levels. Due to the continuing demands within the Center as the Fall semester started, no formal follow-up assessment was conducted.

Overall

During Spring 2020, our faculty faced an unprecedented shift in their teaching. To aid our faculty in reflecting on this experience, the Leonhard Center facilitated multiple opportunities for us to learn from faculty, our faculty to learn from each other, and our faculty to learn from us. Throughout each series, our Center was able to better understand the challenges facing our faculty as well as celebrating their ingenuity and resourcefulness in finding successful strategies for their courses. Table 4 provides a summary of the faculty who participated in our summer COVID workshops.

Table 4. Summary of Workshop Registration and Attendance

Workshop Series	Total registered	Non-repeating registrants
ALL Workshops	547	165
Look What Our College Accomplished!	59	46
LC & ODL Townhalls	111	88
Summer Workshop Series from LC & ODL	377	145

Overall Lessons Learned

During the summer of 2020, the Leonhard Center was able to reach out to large percentage of our faculty. The drastic change from traditional face-to-face instruction to remote instruction (both synchronous and asynchronous) created an opportunity for faculty to re-examine their teaching strategies and opened the door for new strategies through professional development at our workshops.

For us, the overall lessons learned include:

- Providing opportunities for faculty to provide feedback and share experiences was seen positively. The LWOCA series as well as the Townhall series allowed the Center to better understand what the faculty were experiencing and cater our services to their needs. Additionally, this helped faculty feel less isolated in their experiences as they were provided a community of support through these offerings.
- Stronger collaboration between ODL and the Leonhard Center. The opportunities from the Townhalls and Summer Workshop series highlighted the importance of working together. The Leonhard Center provided the pedagogical resources for thinking about being innovative in course elements while ODL provided the technical support and resources to be able to effectively implement those innovations. The pairing provided enhanced support for our faculty, and we continue to explore opportunities for stronger and more regular collaborations between our groups.
- Providing summer opportunities for faculty development. Our University also provided many resources to aid faculty in transitioning online in August 2020. A number of the faculty who participated in our series noted that they appreciated having more planning time and feeling more

comfortable close to the start of classes by having their course planned out over the summer. In response, the Leonhard Center is considering ways to continue providing summer initiatives.

Moving Forward from Summer 2020

In Fall 2020, we continued to build on what we learned from our experiences with these workshops. We hosted a student panel to help faculty better understand the student COVID experience. We also hosted a "Great Ideas for Teaching (GIFTS) from Fall 2020" workshop in December 2020 to debrief from the Fall semester and help faculty come together to share practices. We continue to learn from our faculty and listen to their experience. In Spring 2021, we hosted multiple workshops on mindfulness to promote better work-life balance with our faculty and strategies for mindfulness in the classroom as well as a workshop on reflection and how it can benefit you as a teacher and a workshop around combatting stress and burnout. Overall, the Spring 2021 workshops focused on faculty wellbeing and supporting faculty as individuals as we pass the one-year mark for the pandemic.

The success of the virtual workshop format that we developed has helped us realize that we can effectively bring colleagues from multiple campuses together for our workshops. In the future, we will offer both in-person and "virtual" participation for some of our workshops.

Quickstart Guide for Student Engagement

Technologies to engage your students

For Small group discussions during class time, use Zoom breakout rooms

Use Canvas Announcements regularly

Use Canvas Inbox (email) –

For low enrollment courses use Canvas Discussion Forums

For high enrollment courses use Piazza Discussions

Use Zoom for office hours

Incorporate Poll Everywhere

Key considerations for engagement strategies

What are your expectations for engagement? This fall, your students will not know what to expect in your classroom. **Clearly articulate to your students how you envision them engaging in the class.** How will they communicate with you during class? How will they communicate with each other? What technology do you expect them to use? What will engagement look like in your course?

Can you adapt what you would typically do to engage your students with technology? How can you utilize technology tools to better engage your students?

Your students are not you. All of your students are different. Using a few different engagement strategies will help to engage many of your students.

