Rapid Course Conversion into an Online Modality: A Focus On Pedagogy
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Rapid Course Conversion into an Online Modality: Focus on Pedagogy

Recommended Principles. As classes move to fully online, these suggestions are meant to help guide you through the basics of moving your course online efficiently.

1. **Syllabus and Course Structure: Learning Outcomes**. In most cases, you cannot simply declare a face-to-face (F2F) class now an online class without making changes to the overall assessment structure (and possibly to the grade breakdown of the semester), which means also making changes to the syllabus (including policies). Therefore, this is the place to start before diving into course content and assessments. It may in some cases be advisable to work on content migration / assessments and course design simultaneously, as decisions made with the content and testing may necessitate double-checking the course design.

a. **Course Design and Scope**

    i. Do not change the Student Learning Outcomes (SLOs). The course was approved to meet certain SLOs. Those same SLOs need to be met in a revised-modality option. Of course, the **means** of meeting those SLOs may change in the revised-modality version.

    ii. Conduct a quick alignment check on whether assignments/assessments and readings still match the SLOs in the new course design format. If not, pay particular attention to which assignments or assessments will need re-thinking in the online environment. This [Spreadsheet](#) may help you organize and align your course components.

    iii. As you construct an online experience, it is recommended to think through total hours per week asked if the student, using the general formula of two hours out of class spent reading and studying for every hour spent in class. In the online environment those two categories may look blurred, but should ultimately be a similar total to a F2F class. A three credit course should therefore ask a total of nine hours per week of students, inclusive of the readings and tasks/quizzes within the module, as well as studying offline for exams.

b. **Syllabus Document**

    i. Do not change the syllabus significantly unless you have to. Especially try to avoid changing due dates and grade breakdown. When possible, grading should remain the same. SLOs should remain the same.

    ii. The **spirit** of syllabus policies should be honored above its wording. While specific policies might need to be updated once the class moves online, the spirit of the original policy should be used as the first principle to assure alignment. For example, the spirit of an attendance policy for a F2F class might be to ensure engagement. So an online version of the same class might forego rigid adherence to calendar-based check-ins if the spirit was about regular and frequent engagement, which could be measured in alternate methods online.

    iii. Revised **assessment** structures should be student-neutral (if not student-friendly). Moves that might result in lower student performance simply on the basis of the revised methodology should be avoided. The basic idea is "do no harm."

    iv. If semester grade breakdowns (grade weights by assignment category) are to change in the revised-modality format, the rationale for the change needs to be both explicitly explained to the students and compelling in its logic for the need to change.

    v. Teaching methods may be the area where most modification might occur. Your methods should align with our LO, Program Outcomes, Assessment, teaching philosophy, and discipline. Creating active, meaningful teaching

methods may be the most significantly modified aspect of migrating courses online.

2. **Content**

   a. While it sounds ideal to move the entire course online all at once, this may not be realistic. Give yourself permission to stay "just ahead" of the students by a week or so, if necessary. While that's not a suggested best practice in normal times, it may be the only practical solution in a semester with a sudden conversion to online.

   b. One of the first main tasks is to be prepared to deliver content online. If your course has sufficient assigned reading, one option is to use the reading as the "content delivery" of the course.

   c. Many faculty will want a way to replace lectures and mini-lectures. There are several options here:

      i. **Institutional Course/Learning Management Software (C/LMS)**. Most universities provide conference tools to create and offer a live webinar environment where your slides can be shown to the students while they hear your voice. It may also be recorded for later viewing.

      ii. **Audio over Presentations (Google Slides or Powerpoint)**. If you have a microphone, you can add audio to slides, then convert the result into a movie (.mov) and upload to your LMS or YouTube, then link to the videos to your LMS.

