

Designing and Administering Remote Assessments

During June and July, 2020, a committee of faculty, staff, and students met to discuss and develop guidance related to designing and conducting exams and other assessments in a remote (or hybrid) educational context. This report is the product of that group's work. The recommendations herein are derived from relevant scholarship as well as promising practices from CMU faculty across multiple units. In addition, case studies documenting specific assessment experiences from Spring 2020 are provided as examples for instructors to adopt or adapt. Many thanks to the committee members¹ for their hard work and thoughtful contributions.

Although the prospect of using traditional assessment practices for Fall 2020 may be tempting, there are multiple reasons to adjust your approach. Given the context of remote and hybrid education – including the fact that *all* course experiences will be remote after Thanksgiving break – assessments will need to incorporate remote administration. And with this change in mode of administration, it may also be beneficial to make adjustments to the format and design of your assessments, so that students can demonstrate their learning and you can evaluate their work as effectively as possible. In addition, the COVID-19 pandemic is likely to generate complications and stress later in the semester when [summative assessments](#) occur. Given this evolving situation and resultant uncertainty, let alone the implications of remote education, course instructors are encouraged to *think now* about how they might be able to adjust their assessment strategies.

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We know that remote assessment is new territory for many, and we acknowledge that there will be considerable variation in the assessment needs of different colleges and departments. If you would like to discuss particular aspects of your Fall 2020 assessment approach or any other teaching or technology considerations, please email eberly-assist@andrew.cmu.edu to request a 1:1 consultation.

We offer this set of recommendations for the hybrid/remote modes of instruction taking place during the Fall 2020 semester. It is designed to supplement and extend the existing guidance on [Assessing Students' Learning and Performance](#) from the Eberly Center. The recommendations are organized as follows:

- I. Strategies for Assessing Student's Learning and Performance
 - [Frequent Low-Stakes Assignments](#)
 - [Quizzes and Concept Tests](#)
 - [Exams](#)
 - [Group Work](#)
- II. Strategies for Enhancing Academic Integrity in Hybrid/Remote Environments
 - [Promoting Academic Integrity](#)
 - [Monitoring and Deterring Potential Violations](#)
 - [Using Remote Proctoring Tools](#)

Frequent Low-Stakes Assignments

Remote and hybrid modalities may open up additional opportunities for instructors to consider incorporating [recurring, low-stakes assignments and assessments](#) in place of some/all high-stakes assessments – i.e., more homeworks/quizzes, fewer exams. This assessment strategy provides students with more frequent opportunities for practice and feedback over the course of the semester while offering instructors meaningful data points pertaining to students' learning and overall progress. Note that “low stakes” means the assessment gets assigned fewer points or perhaps may be scored based on completion rather than accuracy/quality. (This still gives practice opportunities but can reduce the grading burden.) As with traditional modes of instruction, designing assignments for hybrid and remote environments begins with [alignment with the learning objectives of the course](#).

What is the pedagogical value of moving to this type of approach?

Learning science research provides ample evidence that students learn by doing (Ericsson et al., 2003; Koedinger et al., 2015), that performance and retention improve with repeated practice (Healy et al., 1993; Martin et al., 2007;), and that feedback enhances learning efficiency (Balzer et al., 1989; McKendree, 1990). So by providing students with frequent low-stakes assignments – e.g., rather than only giving one or two high-stakes exams – you are giving students the practice and feedback they need to learn. And as an assessment strategy, students are demonstrating their learning across a larger sample of tasks and contexts, which leads to more accurate assessment of their proficiency. Another advantage of low-stakes assignments and assessments is that, on average, they show lower rates of cheating and plagiarism than high-stakes assessments. Finally, it is worth noting that, in our [Spring 2020 survey of CMU instructors and students](#), low-stakes assignments were rated among the most helpful strategies for student learning.

Re-allocate final exam questions into multiple shorter assessments

Instead of giving a high-stakes exam during finals period, subsets of questions intended for the final exam can be pulled into [shorter assessments administered every few weeks](#) throughout the semester. Note: questions on these shorter assessments can still involve synthesis or integration of the material; they need not revert to simple recall questions.

- These shorter assessments may be assigned/completed during or outside of class time.
- While they may be scored at the individual student level, group-based feedback may be provided, e.g., in the form of a solution set or via in-class discussion of common errors and other patterns in students' performance.

Align number and size of assignments with course unit load.

To answer the common question about “are we overloading our students by adding more things for them to do per week, especially if all of their courses are doing this” - as long as course instructors stick to the unit load, then it is a fair amount of work. In other words, for semester-long courses, aim to ensure that the time students spend on your course, on average per week, is approximately equal to the number of units. Note: all assignment and assessment types as well as class time should be factored into this calculation.

