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Lessons Learned in a Mixed-mode Teaching Experience

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Lessons Learned: Mixed-Mode Teaching Experience

The coronavirus pandemic altered the teaching delivery modes for universities nationwide and in doing so, allowed for positive adaptation of the classroom experience. At the University of Tennessee at Knoxville (UTK), five different teaching modalities were offered to the student population for both the Fall 2020 and the Spring 2021 terms. Courses offered in new modalities were improved through implementation of new techniques in engagement, lesson delivery, and assessment. Specifically, enhancements were developed in three different types of courses: the technical communications course, laboratory courses, and a series of project-based courses. The technical communications course was changed to a rotating face-to-face model, for which lecture videos and assigned activities were performed on out-of-class days and in-class days were reserved for workshops. Workshops replaced the traditional guided learning activity approach with active learning in a think-pair-share format. Students were given strong and weak examples of writing to be able to give feedback to their peers and improve their own writing prior to submission. Students worked on improving their formal written assignments, and therefore improved their capacity for technical writing, during class rather than submitting their first writing assignment without any peer feedback or review. The workshop format also prevented students from attempting to write the entire paper the night before it was due, as they were required to submit regular progress check-ins in the weeks leading up to the due date. One project-based course was modified to incorporate an ePortfolio to improve records-keeping by the students in the mixed-mode learning experience and project experiences in the senior design project courses were enhanced through online modules supporting lesson content paired with workshops generating discussions-based learning. Assessment of learning in the project-based courses included a variety of new techniques, including professor-student interviews, guided discussion board engagement, and prompted video narratives. Lastly, laboratory courses were moved to a rotating hybrid system by splitting larger exercises into online and in-person components. This allowed for additional reinforcement of theoretical understanding and smaller in-person sessions promoting more one-on-one student contact. A peer review component was added to the course rubric to facilitate additional online student-lead learning opportunities. One upper division geotechnical laboratory course was converted into a semester-long project with group reporting and bi-weekly individual oral examinations. In this model all students were responsible for all course content, but teamwork and collaboration were encouraged and monitored through a mandatory online file sharing platform created for each project team. The teaching modality change for these courses presented an opportunity to improve the learning experience and the impact in these specific courses is particularly relevant as these present many fundamental skills necessary to be transferred to new learning experiences in later coursework. A summary of the teaching modifications for these three families of courses is presented herein; motivation for changes, implementation of the changes, and some reflective observations made by the faculty are shared.

Introduction

Teaching civil and environmental engineering courses through a pandemic offered many opportunities for reinvention in the hybrid course delivery approach. While the transition through the coronavirus pandemic presented many challenges, the need to modify courses resulted in enhancements that may not have otherwise been pursued. In the Civil & Environmental Engineering Department at UTK, students have engaged in a variety of new learning experiences and faculty intend to continue application of some new teaching strategies into the future, at which time, presumably, traditional face-to-face teaching format will resume as the single *standard* modality. Specifically, three course types were significantly modified and offered to students across a full academic year in a *hybrid* structure. Technical communication, project-based, and laboratory courses were considered as opportunities for improved engagement and professors worked independently to develop a valuable in-class learning experience, with all appropriate safety protocols, and partnered with impactful online content to support students online and in asynchronous learning environments. The remainder of this paper shares a brief definition for hybrid course structures, discusses modifications implemented and lessons learned in these (3) distinct courses, and provides a brief closing statement.

Hybrid Course Structures

Hybrid course modality in the context of this discussion is defined as a structure including components of face-to-face (F2F) and online learning opportunities, as well as synchronous and asynchronous content delivery. These four elements of this structure allow professors to deliver content according to the preferences of the faculty and goals for the course. The balance of a hybrid course's components was variable for (3) courses offered at UTK allowing the professors to create the most effective teaching and learning experiences uniquely distinct for each course's objectives. A "Rotating Face-to-Face" hybrid structure and a "Synchronous Simulcast" offering were two hybrid course modalities defined by the university beginning in Fall 2020 and extending through Spring 2021. Professors were provided the opportunity to offer hybrid course experiences in either of these structures, among other modalities, to develop the balance of formal learning opportunities. As shown in Table 1, the engineering communications course design struck a precise balance between face-to-face engagement and online asynchronous learning and reflection, a project-based course offered flexibility with hybrid synchronous engagement allowing students to participate either face-to-face or online during the regularly scheduled class session, while the laboratory course unsurprisingly encouraged a greater face-to-face experience.

