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Capstone Showcase - Transitioning an Onsite Tradition to an Interactive Online Experience

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ABSTRACT

The Capstone Showcase is an annual event in which engineering teams from multiple disciplines display their year-long projects, promoting their professional skills. Due to COVID-19, the Spring 2020 showcase was shifted to a virtual event. Challenges included designing the experience to be interactive, determining which platform and software would best facilitate the event, and coordinating requirements across over 200 teams in five engineering disciplines. The event was a success and the format will be used in the future. Future improvements include randomizing guests' search so all projects have equal opportunity to be visited, scheduling the event over a lunch period to encourage industry attendance, and collecting site statistics to gauge impact.

Key words: capstone, design projects, online, professional skills

INTRODUCTION

The ability to *communicate effectively with a range of audiences* is an ABET Student Outcome (ABET, 2020). Classroom presentations provide limited capacity to achieve this outcome because the context is inauthentic, reinforcing "the gap between real-world and education experience" (Paretti & McNair, 2008, p. 239; Dannels, 2003). Public presentations of engineering design projects build professional competence through experiences that are valued by students and the range of audience members that may attend (Golder & Webb, 2015; Romero et al., 2014). Buzetto-More (2013) cites showcasing and assessing capstone design projects as a best practice, yet little is found in the research literature about public presentations of engineering projects.

The Spring Capstone Showcase is an annual event celebrating accomplishments of capstone students across three schools in the Ira A. Fulton Schools of Engineering (FSE) at Arizona State University. The event highlights projects that student teams have designed and built in Computer Science, Computer Systems Engineering, Industrial Engineering, Electrical Engineering and Biomedical Engineering. Until Spring 2020, each major hosted its own showcase. In early Spring 2020, faculty began planning a single, coordinated event. When campus closed in mid-March due to the pandemic, planning transitioned to an online, synchronous showcase. Organizers faced three significant challenges:

1. Format - Interactions between student teams and guests is always a highlight. It was important that the online event facilitate an interactive experience.
2. Platform - The platform had to be deployed rapidly, but also be able to represent student work effectively; accommodate a range of presentation formats, including PowerPoints, photos, and videos; and support an interactive experience.
3. Communication - Project leaders needed to provide clear, consistent instructions and common deadlines to 800 students across a wide range of majors. All team presentations needed to have a similar format that did not constrain creativity.

The following sections describe solutions we applied.

METHODS

Our design approach sought to recreate guests' experiences during on-site showcases. When guests arrive on-site, they stroll through the large presentation rooms, browsing posters. When a word or image catches an eye, the guest slows and reads closer. If intrigued, the guest approaches the students, who will give a project overview, then the conversation may deepen. The key to creating this experience online was to build the platform so that guests could navigate the experience freely.

FORMAT OF THE EVENT

Clicking the event link took guests to the landing page, where the FSE Dean provided a video welcome. Guests could choose whether to open the video or go directly down the page to a list of engineering disciplines. Within each discipline, 13–61 teams were listed. For each, a thumbnail showed the project name, team members' names and a 30–90 second teaser video summarizing the project. In an adjacent box, the guest could read a one to three sentence project summary.

Within one to two minutes, a guest learned enough about a project to know whether she or he was interested in contacting the team. If so, the guest clicked an embedded Zoom video conference link, and was instantly able to talk to at least one team member. This presentation format enabled guests to fully navigate their own experience, peruse projects quickly, determine whether to connect with team members, and initiate substantive conversations (visit: https://sites.google.com/asu.edu/fse-capstone-sp20; note that Zoom links are removed).

Nimble Platform

The technical lead on the project, Mr. Hampton, recommended using a webpage to enable guests' free navigation, similar to the live events. Google Sites was chosen for its simplicity and rapid development capability (Google Sites, n.d.). Google Sites enables live collaboration, so that three developers could work simultaneously. Google Forms (n.d) was chosen to collect each team's