      iii. **Screencast.** A "screencast" is a broadcast-type video capturing the action occurring on your screen, plus your voice. It can be used for presentation audio. Screencasts are more commonly used to show processes, how to use software, where to click on websites, etc. There are many ways to create these using programs such as [ShowMe](#), [Jing](#), [Google Screencastify](#), [Screencast-o-matic](#); [Nimbus](#); or on a MAC you can use Quicktime player.

      iv. **Accessibility**: Be mindful that some institutions have requirements that materials placed online be accessible to those with disabilities. In the case of video-recorded lectures, this may mean captions. Perhaps the simplest route is to upload a video to YouTube, which will add "best guess" captions that you can edit until they are correct.

   d. It is possible to build two modules per week, replicating due dates of your F2F class, or to combine both into one larger module per week. Or even one module per textbook chapter, lasting longer than one week, though procrastination may interfere with student learning.

3. **Assessments**

   a. Build in frequent assessment in the form of quizzes to replace the kind of accountability that was present when the class was F2F, and you could see/interact with them directly. Students may only perform these critical

assessments if they are part of the grading structure, so this may be an important element to change in the grade breakdown if needed.

b. Multiple choice quizzes have the advantage of grading themselves, but are more time intensive to create. Open response quizzes are easy to create but more grading intensive. One option is to stay "just ahead" of the students, building online as the semester develops (this is true of the content pieces as well, not just the assessments).

c. Consider open book testing. Instead of measuring knowledge and fretting about cheating, you might consider tests that measure application, analysis, synthesis, and evaluation more than memory. Consult the list of Bloom verbs to gain ideas on what to ask.

d. Beyond quizzes, you can make discussion board posts worth points and count toward the overall grade.

e. Among Assignment options, you could ask students to create and submit/upload a document or file, that you view individually and grade.

4. **Student Practice**. In a F2F class, some student practice occurred during the class time. A fully-online experience calls for thinking through ways to require student practice asynchronously.

a. **Discussion Boards**: The built-in tool of most LMS systems can be an ideal way to encourage students to interact with the material and/or with each other. It's sometimes advantageous to require them to write an original post before responding to (or even seeing, in some LMS programs) the posts of others.

b. **Student Groups**: The LMS may offer a way to create student groups (often automatically), which can help make a large class feel small, as the students always interact with the same small group in discussion boards and projects.

c. **Publisher websites**: If access to the publisher website was purchased with the textbook, this may be a rich source of student practice that becomes all the more urgent if F2F meetings are no longer possible.

d. **Third-party tools for practice**: There is no shortage of tools, apps, programs, and websites that allow students to practice learning material. Some are more ideally aligned for certain disciplines (Appendix A).

e. **Interactivity**: You may wish to review this list of 280 Active Teaching Strategies, which is nominally focused on face to face teaching, but many of the ideas here can be adapted for use with the tools listed above, especially Discussion Boards.

5. **How Your Center for Teaching & Learning (CTL) can Assist**

a. Converting your courses to fully online beyond just creating "Files." Learning Modules may be very helpful for course design and to provide a clear structure of expectations for students (could integrate inclusive teaching strategies).

b. Consultations, workshops, rubrics, self-assessments, and consultations on Course Alignment. There should be assurance that the quickly-erected-online

version of the course meets the Student Learning Outcomes (SLO) the same as the F2F version of the course.

    c. Active online teaching methods are ideally aligned with the "[75 techniques for online interaction](#)."

    d. Consider this extensive list of "[Interactive Teaching Techniques](#)" and consider translating appropriate methods into online opportunities to achieve similar interactions as they were able to in F2F.

    e. Instructor self-assessment, which might use the [OLN Online Quality Scorecard](#).

    f. Teach students how to succeed in online courses, especially focusing on their self-regulated learning. Some students struggle with the skills, habits, and discipline needed to succeed online. This list of [101 Top Study Skills](#) provides student-facing tips for online learning, as well critical study skills in general covering effective reading, note-taking, and assessment-prep strategies.