TABLE 1: Hybrid Course Structure Components by Course Type

	Communications	Project-Based	Laboratory
F2F Only Synchronous	50%	0%	57%
Hybrid (F2F OR Online) Synchronous	0%	33%	0%
Online Asynchronous	50%	67%	43%

These courses are offered for different credit hour values and student time dedicated to structured learning was dissimilar for each commitment. Design of the hybrid offering required consideration of course enrollment, opportunity to break into course sections, need for physical hands-on

experiences to meet the learning objectives of the course, and value in creating online content supporting universal design of learning. Students were asked to engage differently in the structured learning opportunities (as expressed in Table 2), based on the goals of instruction for the unique course types. These hours do not include independent study work or completion of course homework assignments, but solely the hours supported by either synchronous activities or asynchronous class engagement. This includes formal course settings, offered either face-to-face or online, and time needed to review deliberately crafted lesson content available in the online learning management system (LMS) for asynchronous learning. The Communications course maintained standard expectations in relation to traditional offerings available in the past and the time commitment for the (2) credit hour course matched the standard (2) hours of formal course instruction. The laboratory course, in response to capacity limitations, provided an alternating system asking students to attend face-to-face labs on alternating weeks and use the opposite weeks to engage in online lab tutorials. The traditional time commitment of five (5) hours of instruction over a two- week period was reduced to four (4) scheduled hours for the same period. The project-based hybrid experience allowed students to participate synchronously during any of the (3) hours traditionally scheduled for the course, but students were only able to attend face-to-face on one day each week. Enhancements to the course structure resulted in the opportunity for students to engage with formal course content in (5) hours during a typical week, more than the standard (3) hours offered in traditional, fully face-to-face formats offered in the past.

TABLE 2: Anticipated Time Effort Towards Structured Learning

	Communications	**Project-Based**	**Laboratory**
F2F Synchronous Class Session	1 hr.	1 hr.	2.5 hr. On Alternating Weeks
Asynchronous Lesson Content	1 hr.	2 hr.	1.5 hr. On Opposite Weeks
Online Synchronous Class Session	0	2 hr.	0
Total Structured Learning Opportunities	2 hr.	5 hr.	4 hr. Across Two Weeks
Total Credit Hours	2	3	1

Engineering Communication Courses

In-person classes were restructured away from the traditional lecture and activity format to a workshop format. Traditionally, this course does not set intermediate deadlines for the student writing assignments and learning activities were traditionally used to help students develop small-scale writing or oral presentation skills resulting in a strong formal document or presentation. Alternatively, the students in the hybrid structure were required to complete small parts of the major upcoming assignment in parts. Once in class, the students were required to participate in small group discussions about the material that they had prepared prior to coming to class. Students were encouraged to “think pair share” after receiving examples of past student work ranging from needing work to well-developed [1], [2]. Students were then able to compare their work to previous examples, instructor expectations, and peer examples to develop their writing skills. Instructor-set

benchmarks used for the writing workshops included the three main points and the first sentence strategy (Figure A.1), the introduction, body content, and conclusions. These workshops were particularly helpful for students to get ideas about what technical writing looks like in practice, improving their writing skills and encouraging them to complete the paper in parts rather than completing the entire paper the day before it is due. The workshops were also integrated into the oral communication sections of the course. Oral presentation workshop topics included converting a paper to a presentation, developing PowerPoint slides or posters, and poster critique sessions. Students who participated in the workshops and discussed their work with a peer or instructor more frequently met presentation requirements when compared to students who chose not to participate in the workshops. All workshops were graded, with a requirement that work be completed and submitted to the course Learning Management System (LMS) prior to coming to class so that they could fully participate in the in-class workshop session.