Ask for feedback from your students. You can use quick surveys or minute papers to get feedback from your students to see how they are engaging with the course and how the course is going.

Don't try everything at once! This semester will bring a number of new teaching experiences for all of us. Don't try to add too many new engagement strategies that you have never tried before. Choose one or two different strategies that you feel will work well within your course and your teaching approach to try out.

Have fun with it! Enthusiasm and a positive attitude can really help engage your students. If you don't want to be there or have a bad attitude about the situation, so will your students. Try to find the bright side and share that with your students.

Quickstart Guide for Teamwork and Collaboration

Technologies for teamwork and collaboration

Create groups within Canvas to provide a set of Canvas tools such as Collaborations and Conferences for each group of students

Use Zoom whiteboarding and breakout rooms

Use O365 Tools or G Suite set of tools for students to collaborate

Use CATME to manage group work and team assignments more effectively

Key considerations to promote teamwork and collaboration

Set expectations. Talk to you students about what teamwork means and use a model for effective teamwork. How will students be evaluated (individually and as a group)? What are your (and their) expectations around team dynamics (fostering mutual respect and civil interactions)?

Assign teams. Remember team size should be appropriate to the project. Research suggests not isolating members of underrepresented groups on a team as well as not allowing students to pick their own teams. CATME Team-maker tool allows you to collect information to optimize teams.

Managing Team Dynamics. Assigning and rotating roles within each team can encourage everyone to participate. Requires teams to set goals and take meeting minutes. Provide students with process for decision making/conflict resolution.

Assessing student teams. Build in individual accountability (lead writers for each section, individual presentation grades). Build in positive interdependence (one team grade for overall report, how well individual elements tied together for one presentation). Peer evaluation at multiple points in the process. CATME can help with peer evaluation (including psychological safety). Self-assessment memos where students compare their performance to the teamwork model for the course can help with individual contributions to the team.

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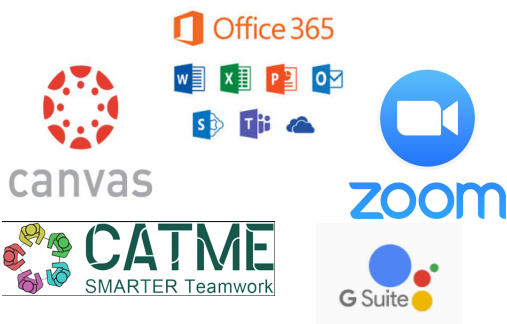
Quickstart Guide to Building Community

Technologies to build community

Record informal videos using Zoom

Use Canvas Announcements regularly

Gather survey data from students to identify which students will benefit most from high-touch communications.

Add notes about student needs in the Canvas gradebook notes column.

Create a visually appealing Canvas course homepage.

For low enrollment courses use Canvas Discussion Forums

For high enrollment courses use Piazza Discussions

Key considerations to build community

Set the tone. Use student names (as best you can). Canvas and Zoom can help here - but take notes for proper pronunciation. Let them know why you want to build community and why you think it is important. Set expectations for how you want them to do this.

Humanize yourself. Instructors can appear intimidating to students. Create opportunities for students to see you as a person and get to know you beyond the classroom – talk about other professional experiences beyond academia, hobbies, pets, interesting facts. Students don't need to know everything about you - but adding in some pieces can really help them connect.

Bring in student experiences. Just like it can be important to help students see you as a person, giving them opportunities to share their experiences and interests can help them connect as well.

Give students a voice/input in class activities. Provide opportunities for students to offer input on the course and/or help determine an element of an assignment. Examples include: Students nominating questions for an icebreaker activity; students providing feedback on how the course is going; students creating (or helping create) classroom guidelines (how they will act in class).

Use pictures in virtual spaces. When in Zoom or Canvas, encourage students to upload pictures of themselves so you can see their faces with or without their camera being on. This makes it feel like there are people on the other end of the virtual classroom (this also means you should upload a picture to Canvas and Zoom).