- To help students structure their time, it is important to [frame what a typical week will look like](#) in terms of the tasks they will need to complete.
- Instructors can also mention that there won't be as big of a push during midterms/finals (e.g., if these exams are scaled down or eliminated), but that it will be a more consistent amount of weekly work AND that their grade won't depend so heavily on the high-stakes assessments.
- Consider options that allow for flexibility in the event of technology failures, such as allowing students to drop the lowest score.

Assign milestone, component tasks in advance of submission of final deliverable.

Many course instructors assign interim assignments leading up to a final [paper](#) or [project](#). This approach sequences assessment tasks over a number of weeks or months which serves to reduce procrastination and completion of a substantial project or report immediately before the deadline.

- Depending on the learning goals of the assignment, students can receive points for effort (e.g., submitting milestones for working on the deliverables) or for quality of responses.
- Just as you remind students to spread their work more consistently throughout the semester, rather than a big push at midterm and finals, this is also good to keep in mind for yourself as you plan for your own grading.
- To help mitigate the grading burden, consider where you can provide group-level [formative feedback](#), either via a Canvas announcement or verbally during a synchronous session.
- Regardless of grading approach, formative feedback can be given during synchronous sessions to avoid grading load later in the semester.

Provide structure for class participation if it is assessed.

Given the potential of a variety of modalities including in-person, hybrid, and remote, it is important to communicate your expectations for meaningful participation, particularly via Zoom.

- Consider providing a rubric for participation so that students are aware of your expectations. An example of a rubric from a History class in Dietrich College is available [here](#).

- Use [technology](#) such as the [Zoom chat feature](#) to provide opportunities for real-time communication and access for students who might be hesitant to participate in a remote environment.
- For hybrid courses, ensure that students have equal access to participation opportunities regardless of their physical location.
- Consider providing opportunities for asynchronous participation including [discussion boards](#) in Canvas, Q&A in [Piazza](#), or written reflections submitted as a Canvas assignment.

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Quizzes and Concept Tests in Remote/Hybrid Environments

Quizzes and [concept tests](#) present a wide range of opportunities for instructors who wish to incorporate timed low stakes assessment on a recurring basis. As with untimed assignments, this approach provides students with more frequent opportunities for feedback and grading over the course of the semester while offering instructors meaningful data points pertaining to student learning and overall progress.

What is the pedagogical value of moving to this type of approach?

Recent research conducted in learning science labs as well as in real classes has shown that, under a variety of circumstances, students learn more from taking a quiz than from studying (Agarwal et al., 2007; Roediger & Karpicke, 2006). In other words, testing students is as much a learning activity as it is an assessment. The explanation for this phenomenon, called the “testing effect,” involves the idea that students are activating their memory as they work on the quiz questions, and this process serves to strengthen connections in memory.

Align expectations and assignments with course unit load.

To answer the common question about “are we overloading our students by adding more things for them to do per week/all of their classes are doing this” - as long as course instructors stick to the unit load, then it is a fair amount of work. All assessment types should be factored into this calculation.

- To help students structure their time, It is important to [frame what a typical week will look like](#) in terms of the tasks they will need to complete.
- Instructors can also mention that there won't be as big of a push during midterms/finals, but that it will be a more consistent amount of weekly work AND that their grade won't depend so heavily on the high-stakes assessments.
- Consider options that would allow for flexibility in the event of technology failures such allowing students to drop the lowest score.

Offer frequent multiple-choice quizzes that test students' knowledge in abbreviated form.

In order to help students check their own understanding of the course material following a lecture, instructors can create [brief multiple-choice quizzes](#) (3-5 questions) in Canvas. With this format, quizzes may be autograded in Canvas. They are designed to measure student understanding of the material covered in the lecture and help the course instructor identify areas in need of review or further clarification.

- This strategy can also be employed before lecture to measure understanding of the assigned readings, or during class as a form of attendance and practice (though such quizzes might be limited to one or two questions so they take less time). Instructors should consider which option best helps accomplish the goal they are trying to achieve.
- Make sure to provide explanatory feedback for the correct responses as well as critical narrative for the incorrect responses: this improves students' self-reported understanding of material (Sullivan, 2016).
- This approach enhances knowledge retention by providing multiple opportunities for students to retrieve information (Roediger & Karpicke, 2006).
- Allow students to take Canvas quizzes with a fixed time allotment and flexible start windows to ensure that all students, regardless of time zone, can benefit from the participation and practice. Alternatively, create a different version of the quiz for students in other time zones.

Consider how to use technology to deploy quizzes in a time-efficient manner.

For instructors who wish to employ low stakes assessments on a regular basis, it is helpful to strategize around the best way to administer those assessments in a timely manner that is accessible to students. Technology can help to streamline these processes (e.g., via [Canvas quizzes](#) or by using [Gradescope for grading](#)). That said, it is beneficial to both practice in advance and have an alternative to offer students in the event that the technology fails. One possible approach for ensuring academic integrity pairs the [use of smartphones for quiz deployment with Zoom video to monitor students' hands and quiz papers](#) during the class meeting.

