



Panel 3D: Capstone Online

Facilitator: Hadar Ziv (UC Irvine)

Panelists: Cassie Bowman (ASU), Sarah Oman (Oregon State), Connor Flanagan (RIT student)

Description: In this new session, we'll discuss the challenges and opportunities of teaching a capstone class in a completely remote setting.

Potential Questions

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Notes:

This session was recorded through Zoom with audio transcription. The audio may be available via request (sarah.oman@oregonstate.edu) within the first year after the panel.

Here is the transcript generated by Zoom:

52

00:05:04.960 --> 00:05:15.369

Online Capstone Session Room: I'm Adar Ziv, and I'm involved with Capstone at UC Irvine. It's, it's the School of Computer Science, actually, so it's a computer science capstone, not,

53

00:05:15.870 --> 00:05:19.949

Online Capstone Session Room: We have a separate school of engineering that runs their own capstone.

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00:05:20.150 --> 00:05:25.830

Online Capstone Session Room: And they do it very similar to most of the people here as far as

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00:05:26.220 --> 00:05:32.760

Online Capstone Session Room: Mechanical engineering is separate from civil, separate from electrical, separate from biomedical, and

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00:05:32.870 --> 00:05:39.900

Online Capstone Session Room: I actually have not much visibility into that space. So I'm definitely representing the School of Computer Science.

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00:05:40.330 --> 00:05:47.670

Online Capstone Session Room: And we have a wonderful panel of three, including Connor on Zoom. Hi, Connor.

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00:05:48.520 --> 00:05:49.750

Connor Flanagan: Hi, everybody.

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00:05:51.850 --> 00:05:55.999

Connor Flanagan: Should I do my intro now? I don't...

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00:05:57.030 --> 00:05:57.870

Online Capstone Session Room: Before...

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00:05:57.870 --> 00:06:15.500

Connor Flanagan: Hi everybody, I'm Connor Flanagan. I'm a graduate student at RIT, which is the Rochester Institute of Technology, where I'm getting my Master's of Engineering in Mechanical Engineering. This past fall, I finished my undergraduate degree in mechanical engineering.

62

00:06:15.500 --> 00:06:21.659

Connor Flanagan: Where I was able to do my capstone program that was a hybrid experience.

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00:06:21.750 --> 00:06:25.189

Connor Flanagan: So, we do our capstone in two semesters,

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00:06:25.370 --> 00:06:30.519

Connor Flanagan: And my first semester was online, and then my second semester was in person.

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00:06:30.810 --> 00:06:34.390

Connor Flanagan: And it gave me a really unique experience for my capstone.

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00:06:35.850 --> 00:06:45.670

Online Capstone Session Room: Thank you, Connor. So, Cassie, I asked Sarah to break your intro into two parts. First, kind of the short part about yourself, and maybe...

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00:06:46.570 --> 00:06:53.929

Online Capstone Session Room: You know, sort of a big picture capstone history, and then we'll do the more detailed specifics in the second round.

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00:06:55.150 --> 00:07:12.209

Online Capstone Session Room: Sure, you want to... Yeah, so I'm Sarah Oman. I am the Capstone Director for the School of Mechanical, Industrial, and Manufacturing Engineering at Oregon State University, and then I also help, run the multidisciplinary capstone program there as well, because we are

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00:07:12.210 --> 00:07:26.080

Online Capstone Session Room: fairly siloed because of how large the College of Engineering is at Oregon State University, so I run just the mechanical industrial manufacturing engineering, and I've been teaching capstones since about 2014, I believe.

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00:07:26.860 --> 00:07:32.790

Online Capstone Session Room: Hi, I'm Cassie Bowman, I'm at Arizona State University, the School of Earth and Space Exploration.

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00:07:33.160 --> 00:07:42.890

Online Capstone Session Room: But I'm actually a Capstone sponsor through the NASA Psyche mission. So I've worked with Sarah and Hadar and many other people at this conference, sponsoring projects for Capstone.

72

00:07:44.480 --> 00:07:48.759

Online Capstone Session Room: Thank you. So, pretty amazing and diverse background on this panel.

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00:07:48.860 --> 00:07:54.919

Online Capstone Session Room: So, we're gonna do a second round of introduction with a little more detail and a little more specifics.

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00:07:55.900 --> 00:08:02.770

Online Capstone Session Room: Before that, some basic rules for... For this panel overall.

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00:08:03.590 --> 00:08:11.220

Online Capstone Session Room: I learned from yesterday's panels to... somewhere in between... I mean, we want you to participate, and we want you to ask questions.

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00:08:11.420 --> 00:08:17.449

Online Capstone Session Room: And really, towards the second half, or for sure, the last third of this conversation.

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00:08:17.580 --> 00:08:28.889

Online Capstone Session Room: we would very much like the questions to be driven by you, not by us. I have, you know, sort of my top 10 questions ready, but we don't have to get to all of them.

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00:08:29.120 --> 00:08:31.710

Online Capstone Session Room: That'll be more the first half.

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00:08:31.890 --> 00:08:35.710

Online Capstone Session Room: And then, you know, things can get...

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00:08:36.039 --> 00:08:40.650

Online Capstone Session Room: Things can get a little more improvised from there.

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00:08:41.190 --> 00:08:46.319

Online Capstone Session Room: Things can also get foolish, like this is my hat from Bluebell Creameries this morning.

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00:08:47.050 --> 00:08:51.290

Online Capstone Session Room: This is usually how I start my class, Intro to Software Engineering.

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00:08:51.940 --> 00:09:01.459

Online Capstone Session Room: Not with this hat, but with some other foolishness, so that all the students, 300 students, pretty much know what they're dealing with for the rest of the quarter.

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00:09:02.370 --> 00:09:03.300

Online Capstone Session Room: So...

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00:09:03.420 --> 00:09:20.150

Online Capstone Session Room: Cassie, maybe going back to you, you have some amazing numbers about how many teams and the... sort of your 9-year history of involvement with Capstone. Yeah, so, so the Psyche mission, started Capstone projects in 2017.

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00:09:20.250 --> 00:09:34.339

Online Capstone Session Room: And since then, we've had 493 teams, and almost 25% of them have either been fully online students, or a mix of online students with on-campus students. And not just at ASU, we've worked with

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00:09:34.340 --> 00:09:57.089

Online Capstone Session Room: 22 university systems around the country. The online programs that I work with are Sarah's, which is relatively new, ASU, which has had one the whole time we've been working with them, and electrical and also software engineering, and then with Penn State World Campus, with their software engineering. So that's where those online students and teams have come from.

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00:09:57.090 --> 00:09:59.909

Online Capstone Session Room: Asu's Electrical Engineering

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00:09:59.990 --> 00:10:19.560

Online Capstone Session Room: lets students self-organize on projects. So, most of my electrical engineering teams this year were hybrid teams. A couple of students who were ASU students on campus, on the Tempe campus, and a number of students who were online, so that was really interesting that students felt completely comfortable to do that. I mean, they knew who they were pairing with, and

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00:10:19.660 --> 00:10:22.159

Online Capstone Session Room: They made it work. So, interesting.

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00:10:23.690 --> 00:10:26.659

Online Capstone Session Room: So... Okay, so...

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00:10:27.880 --> 00:10:39.669

Online Capstone Session Room: I, like I mentioned, I've been teaching capstone since about 2014, and then, at Northern Arizona University, and now at Oregon State University, and a couple years ago.

93

00:10:40.890 --> 00:11:03.560

Online Capstone Session Room: we were told, hey, just a heads up, we are launching the BSME in, online mechanical engineering, so we're gonna need you to just go

ahead and create capstone for our eCampus students. It's like, great! So I was essentially voluntold, so, like, okay, create a mechanical engineering capstone that is fully remote for our asynchronous students.

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00:11:03.710 --> 00:11:09.269

Online Capstone Session Room: And so I have... I developed that over the last year or so. We launched...

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00:11:09.900 --> 00:11:22.279

Online Capstone Session Room: eCampus capstone, this last fall, and our capstone is a two-term capstone, so they start in fall and finish in winter, or start in winter and finish in spring.

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00:11:22.310 --> 00:11:36.000

Online Capstone Session Room: And so, since this was the first launch, we did have two cohorts, this... this... this last academic year. Each cohort has a grand total of five students in it, because that's how many students were actually ready for

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00:11:36.000 --> 00:11:44.110

Online Capstone Session Room: campus, or eCampus capstone, the vast majority of our eCampus students are currently in that freshman-sophomore stage.

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00:11:45.430 --> 00:11:52.769

Online Capstone Session Room: So we're... we are... we know that the numbers are going to ramp up very, very quickly on the eCampus side of things, but, we also...

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00:11:53.460 --> 00:12:05.180

Online Capstone Session Room: when I was voluntold, hey, you're gonna create this eCampus capstone, but you have a couple years, well, they were a little wrong on that you have a couple years, because there were some transfer students that had enough credits that they could...

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00:12:05.190 --> 00:12:19.430

Online Capstone Session Room: start capstone immediately, and they're like, hey, what should we do about this student? So, for the year before this, we also kind of created our capstone to be hybrid, to where if we had one or two off student... off students.

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00:12:19.430 --> 00:12:34.420

Online Capstone Session Room: eCampus students, we melded them into our in-person teams as well in different ways. So we've... we've experimented with everything from fully online teams in mechanical engineering to fully eCampus

102

00:12:34.450 --> 00:12:41.409

Online Capstone Session Room: teams in mechanical engineering. So we've... we kind of run the gambit. I think it's... we're still in the process of.

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00:12:41.540 --> 00:12:59.320

Online Capstone Session Room: well, this didn't work, how should we change that? So we're still in the experimental phase, but thankfully the students kind of know that, to that extent. They know, hey, you know, mainly because all the courses they've been taking so far have also been in the pre-launch phase. They know they're the pre-launch students, but...

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00:12:59.620 --> 00:13:11.899

Online Capstone Session Room: They've... they've learned, and we have learned, and so we're constantly changing how we're doing this eCampus capstone. But to be honest, everything that I'm...

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00:13:12.430 --> 00:13:21.819

Online Capstone Session Room: teaching in the eCampus version is exactly how I do it on the in-person version, meaning I treat my in-person students as guinea pigs, whether they know it or not.

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00:13:21.820 --> 00:13:35.729

Online Capstone Session Room: I change things every single term, whether they know I've changed other things or not, and I do the same thing with the eCampus students. This worked, this didn't, let's try this out, just being transparent with them within that eCampus, that...

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00:13:35.990 --> 00:13:52.980

Online Capstone Session Room: structure. But we've... we've had, I think, 5 teams now that are fully eCampus, and, a number of hybrid teams, and, various sponsors, some sponsors, like Cassie, where it's a direct sponsor, other sponsors, where it's

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00:13:52.980 --> 00:14:09.920

Online Capstone Session Room: a competition base, like NASA has a number of competition, projects out there that they can do, and that... and that kind of thing. So, runs the gamut in terms of what we're doing, and, how new the program is, but we're... it's just a constant learning curve, like Capstone kind of always is.

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00:14:10.950 --> 00:14:17.440

Online Capstone Session Room: Thank you. So, connor, back to you in the rotation, but I also want to update the question.

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00:14:17.660 --> 00:14:18.980

Online Capstone Session Room: If I may.

111

00:14:19.420 --> 00:14:21.270

Online Capstone Session Room: You can still hear me, right?

112

00:14:21.270 --> 00:14:22.529

Connor Flanagan: Yes, I can.

113

00:14:22.530 --> 00:14:28.239

Online Capstone Session Room: Yeah, so, and then open up to everyone, but after this next question.

114

00:14:28.370 --> 00:14:33.379

Online Capstone Session Room: So this notion of online project, when I first saw the title of the panel.