Outside of class, students were required to watch pre-recorded lectures, prepare workshop materials, and complete homework assignments that normally would have been completed in class as learning activities. In order to encourage students to watch the asynchronous video lectures, quiz questions were embedded in the videos (Figure A.2), making students fully watch through the videos to get credit towards their overall course grade. In order to keep students on track, they were required to watch the asynchronous video at some point during the week for which the video was assigned. Online-only assignments had a one-week deadline for completion and submission. Students were also required to participate in self and peer evaluations of their technical writing and pre-recorded oral presentations. Students who were unable to attend class were required to participate in workshops by posting their materials into a discussion board. The discussion boards helped to facilitate distance discussions that were intended to function similarly to in-class workshops. Students were required to read the material from at least two other students and provide feedback to get full credit for the workshop activity. To improve online community, students were encouraged to participate in a class discussion board. Participation in the course discussion board was an optional, ungraded opportunity to find answers to frequent questions and to get peer feedback when needed [3]. An additional attempt at creating out-of-class community was to assign group homework assignments. Assignments were limited to students in the same face to face meeting and used discussion boards to encourage instructor-monitored communication. All assignments were planned to enhance the technical writing or presentation skills of all students. In online asynchronous courses, community is important for students to feel as if they are still a part of the class, as they are no longer working directly with their peers or getting to ask questions directly to the instructor. Asynchronous videos supported the rotating face to face hybrid setup well, so that the instructor could focus only on the students present for workshops rather than having to integrate excess technology and video conferencing into the classroom experience.

This course setup was not popular with the students, as they felt they could not ask questions and were not given enough instruction on how to complete major assignments. Even though student perception was negative, they were actually provided with more support and instruction than in previous semesters. One common student comment is that they needed more support from the instructor during the in-class workshops. Instead of the think-pair-share method between only students, it would have been more beneficial to the student learning experience to have group moderators consisting of an instructor or teaching assistant. The facilitator could guide the students and give developed feedback in addition to obtaining feedback from peers at or near the same

experience level [1], [2]. Given the pandemic and university guidance, attendance was not an acceptable grading requirement. Students would get around participating in the workshops by submitting their work prior to class, but then not showing up for class. To follow this format in the future, the instructor would need to take attendance as a part of the workshop grade. Students also needed a more direct line to the teaching assistants, who were asked to not be present in class due to the perceived risk of classroom virus transmission. Asynchronous videos may also be better supported if students could see the instructor's face during the recording rather than just seeing a PowerPoint and board notes [3]. Students at the sophomore level were not prepared for such a rigorous course to not be taught in a traditional face to face method. Overall, this course methodology of workshops paired with asynchronous learning could work with some additional improvements to workshops, attendance, and video presentation.

Project-Based Learning Courses

Active in-class learning opportunities modeled after a flipped classroom format style were applied to hybrid project-based learning courses. With well-aligned and high-quality online content, students can be provided the fundamental concepts related to both technical and professional skills outside of the class session. Application of the flipped classroom style of delivery allows the in-class time to be dedicated to problems-based work during which time students are primed to ask questions as they complete the analysis or design work. In a rotating face-to-face hybrid course experience, students attended only a fraction of the class sessions which reduced the number of students present on any day of the week. The advantage in this structure was the reduced class size which allowed for improved faculty-to-student interaction; while a student may only be engaged in the live session once a week, that single experience could be more informative and more immediately address the student's level of learning because of the small group encounters. Further, in dedicating class time to working sessions, students could work either in teams or across teams, with guidance from a professor, to regularly engage in discussion while also more consistently making progress towards project completion. Providing the opportunity for students to actively assess their understanding and offering the discussion prompts to relate course activities to the needs of their design project can be enhanced in the hybrid course structure which allows for more focused student-centered activities [4]. The implementation of a "workshop" class session includes providing content on an online platform in advance of the session, providing specifically guiding instruction for the in-class actions, and offering some post-workshop follow up responsibility. For example, online content expressing the expectations of a formal client meeting can prepare a student to participate in an in-class workshop during which students are guided through a short series of prompts to create a meeting agenda and a post-workshop assignment could simply request the students submit their draft through the course's LMS system. The enhancement to traditional delivery of professional skills training is the improved active learning experience, paired deliberately with tasks the students must perform for the success of their project. The hybrid experience promotes most of the positive aspects from both traditional lesson delivery and flipped classroom design [5]. Further, the requirement for students to actively create content for their project, whether that content be technical or management-focused, allows for more dialogue during class sessions and a more structured feedback process post-workshop. These enhancements implemented this year allowed the professor to be more integral in the development of content without micro-managing student efforts.