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Exams in Hybrid/Remote Environments

The process of [creating exams](#) necessarily foregrounds considerations related to equity, level of difficulty, and accuracy of measurement. Exams in hybrid and remote modalities have added complexities with issues that include but are not limited to exam format, use of technology, academic integrity, and accommodations for students with documentation from the Office of Disability Resources. While acknowledging that there is no single solution that will meet all needs, the following suggestions are designed to help instructors identify approaches that speak to these considerations.

Redevelopment of exams requires time and attention to exam design and formatting considerations.

Faculty who transition to remote exams report that it is insufficient to simply transfer questions from paper formats to online formats (Cramp et al., 2019) but rather time and attention should be directed to redesigning for remote formats (Böhmer et al., 2018). In particular, the following design considerations are important:

- Students should be able to easily discern how to navigate within the exam. If possible, instructions should be itemized and distinct from the exam questions (Parshall et al., 2002).
- Consider the format for how students will submit their assignments. Exams that are written on paper and require scan and upload at the end of the exam period can create additional pressure points for students. If students can submit text-only responses, the [quiz function in Canvas](#) can be used for such exams, eliminating the need to scan and upload. Alternatively, editable exam templates and fillable PDF documents can also allow students to save and upload typed responses. (See also an [instructor guide](#) and [student guide](#) on using Gradescope assignments.)
- If students are required to submit responses in formats other than text (i.e., drawings, figures, etc.) that do require scan and upload, factor in additional time to scan and upload when designing the exam. Scanning apps such as Cam Scanner and Scannable allow students to scan documents from a smart phone or tablet.
- The exam format and logistics – including technology needs – should be explicitly communicated in advance, and students should have the opportunity (and even encouragement and/or requirement) to practice in advance, so that technology problems are surfaced earlier rather than later and so that students have some familiarity with the format before exam time.

Incorporate different question formats within exams to promote academic integrity.

- Consider using open-ended questions (with short or long answers) as well as/instead of multiple-choice questions. Open-ended question formats make it harder for students to share answers.
- For exams in which students have to perform a calculation or solve a problem, ask them to show their work or explain their approach to improve assessment accuracy and mitigate cheating risks.
- Open-book, open-note exams are another option for hybrid/remote environments. These exams tend to focus more on whether students can apply concepts and how well they can explain their approach, rather than recalling facts or solving simple problems.
- For written assignments, create questions that require critical thinking, as these types of responses may mitigate opportunities for cheating (McNabb & Olmstead, 2009) and plagiarism (Heckler et al., 2013).

Explicitly remind students about the expectations for each assessment.

At the beginning of your exam/evaluation, include an explicit reminder to students of what is appropriate/inappropriate collaboration or use of resources for the exam/evaluation they are about to take. You can also note the potential range of consequences and ask students to acknowledge that they have reviewed and understand these expectations prior to beginning the assessment. Such reminders may help to reduce the likelihood of violations (Corrigan-Gibbs et al., 2015).

Consider student time zones when planning exams.

- To get a sense of your students' time zones for planning purposes, you can find this information on [course rosters](#).
- To offer flexibility for students in different time zones, allow students to take Canvas exams/quizzes with a fixed time allotment and flexible start windows to ensure that all students, regardless of time zone, can benefit from the participation and practice. Alternatively, create a different version of the quiz for students in other time zones.
- If it's possible to create two form of your assessment ([see section below](#)), you can offer them to students at different times.

Generate more than one version of your exam or exam questions.

- If you use multiple-choice questions, randomize the order of the answer choices (Sullivan, 2016). This can be done when setting up a quiz in Canvas.
- Similarly, instructors who wish to substitute numbers in "parameterized" exam questions can do so within Canvas or OLI. Here, the system generates a version of the question for each

student by inserting a number (from a range you indicate) for a given parameter of the question. To do this in Canvas, see the instructions on [Creating a simple formula question](#) and [Creating a question with a single variable](#). To do this in OLI does not require the creation of an entire OLI course. For more information on implementing this strategy with either tool, please email eberly-assist@andrew.cmu.edu.

- Consider using two versions of the exam that are equivalent in difficulty, but use slightly different questions (Chiesl, 2007). Note: Some instructors are planning to write a set of exam questions that covers the most essential learning objectives for the course (Kinzie, 2020) and then to (randomly) sample from this set to create two different exams – i.e., with the intent that the randomization will, on average, address equivalence issue).
 - You can do this manually, or Canvas allows you to create a [“test bank”](#) from which you can draw when [creating an assessment](#). This approach minimizes perceived practicality of cheating (Sullivan, 2016). This may be especially relevant for students taking exams in different time zones.
 - Following the exam, you may wish to review the grade distributions across exam versions to determine whether a correction is needed to account for differences in difficulty.

Incorporate mastery exams that allow students multiple attempts.