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00:14:33.720 --> 00:14:40.300

Online Capstone Session Room: my context was, oh, the COVID years, we had to go online, we were forced into that situation.

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00:14:40.470 --> 00:14:46.330

Online Capstone Session Room: Everybody was 100% remote. And then, talking to the panel and talking to other people.

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00:14:47.290 --> 00:14:52.679

Online Capstone Session Room: There's a large spectrum here, like both of you described.

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00:14:53.390 --> 00:14:57.150

Online Capstone Session Room: You know, from... from 100% in-person.

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00:14:57.260 --> 00:15:03.760

Online Capstone Session Room: to 100% online and 100% remote. There's a very interesting range in between.

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00:15:04.020 --> 00:15:08.839

Online Capstone Session Room: So... and I think that's the perspective I would like all of you to have.

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00:15:09.700 --> 00:15:12.700

Online Capstone Session Room: And some of you are in that situation already.

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00:15:12.910 --> 00:15:20.299

Online Capstone Session Room: So, so, Connor, what was your, instance, or... of online capstone.

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00:15:20.800 --> 00:15:31.829

Connor Flanagan: Yeah, so, for me, my education timing had shifted. I kind of wanted to graduate sooner, so I could start my graduate program sooner.

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00:15:31.990 --> 00:15:43.730

Connor Flanagan: And RIT has an option where if enough students demand to, start their capstone in the summer, then they can have a capstone group.

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00:15:43.970 --> 00:15:59.109

Connor Flanagan: And so, that's exactly what happened for me. There was a group of five, including myself, that started our capstone experience in the summer semester, and we had an entire semester of

126

00:15:59.130 --> 00:16:14.249

Connor Flanagan: only online work. Most of our work was asynchronous, so while we had to work on the same tasks together, we were able to do them online, apart from each other. And it was a great experience.

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00:16:14.250 --> 00:16:23.940

Connor Flanagan: Once or twice a week for the entire semester, my group would meet online, all at the same time, with our group guide.

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00:16:23.940 --> 00:16:34.660

Connor Flanagan: Who essentially would help us maintain course to ensure that we weren't slacking off or shring too far away, from our project deliverables.

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00:16:34.760 --> 00:16:48.170

Connor Flanagan: And ultimately for me, an online capstone experience was a great way to lay the groundwork of my capstone project, especially for my in-person semester.

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00:16:48.170 --> 00:17:01.470

Connor Flanagan: But I still believe that if we did not have the in-person semester, we could have done the entire project online. Even though it required some in-person work, I think that could have been segued through online methods.

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00:17:03.760 --> 00:17:11.200

Online Capstone Session Room: Thank you. So, so before, kind of, my, my next three questions, it's my first audience participation.

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00:17:11.359 --> 00:17:22.629

Online Capstone Session Room: opportunity, we have some... some shrag from... from Cassie, some good NASA swag, but you have to ask an intelligent question, and we... we get to decide... no, just kidding.

133

00:17:22.930 --> 00:17:30.930

Online Capstone Session Room: Where are you... find yourselves, or think you might be in the future, on this spectrum of online projects?

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00:17:32.180 --> 00:17:36.179

Online Capstone Session Room: So, interestingly, so I'm sobering here.

135

00:17:39.610 --> 00:17:41.220

Online Capstone Session Room: The first time we ever had one.

136

00:17:44.760 --> 00:17:47.860

Online Capstone Session Room: But we actually didn't have a pet for that.

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00:17:48.460 --> 00:17:50.180

Online Capstone Session Room: It's interesting.

138

00:17:50.720 --> 00:17:53.140

Online Capstone Session Room: No student has worn her parents.

139

00:17:54.060 --> 00:17:57.280

Online Capstone Session Room: That makes our work.

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00:17:58.250 --> 00:17:59.150

Online Capstone Session Room: Anybody.

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00:18:01.640 --> 00:18:04.160

Online Capstone Session Room: But, yeah, so we actually, literally.

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00:18:04.420 --> 00:18:11.210

Online Capstone Session Room: Part of the reason I'm here is because we literally have our... Yeah, it's confidence.

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00:18:11.930 --> 00:18:15.010

Online Capstone Session Room: But only in the second semester. They were worried about

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00:18:15.500 --> 00:18:19.139

Online Capstone Session Room: So, there it says, value, because it's fall-Spring.

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00:18:19.280 --> 00:18:20.100

Online Capstone Session Room: Personally.

146

00:18:20.220 --> 00:18:22.149

Online Capstone Session Room: And we have a spring-summer.

147

00:18:22.980 --> 00:18:27.370

Online Capstone Session Room: And there's... Summer sessions, there's a practicality.

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00:18:28.980 --> 00:18:31.099

Online Capstone Session Room: A certain percentage, just kind of..

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00:18:33.470 --> 00:18:36.040

Online Capstone Session Room: Previously here to do it kind of facial leaves.

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00:18:36.180 --> 00:18:39.030

Online Capstone Session Room: And so now we've kind of quantifies it, like I said.

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00:18:39.300 --> 00:18:43.920

Online Capstone Session Room: If these metrics, these teams will be... Online.

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00:18:45.810 --> 00:18:46.799

Online Capstone Session Room: Oh, cool.

153

00:18:47.220 --> 00:18:50.389

Online Capstone Session Room: I'm really interested in what you guys have to say, because...

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00:18:51.340 --> 00:18:57.329

Online Capstone Session Room: We're kind of running live, kind of like what you were talking about. Yeah. So it seems like it should go right.

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00:18:58.330 --> 00:18:59.030

Online Capstone Session Room: Okay.

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00:18:59.810 --> 00:19:09.329

Online Capstone Session Room: specific comments or feedback on this? Yeah, I kind of want to see where everybody is. Are we all in the... I feel like maybe I should run around with the mic a little bit.

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00:19:09.760 --> 00:19:11.559

Online Capstone Session Room: Alright, I'll be...

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00:19:13.810 --> 00:19:16.049

Connor Flanagan: Yeah, that would be helpful. Thank you, guys.

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00:19:17.770 --> 00:19:32.780

Online Capstone Session Room: So, I'm from UCF, Mechanical and Aerospace Engineering, and we have a two-semester capstone. And right now, our first semester is a lot of the design and planning, and second semester is that implementation and testing. Right now, our system is set up, no matter what semester it is.

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00:19:32.780 --> 00:19:38.330

Online Capstone Session Room: No matter, like, what fall, spring, or summer semester it is, where their first section can be virtual.

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00:19:38.330 --> 00:19:50.269

Online Capstone Session Room: The second has to be in person. And so I've been sent here by my team, to discover if it's possible, other than being forced into it, to do a fully virtual senior design.

162

00:19:50.300 --> 00:20:08.310

Online Capstone Session Room: We run into the issue a lot, and you guys might as well, where we have students that are denying jobs or internships, things that will advance them because they can't take the second half of senior design virtually. I actually got an email, like, an hour ago from a student. They're like, yeah, I gotta leave. I'm like.

163

00:20:08.760 --> 00:20:10.670

Online Capstone Session Room: Alright, let's figure this out.

164

00:20:12.900 --> 00:20:15.780

Online Capstone Session Room: Sarah, something specific about this, or more?

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00:20:16.070 --> 00:20:18.330

Online Capstone Session Room: More audience participation.

166

00:20:23.150 --> 00:20:38.439

Online Capstone Session Room: I'm Joby Anthony from Liberty University, and similar to what you were saying, we have a two-semester capstone program. First semester is just design and full bill of materials. That could easily be online, and I've been told that online is coming.

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00:20:38.470 --> 00:20:50.679

Online Capstone Session Room: Our civil and industrial capstone programs, they can go online very easily. They don't have a physical prototype. But our mechanical, computer, electrical are cross-listed, and most of them deliver physical prototypes.

168

00:20:51.130 --> 00:20:55.519

Online Capstone Session Room: how in the world do I compress a 16-week second semester into...

169

00:20:56.010 --> 00:20:59.910

Online Capstone Session Room: An online component, a 4-week lab intensive over the summer.

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00:21:00.140 --> 00:21:11.089

Online Capstone Session Room: how do I do that? How do I replace the hands-on design, testing, trying to plug two things together that don't quite fit? How do I replace that online?

171

00:21:17.170 --> 00:21:18.080

Online Capstone Session Room: You don't have to.

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00:21:19.010 --> 00:21:20.270

Online Capstone Session Room: Thank you, Russell.

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00:21:21.040 --> 00:21:26.160

Online Capstone Session Room: I will simply... I will simply communicate what's on my mind,

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00:21:26.330 --> 00:21:40.669

Online Capstone Session Room: I sit on the Council of Academic Affairs at Ohio State, and the number of online programs is... feels like it's growing exponentially. Maybe that's just because they're getting dumped on us and we have to review them.

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00:21:40.750 --> 00:21:51.829

Online Capstone Session Room: But it's a good thing. And we've also added, online programs within the College of Engineering. And so, to your... to your comment, like, it's like, it is...

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00:21:51.840 --> 00:22:02.929

Online Capstone Session Room: coming in one way or another. I guess one of the questions that pops into my mind is when we think about going into the virtual space, whether or not, and the extent to which the

177

00:22:02.930 --> 00:22:13.840

Online Capstone Session Room: online resources for prototyping, how that is potentially accelerating the ability for us to do this, particularly in mechanical, where I could order an entire physical system,

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00:22:14.320 --> 00:22:15.800

Online Capstone Session Room: Deliver it to my desk.

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00:22:16.720 --> 00:22:17.530

Online Capstone Session Room: Thank you.

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00:22:19.240 --> 00:22:20.990

Online Capstone Session Room: Others, Katie?

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00:22:22.890 --> 00:22:33.290

Online Capstone Session Room: Hi, I'm Katie, I'm from Seattle U. We have a kind of robust, well-established, on-ground capstone with our undergraduate engineering programs and computer science.

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00:22:33.340 --> 00:22:52.139

Online Capstone Session Room: As well as some graduate programs, well, our MSCS also does a capstone. We have an online MSAI and MS data science program that we just launched last fall, and so this coming academic year, they will have online capstone projects. So our grad has... these grad programs also have capstones.

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00:22:52.140 --> 00:22:55.970

Online Capstone Session Room: And they'll be fully online, asynchronous, accredited, etc.

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00:23:01.320 --> 00:23:21.689

Online Capstone Session Room: Samantha, I'm from Grand Canyon University, and so I manage not only the engineering, but also our technology capstones, all within my college. So my technology capstones are, launching online, this fall, with a revision. They've been running online, but now they're all interdisciplinary, so that was... that was my changing of them.

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00:23:21.690 --> 00:23:24.190

Online Capstone Session Room: You're welcome, faculty.

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00:23:24.840 --> 00:23:27.480

Online Capstone Session Room: But we, had the...

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00:23:27.690 --> 00:23:43.119

Online Capstone Session Room: I did have the privilege of being able to change, because we were running them at 8 weeks, and so now they're 2 10-week courses. So instead of trying to translate a 30-week ground program into a 16-week online program, we're going to a 20-week

188

00:23:43.380 --> 00:23:57.750

Online Capstone Session Room: And we're... so it's still shorter, but at least it is long enough for them to get a little bit more substantial pieces in it. And I've also been informed that I should be writing my engineering programs online as well, because those are coming.

189

00:23:57.750 --> 00:24:09.319

Online Capstone Session Room: We just have... don't have a launch date for them, and so I'm piloting that with software engineering, because our software engineering does have hardware components to it. So we will... we will see how that goes, so...

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00:24:13.270 --> 00:24:18.640

Online Capstone Session Room: Hi, I'm Jackson Graham from Utah State University. I guess...