Outside of synchronous class offerings, opportunities to engage students in dialogues about their design projects, such as interviews and ePortfolios, can improve not only the project results, but many other aspects of student learning. The deliberate design of the hybrid course format offers the faculty the opportunity to influence students' time efforts outside of class time, potentially more so than in traditional in-person delivery of lesson materials. Interviews are a creative tool a professor can use to engage students regularly in a relatively easy-to-implement form. By providing a student with a specific rubric, serving as an outline for the needed preparation, an interview can be conducted live or asynchronously, through video or face-to-face, and the subject matter can span any assessment topic the professor seeks to capture (see Appendix B for additional content). In project-based learning courses, progress interviews can serve as a mechanism for students to make guided partial progress, reiterate their process to affirm correctness of their approach, solicit feedback in a low-stakes assignment and in advance of grading of the major project assignment, and request input from the professor. An ePortfolio is another element useful in the hybrid project-based course as a tool to perform assessment, moderate progress, and encourage creative thinking. In some cases, very similar to interviews, an advantage of ePortfolios includes display of student process and allows for a visual platform to support interviews or reviews of progress to date. Additionally, ePortfolios require students to re-structure their thoughts and ideas and present them in a concise, formal, but inviting style; often, students recognize their own questions, concerns, and errors in crafting content in this structured medium [6].

After implementation of these traits of hybrid courses across an academic year, some positive outcomes included: improved rapport, improved feedback mechanisms, and improved engagement specifically for diverse learners. The smaller in-class attendance on any class session day allowed for both connecting with students and addressing their questions while also sharing professional experiences and future forecasting of the application of the lesson beyond the classroom. Often the in-class sessions, whether working problems on boards in small groups or engaging in a directed workshop agenda, allowed for students to self-identify questions or concerns related to their projects even for activities not immediately relevant to the project work itself. Interview and ePortfolios allowed students to express their content in unique and personalized ways; for some, the use of recorded videos allowed them to script their statements which improved their content and likely their understanding. In one example, a student chose to express their interview in complete silence, using short text prompts within his video to express the content required from the rubric provided; this opportunity was unlike other assessment tools and allowed the student to participate in a more personalized way while still completely satisfying the assessment criteria. While collaboration was neither promoted or discouraged, the independent learning was evident and easier to confirm through these assessment tools, through the more direct one-to-one engagement in class, and with the support of online content available for review and re-review "on demand" for student access. Three important observations should briefly be identified. Workshops and in-class board work must be designed with defined structure and aligned with the time available so students can leave the session satisfied and successful. The course structure including in-class obligations and out-of-class obligations needs to be explained well, multiple times; enforcement of pre- and post- class session work is required for students to both be prepared for the class session and also to receive feedback after the session. At this time, students are new to the dynamic course structures and have not been trained for the independent learning responsibilities and faculty need to be prepared to create safety nets to provide support, especially early in the term. Recommendations include direct email communication to students absent or

inactive on the LMS system, use of discussion boards and announcements clarifying the expected actions, and some mechanism for grace that enforces behavior firmly, but recognizes the challenges of transitioning to a course structure more complex than likely experienced in other academic training.

Laboratory Instruction

Laboratory courses offer students the opportunity to apply their theoretical knowledge in a hands-on environment creating physical memories for abstract ideas. Moving labs online initially seems anathema to that goal. However, research has shown that with clearly defined learning objectives [7] and interactive, easy to digest, content [3] a valuable online laboratory experience is possible. The implementation of a rotating hybrid model, wherein student groups alternate between online and face to face class sessions weekly, can further improve the student experience by pairing thoughtful online content with small group, hands-on learning opportunities.

The laboratory course used as an example in this section teaches geotechnical engineering field sampling techniques and testing methods through interactive exercises. Students are broken into groups of five and are required to conduct experimentation adhering to standard methods and to produce professional technical reports conveying the results, analysis and application of the collected data. The course culminates with a project wherein each group submits soil profile calculations including bearing capacity and predicted settlement for use in foundation design. The following discussion about engineering laboratory courses will focus on integrating online content into a traditionally fully face to face laboratory course, along with strategies for creating an effective online laboratory learning experience.