In the [mastery format](#), students can retake the exam (or different versions of the exam) multiple times in order to demonstrate mastery. Early attempts do not affect the student’s final grade. This focus on mastery over memorization allowed students to demonstrate their knowledge more fully, and lower their stress. Mastery exams can follow many different formats and have been used in multiple departments including Computer Science, the Information Networking Institute (INI) and Statistics and Data Science.

Consider if “oral review” could be incorporated as an element of an exam strategy in which students submit their exam via the assigned method and then discuss a sub-sample of their responses in individual sessions with a course instructor or TA.

Although the majority of scholarship on oral exams has been conducted outside of the U.S., the education literature offers some evidence of benefits of oral assessment approaches including opportunities to focus on deep understanding as opposed to recall (Iannone & Simpson, 2012) as well as live prompting and correction by the instructor (Douglas & Knighten, 2014). Additionally, oral assessment formats minimize opportunities for plagiarism (Joughin, 1998). That said, it is important for instructors to understand that student anxiety and uncertainty around oral question formats may be high (Huxnam et al., 2010; Iannone & Simpson, 2015). Therefore, it is important to implement this approach

with great care and consideration for a number of complexities including elevated anxiety, implicit bias, and equity. For example, to reduce bias, instructors using this approach are advised to select the sub-sample of questions for oral review in advance and in some randomized manner. Important additional information regarding administration of oral exams is available [here](#).

Deploy technology creatively to simulate classroom environments.

Multiple technology tools can be used during exam sessions to provide students with access to instructors and TA's, similar to what they would experience in a physical classroom. An added benefit to this approach is that instructors and TA's can likewise monitor students throughout the exam. [One approach that has been used in the School of Computer Science](#) combines [Gradescope](#), [Piazza](#), [Zoom](#), and Slack.

Prepare and test all technology that will be required for exams.

Advance preparation and testing will help students demonstrate what they have learned without distractions and unnecessary anxiety. If technology is required for students during your exams/evaluations – for completing the assessment activity and/or for remote proctoring purposes – these strategies are strongly recommended:

- Ensure that all students have the necessary technology and that it works properly for them in their remote learning environment. Enrollment Services sent a survey to all undergraduate and graduate students in July to inventory basic technology needs such as reliable internet access, computer/laptop, webcam, smartphone, and headset. Although this data collection provides important early information, student needs may change throughout the semester. If students report needs related to technology, their [Student Affairs college liaison](#) can work with them to provide support and identify resources.
- Avoid using a technology that is new to students. Use technology tools that you have already successfully used with students (e.g., in prior online activity or assessment).

- Conduct a trial run with the technology. Schedule a trial run when instructors and students practice using the planned exam-administration technologies. Do this enough in advance so that any technical glitches or gaps in students' remote-working environment can be addressed (Cramp et al., 2019).
- The trial run should contain all of the question types on the actual exam. This not only allows students to test the functionality of their technology but affords an opportunity for meaningful review of content.
- If students use any assistive technology, make sure it works with the designated technology. If you have questions about compatibility of technology with assistive devices, please reach out to the Office of Disability Resources at access@andrew.cmu.edu.
- Consider allowing soft deadlines. If your exam may be sensitive to student connectivity issues or time required for students to download/scan/upload, provide some extra time (above and beyond your exam-completion time) for these logistics. Please consider allowing soft deadlines if students report having technical problems.
- Provide a communication channel for students to contact you if technical issues arise during the exam session.

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Considerations for Oral Assessment Approaches

Instructors who wish to use oral assessment approaches should be mindful of multiple considerations, including students' lack of familiarity with the format and the added complexity of the remote environment, particularly since students prefer oral assessments face-to-face as opposed to online (Sotiriadou et al., 2019).

Instructors who are interested in oral assessment formats are encouraged to contact eberly-assist@andrew.cmu.edu for an individual consultation.

It is important for instructors to understand that student anxiety around oral assessment formats may be high.

- This anxiety may be particularly significant for non-native English speakers (Kang et al., 2019).
- Discuss explicit study and preparation strategies for the oral assessment with students.
- Provide detailed information about the norms of the oral assessment format that will be used. Specific considerations might include but are not limited to the following:
 - Can students use pen and paper to jot down ideas before verbalizing?
 - Are answers expected spontaneously and quickly or is there room to pause and think before answering?
 - Are students graded on the end point rather than the path that they take to reach the end point?
 - What happens if the student makes a mistake or says "I don't know?"
 - Will the instructor provide hints or other prompts?
 - Does the student receive multiple attempts?
 - What is the role of the instructor during the conversation?
- In evaluating students' responses, emphasize the content or gist of the student's response rather than how they expressed it. This can reduce communication pressure on all students and especially those who speak multiple languages.

Expectations should be clearly communicated to students via a rubric, including the types of questions that they will be asked and how they will be evaluated.

- An example of an oral exam rubric from a History course in Dietrich College is available [here](#).