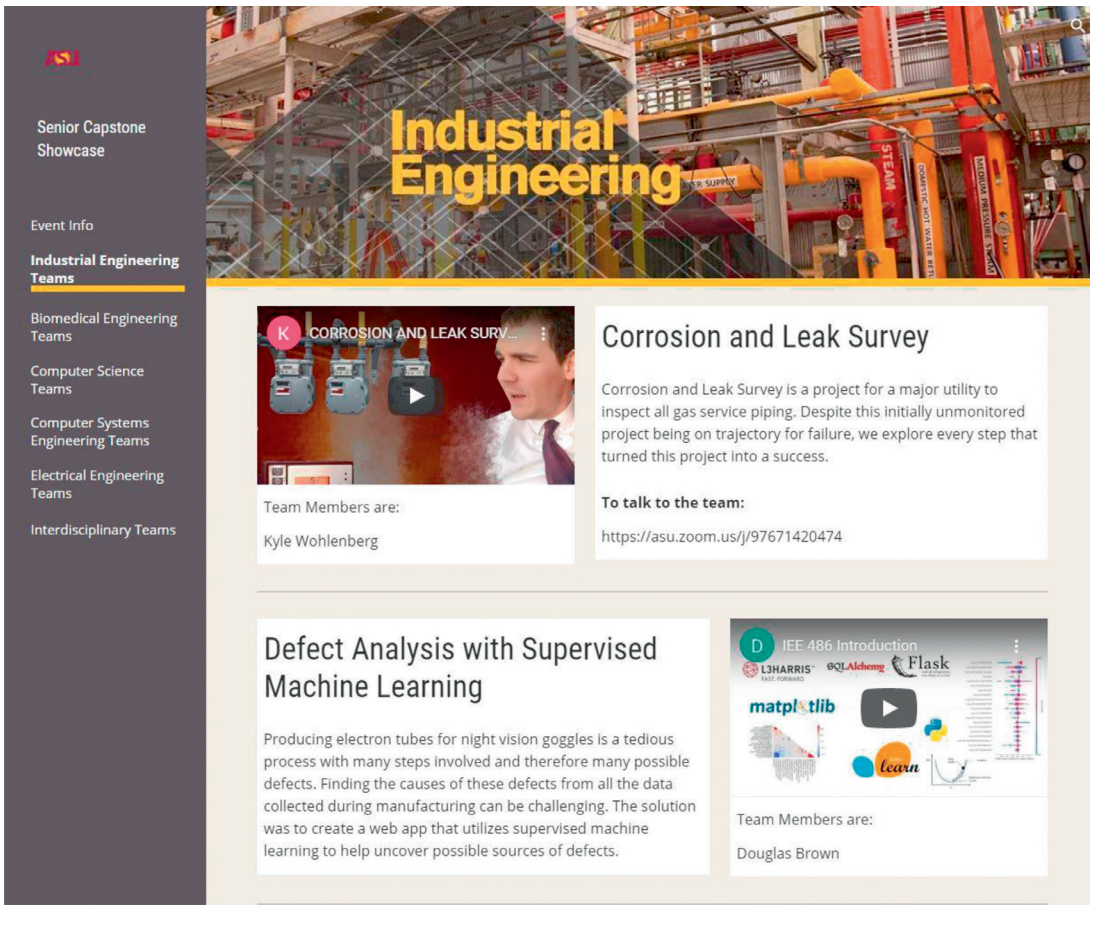

Figure 1. Example website.

Figure 2. Zoom Image of a video conference with a team.

content to display on the website. The developers were able to complete the Google Site with 205 team displays in less than two days. The capstone team was extremely pleased with the site, and impressed by students, who had little trouble creating their videos and other deliverables. Out of 205 teams, only three required extra technical assistance.

Effective Communication

Once the platform was planned, faculty organizers needed to communicate the capstone showcase requirements effectively to all teams across all disciplines. Instructors co-created a single assignment they each deployed immediately in all their courses (https://docs.google.com/document/d/e/2PACX-1vRnMs42kXkRqDiu3J1OGMKeqQugjpKZU8AFgN_osgapFrIntEgGHrGJKW0LpIQV92KU4MPMSh-7kFfG3/pub). The assignment (which was graded) included media components (such as a teaser video), a thumbnail image, a three-sentence project description, and a one slide digital poster. Students were also graded on their presentation skills. The assignment included instructions, templates, and tips for best practices for developing each component. *(Note: the short video introducing this paper was created using the same requirements given to students for the showcase event.)*

The event was announced over email to students and industry partners, as well as in articles in university newsletters and websites. Yet an administrative glitch delayed advertising the event, so announcements were sent out late, which probably limited attendance.

Table 1. Capstone Showcase participation by major, number of students, and teams.

Major	Students	Teams
Computer Science	337	62
Electrical Engineering	194 (61 of which were online-only students)	50
Biomedical Engineering	~150*	29
Industrial Engineering / Engineering Management	92	34
Computer Systems Engineering	56	13
Interdisciplinary	~50*	19
Total	~835*	205

*The Biomedical Engineering program reported only approximate numbers of students, of which some were interdisciplinary.

PRELIMINARY RESULTS

Table 1 shows the number of students and teams that participated. High points included the creativity and detail that teams demonstrated in their brief videos, as well as guests' ability to browse the showcase at a glance. Anecdotally, attendees reported being able to engage with students more directly than during the on-site event, as there were fewer distractions and students seemed better prepared, due to having had to upload their project summaries and videos beforehand. The virtual format enabled online-only students to fully engage, which had not been possible during on-site showcases. The submission assignment worked very well. Google Sites was the perfect platform for this event, from the perspectives of both the development team and students. After the event, the website is still used to recruit Capstone sponsors and build industry relationships.

Many teams were disappointed that more sponsors did not attend. Exact figures cannot be known because site analytics were not collected. Also the development team added student teams to the platform as site deliverables were submitted. Therefore, teams that submitted early were listed at the top of the page. Those teams experienced greater traffic compared to teams listed further down the page. During the showcase, faculty and TA's assessed teams' projects. The Excel grading form generated from students' registration information facilitated rapid grading; however, the period of grading was too short, which rushed the graders.

NEXT STEPS

This first Online Capstone Showcase is regarded as a great success. The online format will be used in the future, as ASU moves towards blended instruction (Arizona State University, 2020). Future improvements include:

- Expanding the grading period to the full length of the event. In our first run, the event lasted 3 hours, with the first half dedicated to a grading period, and the second half opened to the

public. This proved to be too short of a time for grading, plus many students were idle during the first half.

- Scheduling the event over a lunch period to encourage participation from industry.
- Opening the website to viewing videos earlier to encourage more guest participation.
- Implementing site analytics to evaluate participation and impact.
- Randomizing the placement of projects on the platform during guest browsing to ensure more equitable visitation across teams.

Some argue that blended face-to-face and online learning is the key to survival for brick and mortar universities (Christensen and Eyring, 2011). Rather than a learning setback, COVID-19 may be thrusting higher education towards our successful future.

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