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00:24:19.400 --> 00:24:35.579

Online Capstone Session Room: more so than maybe this is just coming no matter what. Utah State University is a land-grant university, and so our, you know, our whole mission is to serve the entire state, but the majority of our state is very far from our campus, and so the ability to actually

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00:24:35.580 --> 00:24:45.380

Online Capstone Session Room: reach, you know, any student in the state where they are, where they can afford to be, and provide an education for them. I think that's, for me, is the biggest

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00:24:45.450 --> 00:24:53.369

Online Capstone Session Room: Reason why this sort of thing makes sense for us to try to figure out is, just to make this more accessible to more types of people, so...

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00:24:54.050 --> 00:24:54.750

Online Capstone Session Room: Excellent.

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00:24:55.570 --> 00:24:58.999

Online Capstone Session Room: Or... Back to you.

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00:25:01.440 --> 00:25:03.640

Online Capstone Session Room: Yeah, and that's a common rule.

197

00:25:04.120 --> 00:25:17.760

Online Capstone Session Room: So just as a follow-up, in our mechanical program, our courses are very project heavy. Every course has a physical prototype that's delivered at the end, so it's not just capstone.

198

00:25:17.830 --> 00:25:30.490

Online Capstone Session Room: that we're going to have a struggle with. It's all of the prerequisites as well that go with that, like a thermal fluids lab. How do I do that online? Performing a heat exchanger experiment, how do they do that online? Do they

199

00:25:30.490 --> 00:25:44.339

Online Capstone Session Room: work with a supervi... like, a supervised lab technician? How does that work? Like, dynamics, how do I do a final project in Dynamics? Online? Do I mail them stuff? Do I have them make it? How do I do that?

200

00:25:49.970 --> 00:25:52.390

Online Capstone Session Room: Of particular interest to me is...

201

00:25:52.500 --> 00:25:57.809

Online Capstone Session Room: there's kind of, like, the cultural element. So, I mean, I'm fully aware that at my school.

202

00:25:57.950 --> 00:26:01.709

Online Capstone Session Room: You know, what students are paying for, to some extent, is...

203

00:26:01.870 --> 00:26:08.289

Online Capstone Session Room: a room and a chair and a person expecting their butt to be in it. Kind of like the physical, like.

204

00:26:08.440 --> 00:26:11.569

Online Capstone Session Room: being there, so I might as well do the work, sort of.

205

00:26:11.800 --> 00:26:16.929

Online Capstone Session Room: element, and we all know that, like, online work, I mean, we all love the idea of

206

00:26:17.100 --> 00:26:21.169

Online Capstone Session Room: Remote work, but... Not all of us are built for it.

207

00:26:21.330 --> 00:26:29.179

Online Capstone Session Room: I'd be interested in knowing, like, perspectives of schools that are largely culturally physical and kind of rely on that.

208

00:26:29.330 --> 00:26:36.460

Online Capstone Session Room: Versus, like, online schools that are, like, you know, during the pandemic, all of us sucked compared to maybe, like.

209

00:26:36.990 --> 00:26:48.090

Online Capstone Session Room: TV advertising, Arizona, you know, whatever, because they actually knew how to do it online, and we all just were like, okay, let's try this sort of thing. So I'd be interested in, like, hearing, like, cultural...

210

00:26:48.480 --> 00:26:58.000

Online Capstone Session Room: the cultural perspective, and like... I'm interested in that shift, because it's two different problem statements, to some extent, from my perspective.

211

00:27:00.300 --> 00:27:01.720

Online Capstone Session Room: By the way, hi, Connor.

212

00:27:04.080 --> 00:27:05.130

Online Capstone Session Room: RIT.

213

00:27:05.660 --> 00:27:16.049

Online Capstone Session Room: So, maybe back to the panel now, but... I don't know, but I don't know if they want to speak. Okay. Did you want to introduce yourself?

214

00:27:19.420 --> 00:27:36.929

Online Capstone Session Room: Hi everyone, I'm... I'm Brandi Westgate, I'm from UT Austin, so don't tell the other Aggies. I'm with the computer science department, and we're looking to... just background, we don't even have a capstone program for our undergraduates, so we're just gonna skip that, and we're gonna go straight to our online master's students.

215

00:27:37.050 --> 00:27:46.210

Online Capstone Session Room: And we're looking to offer a 12-week, capstone-esque, right? This... it wouldn't be a requirement, it would be, co-curricular.

216

00:27:46.350 --> 00:28:02.560

Online Capstone Session Room: So, we're just really looking for best practices on how to even facilitate this, ensuring that students stay engaged, the student teams, and then, yeah, so, we know nothing, so anything you can share, we would love.

217

00:28:03.080 --> 00:28:04.800

Online Capstone Session Room: Thank you.

218

00:28:05.290 --> 00:28:09.260

Online Capstone Session Room: So, Suyin, you're good, or you want to say something, you're good?

219

00:28:12.400 --> 00:28:28.509

Online Capstone Session Room: Hi, I'm Soyin from University of Southern California. I'm part of the school called the Iovine and Young Academy, which is a transdisciplinary school that combines technology, design, and business all together. We have a capstone course for undergraduate.

220

00:28:28.510 --> 00:28:41.589

Online Capstone Session Room: Our master's program started fully online. We have about a total of 200, master's students. Recent years, we just launched, underground master's program.

221

00:28:41.590 --> 00:28:51.289

Online Capstone Session Room: And some of the students wanna take online version of our courses, some of them in person. Some of them are interested in physical design.

222

00:28:51.290 --> 00:29:03.730

Online Capstone Session Room: Others are interested in digital, and so how do we really facilitate and support students with diverse interests across different domains, is my question.

223

00:29:04.560 --> 00:29:05.270

Online Capstone Session Room: Sweet.

224

00:29:06.250 --> 00:29:10.500

Online Capstone Session Room: All right, so that's lots of questions, so probably back to the panel.

225

00:29:11.140 --> 00:29:13.249

Online Capstone Session Room: to start responding. Okay.

226

00:29:14.070 --> 00:29:15.980

Online Capstone Session Room: Alright,

227

00:29:16.350 --> 00:29:21.559

Online Capstone Session Room: So, my number one piece of advice... I'm just gonna stick this on me so I don't have to hold it.

228

00:29:22.140 --> 00:29:27.520

Online Capstone Session Room: Find if your university has an eCampus

229

00:29:27.620 --> 00:29:37.700

Online Capstone Session Room: development group. They are the gurus. Majority of my course, I lean on them completely, like, how should I do this?

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00:29:37.800 --> 00:29:54.749

Online Capstone Session Room: Because they have that experience of, this is how we created a team-based course, so they never had anything like my course, but, like, this is how we deal with teams, and this is how we, we, recorded this, and that kind of thing. And so they are the experts, reach out to them.

231

00:29:54.750 --> 00:30:03.169

Online Capstone Session Room: And see if they have the resources to educate you. When I created this course.

232

00:30:03.170 --> 00:30:10.790

Online Capstone Session Room: I was actually a student in the eCampus curriculum development program.

233

00:30:10.790 --> 00:30:18.400

Online Capstone Session Room: So I went back to school to... to learn how to create this, and it was... it was a great experience.

234

00:30:18.420 --> 00:30:30.569

Online Capstone Session Room: So, I highly recommend, absolutely, see if you have an eCampus support program of some kind. If you have eCampus, programs, you more than likely have that office.

235

00:30:30.630 --> 00:30:38.470

Online Capstone Session Room: And then the other thing you can do, especially the online CS programs and those kind of programs.

236

00:30:38.470 --> 00:30:54.550

Online Capstone Session Room: is reach out to the established programs. Reach out to ASU, reach out to OSU. You can start with me, and I can immediately give you to whoever's teaching the CS person, or you can just do a Google search of who's teaching the eCampus CS program.

237

00:30:54.710 --> 00:30:59.859

Online Capstone Session Room: at least at OSU, our eCampus CS program has been

238

00:30:59.860 --> 00:31:19.529

Online Capstone Session Room: one of the largest enrollment programs in the College of Engineering for probably a decade, whenever they launched. They are huge, they have a lot of experience under their belt, and so they would be a great resource. And you'll find that, like, just like in this community with the CDC community.

239

00:31:19.530 --> 00:31:34.729

Online Capstone Session Room: We're more than happy to... to showcase what we're doing to, and, and help each other. And I think you'll see that OSU and ASU will be able to do that as well. Penn State, Barron, Penn State World Campus. Oh, yeah. And then Penn State.

240

00:31:34.860 --> 00:31:46.740

Online Capstone Session Room: Yeah, so for the online CS, specifically, there are established programs. Reach out to them, see how they, they do things. Okay, so there's that one, that one.

241

00:31:47.540 --> 00:32:01.669

Online Capstone Session Room: let's talk about physical prototypes, because that's almost always the number one question we have. One, if you re-read ABET learning outcomes, nothing in ABET says you have to build a physical prototype.

242

00:32:01.860 --> 00:32:11.379

Online Capstone Session Room: And so, based off of that, I then went into the course learning outcomes listed in my syllabus, and nothing said you had to build a physical prototype.

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00:32:11.520 --> 00:32:23.440

Online Capstone Session Room: And so, my course, my eCampus course, revolves around what are my learning outcomes that I have to abide by, to make sure that I'm still within ABET accreditation.

244

00:32:23.750 --> 00:32:26.559

Online Capstone Session Room: And I'm gonna make sure I hit all of those.

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00:32:26.860 --> 00:32:31.010

Online Capstone Session Room: And... and so what I did was I realized that I don't have to...

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00:32:31.090 --> 00:32:37.889

Online Capstone Session Room: make a requirement for a physical prototype, I have to make a requirement that I can prove that these students know how to take

247

00:32:37.930 --> 00:32:53.500

Online Capstone Session Room: customer requirements for a project and turn them into an idea. Great, that was here, that was in that first term. They need to prove that they can create a solution. A solution could be a fully virtual 3D model.

248

00:32:53.860 --> 00:32:59.100

Online Capstone Session Room: They have to, like, in the build and test, the verification portion of it.

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00:32:59.100 --> 00:33:15.950

Online Capstone Session Room: They can verify through computational analysis, they can verify through FEA, CFD, they can verify, through any number of ways that way. So, I am still hitting every single ABAT learning outcome that my in-person students are hitting on.

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00:33:15.950 --> 00:33:40.109

Online Capstone Session Room: but just without that physical prototype. But there are still so many eCampus students that are like, I still want to build something physically. Even though you're not requiring me to, I still really want to. And so we've done that. I'll let Cassie speak about a couple of the projects that we've done with her, where they were fully eCampus students, and what kind of prototyping they did, and how they did it. So that is an option.

251

00:33:40.110 --> 00:33:47.310

Online Capstone Session Room: Another example, not in, engineering, but I went to an eCampus forums a couple weeks ago, and

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00:33:47.530 --> 00:34:02.320

Online Capstone Session Room: someone in anatomy and physiology said that what they did for one of their labs, their specific hands-on labs, is they created a 2D virtual version of the lab, so they learned how to identify bones in this 2D virtual

253

00:34:02.320 --> 00:34:10.499

Online Capstone Session Room: scenario. And then for their test, they literally mailed a box of human bones

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00:34:10.500 --> 00:34:22.060

Online Capstone Session Room: to the student, and then the student had to open the box on Zoom during a set time, and pull out each bone and identify the bone to... as their test.

255

00:34:22.250 --> 00:34:45.359

Online Capstone Session Room: That sounds like an episode of Dateline. I know, right? So there are ways, like, if anatomy and physiology can literally mail you a box of bones, literal bones, I feel like there are ways that we can do these labs where you're mailing labs, or a lot of my colleagues on the lab-specific ones with heat transfer and,

256

00:34:45.360 --> 00:34:55.729

Online Capstone Session Room: intro to design and mechanical components and that kind of thing. They... they videoed their entire lab with student undergrads as actors.