- The instructor should carefully consider how much (if at all) “communication skills” should be evaluated during the oral exam (Joughin, 1998). This is especially important if communication skills are not explicit learning objectives.
 - If there are multiple examiners, it is critical that they discuss the prompts and rubric together and hypothetical student responses and scoring. This is to ensure that there is interrater reliability and one instructor isn't seen as more challenging. Alternatively, each exam can have multiple evaluators (Dicks et al., 2012).
- If you have multiple instructors or TAs, consider checking how consistently you are applying the rubric and scoring students by spot-checking each other. This could be done during the practice assessments or by sitting in on a few of each other's assessments. Alternately, oral assessments could be recorded, thereby providing an artifact of the student work in the event that scoring review is required.

Select more complex problems, topics, and content so as to leverage the strengths of the format (e.g. students can explain their thinking, instructors can ask follow up questions).

- Oral assessment formats are particularly useful for assessing higher order dimensions of learning such as application, evaluation, and synthesis. They are also useful for assessing applied problem solving ability and interpersonal competence (e.g. skills exhibited in relation to the exercise) (Joughin, 1998).
- As with any assessment, content should align directly with learning objectives.

Giving students practice with oral assessments (e.g. answering a practice question that is not scored but where feedback is given) is an important component of this assessment strategy.

Doing so helps students feel more comfortable with the format (Douglas & Knighten, 2014).

- Additional practice might include small and large group discussions, to give students practice verbally articulating concepts.
- Short writing assignments where students outline how they might respond to a question orally might also provide opportunities for practice and feedback.

Further resources on oral assessments

As previously noted, much of the scholarship pertaining to oral assessment approaches has been conducted at institutions outside of the U.S. Many of these institutions provide online resources to help inform design and delivery of these approaches. A subset of these resources is outlined below with relevant links.

As always, please know that Eberly consultants are available to talk with you if you are interested in incorporating oral assessment approaches in your course. Please email eberly-assist@andrew.cmu.edu to request an individual consultation.

Topic	Available resource(s)	Institution
Designing oral assessments	Considerations for instructors who wish to consider oral assessment approaches	KTH Royal Institute of Technology Stockholm (Sweden)
Designing and delivering oral assessments	Comprehensive overview of considerations related to oral assessment approaches including accommodations for students with disabilities and bias mitigation	Leeds Metropolitan University + University of Wollongong (UK/Australia)
Shifting to oral assessment approaches	Considerations for instructors who wish to convert traditional in-person exams to oral assessments	Örebro University (Sweden)
Testing technology for oral assessment approaches	Checklist to facilitate preparation for oral assessment approaches in remote/hybrid environments.	Karlsruhe Institute of Technology (Germany)
Communicating expectations related to oral assessment approaches	Sample course policy related to oral assessments conducted in remote/hybrid environments	RWTH Aachen University (Germany)
Helping students to prepare for oral assessments	Tips for students as they prepare for oral assessments in both asynchronous and synchronous formats	University College Cork (Ireland)
Conducting an oral assessment	Overview of best practices during the exam session including strategies for how to ease student anxiety	University of South Hampton (UK)

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Assessing Group Work in Hybrid/Remote Environments

[Assessing group work in any course modality is complex](#), requiring course instructors to evaluate process-related and product-related skills while using indicators from group performance to assess individual grades. Group work in hybrid and remote environments can provide rich learning experiences that will help to prepare students to collaborate in similar environments in their professional work, a key attribute that employers who recruit at Carnegie Mellon identified in a 2020 focus group as being particularly beneficial. The following consideration can help instructors to prepare for the added complexities of assigning and assessing group work in hybrid and remote environments.

Compose student teams carefully.

- With remote and hybrid modes of instruction, there may be added complexities to composing teams. For example, students' schedules may be harder to align given the stretched class day and different time zones. Consider composing teams based on aligning when their schedules are open – to facilitate synchronous collaboration/meeting time. [Additional guidance on group composition](#) is available from the Eberly Center.
- Leverage technology to help compose teams based on various factors, including schedules and geographic locations. A number of faculty in CIT use the [Comprehensive Assessment for Team-Member Effectiveness \(CATME\)](#) for [team formation](#) (Layton et al., 2010) and team management including [peer review](#). It is particularly beneficial for instructors who wish to assess development of teamwork and collaboration skills (Loughry et al., 2014).
- CATME is centrally licensed by the Eberly Center and is available to [course instructors](#) at no cost. Faculty who would like to learn how to use this tool should email eberly-assist@andrew.cmu.edu.

Provide frequent support to teams as they organize and work on projects.

- Spend some time (synchronously or asynchronously) addressing aspects of teamwork that will likely arise in this project (especially ones that may be challenging for students, e.g., agreeing on the team's focus, deciding when/how to meet, assigning roles and responsibilities), and provide resources to make those steps easier for students.
- The Eberly Center provides a number of [sample tools](#) to support group projects including skills inventories and team contracts. Additionally, [CollaborativeU](#) and [ConflictU](#) are online training modules offered through the Open Learning Initiative to support skill development in effective

collaboration and conflict resolution. These modules are available at no cost to CMU instructors and students.