Steps to Migrate Your Course Online

1. Review Face-to-Face (F2F) Course Design

For online courses, a "[Mental Model](#)" can be even more critical to help students begin to make connections on day one. The model can be best used when integrating the three major steps for standard backward course design ([Wiggins & McTighe](#), 2005):

- **Step 1. Learning Outcomes** (LO) are what learners will KNOW (Cognitive); DO (Psychomotor Skill); and VALUE (Affective Disposition) as they progress through the course. Outcomes should be specific, speak to skills and performance rather than knowledge and understanding. Outcomes should be measurable and use [action verbs](#).
    - Online Considerations: Actually, whether we are teaching F2F, online, blended, hybrid, abroad, etc., the LOs for our courses should not vary significantly. Once we have prepared well-aligned, effective LOs, we can offer appropriate ways to Assess and create Instructional Methods to facilitate the LOs.
    - Pedagogical Recommendations: Review your LOs to ensure they are well written (conceptually-based, active verbs and **avoid** terms such as "know" and "understand" which are difficult to measure) and aligned with your Program Outcomes, Assessments and Methods.

- **Step 2. Assessment** is the first step of developing reliable and valid ways to judge student performance. The second step is to create a transparent and consistent [measurement tool](#) (analytical [rubric](#)), then finally to evaluate the level of quality. Recall there are many ways to assess, including Projects, Artifacts, Paper, Performance, Presentations, Reflections, Practicals, Peer Evaluations, etc., all can be created, gathered and assessed using technology.
    - Online Considerations: For Assessments, we have an opportunity to capitalize on students access to the internet and local service learning as we identify

appropriate ways to capture student behaviors and abilities. You might review the [Suggestions for Using Technology to Assess Performance Document](#).

- Pedagogical Recommendations: Since we may not be able to detect student physical cues of understanding, offering more frequent feedback opportunities are beneficial. A timely feedback loop will help students gauge their progress and provide the instructor with information to identify next steps or remediation. Not all feedback requires grading, some may simply offer individual or aggregate narratives of trends that the instructor is observing. We should be overly clear with expectations and rubrics, perhaps include examples and models. You may wish to consider offering student response systems such as [Poll Everywhere](#), [Kahoot](#), [Answer Garden](#), [Tricider](#) or [Padlet](#).

- **Step 3. Instructional Methods** should align with our LO, Program Outcomes, Assessment, teaching philosophy, discipline - we will address this next.

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2. Integrate Instructional Methods

- **Step 3. Instructional Methods** should align with our LO, Program Outcomes, Assessment, teaching philosophy, discipline. There is ample research that student engagement is key to active learning and this benefits all students, regardless of their background, motivation and abilities. Thus, we should consider offering active methods with opportunities to give and solicit student feedback, which can help us gauge when approaches are effective.
    - Online Considerations: Creating active, meaningful teaching methods may be the most significantly modified aspect of migrating courses online. You may wish to review the [280 Active Teaching Strategies](#) list, which many can be adapted to online. If you have time, here is an extensive 40 minute video of a workshop on integrating [Active Learning](#).
    - Pedagogical Recommendations: A major aspect to consider is student engagement and being extremely explicit on expectations. If you simply open an online Discussion Board, chances are few students will contribute. Whereas if you integrate a Discussion Board into an assignment and/or interactive lecture, with higher level prompts ([Bloom's Taxonomy](#) of prompts) that provide clear directions and explanations connecting the students' thoughts and the material, there is a much greater chance that the activity will be productive. This approach can be supported by [interleaving](#) assessment and LOs.

You might take time to draft mental models, confirm Learning Outcomes, develop authentic assessments and gather/align active teaching strategies. This [Spreadsheet](#) may help you organize and align your course components.