257

00:34:55.730 --> 00:35:05.939

Online Capstone Session Room: And then their assignments were to say how they would actually set up the instrumentation, and so... and then a GTA would go in and set it up based off of what they said.

258

00:35:06.360 --> 00:35:20.320

Online Capstone Session Room: And then the GTA would record what the outcome was, whether it worked or didn't, and send it to the students. So there are ways to do these physical labs where they're not physically the ones turning the dials, but they can still do it.

259

00:35:20.320 --> 00:35:35.240

Online Capstone Session Room: And all of that was set up through our amazing eCampus program. They have the knowledge, so going back to that, you know, use our eCampus resources as much as possible. But, Russell, you hit nail on the head. There are so many online

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00:35:35.520 --> 00:35:54.380

Online Capstone Session Room: non-brick-and-mortar places where you can build something in Exometry, or send it to Exometry, and they will... they will, manufacture it and send it to the students, so there are those opportunities as well. But I want... let's... let's go through all of that. Can you write down... yeah.

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00:35:54.560 --> 00:35:58.230

Online Capstone Session Room: So there is that... that ability,

262

00:35:58.500 --> 00:36:02.779

Online Capstone Session Room: But I, I do wanna... do you... do you want to take over now?

263

00:36:02.890 --> 00:36:08.210

Online Capstone Session Room: Oh, I'm happy to just respond. You can extend it right here, and then you can probably hear both of us.

264

00:36:08.590 --> 00:36:26.009

Online Capstone Session Room: So, I've worked with a couple of Sarah's teams that were online teams, and of course, all her teams, to me are kind of online, right? I'm in Arizona, and I'll... I hope I'll meet the students someday, but in the meantime, I'm not meeting them regardless, in person.

265

00:36:26.130 --> 00:36:43.939

Online Capstone Session Room: And so, sometimes I had to... I... it's not even clear to me sometimes when I'm meeting them whether they're online students or not, because I'm not going to meet with them in person. If they all Zoom in from their own homes, they could be on-campus students, and I wouldn't know either way. So, I think in some ways it's sort of...

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00:36:44.440 --> 00:36:57.480

Online Capstone Session Room: it can be irrelevant to your sponsor, and it actually can open you up to other sponsors if they don't feel like they need to physically be there, or they don't have the time to... even if they're local to you, they don't have the time to meet with your teams in person.

267

00:36:57.730 --> 00:37:15.960

Online Capstone Session Room: But to her point about the teams wanting to build things, the teams took it on themselves. They wanted the opportunity, they... you know, Sarah always has a really interesting low-fidelity prototype part of her program, which is use household materials to try to tease out what some of your design problems are going to be, so they could do that.

268

00:37:15.990 --> 00:37:25.740

Online Capstone Session Room: Easily. But then, you know, some of them just ordered some parts and started building components and seeing what was working, and starting to tease out what issues they would have.

269

00:37:25.740 --> 00:37:37.300

Online Capstone Session Room: The other thing I've noticed with online teams, if they're not doing physical prototyping, is they really do deep dives into some of these very industry-common software packages.

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00:37:37.300 --> 00:37:40.479

Online Capstone Session Room: And even realize they need..

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00:37:40.710 --> 00:37:56.889

Online Capstone Session Room: something more, and so, like, I had one of your team members reach out to the rep for, I think it was SOLIDWORKS or ANSYS, where they needed a plugin that they didn't have, and, you know, they... they just took a lot of initiative. And then to the point about equity, like you were talking about, or access.

272

00:37:57.110 --> 00:38:19.490

Online Capstone Session Room: I think that's the biggest thing I see with online students. A lot of them are full-time employed with families, some of them are deployed with the military, some of them are veterans, some of them are just really rural, and this is their only opportunity. So many students have told me, like, there's... I live in rural West Virginia, this is my only chance to be, you know, to get a BS easily.

273

00:38:19.490 --> 00:38:23.280

Online Capstone Session Room: So, that part of it, I think, has really been nice, and the students..

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00:38:23.350 --> 00:38:40.519

Online Capstone Session Room: have been extra motivated, I feel like, you know? And if you have a full-time job and kids, you're not messing around with your timelines. You're getting things done, you're showing up at meetings, you already work full-time, so you know. I had this... one of your students would always call in from his truck.

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00:38:40.520 --> 00:38:49.980

Online Capstone Session Room: you know, like his work truck, so that he could make our meetings. But, you know, Zoom lets you do that. Technology lets you do that. So, I'm a...

276

00:38:50.190 --> 00:39:09.429

Online Capstone Session Room: I'm a fan. I think it can work, and at ASU with electrical engineering, for example, the teams still have a budget, they still put in their purchasing the same way, and their parts get mailed to them. So, you know, programs that have physical prototyping have, like you've said, figured out ways to make it work, I think.

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00:39:10.850 --> 00:39:17.519

Online Capstone Session Room: Connor had some amazing insights when we talked to him last week. I would love to... Yeah.

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00:39:18.620 --> 00:39:22.579

Online Capstone Session Room: Conor, can you share some of the things you shared with us?

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00:39:23.440 --> 00:39:42.059

Connor Flanagan: Yeah, for my online capstone, like some other people said previously, my first semester was all planning, and bill of materials, and working out vendors, and so a lot of our work that first semester was

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00:39:42.060 --> 00:39:51.349

Connor Flanagan: Really productive, and was not limited at all by the online, presence of the... of the education.

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00:39:51.510 --> 00:40:05.540

Connor Flanagan: And I personally found in our second semester, when we shifted to in-person, I felt like our commitment kind of wavered, because we relied heavily on the fact that, oh, we can meet in person.

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00:40:05.540 --> 00:40:14.180

Connor Flanagan: and execute these tasks. In my undergraduate experience, I did University Physics 2.

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00:40:14.180 --> 00:40:29.359

Connor Flanagan: online, and I took it at a community college, and what I was able to do was I had to purchase a lab kit, just like you have to do for a lot of, lab classes, and I did all of the experiments at home.

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00:40:29.480 --> 00:40:40.940

Connor Flanagan: And in the portal that we did the labs through, they had videos for how to do every step, so you could set up these simple or not-so-simple experiments.

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00:40:41.190 --> 00:40:53.769

Connor Flanagan: at home, and you could execute them, and I found with the majority of my labs, I had little to zero error. I mean, you could easily find error in your lab if you

286

00:40:53.770 --> 00:41:05.130

Connor Flanagan: accidentally placed 100 gram weight on the spring, as opposed to a 10 gram weight, you know? You can still always mess up, but that's always present in in-person experiments as well.

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00:41:05.250 --> 00:41:09.550

Connor Flanagan: And so at RIT, we're very fortunate that we have

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00:41:09.680 --> 00:41:19.749

Connor Flanagan: A lot of our software applications are given to us for free as students, like SOLIDWORKS, we can get a SOLIDWORKS license for free. It's absolutely awesome.

289

00:41:19.840 --> 00:41:23.300

Connor Flanagan: And a lot of the work that we're able to do is..

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00:41:23.330 --> 00:41:39.950

Connor Flanagan: capable of being done at home or online. A great software that we make use of is called Onshape, where it's a collaborative CAD environment, so you can work on CAD models, simultaneously with other people.

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00:41:39.990 --> 00:41:56.930

Connor Flanegan: And it's... it's a really great experience for first learning to use CAD, which is how I was introduced to Onshape. It was my... it was my first CAD class, was, at least in college, was learning to use Onshape and learning to do, collaborative work.

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00:41:57.430 --> 00:42:06.199

Connor Flanegan: But I would say the biggest thing for my online capstone experience was having the proper support there.

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00:42:06.320 --> 00:42:20.889

Connor Flanegan: And part of that fell onto my team used a Gantt chart to log every single task that we had to do online, and it really made sure that we were as straight as an arrow with our, our,

294

00:42:21.060 --> 00:42:44.340

Connor Flanegan: project progress. And additionally, our group guide was so instrumental in us executing our project. He really made sure that we were getting out of it what we needed to. Which, back to what Sarah was saying about ABET accreditation, it doesn't have to be a physical model. A lot of the work can be done on SOLIDWORKS or on MATLAB to create a proof of

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00:42:44.340 --> 00:42:46.860

Connor Flanegan: concept to verify

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00:42:46.860 --> 00:42:52.949

Connor Flanegan: oh, hey, if you wanted to do a heat transfer project, you can do it online through MATLAB,

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00:42:53.260 --> 00:43:08.539

Connor Flanegan: And there's no issues. You can use a proven or verified model as the basis of the project, and then have the students develop their own model, and verify that it works against their own.

298

00:43:09.300 --> 00:43:10.070

Connor Flanegan: Yep.

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00:43:12.650 --> 00:43:13.510

Online Capstone Session Room: Thank you, Connor.

300

00:43:13.640 --> 00:43:15.319

Online Capstone Session Room: Thank you, Connor.

301

00:43:16.300 --> 00:43:29.409

Online Capstone Session Room: So I want to say a few things. First of all, Connor, I know why you took UP2 at another university. That's a little, RIT UP2 is kind of notorious. We actually dropped that from our program because it was so notorious.

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00:43:30.730 --> 00:43:42.930

Online Capstone Session Room: But what I want to say is... so, this is a little bit meta, but our capstone students, we frequently have projects from other universities and from within RIT, where we're literally making

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00:43:42.930 --> 00:43:51.259

Online Capstone Session Room: virtual versions of... like, we have a protein-ligand interaction lab that our students made last semester for a...

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00:43:51.390 --> 00:43:56.829

Online Capstone Session Room: Science... for a science professor who wanted to virtualize experiments.

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00:43:56.940 --> 00:44:02.980

Online Capstone Session Room: And so I guess part of what I'm saying is, like, if you guys are wanting to try this stuff.

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00:44:03.170 --> 00:44:17.389

Online Capstone Session Room: it's kind of meta, but send the project to me. Maybe our students can make it for you. In fact, I actually really enjoy making stuff for other universities, and to some extent, it gives me projects that our...

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00:44:17.770 --> 00:44:34.749

Online Capstone Session Room: tenure-track faculty can coach more successfully than the industry projects. We'll put it that way. Yeah, so the other thing that I would say is, I was just in a session where they were kind of talking about, we were talking about project management in

308

00:44:34.920 --> 00:44:37.059

Online Capstone Session Room: In, you know, capstones.

309

00:44:37.210 --> 00:44:53.170

Online Capstone Session Room: And I would recommend, and this is... this is my own worldview, but I would recommend looking a little bit more toward the way software engineers manage their tasks. So, for instance, you know, the Gantt is a very, kind of, like, physical...

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00:44:53.570 --> 00:44:55.989

Online Capstone Session Room: This is what it looks like, sort of.

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00:44:57.300 --> 00:45:08.530

Online Capstone Session Room: you know, project visualization and planning tool, I actually would recommend going toward more of a Kanban board-style management, because if you're going online anyway.

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00:45:08.710 --> 00:45:20.159

Online Capstone Session Room: Then you... it's likely that that would integrate better with things that you're using, maybe, like, get repositories or other online and project management and...

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00:45:20.370 --> 00:45:24.550

Online Capstone Session Room: virtualization tools anyway, and so, you know, essentially.

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00:45:24.880 --> 00:45:30.579

Online Capstone Session Room: Software engineers kind of started doing this stuff many years ago, and so we've kind of eliminated some of those

315

00:45:30.730 --> 00:45:40.640

Online Capstone Session Room: difficulties, and so maybe you could look towards software engineering for some of your... specifically your project management-type tools, could be interesting.

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00:45:49.170 --> 00:45:55.420

Online Capstone Session Room: So, I was actually going to do a little segue to process and tools based on dimension of Kanban, but...

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00:45:56.520 --> 00:45:59.450

Online Capstone Session Room: I want you to finish the previous topic.