- Both CollaborativeU and ConflictU are designed to embed in an existing class that has a significant team project component.
- Each module typically requires 2-3 hours for students to complete.
- Instructors who wish to incorporate these modules should email eberly-assist@andrew.cmu.edu.
- Help students practice working in teams and get to know their teammates having them work together on a [low-stakes, fun assignment as their first assessment](#).
- Offer support as needed via team meetings, office hours, etc. to groups as they progress in their work. While the frequency may vary depending on the project timeline, periodic check-ins, milestone deliverables, and peer review will allow you to evaluate incremental progress and deliver formative feedback.
- [Incorporating milestone deliverables](#) may be particularly effective for longer term projects that span two weeks or more. This approach not only enables monitoring of each group's progress but facilitates identification of students who are not contributing to the project, providing early opportunities for outreach and engagement.
- Encourage individual students to reach out privately if problematic group dynamics surface. If there is concern over one of the group members, you could schedule a group check in to help students resolve the matter proactively, without disclosing the student who raised the concern.

Encourage students to actively plan for presentation flow.

- Students should determine order of speakers and slide deck management in advance.
- If using the chat functionality in Zoom, you can encourage (or require) a student on the team who is not the current speaker to monitor.

Consider alternatives to live presentations for larger classes.

- If the size of your course prohibits live presentations, consider asking students to record their presentation and post to the course Canvas site.
- Determine the subset of recordings that students need to view and reserve the class meeting times for a live Q&A session with each of the teams. By assigning students specific recordings that they are responsible for watching and developing questions on ahead of time, the Q&A sessions will likely be more productive and beneficial for the teams.

Provide structure for any post-presentation Q&A that requires audience participation.

- Notify students in advance that they will be expected to present questions to their colleagues.
- Consider evaluating students on the quality of questions that they ask. If you opt to do so, [communicate these expectations clearly](#).
- If the size of the course does not permit each student to present a question to every group, provide a structured plan for how to otherwise collect peer ratings or review comments. This can be a graded element or completion/noncompletion.

References

Layton, R. A., Loughry, M. L., Ohland, M. W., & Ricco, G. D. (2010). Design and validation of a web-based system for assigning members to teams using instructor-specified criteria. *Advances in Engineering Education*, 2(1), 1-28.

Loughry, M. L., Ohland, M. W., & Woehr, D. J. (2014). Assessing teamwork skills for assurance of learning using CATME team tools. *Journal of Marketing Education*, 36(1), 5-19.

Promoting Academic Integrity

Recognize that the instructor's role is critical to promoting academic integrity and student decision making in individual courses.

For incoming students, university Orientation programs including the academic integrity session will be delivered via Canvas modules developed by the [Office of Community Standards and Integrity](#). In these sessions, students are directed to consult their syllabi and talk with their instructors for more information about their instructor's expectations, particularly in areas related to collaboration. That said, it is important to note the following:

- While students have the opportunity to receive an introduction to the university's Policy on Academic Integrity during various orientation programs, participation in the centralized university Orientation programs may vary, particularly between undergraduate and graduate student populations. While the majority of undergraduate students participate in the university's Orientation program, incoming master's and PhD students are encouraged to attend but it is not mandatory.
- Many colleges and departments supplement the university-wide Orientation programs with their own programs, particularly for master's students. Many, though not all, of these sessions include information related to academic integrity.
- Thus, while students may receive an introduction at Orientation, it is important to note that exposure may vary and students will be looking to you for further guidance.

Communicate your expectations for academic integrity early and often.

- Review your course syllabus to ensure that it spells out your expectations, particularly with regard to your expectations related to academic integrity. See [this page](#) for issues to consider and sample policies.
- Take some time at the beginning of the semester to explain *and motivate* your academic integrity policy (e.g., as part of your syllabus review on the first day). These conversations establish academic integrity as a community value with shared responsibility for upholding those values. These conversations provide an important foundation for the student-instructor relationship. When students perceive their instructors to be interested in their learning and respectful of students, they are less likely to cheat (Chapman et al., 2004; Smith et al., 2002).
- Provide examples of past situations (without sharing identifying information) in which students might have experienced confusion regarding the academic integrity expectations. Encourage students to ask

when they aren't sure what constitutes an academic integrity violation (and note that they won't be penalized for asking).

Additional training on academic integrity expectations is available via an OLI module.

Majd Sakr from the School of Computer Science developed an asynchronous OLI module designed for an audience of professional master's students in partnership with the Eberly Center and OCSI. It addresses the issue of academic integrity through the lens of professional credibility. It is highly interactive, incorporating approximately 40 exercises that are designed to promote critical thinking around the university's expectations and consequences for failing to uphold course policies. The module also includes pre-course and post-course assessments to capture students' level of understanding.