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Quickstart Guide for Student Assessment

Technologies for assessments

Assess student discussions in low enrollment courses using [Canvas Discussion Forums](#)

For high enrollment courses use [Piazza Discussions](#)

Use [Canvas Assignments](#) for students to submit projects, homework, reports, case studies

Build paper-based exams in Canvas using the [2-part exam process](#)

Create [Canvas quiz banks](#) to randomize questions for each student

Use Zoom or Examity for [remote exam proctoring](#)

Use [Gradescope](#) for efficient grading and student feedback

Key considerations when creating assessments

Align your assessment activities with your course objectives. Your course objectives should drive your course, including your assessments. What assessments will help students to meet your learning objectives?

Include both formative and summative assessments in your course. Formative assessments help provide feedback to students on what they do and do not understand. Summative assessments evaluate student performance and can provide evidence that students have achieved the learning objectives. Both types of assessment are important to support students learning your classroom.

The lines between assessment and learning can be blurry. There are a number of [classroom assessment techniques](#) that are also learning opportunities for students. Learning and assessment do not need to be completely separate as they can support each other.

Gather feedback on your instruction periodically during the semester. Especially when trying something new (like everything in the Fall 2020 semester), it can be really helpful to get feedback from your students on how it's going before the end of the semester (formative assessment of your teaching). Minute papers or quick surveys can work well here. REMEMBER: Whenever you collect feedback from your students, you should then take time to talk about it when them.

Tips on Remote Assessments (post-Thanksgiving 2020)

Reconsider final exams. Remote exams can create a number of challenges. Since we know the end of the semester will be remote for everyone, think about if a final exam is necessary for your course. Could a project or alternative assessment take its place?

If using a final exam, consider the two-step exam process. The Office for Digital Learning with the college outlines a two-step process for exams in Canvas that can help alleviate some of the stress for both students and instructors. Review the process here.

Consider open-book exams. With remote exams, it can be hard to monitor what resources students are using during an exam. Using open-book exams can level the playing field for students following the rules.

"Front load" the semester in terms of assessment. Try to have a majority of the points for student grades based on assessments that they complete before we go remote.

Quickstart Guide for Remote Labs

Technologies for virtual labs

Record lab demonstrations with Zoom

Simulated simulated labs online:

https://phet.colorado.edu/

https://www.golabz.eu/labs

http://vlab.co.in/

https://www.labster.com/ (subscription)

Matlab/Simulink

Best Practices for Recording Lab Videos with Cellphone or Tablet:

Designate one "shooter" and one presenter; the shooter will be responsible for operating the phone or tablet and the presenter will walk through the content of the lab

If possible, the presenter should wear earbuds, airpods, or any other wireless device that includes a microphone that can connect to the phone or tablet

Shoot the video in landscape mode

Make the environment as quiet as possible. If loud equipment can be turned off, do so

Make the environment as bright as possible, turn on any lights that you can

When possible, avoid shots that put the presenter in front of a window or other bright light source; it's better to have the light source behind the shooter

Stabilize the camera. Holding a phone or tablet at arms length for any period of time will get tiring and result in shaky video. You may be able to rest the phone on top of a piece of equipment near the area you are presenting, with the shooter simply keeping it standing upright

Upload the video to your computer, then publish in Canvas.

Key considerations for remote labs

Focus on learning outcomes. What do students need to be able to do when they are done with the lab? Consider alternative ways to meet those learning objectives if student will not be on-site.

Consider the skills that students will need to have on the job. Will they be mixing concrete, for example, or will they be analyzing data? You may be able to record yourself performing some tasks that students would normally be performing if they are not the real-world skills they will need.

Ask students to predict outcomes. Research in generative learning shows that students are prompted to generate an answer retain knowled**ge better and show increased transfer.**

Consider the number of lab sessions needed. Get students into the lab space for the most meaningful work.

See what other resources exist. Are there existing simulations for labs that you could use for your course?