3: Engage in Professional Teaching Development

After you have your materials gathered and have your initial organization, you might consider connecting with a colleague, and/or someone from your Center for Teaching for assistance

and/or just to brainstorm and confirm your approach. If you contact a colleague, try and find someone who has actually taught online and has evidence of success that their methods have been successful in a similar setting as you will be teaching in. You might consider starting a Frequently Asked Questions (FAQ) that you can document your questions, ask colleagues for theirs so that everyone is not recreating the wheel.

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4. Identify General Practices for Teaching Online and ARM Tech

- Develop a [classroom culture](#) and create a community of learners through [activities](#) that build a learning environment. For example, the instructor and students could create a [Flipgrid](#) video introducing themselves;
- Provide extremely [clear guidelines](#) on course participation expectations and assignments (with reasonable due dates);
- Provide a guide for civil, active and [inclusive engagement](#);
- Return work with clear, helpful feedback in a timely fashion;
- Offer exciting, focused [activities](#) every session; and
- Share how/when you will communicate, perhaps remind students of [netiquette](#).

[Students are more successful when instructors are present](#) (Chronicle, 2020). Ways to be present include:
1. Incorporating videos/audios aligned with learning outcomes;
2. Frequent communication;
3. Checklists to remind and foster self-regulated learning;
4. Low-stakes assignments, especially early in the term to help students acclimate;
5. Provide regular, timely feedback in various forms (individual/group; writing/audio, etc.);
6. Show you care about them; their learning and their success;
7. Encourage/Define collaboration; and
8. Demonstrate flexibility and patience.

Identify and use **appropriate, relevant and meaningful (ARM) technology.** There are many ways to use tech to create online learning opportunities and afford students authentic ways to represent their application of concepts. I will share a few, which you might consider, realizing we all have different approaches, expectations and experience using technology.
1. **Use tools that you already know**. The challenge becomes how best to align these tools with the specific type of experiences that engage students.
2. **Use ubiquitous tools**, especially ones that you and students currently use (i.e., institutional Google Suite).
3. **Use institutionally supported tools**, such as your Course Management Systems (CMS) and programs that are part of those systems - try not to let those systems modify your teaching philosophy, outcomes or get between you and your students.

4. Then, if you are unable to find precisely the tech tool from above that can help you create a similar engaging environment as you typically offer students, the following approaches might be worth exploring. Remember, these technologies could be used by you and/or students to create the type of opportunities that you believe are appropriate (Additional applications, [Appendix A](#)).

Videos
- [Screencasting](#) (Apps such as ShowMe [free]; Websites/plugins such as Jing; Google Screencastify, Zoom, [Screencast-o-matic](#); [Nimbus](#); or on a MAC you can use Quicktime player). Screencast can be powerful tools for instructors AND students as they capture any activity displayed on a computer screen with voice over. Historically, teachers used these to narrate Powerpoints, and although a few of these would be fine, it is highly encouraged to create more engaging learning objects, such as demonstrating websites, simulations, etc.
- [Video Scribe](#) (Example [Videoscribe](#)). This is another way to share material in a fashion that allows you to create engaging visuals and help students focus on key concepts. One of the major advantages is that at the end, the video automatically zooms out and displays the entire conceptual framework. This is particularly helpful for students who may only be able to understand facts in isolation. There is a fee, although they offer a one week free trial.
- [Stop Motion](#) (Example [Stop Motion](#)). If you would like to demonstrate a dimensional object, this program will allow you to do that. The program allows you to show your object, move it around, take another picture and narrate. The software threads the pictures and voices together. There is a fee, ~ $5 USD.
- Green Screen (Example [Green Screen](#)). These require resources, time and a storyboard or script. They can be a powerful addition for key concepts.
- [Flipgrid](#). A quick way for instructors and students to create and connect videos.