318

00:46:01.180 --> 00:46:03.940

Online Capstone Session Room: It's off, you're on.

319

00:46:04.820 --> 00:46:08.570

Online Capstone Session Room: Like, I'm afraid I'm gonna ask my question and now derail the direction.

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00:46:08.710 --> 00:46:20.089

Online Capstone Session Room: what popped into my head was, I'm wondering how all this interacts with traditional industry partners, like, how they respond to this type of engagement, and what kind of adjustments they have to make.

321

00:46:20.950 --> 00:46:24.679

Online Capstone Session Room: Can we park this one? Because it is... it is on my list.

322

00:46:24.860 --> 00:46:27.019

Online Capstone Session Room: We are a few minutes away from

323

00:46:27.630 --> 00:46:48.339

Online Capstone Session Room: So, let's do follow-up, and then you can... Yeah, I just wanted to follow up with a couple more things that I thought about in terms of, like, how do we do things with... if you... your... let's say your student learning outcomes for this course that are written in the syllabus say, we need a physical deliverable, because sometimes... sometimes we are restrained, like, no, our syllabus says this, we have to do this.

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00:46:48.340 --> 00:46:57.770

Online Capstone Session Room: There's still ways to do that. Like, the example, you can do low-fidelity prototypes, materials around you have, but let's say we need a higher fidelity prototype.

325

00:46:58.140 --> 00:47:07.229

Online Capstone Session Room: See if your requirements say that your entire prototype has to be physically assembled, or if it can be subsystem.

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00:47:07.310 --> 00:47:27.249

Online Capstone Session Room: Solutions. So, for example, one of the, Psyche teams, one team member had a 3D printer, so he did... he 3D printed, like, the physical arm. Another student was really interested because our instrumentations class requires them to build, to buy this Arduino kit.

327

00:47:27.390 --> 00:47:31.229

Online Capstone Session Room: And so all of my capstone students I know have this Arduino kit.

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00:47:31.230 --> 00:47:55.829

Online Capstone Session Room: And so this student really wanted to prove that if we use this programming, and he did the programming, and he did the hardware setup, that, hey, this programming turns on these lights at specific times, but if you envision this light to be a linear actuator that is this \$2,000 linear actuator, here's how the system would work with the arm that my teammate has built in Colorado while I'm sitting here in Oregon.

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00:47:56.100 --> 00:48:01.969

Online Capstone Session Room: So there are ways around it, like, here's the 3D model of how it all would work.

330

00:48:02.310 --> 00:48:18.670

Online Capstone Session Room: And then Cassie has the Arduino system set up, so she proves that, and then I have the arm in Oregon that proves that, so you can still have this physical deliverable of the subsystem, solutions that maybe aren't integrated.

331

00:48:18.970 --> 00:48:24.780

Online Capstone Session Room: So you could go that direction. You could also do integration by just making sure that your budget has

332

00:48:25.120 --> 00:48:39.240

Online Capstone Session Room: a budget for UPS, essentially, and so I have had a couple students, build something with their 3D printer and then send it to their, teammate over, you know, a couple states away, to be able to do that.

333

00:48:39.240 --> 00:48:45.509

Online Capstone Session Room: I wouldn't necessarily recommend requiring that, because you don't know where your students

334

00:48:45.510 --> 00:48:59.720

Online Capstone Session Room: currently are geolocated. And we do have international eCampus students, and so the international shipping becomes, logistics and timeline management. And so you don't really necessarily want to.

335

00:48:59.740 --> 00:49:04.939

Online Capstone Session Room: Rely on the ability to... to mail things between teammates?

336

00:49:05.180 --> 00:49:23.969

Online Capstone Session Room: But it could be an option that you give the students if they're interested. And then the other thing you can consider, you really have to talk to your eCampus support system and see what your eCampus program requires in terms of disclosure before a student gets into a course.

337

00:49:24.110 --> 00:49:30.399

Online Capstone Session Room: Because there are some courses that we can say, hey, it's asynchronous.

338

00:49:30.710 --> 00:49:33.020

Online Capstone Session Room: For 9 weeks out of 10,

339

00:49:33.160 --> 00:49:46.189

Online Capstone Session Room: But you are required for this course to come to Corvallis, Oregon for two weekends, and these are the prescribed weekends, and we tell you well ahead of time, these are the two weekends that you are coming to campus.

340

00:49:46.190 --> 00:49:51.760

Online Capstone Session Room: to do this lab or this lab. We do have a number of eCampus courses that do that.

341

00:49:51.760 --> 00:50:06.849

Online Capstone Session Room: I don't know if there's any in our program specifically, but when I talked to our support system, I was like, yeah, as long as you... you have to disclose this before the students register to the course, it needs to be disclosed here, here, and here, and it has to have specific dates.

342

00:50:06.880 --> 00:50:23.700

Online Capstone Session Room: So the students know, okay, yes, I'm an eCampus student, but for two weekends out of this term, I am going to be in Corvallis, Oregon. So there can be those requirements, you just need to talk to your eCampus developers ahead of time to see if that's an option for you.

343

00:50:24.640 --> 00:50:25.300

Online Capstone Session Room: Okay.

344

00:50:26.330 --> 00:50:29.770

Online Capstone Session Room: I don't have anything to add, that's... Connor, on this issue?

345

00:50:33.250 --> 00:50:34.110

Connor Flanegan: Yeah.

346

00:50:34.110 --> 00:50:35.710

Online Capstone Session Room: Yeah, go ahead.

347

00:50:35.710 --> 00:50:38.160

Connor Flanegan: I was just going to say that,

348

00:50:38.450 --> 00:50:49.190

Connor Flanegan: For our projects, what we did was, online, we basically planned out our entire physical semester to,

349

00:50:49.440 --> 00:51:04.649

Connor Flanegan: to have a great idea of when we were going to build certain things at certain times, to ensure that our timing would not be hijacked by, oh, this part isn't supposed to come in for 4 weeks. Well, we already knew that when we did our planning.

350

00:51:04.650 --> 00:51:09.700

Connor Flanegan: Online, asynchronously. So,

351

00:51:09.950 --> 00:51:27.089

Connor Flanegan: one of the things that I found really great was that we were able to, and my group was interdisciplinary, so it wasn't just mechanical engineers. We had 3 mechanical engineers, we had an electrical engineer, and a software engineer. So...

352

00:51:27.090 --> 00:51:41.090

Connor Flanegan: The mechanical engineers would work together and do the CAD programming for our project, and as that was getting done, our electrical engineer was designing our circuit board for our project.

353

00:51:41.090 --> 00:51:55.370

Connor Flanagan: in his application. And then he sent us dimensions for his subsystem, and then we implemented that into our CAD model to say, okay, this will work. We're able to physically create this product.

354

00:51:55.380 --> 00:51:58.850

Connor Flanagan: But regardless, having the proof of concept

355

00:51:58.970 --> 00:52:14.110

Connor Flanagan: online was still a great way for us to show to our client, hey, this is what we're looking at for size and weight, and it's meeting our engineering deliverables that we signed a contract for. So, our client was...

356

00:52:14.110 --> 00:52:21.340

Connor Flanagan: Always satisfied with what we showed them that was an online demonstration, as opposed to just a physical product.

357

00:52:23.430 --> 00:52:24.150

Online Capstone Session Room: Thank you.

358

00:52:25.660 --> 00:52:26.510

Online Capstone Session Room: Dress.

359

00:52:26.650 --> 00:52:28.899

Online Capstone Session Room: Your comments from the previous

360

00:52:29.080 --> 00:52:37.130

Online Capstone Session Room: capstone without physical prototype about Agile, and how that can work, because that can really help structure an online team.

361

00:52:37.820 --> 00:52:45.220

Online Capstone Session Room: Yeah, so I wanted, based on your comment and Sam's comment, Am I not on?

362

00:52:45.490 --> 00:52:53.269

Online Capstone Session Room: Oh, okay. I was doing just enough for Connor to hear me, but for your benefit as well.

363

00:52:54.950 --> 00:53:07.020

Online Capstone Session Room: I'm gonna start wrapping two items into one question for the remain... the remaining time. So, the next topic is process and tools combined. Basically, the comment that was made here was.

364

00:53:07.280 --> 00:53:13.890

Online Capstone Session Room: Can we apply... Should we apply software engineering.

365

00:53:14.020 --> 00:53:24.839

Online Capstone Session Room: methods and best practices, like Agile, like Scrum, like the Scrum ceremonies, daily stand-ups, would that be beneficial to online projects and online capstone?

366

00:53:24.950 --> 00:53:29.089

Online Capstone Session Room: And in the same token, the tools..

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00:53:29.320 --> 00:53:38.339

Online Capstone Session Room: Jira, Asana, Trello, Kanban, Slack for communications, so both project management and process management.

368

00:53:38.520 --> 00:53:44.200

Online Capstone Session Room: So, well, okay, I'll say my opinion for 30 seconds, and then it's open to everyone.

369

00:53:44.740 --> 00:53:46.610

Online Capstone Session Room: I mean, I'm...

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00:53:47.360 --> 00:53:57.060

Online Capstone Session Room: I'm biased towards Agile and Scrum, being a software engineer and a software engineering professor, and it's been working for us in capstone projects.

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00:53:57.160 --> 00:54:07.520

Online Capstone Session Room: And actually, I always say that at UC Irvine, because I'm... I sort of have some influence on all capstone instructors, not just my own.

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00:54:07.980 --> 00:54:23.640

Online Capstone Session Room: We basically give all students in capstone projects what I call a light process framework. So basically, we adopted some subset of Agile and Scrum. The most obvious part is to run in two-week sprints.

373

00:54:23.780 --> 00:54:27.159

Online Capstone Session Room: We're at the end of each sprint, there's,

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00:54:27.330 --> 00:54:30.990

Online Capstone Session Room: an actual requirement, an actual Canvas homework that says.

375

00:54:31.220 --> 00:54:36.599

Online Capstone Session Room: deliver your Sprint report here, and all my students who are arriving...

376

00:54:37.070 --> 00:54:41.190

Online Capstone Session Room: Had to do this every two weeks, and they can tell you how wonderful that was.

377

00:54:41.500 --> 00:54:49.620

Online Capstone Session Room: And, and then all the other ceremonies, scrum retrospectives, daily stand-ups.

378

00:54:49.850 --> 00:54:59.059

Online Capstone Session Room: Test-driven development, pair programming is... is... is they know them all, they have access to all those principles, but it's more up to them

379

00:54:59.060 --> 00:55:14.390

Online Capstone Session Room: Cassie was mentioning earlier, student initiative and student control. The remaining 90% of what Agile and Scrum have to offer are actually in the students' hands and up to student initiative and student control.

380

00:55:15.500 --> 00:55:21.850

Online Capstone Session Room: So... more thoughts about this? Pinch.

381

00:55:23.320 --> 00:55:25.040

Online Capstone Session Room: Thoughts and opinions?

382

00:55:27.770 --> 00:55:38.449

Online Capstone Session Room: if the question is what you should implement into this online course, I think the question is more along the lines of, how much do you want to take on?

383

00:55:39.010 --> 00:55:43.720

Online Capstone Session Room: When I was developing this eCampus version of this course.

384

00:55:44.130 --> 00:55:54.679

Online Capstone Session Room: I developed it almost identically to the in-person course, and it was still overwhelming in terms of how much time and effort I had to put into

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00:55:54.680 --> 00:56:06.210

Online Capstone Session Room: just... I thought it would be easy, like, I already do this, I've been teaching this for 10 years, I just gotta make it, like, look pretty on canvas. Hell no. It was so much more than that. And so...

386

00:56:06.290 --> 00:56:11.519

Online Capstone Session Room: what I would highly recommend is, however you're teaching capstone now.