Moving portions of the course online when all work is group based can create concerns regarding individual student understanding of course content, but these concerns are easily assuaged through minor changes to the in-person course delivery and assessment methods. The semester is designed so each group technical report contains related data from both online and in person exercises. Throughout each in person exercise there is a review of key points from the online content highlighting relationships between both data sets. Acknowledgement of asynchronous content unifies the overarching concepts and presents an opportunity to address questions related to both exercises. This step promotes understanding and one on one verbal quizzes are built into the syllabus to assess that understanding on an individual level. Students are required to complete a verbal quiz that relates to each of five technical reports. Quizzes are scheduled at the end of in person lab exercises and consist of three base questions relating to procedure, analysis, and application. Students are graded on a scale of 0-5 in each category (see appendix C for sample rubric.) The verbal quiz in application is a conversation with each student wherein the grading is related to how well the student drives the dialogue and how accurately they relay basic information contained in their group report. This system promotes personal accountability for all content and gives the instructor real time feedback as to the effectiveness of the course delivery method [8].

Creating an effective online laboratory exercise is less about technical skills and more about analyzing student outcomes. The point of most undergraduate laboratory experiments is not mastery of a specific testing process, but rather using a testing process to demonstrate a theoretical concept materially. Generally, more than one lab exercise will be used to reinforce the same

concept so those can be paired together into online and in person components. For example, in a geotechnical lab, students may be asked to perform both a specific gravity and hydrometer analysis on the same soil with the joint outcome of detailed soil classification. These two experiments can be paired together and then specific gravity, the less complex experiment, can be converted to an online experience. Students are still able to physically interact with the soil sample and are present in class for the more complicated hydrometer procedure where faculty oversight and guidance is more valuable. The resulting report would not be submitted until all students complete both experiments.

To promote student success and reduce the learning environment adjustment period, online laboratory experiences within a course, and ideally within a department, should all follow the same template. Using the guidance provided in *Small Teaching Online* [3], recommended elements for said template include the following:

> *Theoretical Video* A short presentation covering the reason for a procedure, any applicable theoretical background, calculations and report requirements. This will prepare students for the procedural video and help to reorient them to the experiential learning process.
>
> *Procedural Video* A video of the experiment. Narration should include not only standard procedural cues but also identifiable physical sensations (temperature variations, sounds, weight, etc.) It is important to take steps to recreate the laboratory environment by promoting active engagement with the recorded content and requiring student participation in data collection. Many LMS systems will allow the user to imbed quiz questions in videos and doing this can encourage student interaction. If this is not possible, give verbal cues in the video for data collection or key concept reinforcement opportunities.
>
> *Integrated Manual* Videos should be housed in an LMS page that allows for the integration of additional course content. Including a text summary of the information presented in the theoretical video will reinforce key concepts. All necessary documents should be hyperlinked in this single integrated manual for easy access and organization.

After implementing a rotating hybrid system in four laboratory courses over the last year, some positive outcomes include: improved student accountability, improved rapport, and improved ability to accommodate unexpected circumstances. Group reporting paired with verbal quizzes reduce the out of class time for students and increase instructor's ability to gauge individual levels of comprehension. The smaller in person sessions allowed for increased communication, detailed instruction and individual attention. Pre-recorded, asynchronous labs serve as a ready-made option for students who miss a laboratory session and can revolutionize the make-up lab policy for a given course. The recordings are also beneficial in larger lab sessions where not every student can see the experimental set up clearly and they allow students to review experimental procedures independently while writing their reports. Moving forward the recorded theoretical background lectures may help reduce the in-class lecturing time and increase student readiness and understanding [9]. So, while there is no true replacement for the traditional laboratory course, asynchronous online lab content can enrich the student experience while providing support and flexibility for the instructor.

Conclusion

Sudden alterations in classroom modes due to the coronavirus pandemic inspired positive adaptations to course delivery that may not have otherwise taken place. The inherent complexity of technical communication, project-based, and laboratory courses required custom hybrid solutions. Through the implementation of course elements such as peer-lead workshops, ePortfolios, individual interview-style assessment, and packaged asynchronous content students were able to maintain a high level of engagement in spite of the reduction in contact time. Though implemented out of necessity, these changes created opportunities for students to take autonomous ownership of their course materials while enhancing the quality of interaction with instructors. This increased versatility of course delivery will continue enriching the learning experience for both students and instructors long after academia returns to pre-pandemic course formats. In the effort to capitalize on the pandemic teaching encounters, the hybrid structure of delivery for less traditional course types will prove to be a positive outcome from the drastic opportunity for change.