- The Eberly Center can set up an instance of this module for any instructor who wishes to incorporate it into their course. Please contact eberly-assist@andrew.cmu.edu to request the OLI instance and connect it to Canvas.
- NOTE: Completion is currently being required by several departments in order to ensure that students are familiar with the university's policies and expectations. Verification of completion can be provided to course instructors. Please contact eberly-assist@andrew.cmu.edu with these requests.

Explicitly remind students about the expectations for each assessment.

At the beginning of your exam/evaluation, include an explicit reminder to students of what is appropriate/inappropriate collaboration or use of resources for the exam/evaluation they are about to take. You can also note the potential range of consequences and ask students to acknowledge that they have reviewed and understand these expectations prior to beginning the assessment. Such reminders may help to reduce the likelihood of violations (Corrigan-Gibbs et al., 2015).

References

Chapman, K. J., Davis, R., Toy, D., & Wright, L. (2004). Academic integrity in the business school environment: I'll get by with a little help from my friends. *Journal of Marketing Education*, 26(3), 236-249.

Corrigan-Gibbs, H., Gupta, N., Northcutt, C., Cutrell, E., & Thies, W. (2015). Detering cheating in online environments. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 22(6), 1-23.

Smith, K. J., Davy, J. A., Rosenberg, D. L., & Haight, G. T. (2002). A structural modeling investigation of the influence of demographic and attitudinal factors and in-class deterrents on cheating behavior among accounting majors. *Journal of Accounting Education*, 20(1), 45-65.

Monitoring/Deterring Potential Academic Integrity Violations

The following tools provide course instructors with support for monitoring students in a variety of assessments that can be particularly beneficial in remote environments. Despite their utility, it is important to note **no monitoring tool can unilaterally and automatically determine that cheating has occurred.**

Regardless of what tool you are using to monitor/deter potential cheating, these reports should not be viewed as proof that cheating has occurred. Instead, instructors are strongly encouraged to view any reports or indicators from these tools as something potentially worthy of [further investigation](#) and to combine multiple information sources to make an informed judgment.

Lockdown browser and monitoring technology are available for quizzes and exams.

[Respondus LockDown Browser and Respondus Monitor](#) are available in Canvas for faculty to monitor student behavior during a designated exam session via recordings captured through students' webcams and microphones during exams. These types of remote proctoring tools may function as deterrents against cheating (Alessio et al., 2017). Moreover, evidence suggests no difference in student exam performance between exam conditions with in-person proctoring versus remote proctoring using Respondus tools (Stack, 2015).

Turnitin can be used to monitor originality in written assignments.

[Turnitin](#) is a tool that you can enable with prose-based assignment submissions in Canvas. This tool compares each student's submission against a broad range of sources (e.g., Wikipedia, their classmates' papers, papers submitted by students at other institutions, etc.) and evaluates the difference between your student's submission and these other sources. Turnitin provides the instructor with a report for each student that identifies the areas of overlap within a student's paper as well as the source from which it potentially came. Note: Turnitin can also provide this report to students, so some instructors use it as a learning tool to help students understand plagiarism and appropriate vs. inappropriate uses of text. If you opt to use Turnitin, please note:

- The percentage of overlap reported by Turnitin may be attributed to many sources, not all of which point to student plagiarism. For example, if students are required to use some of the same sources or an assignment template, instructors should anticipate a reasonable percentage of overlap. Instructors can use the report generated for each assignment to see whether the overlap comes from citing the same (assigned) source or from plagiarizing another student's paper.

- The Turnitin report that is generated for each student is not “proof” that the student plagiarized (Heckler et al., 2013). Course instructors should use the information provided in the report to further investigate any overlap and then must analyze the student’s work to make an informed judgment.

References

Alessio, H. M., Malay, N., Maurer, K., Bailer, A. J., & Rubin, B. (2017). Examining the effect of proctoring on online test scores. *Online Learning, 21*(1), 146-161.

Heckler, N. C., Forde, D. R., & Bryan, C. H. (2013). Using writing assignment designs to mitigate plagiarism. *Teaching Sociology, 41*(1), 94-105.

Stack, S. (2015). The impact of exam environments on student test scores in online courses. *Journal of Criminal Justice Education, 26*(3), 273-282.

Remote Proctoring Tools to Support Monitoring/Deterring

[Respondus Lockdown Browser](#) functionality can be added to any Canvas Quiz. Upon opening the quiz, students will be prompted to download the application and take the quiz. This tool is custom browser intended to provide **secure testing** by allowing access to only those sites/apps (e.g., a Canvas quiz) as designated by the instructor. Additionally, they will be prevented from taking computer screenshots or printing the screen.