387

00:56:12.240 --> 00:56:22.119

Online Capstone Session Room: just focus on converting that to eCampus, because that alone is going to be a heavy lift. And then decide how much more change do you want to do.

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00:56:22.440 --> 00:56:36.590

Online Capstone Session Room: Or, alternatively, since you're here, you want to... obviously, you're interested in capstone design, you're interested in improving your capstone experience, and maybe you have, like, a two-year period before you start doing this eCampus.

389

00:56:36.870 --> 00:56:52.589

Online Capstone Session Room: implement this potential change, try it out on your in-person students, try out... if you haven't done Agile, if you haven't done Trello, try it out now on your in-person students, and then figure out how well it works implementation-wise before then...

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00:56:52.800 --> 00:56:58.170

Online Capstone Session Room: converting to eCampus. So that's... that's my take, is, like, I just... I...

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00:56:58.250 --> 00:57:13.600

Online Capstone Session Room: I did not realize how much lift there was in... in this... what I thought was a simple, I've been teaching this for years, I'm just gonna throw it onto eCampus and it'll be fine. It's a lot more heavy lift than you would think.

392

00:57:17.440 --> 00:57:31.270

Online Capstone Session Room: I'll say, and Sarah can back this up, that not... I mean, it's obviously not all rosy, right, online, but it's not rosy in the same way that in-person teams are not rosy sometimes. So I haven't encountered

393

00:57:31.300 --> 00:57:49.420

Online Capstone Session Room: new challenges in teams, just because they're online or they're hybrid. A lot of my on-campus at ASU teams, we still meet by Zoom, because their schedules are so complex as seniors, that this way, everyone can join. You join from your job, you join between classes.

394

00:57:49.510 --> 00:58:06.150

Online Capstone Session Room: So, I think the problems are this... any problems are the same. I haven't encountered problems that are different, but I also don't have to grade students, so those of you who are thinking about grading and things, you might be thinking about some of the challenges a little bit differently.

395

00:58:06.150 --> 00:58:12.999

Online Capstone Session Room: And I was also gonna just say that if you want to talk to a mechanical engineering program that uses

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00:58:13.000 --> 00:58:26.829

Online Capstone Session Room: kind of an agile methodology has these sprints. Seattle University Mechanical Engineering does it, and they've adapted it, so sometimes the sprints are a month instead of two weeks, but that's actually ended up being really interesting as the sponsor to have

397

00:58:26.830 --> 00:58:40.139

Online Capstone Session Room: something for them, you know, they present essentially part of their product at the end of those sprints, and it's a really interesting organizational way to go about it. And that's their in-person, so it's another example.

398

00:58:40.950 --> 00:58:46.229

Online Capstone Session Room: Connor, you've already mentioned a couple, tools that you use. Was there anything else you wanted to add?

399

00:58:48.110 --> 00:59:04.930

Connor Flanagan: I mean, the majority of our communication was email and Slack-based. So, RIT, forces our groups, not that we don't want to, but just to ensure that they're monitoring us adequately.

400

00:59:05.110 --> 00:59:18.059

Connor Flanagan: we have to use Slack as a method of communication, and within Slack, we're able to create multiple channels within a group. So we would have a chat that was just our team.

401

00:59:18.630 --> 00:59:38.310

Connor Flanagan: So, only the members that were actually working on the project. Then we had a channel that was our team, plus our group guide, who's essentially, like, an adjunct faculty member. And then from there, we also had our team, plus our guide, plus our, capstone director.

402

00:59:38.440 --> 00:59:56.929

Connor Flanagan: So, a lot of our communication was being oversought by our capstone director to ensure that we were making adequate progress, and to ensure that, we weren't straying away too far from... or, like, going down a rabbit hole of a certain niche.

403

00:59:58.020 --> 01:00:14.130

Connor Flanagan: part of the project. And that's what was really great about our capstone. I'm unsure how you guys direct your capstones, if you guys all have guides for your groups, but if we didn't have our guide for our group, I definitely would have

404

01:00:14.160 --> 01:00:33.040

Connor Flanagan: I definitely believe it would have been much more challenging to accomplish, because our guide was somebody who's worked with our program for multiple years to do exactly what he did, which was to ensure that we were meeting our deliverables, we were formatting them correctly, and they could be achievable.

405

01:00:33.210 --> 01:00:41.699

Connor Flanagan: And all of this was able to be done online because of his expertise with having done it.

406

01:00:41.770 --> 01:01:01.479

Connor Flanagan: And not only had he done it online, but he'd done it in person as well. And he said time and again that the online groups tend to do better because they don't just show up in class and do it, they have to do it in their own free time, and ensure that the quality of their work is good enough

407

01:01:01.670 --> 01:01:05.129

Connor Flanagan: to submit it for an actual grade. So...

408

01:01:07.590 --> 01:01:17.460

Online Capstone Session Room: Excellent, thank you. So, Connor, actually staying with you, and then in reverse, opening it back up to everyone, my next question, again, to generalize

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01:01:17.970 --> 01:01:19.709

Online Capstone Session Room: On your points.

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01:01:20.660 --> 01:01:29.540

Online Capstone Session Room: One of the top things that we usually market and advertise, at least I know I do, is, for Capstone is...

411

01:01:29.650 --> 01:01:39.269

Online Capstone Session Room: Students acquire a combination of soft skills and technical skills in preparation for the real world and real jobs, and

412

01:01:39.760 --> 01:01:41.889

Online Capstone Session Room: In their future careers.

413

01:01:42.320 --> 01:01:44.510

Online Capstone Session Room: So... so did you...

414

01:01:45.610 --> 01:01:54.060

Online Capstone Session Room: did you feel you acquired the appropriate technical skills and soft skills? Of course, emphasis on soft skills, I think, is

415

01:01:54.200 --> 01:01:59.230

Online Capstone Session Room: is more relevant here. And of course, the key question for us here is.

416

01:01:59.440 --> 01:02:03.140

Online Capstone Session Room: Was it in any way affected or different?

417

01:02:03.280 --> 01:02:07.820

Online Capstone Session Room: In an online capstone environment. And then open to everyone.

418

01:02:08.780 --> 01:02:23.040

Connor Flanagan: I would 100% say that my soft skills, especially with, like, presentation development and client communication, improved dramatically because of the online capstone program.

419

01:02:23.090 --> 01:02:36.310

Connor Flanagan: So, for me, my project was, I doubt any of you are familiar with beat baseball, but beat baseball is a form of baseball that is made for people who are blind.

420

01:02:36.420 --> 01:02:46.930

Connor Flanagan: And so, our project was to create a new beep ball that was More economically efficient, more rugged.

421

01:02:47.160 --> 01:03:01.329

Connor Flanagan: And, had easier, charging capabilities. The previous ball had a very unique charger that you could only buy through the supplier. And the balls were \$45, for one.

422

01:03:01.710 --> 01:03:10.010

Connor Flanagan: Which is not exactly easy to purchase, especially for such a niche sport that requires outside funding.

423

01:03:10.330 --> 01:03:12.240

Connor Flanagan: And,

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01:03:12.640 --> 01:03:26.400

Connor Flanagan: our... our clients were great. We were fortunate enough to have, a retired mechanical engineer who was just interested in the sport as one of our... as part of our client group, and then our other,

425

01:03:26.700 --> 01:03:32.849

Connor Flanagan: person in our client group was somebody who plays beat baseball in their free time. And so...

426

01:03:32.910 --> 01:03:51.459

Connor Flanagan: Being forced to understand, as well as have them understand what we wanted out of the project was absolutely essential, because we had to be able to communicate verbally or written, what exactly it was we wanted out of something.

427

01:03:51.460 --> 01:03:56.059

Connor Flanagan: So, when we would make our, our presentations.

428

01:03:56.080 --> 01:04:01.400

Connor Flanagan: We would have to ensure that our language was of the utmost clarity.

429

01:04:01.960 --> 01:04:18.490

Connor Flanagan: to have them understand what we were developing, as well as to know what they were thinking. Because if I'm saying something, it's not guaranteed that you're going to interpret that 100% correctly. So...

430

01:04:18.860 --> 01:04:38.619

Connor Flanagan: we were stuck on a hiccup for a little bit, I think it was a week, of misunderstanding the size and the mass deliverables for the beat ball. So, we... I think we had, like, a 20 email long chain, just going back and forth about what exact size we wanted for our ball.

431

01:04:38.620 --> 01:04:42.020

Connor Flanagan: Because there's a little bit of,

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01:04:42.490 --> 01:04:52.650

Connor Flanagan: nuance to the sizing of balls in beat baseball. There's NBBA license sizes, there's alleged

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01:04:52.820 --> 01:05:11.609

Connor Flanagan: There's allegedly licensed sized balls, and, you know, all of this was through extensive Amazon research and product researching, and ultimately, we came down to a size that wasn't NBBA licensed, but we were speaking with the NBBA about licensing.

434

01:05:11.620 --> 01:05:14.439

Connor Flanagan: For, a new and updated ball.

435

01:05:16.640 --> 01:05:21.490

Online Capstone Session Room: So, that's an interesting point. What I... what I hear Connor saying is.

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01:05:21.810 --> 01:05:26.730

Online Capstone Session Room: For example, in giving a classroom presentation or a client presentation, you... you...

437

01:05:26.950 --> 01:05:30.419

Online Capstone Session Room: You probably lose 50% or more of...

438

01:05:30.720 --> 01:05:38.760

Online Capstone Session Room: Eye contact and hand gestures, and other human communication things that you take for granted.

439

01:05:38.980 --> 01:05:42.090

Online Capstone Session Room: And because of that, you actually have to be better.

440

01:05:42.590 --> 01:05:46.839

Online Capstone Session Room: And more precise. And more accurate, and more prepared.

441

01:05:47.510 --> 01:05:50.800

Online Capstone Session Room: than you would have been otherwise. Yeah. No, I...

442

01:05:51.600 --> 01:05:59.730

Online Capstone Session Room: Connor nailed it. He's... he had a great answer. I was like, no notes. Yeah, same thing. Yeah.

443

01:05:59.840 --> 01:06:06.880

Online Capstone Session Room: Follow-up questions... About this... Are you buying this?

444

01:06:10.390 --> 01:06:11.410

Online Capstone Session Room: Okay. Yep.

445

01:06:11.650 --> 01:06:16.499

Online Capstone Session Room: You want to move to the industry-sponsored question? Yeah, you want to start up?

446

01:06:17.230 --> 01:06:35.289

Online Capstone Session Room: Yeah, we'll go back to the question you had about, you know, we're typically, traditionally, we have a set number of industry sponsors that want to work with us, and how does that translate to eCampus? We're still playing around with that.

447

01:06:35.900 --> 01:06:46.739

Online Capstone Session Room: We have Cassie, so she's your first client. She really was. It was great. But one... one thing I love about...

448

01:06:46.960 --> 01:06:59.030

Online Capstone Session Room: what we call paper projects, I hate that term, but essentially, like, computational analytical projects that don't necessarily have this, this, physical build requirement.

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01:06:59.330 --> 01:07:00.280

Online Capstone Session Room: is...

450

01:07:00.930 --> 01:07:13.449

Online Capstone Session Room: It forces the students to put more time and energy into the computational analysis, but the best part is it increases the size of your budget to infinity.

451

01:07:13.850 --> 01:07:17.049

Online Capstone Session Room: And... maybe not infinity, but,

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01:07:17.190 --> 01:07:40.630

Online Capstone Session Room: I worked with a project, so the sponsor was remote, the students were in person, but they were working for a company, I'm not sure I'm supposed to say which companies, whatever, that was trying to do a radome tester, and so the radome is the tip of a particular type of missile, at that time, and they needed... they wanted a proof of concept of how to create a test for a certain...

