

How JSIRE Academics Adapted to COVID-19: Oklahoma State University Fire Protection & Safety Engineering Technology Program

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ABOUT OKLAHOMA STATE UNIVERSITY'S FIRE PROTECTION & SAFETY ENGINEERING TECHNOLOGY PROGRAM

The Fire Protection & Safety Engineering Technology Program (FPST) is situated in the College of Engineering, Architecture, and Technology (CEAT) at Oklahoma State University (OSU). This program of seven faculty and ~250 students is the nation's first ABET (formerly known as Accreditation Board for Engineering and Technology) accredited Fire Protection and Safety Engineering Technology program. OSU has a total enrollment of ~25,000 students and is located in Stillwater, Oklahoma, and is accredited by the North Central Association of Colleges and Schools. The President's Committee on the Arts and Humanities recognized the FPST program as a "national treasure whose work is of great national importance," and the Honorable Adair Wakefield Margo (Chairman, 2000-2008) praised OSU for preparing graduates who safeguard art, history, and the public (Oklahoma State University, 2020). OSU graduates protect people and property throughout the world from fires, chemical releases, floods, and other disasters. They have also protected historic art and structures such as the Statue of Liberty and priceless artifacts inside the Smithsonian Institution.

SPRING SEMESTER 2020

During the Spring 2020 semester, the nation was impacted by COVID-19. In light of the risks to the health and safety of the students, faculty, and staff, the administration of OSU made the decision to suspend face-to-face (F2F) classes after Spring break (the last classes were held on March 13). The faculty was asked to convert the remaining F2F classes for the semester to online (OL) platforms with strong encouragement to teach synchronously and to use asynchronous pedagogy only if the network or OL teaching platforms could not support the increased load. In the week prior to Spring break, the administration advised the student body to take their textbooks home with them in the case of school closure. This prudent step alerted students to the very real possibility of a dramatic change in their university experience. Students were not only able to bring home textbooks, but also took the initiative to take home many of their personal belongings in order to prepare for a lengthy absence.

OSU was in a unique position as FPST maintains a joint degree program with Southwest Jiaotong University (SWJTU) in Emeishan, Sichuan Province, China. The program began

making contingency plans in late January as one FPST professor's trip to China for the Spring semester was cancelled by SJU. Those classes were converted to OL teaching platforms for the joint program. Due to this change, the program identified the need to shift OSU courses OL for both OSU students and SJU students, particularly for the upcoming Summer semester. The program updated web cameras, obtained document cameras for all faculty, and some faculty acquired green screens. Green screens, known as Chroma key in the film industry, are monochrome backgrounds placed behind the actor/presenter during filming and the background color is then digitally removed in post-production (Foster, 2010). The use of green screen technology enhanced the visual appeal of OL lectures and allowed for more creative overlays of the speaker and the subject material. All these preparations bore fruit when the campus-wide decision was made to switch to OL teaching.

Over Spring break the program—and the university in general—made plans to switch to OL teaching, which was largely embraced by the faculty with a can-do attitude. Three big concerns related to migrating to OL were identified. First, Would the students have sufficient internet access, particularly those in rural areas? Second, Would the OSU network (and the internet in general) have the capacity to support a sudden and massive increase in traffic from both OL teaching and the majority of the national workforce telecommuting? Third (for programs such as FPST that are based on hands-on or experiential learning in laboratory intensive classes), Would we be able to deliver a substantially equivalent learning experience for these labs and for senior design projects?

In general, students had sufficient access to internet resources from home. Some exceptions occurred and students adapted well through tethering computers to cell phones and taking advantage of telecommunication providers helping during the crisis. The campus network as well as the internet handled the increase in traffic quite well. OSU's Office of Information Technology (IT) took steps to ensure adequate licenses and leveraged resources with Canvas, OSU's OL learning management system provider, to ensure additional servers were ready to handle the increased load. Faculty took the additional precaution of using multiple platforms for OL delivery. Some faculty used the web conferencing feature in Canvas to host classes, some used Skype, and still others used Zoom. The platforms performed well. Zoom did have some security issues, but those were quickly addressed. The ability to deliver the courses synchronously was paramount for student engagement, but the OL platforms also allowed for recording of lectures in case some students had Wi-Fi difficulties. The final concern of teaching hands-on laboratory exercises and senior design projects in a virtual environment was the most difficult to address.