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Appendix A: Technical Writing Course Content

Both in-class and out-of-class sessions were supplemented with informal assignments. Prior to coming to an in-person workshop class, students were required to complete the relevant portion of the writing assignment relevant to the workshop (Figure A.1). Students were required to complete the pre-assignment prior to arrival to class, this allowed them to share and improve their written content, further improving writing skills and the content of their major written assignments. Out-of-class, asynchronous video lectures were paired with true/false video questions to keep students engaged and to measure student understanding of lecture material (Figure A.2). All assignments were posted to Canvas for student interaction.

Figure A.1: Example Pre-Workshop Assignment

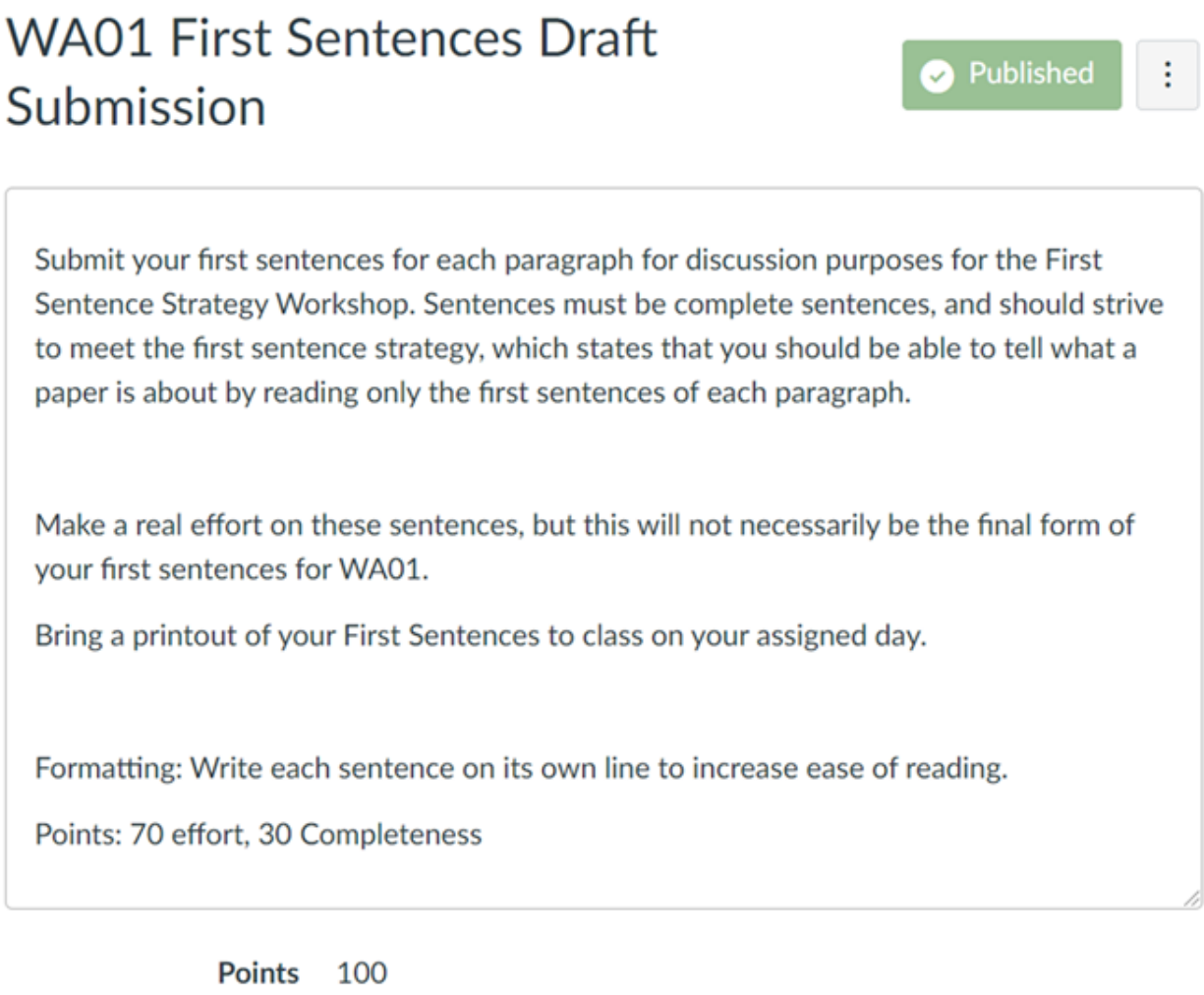
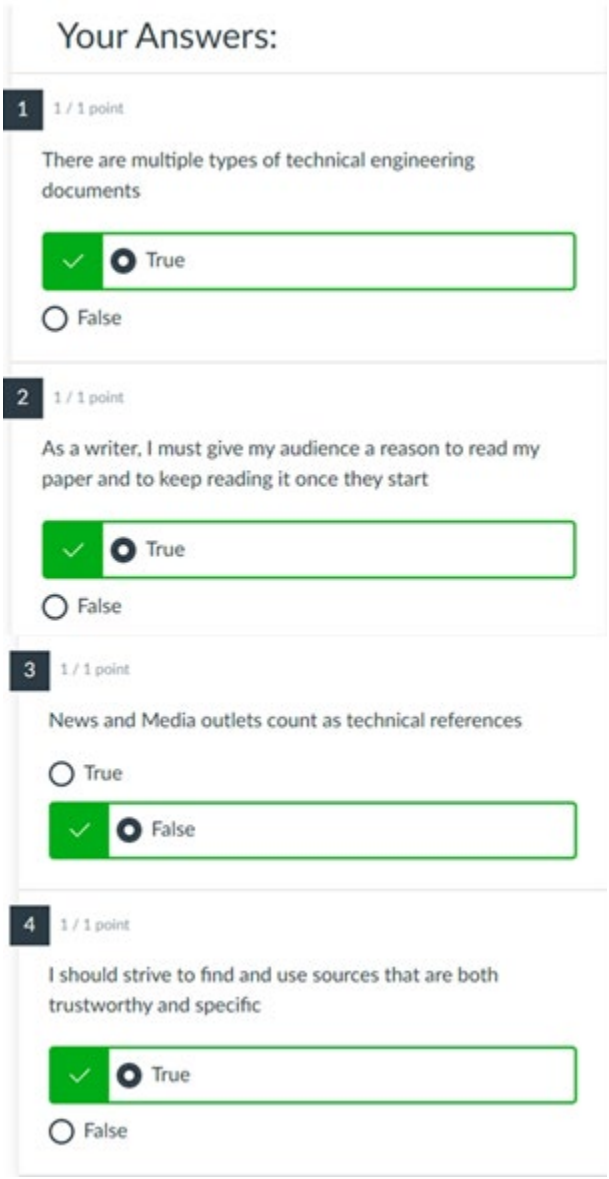