453

01:07:40.840 --> 01:07:42.100

Online Capstone Session Room: Thermal load.

454

01:07:42.370 --> 01:07:45.250

Online Capstone Session Room: And so we put two teams on it, and both teams

455

01:07:45.330 --> 01:07:59.130

Online Capstone Session Room: had basically an infinite budget, but part of the responsibility was, you have to give us how much your solution would cost us. And it needed to be, like, marketed, like, how much is this truly gonna cost, not like a wag.

456

01:07:59.210 --> 01:08:19.160

Online Capstone Session Room: And both teams, their solution was about the size of my office, but again, this was all virtual, so they didn't have to spend time trying to figure out, like, how to physically build it. They made some amazing design that was... I think the footprint was something like 15 foot by 15 foot by about 10 foot tall.

457

01:08:19.160 --> 01:08:26.169

Online Capstone Session Room: Very, very large-scale welded, base into the floor of the company, so the company

458

01:08:26.170 --> 01:08:38.989

Online Capstone Session Room: told them, how big the floor plant was, they told them where the anchor points would be, and so they were constrained by that. But the team then had to source what, essentially thermal, loading...

459

01:08:39.220 --> 01:08:54.919

Online Capstone Session Room: commercial off-the-shelf components they could purchase, and in what orientation they needed to put that in, and then they had to do the CFD and the FEA to prove that it was a viable project, that it would reach the loading cases, that the radome would actually

460

01:08:55.120 --> 01:08:59.240

Online Capstone Session Room: Feel, during... operation.

461

01:08:59.590 --> 01:09:14.939

Online Capstone Session Room: And so this... and most of the solutions, the two solutions that the students had, I remember the... the budget ended up being, like, a quarter million dollars for each of these solutions, but this company was thrilled, because they basically got...

462

01:09:14.939 --> 01:09:30.370

Online Capstone Session Room: a... the start of a proof of concept that they had very little, initial buy-in for. In fact, it was just our... our normal donation to be a sponsor. But other than that, there was no...

463

01:09:30.700 --> 01:09:42.970

Online Capstone Session Room: cost to them after that, and then they had two... two solutions that were, you know, very large-scale solutions that they could kind of figure out with their own engineers. So there is that viability of

464

01:09:43.100 --> 01:10:02.219

Online Capstone Session Room: very large-scale scoped projects doing eCampus, or doing... I mean, this was... this was an in-person team, but it could have totally been an eCampus team. So you have the ability to expand the scope and scale of a project this way. So... yeah.

465

01:10:05.860 --> 01:10:18.960

Online Capstone Session Room: Yeah, I would say, especially if you're going to have an in-person capstone and an online, the online capstone might give you access to other sponsors that had not seemed like they could be part of your sphere.

466

01:10:18.960 --> 01:10:38.259

Online Capstone Session Room: Just because they are somewhere completely different. And I think there was another panel yesterday about, off-campus opportunities, which ended up being kind of international as well. And so, if you kind of think more broadly about getting sponsors, you might be able to find some that way that don't... that have projects that don't require students to travel to their facility.

467

01:10:38.260 --> 01:10:50.380

Online Capstone Session Room: Or, you know, have projects that are more... like, a lot of our projects are really thinking about the far future of exploration of this asteroid that we're sending an orbiter to right now, but people are already thinking about, you know.

468

01:10:50.590 --> 01:11:08.369

Online Capstone Session Room: proposing return missions to the... to the surface, you know? You're not going to build something space-ready during a capstone, two-term capstone, but you can start generating ideas, and there might be, you know, other sponsors out there that are interested in that kind of, like you're saying, the ideation, the idea generation phase.

469

01:11:10.800 --> 01:11:19.990

Online Capstone Session Room: So, Cassie, while you're still on, since you are our reigning representative of industry partners for this purpose.

470

01:11:20.230 --> 01:11:23.239

Online Capstone Session Room: Over your almost 500 teams.

471

01:11:25.080 --> 01:11:31.730

Online Capstone Session Room: I don't know if you memorized all the stats, but my question is not really about the stats, but about...

472

01:11:32.300 --> 01:11:38.009

Online Capstone Session Room: What is your overall sentiment across 500 teams? Is... is this online...

473

01:11:38.360 --> 01:11:42.710

Online Capstone Session Room: Make a difference, make it better, make it worse.

474

01:11:43.370 --> 01:12:01.900

Online Capstone Session Room: doesn't make a difference, it's all about the team and the team dynamics. Yeah, I don't find that it makes a difference, and a lot of times I can't remember if my teams are online or not, and sometimes I don't remember which school they're from. So, so for me, it's not a problem, and I think for large

475

01:12:02.220 --> 01:12:15.030

Online Capstone Session Room: industry partners, they're used to working with people across distance and time, so it doesn't really stick out. I mean, I have lots of colleagues from the mission that I've never met in person, but I've worked a lot with online.

476

01:12:15.200 --> 01:12:32.039

Online Capstone Session Room: And I used to work for Raytheon as a contractor to the Mars program, and I had layers of managers that I never, ever met, because I was remote to them. So, I think your industry partners might be more used to it than people would think.

477

01:12:32.100 --> 01:12:49.150

Online Capstone Session Room: And like I said, the... the challenges of a capstone team sometimes come down to individual personalities, and that's the same online or in person. I haven't found that to be different. So, I never shy away from it one way or the other. I mean, it's fun to have on-campus teams, but it's...

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01:12:49.150 --> 01:12:56.559

Online Capstone Session Room: No different to have, you know, teams that are all over, and it gives students a lot of flexibility, and gives your sponsors a lot of flexibility, too.

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01:12:58.720 --> 01:13:08.710

Online Capstone Session Room: Yeah, part of the context of... of proposing this panel that, so Cassidy and I proposed this panel because we wrote a paper for

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01:13:08.710 --> 01:13:24.809

Online Capstone Session Room: this conference, where we interviewed students who were either hybrid or online, as well as sponsors who were hybrid or online. And the results of that paper, if you take the context of the online portion out of it, would sound like every other capstone program

481

01:13:24.810 --> 01:13:43.810

Online Capstone Session Room: problem. I mean, it was communication, sponsors not knowing what the jargon is and what these artifacts for the course are, the strange schedule that happens, things like that. I was like, well, that's what happens in in-person, we just need to scaffold it a little bit differently for the eCampus students, but...

482

01:13:44.160 --> 01:14:01.100

Online Capstone Session Room: I mean, most eCampus students, what you'll find, is that they are non-traditional students, they have, years of experience under their belts, they have children, they are primary caregivers of people, so they're usually a lot more motivated, so you end up getting.

483

01:14:01.200 --> 01:14:18.120

Online Capstone Session Room: higher quality output from these 35-year-olds, than... than you typically see from the 18 to 22-year-old range. So, it's... it's fascinating to see the drive that comes out of our eCampus students.

484

01:14:19.930 --> 01:14:20.889

Online Capstone Session Room: Thank you.

485

01:14:21.090 --> 01:14:25.310

Online Capstone Session Room: Any, any, Russell or anyone follow up on this, or...

486

01:14:25.560 --> 01:14:27.000

Online Capstone Session Room: Okay, so...

487

01:14:27.320 --> 01:14:44.489

Online Capstone Session Room: And by the way, Sarah's and Cassie's poster is, like, literally outside this door, and I'm sure they'll be happy to talk to you some more. But at 3.30, a minute before, we are required by law to finish on time. By law means it comes from our co-chair, Todd.

488

01:14:44.810 --> 01:14:51.670

Online Capstone Session Room: To, there's a group picture, meaning the whole conference picture, right after this session.

489

01:14:52.040 --> 01:15:09.619

Online Capstone Session Room: So, I'll try to be good about being on time. I feel like I have to ask one question about the end, the end of the process, the end of capstone, and so I'll phrase it in a certain way, but again, you can take it in different directions, because it's really about the experience.

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01:15:09.720 --> 01:15:14.529

Online Capstone Session Room: the end of Capstone, which for us on the quarter system is coming.

491

01:15:15.030 --> 01:15:18.730

Online Capstone Session Room: We're not past it, it's still in the future of my students.

492

01:15:18.840 --> 01:15:24.140

Online Capstone Session Room: In two days, we have the big expo showcase event, and then there...

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01:15:25.350 --> 01:15:29.179

Online Capstone Session Room: So everybody on the quarter system is on the same boat.

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01:15:30.690 --> 01:15:34.340

Online Capstone Session Room: And so, the question is the same question

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01:15:34.590 --> 01:15:40.199

Online Capstone Session Room: as all the other ones, but now applied to the end. Is there anything different

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01:15:40.330 --> 01:15:43.560

Online Capstone Session Room: Or anything that should be different about...

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01:15:43.880 --> 01:15:50.240

Online Capstone Session Room: The showcase event, the final presentation, the final delivery of the final deliverables.

498

01:15:50.640 --> 01:16:00.199

Online Capstone Session Room: the celebration. Anything, either in the technical sense or in, let's call it, in the social or celebratory sense.

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01:16:03.050 --> 01:16:21.169

Online Capstone Session Room: I'm gonna address this just because I have some programs that do it very differently between the online students and the in-person, and I have one program, which is ASU Electrical Engineering, that does it essentially the same, as same as they can. So the electrical engineering capstone, all teams

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01:16:21.330 --> 01:16:36.049

Online Capstone Session Room: have to participate in the expo, and that, for all online teams, that means being there on a Zoom, like Connor is right now, the whole team, they set it up for them in the same room as everyone else, there's headphones.

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01:16:36.050 --> 01:16:48.169

Online Capstone Session Room: the judges or the participants can come up, put their headphones on, talk to them through the Zoom. The hybrid teams, I had a bunch of hybrid teams this year, so the students who were in person were there physically, their counterparts were on Zoom.

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01:16:48.170 --> 01:17:00.380

Online Capstone Session Room: You know, you directed it to everyone who was there. The thing I... I think it was a ton of work, so I... you should talk to the electrical engineering faculty and see what they think about having done that, because it was a lot of work for them.

503

01:17:00.380 --> 01:17:07.210

Online Capstone Session Room: But it was nice because the online students then were seeing the industry representatives who were coming

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01:17:07.400 --> 01:17:20.820

Online Capstone Session Room: to the showcase. They were getting to talk to people's friends and families. They got to feel like they were part of the whole capstone showcase. So, that was the positive. Probably the negative was it was a ton of work for the,

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01:17:20.870 --> 01:17:39.020

Online Capstone Session Room: for the professors, but like you were saying, it was clear up front, you need to set aside this time, you should be on the Zoom, you know, you're going to be talking to the judges and the participants at the showcase. But I have lots of other programs where the students, and you can talk to this, like, record their presentation, or

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01:17:39.020 --> 01:17:43.580

Online Capstone Session Room: Their culminating activity is a formal presentation to their sponsor.

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01:17:43.790 --> 01:18:00.029

Online Capstone Session Room: when I'm in that situation, I try to invite other people from the Psyche team, so it's... they're not just presenting to just me again. But I think it's nice if there can be some culminating thing for... for teams, but it's a... it's a lot of work for the program. Yeah.

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01:18:02.200 --> 01:18:19.899

Online Capstone Session Room: that's still my future work slash guinea pig trial and error. We tried a couple things this year. Last year, when we had the hybrid model, the, the online students came in person for Expo. It was their first day on campus ever, and it was their Expo.

509

01:18:20.270 --> 01:18:35.589

Online Capstone Session Room: But we also have a virtual expo page, that is basically a project portal where they get to submit their project, and this is the cool stuff that we did. I used to do that at NAU as well.

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01:18:35.800 --> 01:18:37.410

Online Capstone Session Room: I'm... I'm...