Presentation Programs
- Presentation programs. I created a Google Slide Template that integrates the [research on effective presentations](#). Also, I have created a basic [lesson format guide](#).
  - Google Slides used in combination with other tech such as screencasts.
  - [Pecha Kucha](#) (Student [Example](#); [7 minute Pecha Kucha](#) summary of Teaching Online) creates a visual presentation of images with voice over.
  - [Zoho Show](#) for built-in broadcasting tools to stream presentations
  - [Prezi](#) for animated, non-linear presentations
  - [Canva](#) for creative presentations
  - [Evernote Presentation Mode](#) to turn notes into a presentation

Student Response Systems can be used a/synchronous to maintain attention; promote engagement; help facilitate discussion; encourage participation; create a safe, accessible space; and check for understanding. Examples include [Poll Everywhere](#), [Kahoot](#), [Answer Garden](#), [Tricider](#), [GoFormative](#), [WooClap](#) and [Padlet](#) (Example [Padlet](#); Free Alternatives [Lino](#), [Dotstorming](#), [Wakelet](#), [Scrumblr](#)).

Online Teaching Resources
- [MERLOT](#) - Multimedia Ed Resource for Learning & Online Teaching with 80,000 digital materials (courses, virtual lab); ISBN search, etc.
- [Teacher Tube](#) - an online community for sharing instructional videos.
- [Smithsonian Open Access](#) (New Feb 2020)

Other
- [Ted Ed](#) online Lesson Creator ([Example](#)). The format offers prompts, "Watch, Think, Dig Deeper, Discuss, And Finally …"
- [Word Clouds](#). This is a quick and easy way to allow students to qualitatively review the main thesis of their work and include it as a cover page.
- Blog (Google Doc; [Wordpress](#)). Blogs can be an effective way to create an environment for student reflection (metacognition).
- Podcasts (audio files of longitudinal, story-line events/concepts). There are many ways to create these, such as Voice Thread, or free digital audio apps, where students could capture their understanding, then upload as an audio file to the CMS, or Google Drive.

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5. Build Online Modules, and Habits and Schedule

Some students (and instructors) have limited experience learning online (although many of us use technology and perhaps learn online, much of that is intrinsically motivated and perhaps searching for an answer, instead of deep, applied learning). Therefore, it can be helpful to everyone if we can reduce anxiety. To do this, create a schedule which is consistent, so students can begin to know what to expect and built habits can be useful.

There are several ways to organize your online course using two major types of categories, **Synchronous** (real-time) or **Asynchronous** (where students access the learning materials; share their work; and assessment is accomplished non-real time).

For synchronous, all of the interaction does not need to be real time, but there are opportunities for real time engagement. This could be in the form of real time teleconference lectures from an instructor (from their laptop, displaying a "talking head" or an online whiteboard; or narrating a Powerpoint); virtual office hours (where faculty post when they will be available in a teleconference and students can join and ask questions) and class or small group work through teleconferencing or sharing real time editing documents (Google Doc).

For Asynchronous, the instructor typically records lectures in the form of a recorded video, narrating a Powerpoint or talking while writing on an online whiteboard - these are frequently accomplished by using a screencasts. The videos are then integrated into the syllabus schedule through linking to modules (aka, electronic learning objects, or eLOs).

Course Modules
Each Module should include learning materials organized in a way to help students process the information. The organization could be linear (objectivist); or nonlinear (constructivist). Either way, we need to ensure students can easily follow, there is a clear plan with checkpoints and well-aligned formative and summative assessments. Components of the following template could be created in a document and added to a folder labeled Module #1, #2, etc. You might consider creating or using your syllabus as a navigation page, providing links to the modules, to help students access the material. The following represents a "Module" approach to our course schedule (An example is provided in [Appendix B](#)):

1. **Agenda** connecting major concepts from the prior module with a timeframe.

2. **Measurable Learning Outcomes.** This is where you will take the Course Learning Outcome and create sub-LOs for each module.
   By the end of this session, we will be able to…
   a. KNOW (Knowledge) – Cognitive
   b. DO (Skill) – Psychomotor
   c. VALUE (Disposition) – Affective.