Respondus Monitor is an extension of [LockDown Browser](#). In addition to the functionality of LockDown Browser, students are recorded through their webcams and microphones. Monitor's algorithms analyze each video and assign it a high/medium/low risk of cheating based on several factors including whether the person in front of the computer changes and whether multiple people appear. Instructors can then review a subset of the videos, e.g., "high risk" videos, if they need/wish to do so.

The Respondus tools are integrated in Canvas.

Instructions on [how to enable Respondus](#) in your CMU Canvas course are available on the Eberly website. Additional [how-to resources](#) for instructors and students are available from Respondus.

Provide information to alleviate student concerns about remote proctoring tools.

It is important to recognize that students may experience heightened levels of anxiety regarding remote proctoring, particularly if video recording is utilized. It is important for instructors to provide information and resources in order to help to address these concerns.

- Share this [video](#) developed by Respondus to help students understand the system and what the experience will be like.
- Course instructors are also strongly encouraged to prepare and [test any technology](#) that will be used during exams.

Consider how to provide students with communication channels during exams.

Respondus provides a way to [allow access to other web resources and files](#). For example, you can provide students with a secondary channel (e.g., a link to a specific Google doc, or to your Piazza instance for the course) to talk with you or your TAs should questions or issues arise during an exam. See also: [Instructor Quickstart Guides](#)

Equity Considerations Related to Use of Respondus Tools.

If you are interested in using Respondus tools, please note the following:

- Instructors must also be mindful of student equity when requiring the use of any technologies for remote exams. Any and all recording of examinations should be applied consistently to all students in the course.
- Respondus Monitor requires students have access to a webcam, which some students may not have. If students do not have access to a webcam, they will see an error when they attempt to take the exam and will not be able to complete it. Be sure to check on this in advance. If you need assistance with identifying alternatives for your students, please email eberly-assist@andrew.cmu.edu.
- Respondus Monitor cannot be used with students under 16 years of age.
- Respondus Lockdown Browser and Respondus Monitor may not work with accessibility devices/software such as screen readers. If you plan to use Respondus tools in your exams, ensure that all your students will be able to use them. You may need to work with the [Office of Disability Resources](#) to ensure that all your students will be able to take the exam.
- Respondus Lockdown Browser and Respondus Monitor are not compatible with all platforms (only Mac, Windows, and iPad). If you plan to use Respondus tools in your exams, ensure that all your students have an appropriate device.

Appendix A

Smartphone Quiz Deployment with Zoom Monitoring

The quiz question was presented to students on their phones during the Zoom class meeting. Students were instructed to keep their phones flat on their desks, and keep the sidebar visible at all times. Students also had to have their hands and exam paper in view at all times. The students wrote their responses on paper, scanned them with the CamScanner on their phones, and uploaded their submissions to Gradescope upon completion. The instructors used Zoom to monitor the students during the quiz.

- **Advantages:** This approach uses accessible tools that are familiar to students. Video monitoring via Zoom provides opportunities for instructors to detect any potential academic integrity violations.
- **Limitations:** The course instructor may opt to limit the question(s) in the assessment to what could be presented on a phone screen.
- **Implementation considerations:** The course instructor should have an alternate plan in the event of technical failure. In this particular case, if any student experienced a technical issue during the exam, that student met with the instructor individually for the assessment.
- **Class:** SCS 15-112
- **Student tools:** laptop, smartphone, webcam
- **Instructor tools:** Gradescope, Zoom
- **Assessment uses:** Quizzes, Concept Tests, Exams

Appendix B

Integrated Use of Technology Tools to Simulate Classroom Environment

The course instructor wrote the exam questions in Gradescope, and students logged in to Gradescope to take the exam. Each student joined Zoom with their video on. One TA in the main Zoom room assigned each incoming student to one of the Zoom meeting rooms where they took the exam. Approximately 20 students were assigned to each meeting room. Each of the proctors shared their screen with the students in their Zoom meeting room. The shared screen was a Google Doc shared by the instructors as a virtual whiteboard where clarifications/corrections to questions were shared during the exam. Students were able to ask the instructors private questions in Piazza during the exam. The proctors used Slack to share information about clarifications, updates from their Zoom meeting rooms, etc. The TA in the main Zoom helped to coordinate what was going on in the different proctored rooms including monitoring for consistency with messaging such as announcements regarding time remaining.

- **Advantages:** This approach uses accessible tools that are familiar to students and facilitates real-time communication between instructors with Slack and with students through Piazza. Video monitoring via Zoom provides opportunities for instructors to detect any potential academic integrity violations.
- **Limitations:** Although it may be tempting to replace messaging in Piazza with the chat messaging in Zoom, instructors should note that private messaging is not possible in Zoom breakout rooms.
- **Implementation considerations:** The course instructor should have an alternate plan in the event of technical failure.
- **Class:** SCS 10-701
- **Student tools:** laptop, webcam
- **Instructor tools:** Google Doc, Gradescope, Slack, Piazza, Zoom
- **Assessment uses:** Exams