511

01:18:37.770 --> 01:18:53.689

Online Capstone Session Room: hesitant to do that model, because you can actually access every single one of my projects that I... that I had at NAU to this day is still on their website, and sometimes that yields,

512

01:18:54.320 --> 01:19:09.909

Online Capstone Session Room: problematic things, especially if a student doesn't want an online presence. I have no control over that NAU website anymore, and those students are still on that website, and so you can Google a student's name, and it'll come up to this website, and

513

01:19:10.140 --> 01:19:16.989

Online Capstone Session Room: So there's... there is some issues with requiring an online permanent presence.

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01:19:17.000 --> 01:19:30.589

Online Capstone Session Room: from a student project, so right now, I don't have a requirement that they do this virtual project page. It's a, here's the link if you're interested in throwing it on, make sure everybody on your team has said yes to this.

515

01:19:30.590 --> 01:19:45.460

Online Capstone Session Room: And if they haven't said yes to this, you need to redact all of their information from it. So... when it... when it comes to that final expo-type thing, I'm still playing around with what might be good solutions, what...

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01:19:45.460 --> 01:19:52.389

Online Capstone Session Room: what we could do. And ultimately, I think what it comes down to is, I just need to ask the students themselves, like, how do you...

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01:19:52.390 --> 01:20:07.739

Online Capstone Session Room: How do you want to celebrate yourself at the end of this term? Do you want to come to Expo in person? Do you want to do a recording? Do you want to be live? And leave it up to them. They're pretty intelligent people, and they probably know what they want to do, so that's...

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01:20:07.740 --> 01:20:12.969

Online Capstone Session Room: Likely what we'll do next year is just put it to them, like, how do you wanna... how do you wanna celebrate what you've been doing?

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01:20:15.310 --> 01:20:18.069

Online Capstone Session Room: Do you think this issue of, like,

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01:20:18.410 --> 01:20:24.629

Online Capstone Session Room: Long-term, eternal existence of your online presence can be solved by...

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01:20:25.300 --> 01:20:32.710

Online Capstone Session Room: a technical solution? Like, after a year, it goes into a password archive or something like that? Yeah, absolutely.

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01:20:32.920 --> 01:20:37.599

Online Capstone Session Room: Okay. I don't have access to NAU anymore, so I can't... I suppose I could have, though.

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01:20:39.610 --> 01:20:42.440

Online Capstone Session Room: Katie or others with respect to this...

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01:20:42.540 --> 01:20:48.460

Online Capstone Session Room: End of capstone, end of project, showcase event... Thoughts?

525

01:20:48.460 --> 01:20:50.860

Connor Flanagan: If nobody else has any comments, I just...

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01:20:50.860 --> 01:20:51.500

Online Capstone Session Room: Honor, please.

527

01:20:51.500 --> 01:20:57.389

Connor Flanagan: something. This is probably best if I share my screen. Let me see...

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01:20:57.550 --> 01:20:59.339

Online Capstone Session Room: Maybe I need to allow t-shirts.

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01:20:59.340 --> 01:21:00.069

Connor Flanagan: There we go.

530

01:21:00.400 --> 01:21:01.150

Connor Flanagan: Sure.

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01:21:01.860 --> 01:21:05.900

Connor Flanagan: Oh, I have to request sharing. That's okay.

532

01:21:07.540 --> 01:21:09.290

Connor Flanagan: She worked the magic? Cool.

533

01:21:09.750 --> 01:21:11.549

Connor Flanagan: But just to...

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01:21:11.700 --> 01:21:20.490

Connor Flanagan: prepare you for what I'm gonna share. So, my project, unfortunately, wasn't able to be finished entirely with the physical version of the ball.

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01:21:20.640 --> 01:21:22.730

Connor Flanagan: So,

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01:21:24.650 --> 01:21:36.009

Connor Flanagan: Let's see if that works. So, what we were required to do, as is in line with our course deliverables, is develop a handover document.

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01:21:36.010 --> 01:21:51.819

Connor Flanagan: So we have a singular document that has a table of contents for the entire progress of our project, starting with our very first week, where everybody met each other. And,

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01:21:51.970 --> 01:21:57.309

Connor Flanagan: It goes through the entirety of our development, starting with our problem definition.

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01:21:58.100 --> 01:22:15.040

Connor Flanagan: further on into our first look at it, and then our finalized look, and we have comments on everything. We have images of the initial beat baseball that our client gave us as a... as a,

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01:22:15.270 --> 01:22:18.369

Connor Flanagan: Example, essentially, to see what we were working with.

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01:22:18.590 --> 01:22:37.990

Connor Flanagan: From there, we have a breakdown of all the components within the ball, and we have our purchasing sheet, we have our testing results, and we have multiple charts, and CAD diagrams, and electrical board diagrams.

542

01:22:38.060 --> 01:22:54.669

Connor Flanagan: And all of this is to ensure that our next group is able to... or the next group that takes the project is able to adequately continue the work with the work that we made. Because if we hand over... oh, let me see if I can try it again.

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01:22:56.130 --> 01:22:57.790

Online Capstone Session Room: Go to share one more time.

544

01:22:57.790 --> 01:22:59.120

Connor Flanagan: Yeah, this should work.

545

01:22:59.420 --> 01:23:00.150

Connor Flanagan: Sure.

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01:23:00.150 --> 01:23:00.780

Online Capstone Session Room: There you go.

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01:23:00.780 --> 01:23:02.449

Connor Flanagan: Can you guys see my...

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01:23:02.760 --> 01:23:04.889

Online Capstone Session Room: We can see you, yes, yes.

549

01:23:05.600 --> 01:23:16.119

Connor Flanagan: So, this just has all of the work from the entirety of our project. And it's really great, because it's such a great demonstration of...

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01:23:16.460 --> 01:23:22.520

Connor Flanagan: How do you continue the legacy of a project through an online medium?

551

01:23:22.750 --> 01:23:26.380

Connor Flanagan: And here's our table of contents here.

552

01:23:27.190 --> 01:23:29.710

Connor Flanagan: And it just goes through to...

553

01:23:30.660 --> 01:23:33.619

Connor Flanagan: To show all of our progress on it.

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01:23:34.530 --> 01:23:44.530

Connor Flanagan: In an online medium, and in no way did it require us to be physically present to prove our work, or to demonstrate what we built.

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01:23:44.560 --> 01:24:05.400

Connor Flanagan: And additionally, aside from the... from this online manual, we had to create a video for our online demonstration for people that weren't able to physically attend our expo, as we were in the fall demonstration, but our spring demonstration is our huge one.

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01:24:05.400 --> 01:24:22.570

Connor Flanagan: So they always have the fall groups come together and create videos that can then later be shown at the Spring Expo, if not everybody's there, because 3 people in my group graduated. And it was me and one other kid that were still doing schooling.

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01:24:24.130 --> 01:24:36.620

Connor Flanagan: So, it just goes to show that in no way is a physical presence required to effectively communicate the end of your project and the results of it.

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01:24:38.530 --> 01:24:45.060

Online Capstone Session Room: Thank you, Connor. Of course. Alright, so one last question. I think we have maybe one minute each to the,

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01:24:45.250 --> 01:24:47.840

Online Capstone Session Room: requisite AI question.

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01:24:48.520 --> 01:24:52.670

Online Capstone Session Room: is, is, I think I know what Sarah's answer is going to be.

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01:24:53.160 --> 01:24:59.750

Online Capstone Session Room: But is AI, the rise of AI, affecting any of this? For example, the assessment.

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01:25:00.440 --> 01:25:05.339

Online Capstone Session Room: Are we worried that students can do their entire capstone project by asking

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01:25:05.730 --> 01:25:09.679

Online Capstone Session Room: Codex or Gemini to do it for them, anything in that regard.

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01:25:13.890 --> 01:25:15.280

Online Capstone Session Room: Connor, you can go first.

565

01:25:15.470 --> 01:25:15.950

Connor Flanegan: Oh, yeah.

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01:25:15.950 --> 01:25:16.879

Online Capstone Session Room: You wanna go first, Connor?

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01:25:16.880 --> 01:25:33.030

Connor Flanegan: Sure. This one's really quick and easy for me. Having done my capstone partially online, sure, some of my work could have been done with AI, absolutely, but in the end, it's entirely on the student.

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01:25:33.250 --> 01:25:39.160

Connor Flanegan: to, get what they want out of their capstone experience.

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01:25:39.810 --> 01:25:50.730

Connor Flanegan: In my experience, we used AI as a check-our-work utility. So, when we finished our engineering deliverables.

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01:25:50.850 --> 01:26:10.569

Connor Flanegan: we had ChatGBT, or I don't even know if Claude was a thing at the time, check our written deliverables to see, hey, this is what our client said they wanted, this is what we've prepared for them in a client contract, how does this align with their goals and what we want to deliver for them?

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01:26:10.570 --> 01:26:13.059

Connor Flanegan: And AI will give us an accurate assessment.

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01:26:13.240 --> 01:26:14.310

Connor Flanegan: And..

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01:26:14.340 --> 01:26:30.569

Connor Flanagan: if students are using AI in the capacity like my group used to check their work, it is, if anything, it's a tool, just like anything else, right? Just like SOLIDWORKS is, just like MATLAB is, but if they're using it in a generative capacity.

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01:26:30.570 --> 01:26:42.230

Connor Flanagan: likely they're just robbing themselves of the experience. And more often than not, it simply can't do the work that they would want it to do, like create an entire CAD model, or

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01:26:42.230 --> 01:26:48.760

Connor Flanagan: create a MATLAB model that accurately, captures all of the complexities of their problems.

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01:26:50.380 --> 01:27:00.730

Online Capstone Session Room: Very good points, thank you. Perfect. I think Connor summarized it all perfectly. We surveyed our students at the end of Capstone 2, both terms this... this year.

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01:27:00.730 --> 01:27:21.890

Online Capstone Session Room: And what Connor said is essentially the summary of the paper of the survey that we are putting out. He's just summarized an entire paper in 30 seconds. So it's not just... it's not just his experience. His experience is backed up by the students that we have surveyed. That's exactly what they say. Majority of students are not actually using it for cheating, they're using it for checkers.

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01:27:21.890 --> 01:27:27.169

Online Capstone Session Room: Yes, we... our conversation is almost always about how AI is being used to cheat.

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01:27:27.170 --> 01:27:52.110

Online Capstone Session Room: But it's one of those, like, we're talking about the 5% of students, rather than the 90% of... actually, it's 80% of our students are using AI. There's actually 20% of our students are not using AI, period. They hate it, they want nothing to do with it. The other 80% of that, they're... they're all... and this was an anonymous survey, they're all saying, you know, we're using it to check our code, we're using it to see if we're missing anything, like, this is what we're

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01:27:52.110 --> 01:27:55.449

Online Capstone Session Room: doing, what are we missing, those kind of things. So...

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01:27:55.830 --> 01:27:59.910

Online Capstone Session Room: everything that Connor said is kind of the summary of that survey as well.

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01:28:02.230 --> 01:28:02.970

Online Capstone Session Room: Perfect.

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01:28:04.890 --> 01:28:05.580

Online Capstone Session Room: Shit.

584

01:28:06.160 --> 01:28:10.239

Online Capstone Session Room: Alright, so you, you are my witness to Todd?

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01:28:11.910 --> 01:28:17.589

Online Capstone Session Room: that we finished one minute, 2 minutes ahead of time. So first, let's thank our wonderful panel.

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01:28:20.810 --> 01:28:32.660

Online Capstone Session Room: And thank all of you. A couple of reminders. There's... there's Shrag from CASI and Psyche and NASA here, and we're supposed to all report to the main area for...

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01:28:33.140 --> 01:28:35.360

Online Capstone Session Room: A big picture, and thank you, Connor.

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01:28:36.400 --> 01:28:39.009

Connor Flanagan: Yeah, thanks so much for having me, guys, it was a pleasure.