3. **Hook/Gain Attention**: How will you engage students to initiate the module concepts? (video, visuals, prompts, driving questions - all could be real or non-real time).

4. **Teaching Methods, Procedures and Content.** Share a link to your presentation material, articles, Active Teaching Strategies, teleconference or recorded lectures.
   a. **Purpose** (demo, simulation, role play, case-base, problem, etc)
   b. **Teaching Method** (inquiry, project, collaborative, experiential, lecture, etc.)
   c. **Discussions (**safe, rules, key prompts, divergent questions, argument skills)
   d. **Guided & Independent Practice** (with instructor and/or with peers)

5. **ARM Tech.** Consider integrating tech, which can help students apply the concepts.

6. **Formative Assessment.** These could be graded or non-graded, written/oral etc. Examples include projects (or milestones for an on-going project), one minute papers, brief performances (perhaps students creating video summaries of the prior concepts), reflections (metacognitive writings on Google Docs), collaborative activities between students where they document outcomes, and other student response systems.

7. **Wrap Up/Exit Strategy.** Sum and synthesize outcomes, provide prompts that help students look ahead and offer exit tickets, a method to determine major ideas that the students took away and can apply. Remind students what is due for the next module.

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6. Design Interactive Modules (Try to create 1-2 high quality model modules)

Part of the Front-load of effective online course design is that by now, you most likely have reviewed, updated and gathered the critical components of your course. Now, the goal is to configure these in a way that best align with your teaching philosophy and can be clearly offered to students in an inclusive, interactive and authentic way.

As with most activities, the first module that you create will take much more time than subsequent modules. Although the process may seem slow, I would recommend that you take all the time you need to create the first model module. Then ask a colleague or someone from your CTL to review and provide critical feedback. After you have updated the module with the feedback, this first module will become a worthwhile return on investment. You most likely will want to update the module as you learn more and you begin to piece together your course. It may be better to create more modules similar to the first one and then when finished, return to the first, update and follow the pattern for others.

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7. Revisit and Align ARM Tech into Several Modules

Your first pass on reviewing the ARM Tech was a reconnaissance mission. You most likely noted the ones you had used, heard about or generally appealed to you. Now, you should review with a different lens, one that hyper focuses on how the ARM tech will align and empower students to access your learning material in ways that perhaps they could not do as well F2F. This approach is called the SAMR model. The model includes: Substitution where technology acts as a direct tool substitute, with no functional change; Augmentation, as technology acts as a direct tool substitute, with functional improvement; Modification where technology allows for significant task redesign; and Redefinition, technology allows for the creation of new tasks, previously inconceivable.

Specific tasks that you might consider are to create a spreadsheet that allows you to plot your concepts and then correlate with an ARM Tech that you believe might help students practice and apply those concepts. Ideally, you would pilot the tech by adding some content, but not too much in case it does not align as well as you had hoped, or it is cumbersome to use. Again, identifying a colleague to partner with on this will make the task less frustrating.

8. Continue to Build Modules Connecting All Prior Components

By now, you may have several modules built and perhaps becoming impatient as you look at the calendar and realize classes begin soon. One approach that you may wish to keep in mind, is that if you can create a conceptual framework with tentative dates, you could share this with your students upfront and commit to posting a new module at least two weeks prior. This continues to build an open, transparent communication, prepares students for the routine and gives you time to create functional modules throughout the term.

9. Review, Reflect, Update, Practice

Review your entire course, perhaps with a colleague or offer a peer-to-peer review. You might consider using the Online Learning Network (OLN) Quality Scorecard (Appendix D). Practice using the tools with a colleague, as they play the role of a student (at times, we forget that we have created a tool using an instructor interface and have configured the learning experience incomplete). I recommend that you check your entire course, hyperlinks, forms, videos, etc. This will take most likely the entire day, but will pay dividends through the term because you will not have to "fix" things when you are busy.