A significant discriminator for students when choosing an OL program versus a brick-and-mortar university is the experience of hands-on learning. OSU's engineering programs, including FPST, have extensive laboratory facilities that are used for teaching and for seniors to execute their capstone projects. Fortunately, FPST has a two-semester senior design project. Therefore, the student teams had completed most of their projects by March 14, especially the most intense building/experimental phases. The students were disappointed that they did not get to demonstrate their projects at the senior design expo or be able to have a graduation ceremony.

The project presentations were converted to OL meetings and the students presented videos from their earlier experimentations/trials. While not ideal, the virtual presentations were a suitable substitute and were likely a good learning experience for working in the “new normal.” Overall, the senior design presentations were easier to adapt to the OL environment than the teaching laboratories.

In order to maintain some continuity in the teaching labs, the professors in FPST switched to video recording the lab activities (asynchronous recordings complemented the synchronous OL lectures). The professors performed the hands-on portion of the activity, manipulated the equipment, and provided instructions. Afterward, the instructors sent the data that was collected as part of that skill demonstration out to the students, who would perform the data analysis and write up the results. For most of the lab components, this process was similar to the F2F procedure in three of four parts: instruction, data analysis, and write-up. However, the video is a 2D rendering of a 3D process and is not nearly as satisfying from a student perspective.

SUMMER SEMESTER 2020

For the Summer term, FPST offered several OL courses, which is atypical for the program. However, a cohort of SWJTU students was supposed to be in Stillwater taking classes on the OSU campus. Those courses were moved OL, which has also provided domestic students the opportunity to enroll. Typically, nearly all FPST students have internships over the summer. Therefore, F2F lab classes are typically not feasible for the students and enrollment would be too low to support holding class. However, COVID-19 has impacted many students’ internships and the OL sections being offered are helping them get ahead with schoolwork and lightening course loads for the following year. Looking toward the Fall 2020 semester, OSU is planning to hold F2F classes.

FALL SEMESTER 2020

Numerous precautions are being taken to ensure the health and safety of the students, faculty, and staff for F2F classes in the fall semester. OSU plans to test 100% of the students, faculty, and staff for COVID-19. The Oklahoma Animal Disease Diagnostic Laboratory (OADDL) at OSU has stood up the largest COVID-19 testing center in the state and will support this initiative. A block of dorms has been set aside specifically to house those that test positive. Classes will have reduced F2F capacity by ~1/3 in order to accommodate the Centers for Disease Control and Prevention’s (CDC) recommended six-foot separation distance. This reduction is being managed by moving some courses into larger venues as well as contingencies to have some students attend class on certain days of the week while attending synchronously OL the other days the course meets. The campus will also require the use of face masks while in any public space. In addition to these preparations, the faculty of the FPST program are also preparing for the contingency to teach all classes OL.

CONCLUSION

Looking to the future, the impacts of COVID-19 have some significant implications for the future of brick-and-mortar universities. Students and parents will naturally ask if the high cost of a traditional university education is worth the investment if OL universities can deliver a nearly similar education for a substantially lower price given that OL universities have considerably lower overhead compared to expensive laboratory facilities. Students and parents will also want to know what an on-campus experience provides that an OL format does not? Responding with football games, student organizations, and a community of other young adults is probably an insufficient answer in the new normal. However, with the significant time already invested in creating recordings of class lectures and laboratory activities provides traditional universities with a decidedly unique opportunity.

Universities have slowly shifted focus from classical education to career training. With OL universities able to compete in the career training market very competitively, brick-and-mortar universities may discriminate themselves by re-embracing classical education through the use of the “flipped classroom.” Using the already recorded lecture material, OL quizzes, and lab demonstrations, faculty can assign all the basic career training material outside of precious class time. This then frees up the lecture hours for more thought-provoking discussion, case studies, debate, and exploration of ideas that comprise the foundation of critical thinking paramount to classical education. While many administrators see COVID-19 for its obvious financial hardships, this pandemic may be an opportunity for traditional universities to take back the financial loss of footing from OL schools.

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