Figure A.2: Sample Asynchronous Lecture Video Quiz Questions



Appendix B: Project-Based Learning

The ePortfolio assignment was designed to assess class engagement through the term and was met with good success influenced significantly by the use of interviews as a tool for assessment. In the hybrid learning experience, concerns were raised regarding course note-taking and retention of learning materials after the LMS site closed and students no longer had access to the online content. Additional professional skills training was also developed through the sequence of assignments contributing to this specific graded element of the course. Ultimately, the assignment consisted of an initial instructions guide supported by criteria to be prepared for (3) distinct interviews. Two interviews were required to be hosted live (online) and one was available with the option to submit a pre-recorded video. Rubrics for the three interview sessions are shared herein. Students became extremely efficient in participating in the interviews, understood the needs to meet the criteria expressed within the simple rubrics, and most created ePortfolio and project-based work above minimum standards expressed through assignment instructions.

Figure B.1: ePortfolio Learning Objectives

Learning Objectives

Develop a records-keeping system.
Maintain evidence of engineering work performed.
Record effort of independent learning.

Figure B.2: Grading Rubrics for (3) Review Interviews

REVIEW 01: Grading Rubric	
Task	**Scoring**
Schedule and participate in meeting with Dr. J	Score will be a ZERO if this is not performed
Individual ePortfolio site created	Earn 1 point
Site has been updated to reflect individual (narratives, written content on landing pages, etc.).	Earn up to 2 point
Site includes content that demonstrates individual effort to record personal notes from Canvas lesson materials. At least one piece of evidence for each course lesson* to date (min. 4), specifically: ● Week02M Lesson Materials ● Week02W Lesson Materials ● Week02F Lesson Materials ● Week03 Lesson Materials: Intro.	Earn up to 1 point
Site includes content that demonstrates individual completion of homework. At least one piece of evidence for each homework to date, specifically: ● HW02A, HW02B ● HW03A, HW03B	Earn up to 1 point
REVIEW 02: Grading Rubric	
Task	**Scoring**
Participate in the review. Attend an interview session or share a video. Unprofessional videos may be severely penalized.	Score will be a ZERO if this is not performed
Site's Independent Learning space has been enhanced to either:	Earn 1 point