10. Rest - You Will Need It

Seriously, every activity requires a certain endurance and you may be in excellent shape to lecture for 3-4 hours each day, but teaching online requires a different skill set and timeframe. Pace yourself, develop efficiency models, reach out for assistance often and find the balance. Remember, we need to stay healthy to function at our best, so eat, rest, exercise, all of the

normal recommendations, but often, these are delayed when we teach online, especially if we are teaching students from different time zones. Above all, **try to enjoy** the new challenges. Your attitude will be completely transparent and modeled by our students.

Bonus. If possible, you may wish to consider thinking about how you are going to determine how effective your online course is early in the term, so you can make adjustments, if necessary. We share several data collection instruments for your consideration in Appendix D.

Appendices
Appendix A. Additional Technology Apps.

Appendix B. Example of One Module from a Math Education Course

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Appendix C. From Online Learning Network Quality Scorecard (with SJS Examples)

Appendix D. Assessment Plan Considerations

Appendix E. 75 e-Learning Activities. Watkins, R. (2005) Making Online Learning Interactive. SF: Pfeiffer.

Appendix F. Faculty Development List of Emergency Remote Teaching Guidelines

Appendix G. Colleague FAQ with Suggestions:
1. What are some ways to offer **traditional exams online**?
   ● Perhaps considering modifying traditional memorization tests to an open exam, which allows and perhaps encourages students to apply material/concepts that they can find online to connect/synthesize to course concepts. This will require redesign of the test instrument and most likely assistance in grading.
   ● Faculty may not currently have their exams in a configuration that makes it easy to deploy and avoid potential breach of academic integrity. There are exam protocol software programs available (we just purchase Examity) [or ProctoHub], most tech departments will have licenses available. The advantage is for large classes is that the grading can be automated (it is recommended that we performed an item analysis, resulting in discrimination index and difficulty level).
   ● A few faculty have modified their traditional exams into more authentic assessments, such as Project-based learning, which could be completed off-campus; through online, videoconference; submitted and assessed online, thereby reducing and/or eliminating F2F contact and potential spread of the virus.
   ● Physical testing sites. A few are considering arranging testing sites where only a smaller set of students would arrive, take the exam in a cubicle like setting. These could be paper/pen and/or taken on computer terminals with no access to the internet (the latter could be automated grading).

2. Instead of traditional multiple choice online exams, how could I offer **essay type exams to large classes** of over 200 students?

There are a couple of potential options that you might consider:

- Perhaps, you could ask teaching assistants to grade using a rubric that you create and train them on
- Provide practice opportunities for students on both content and format - grading essays that are correct typically requires less time than those with many errors.
- You me provides an oral exam to his ~250 students (with his 6 TAs) - his method includes providing ten questions prior to the exam, so students study all ten. The day of, each student arrives at the TA office, randomly selects two of the ten items and answers. The TA grade on the spot using a rubric (that is predesigned, reviewed, beta tested and valid)- (Kang, D., Goico, S., Ghanbari, S., Bennallack, K., Pontes, T., O'Brien, D., & Hargis, J. (2019). Providing an oral examination as an authentic assessment in a large section, undergraduate diversity class. International Journal for the Scholarship of Teaching and Learning, 13(2).);
- Perhaps ask them to create group papers/essays, in which they can designate sections where they were primary, secondary, tertiary responsibility (this is exactly how we functioned when I worked at an engineering firm for ten years)

3. What are some possible ways to offer **laboratory classes**?

Here are several options that may be worth exploring:

- Florida Virtual School has been offering chemistry/physics labs for over a decade (White Paper). Some universities are reviewing their labs and determining if they can either create a list of household, or materials that could be acquired locally, ask students to complete labs at homes and video themselves, upload, critique.
- Virtual labs - although not as authentic, there are some quality sites. Some virtual labs that might be of value include American Chemical Society and Labster.

Appendix H. Rapid Course Conversion into an Online Modality: Pedagogy GSlide