• Include more than only structures content. At least one piece of evidence exists that shows individual effort to independently grow in one additional field of civil engineering study. • Deliberately serve as a tool for preparing for the FE exam. Language on the site makes this apparent. Headings and organizational trends align with preparing for the FE exam.	
Site has been enhanced to display homework assignments in an impactful way, either: • HW has been organized to deliberately feature accomplishment in specific technical or professional skills. • HW has been deliberately organized to prepare for the FE exam by preparing well organized and labeled materials. Ensure headings and organization are deliberate and intentional so the viewer can recognize the effort.	Earn 1 point
Course notes are yours, course notes are comprehensive, and course notes respect the intellectual property of our course (content has been suitably paraphrased and restructured for your site). Content has clearly been received from the course and you have independently processed that information, assembled important points, and presented your own unique work.	Earn up to 2 point
Site has been updated to include new course materials and homework assignments, specifically: • Week04 Lesson Materials • Week05 Lesson Materials • HW04 • HW05A & HW05B	Earn up to 1 point
TOTAL	**5 points**

REVIEW 03: Grading Rubric	
Task	**Scoring**
Participate in the review. Attend an interview session or share a video. Unprofessional videos may be severely penalized.	Score will be a ZERO if this is not performed
Site's Projects page has been updated to include: • Some landing/introduction/information to preface the page; content that prepares the reader for the content shared on this sub-page. • At least one visual relevant to your CE371 project. • At least some verbal content relevant to your CE371 project. Be sure any content referenced from Google Drive is set so sharing permissions allow all guests to view any attachments or external files.	Earn up to 2 points
Site has been enhanced in some way to celebrate you as a person. A person who has interests and passions. A person who has motivation and drive. This enhancement is completely your discretion; however, the location and content needs to be created mindful of the audience. Locate the content deliberately, provide headings and topic sentences, develop content that you would recognize and be interested in viewing as a guest to your site. Keep in mind, the site needs harmony; be sure there is a means that completes your story such that this new content does not seem out of place.	Earn 1 point
Share this page with some person outside of our course. Ask them for their first opinion of the site. Share their remarks.	Earn up to 1 point
Site has been updated to include new course materials and homework assignments, specifically: • Week06 – Week 10 Lesson Materials personal course notes • HW06A – HW10	Earn up to 1 point
TOTAL	**5 points**

Appendix C: Lab Instruction

This verbal quiz was designed to assess individual student understanding of material presented in group assignments. The quiz process is a conversation between the instructor and the student in which the extent to which the student independently leads the discussion is directly reflected in the grading rubric. The same general rubric is applied to all verbal quizzes (Figure C.1)

Figure C.1: Grading Rubric for a Verbal Quiz

Criteria	Ratings						Points
Procedure	**Exceptional** 5 pts Able to answer the question using technical terms without prompting or notes.	**Good** 4 pts Able to answer the question without prompting or notes.	**Fair** 3 pts Able to answer the question with minor prompting.	**Developing** 2 pts Able to answer the question with prompting and notes.	**Poor** 1 pt Unable to answer the question.	**Absent** 0 No show	5
Analysis	**Exceptional** 5 pts Able to answer the question using technical terms without prompting or notes.	**Good** 4 pts Able to answer the question without prompting or notes.	**Fair** 3 pts Able to answer the question with minor prompting.	**Developing** 2 pts Able to answer the question with prompting and notes.	**Poor** 1 pt Unable to answer the question.	**Absent** 0 No show	5
Application	**Exceptional** 5 pts Able to answer the question using technical terms without prompting or notes.	**Good** 4 pts Able to answer the question without prompting or notes.	**Fair** 3 pts Able to answer the question with minor prompting.	**Developing** 2 pts Able to answer the question with prompting and notes.	**Poor** 1 pt Unable to answer the question.	**Absent** 0 No show	5
						Total	**15**