

# Remotely Teaching a Large Enrollment Introduction to Forensic Science Course

Gina Londino-Smolar, MS<sup>1</sup>

<sup>1</sup>Department of Chemistry and Chemical Biology, Forensic and Investigative Sciences Program, Indiana University Purdue University Indianapolis, 402 N. Blackford St. LD 326, Indianapolis, IN 46202  
*glondino@iupui.edu*

**Abstract:** During the fall semester at Indiana University Purdue University Indianapolis (IUPUI), an introductory course in forensic science is typically taught face to face with a maximum enrollment of 300 students. This is done in a large lecture hall with stadium seating. Due to social distancing restrictions according to the CDC, the lecture hall which typically holds roughly 420 students could only allow 73 students at one time. Therefore, teaching online at a distance was the only option available to teach the course. Many decisions needed to be made on the teaching model of the course and how students would be engaged in the course content. There was a wide variety of options for distance learning and teaching mode. It was decided the hybrid distance model would best benefit the students and instructor for the large lecture course. Distance hybrid includes up to 75% asynchronous instruction with at least 25% of synchronous live teaching done completely remotely. Determining the best tools and technology to use as well as what material to cover during both types of teaching was a challenge. Online video conferencing tools were not typically used in large live lectures and needed to be adapted to engage students with the course materials. The learning management system (LMS), typically used to record grades and collect assignments, now needed to house all the learning materials and assessments as well as be organized in a way that students could easily find the correct resources. The paper will address the challenges and resolutions for teaching large lectures remotely.

**Keywords:** large lectures, remote instruction, forensic education

## Introduction

Large enrollment courses are typical across many 4-year institutions for introductory and gateway courses. These can house anywhere from 100 to 500 students and are usually taught in large lecture halls with stadium seating. There is an instructor on stage, behind a podium with lecture slides or written notes on an overhead projector. There is not much discussion or interaction with students in large lectures, and rarely do students ask questions, or interact with the instructor. Over time, there have been ways to better encourage students to engage in large lecture classes and participate in the course material through response systems, simple index cards, or one-page papers. Teaching in a large enrollment course has been greatly changed over the past decade, with new teaching methods, advances in technologies, and active learning classrooms. Even with 400 students there are ways to engage students and have a better sense of their ability to grasp the concepts.

However, due to social distancing restrictions currently in place across institutions in the United States, large lecture classrooms are not able to accommodate even 100 students. At IUPUI, the classroom where the

introductory course in forensic science is taught can normally hold 420 students but only 73 students are allowed at one time during the ongoing pandemic. The course also had assigned seating and attendance verification for contact tracing that is difficult to complete for each class period. With a maximum enrollment of 300 but only allowing 73 students in the classroom at one time, the course would have to be taught five times for all the students to be able to sit in lecture and participate in class discussions. Therefore, a remote, hybrid distance teaching model was chosen to teach the course with over 270 students this fall semester.

Hybrid distance is a teaching model which allows for up to 75% of the course material to be taught asynchronously with at least 25% of the course materials to be taught live during regular class meeting times via remote instruction using a video conferencing tool. The course typically meets twice a week for 75 minutes each class period. It was decided to use one day each week for live synchronous teaching to review course material and answer questions about course assignments. The second weekly course meeting date is used for students to complete lecture material, lecture presentations and low-stakes questions, activities over the unit topic, and

participate in the discussion boards. This work is to be done asynchronously. The actual class time is used for online office hours for students to ask questions live during a scheduled meeting time. Attendance is required for the one weekly course meeting and is recorded using a live response system. The second weekly meeting is optional and attendance is not recorded.

A typical introduction to forensic science course is taught using this style of teaching. With a maximum enrollment of 300 students, a variety of students enroll in the course; from majors in forensic science to non-science majors at all levels of undergraduate study. The course covers a survey of forensic science topics including crime scene investigation, forensic science laboratories, law in forensic science, impression evidence, and death investigation sciences. Each topic is covered over the course of one week with two class meetings with a total of 75 minutes per week. For the remote version of the course, students are required to meet virtual one day a week with a second meeting optional.

The face-to-face section of the course invites experts in relevant fields to give guest lectures. This includes speakers from law and all branches of forensic science including forensic anthropology, entomology, pathology, fingerprinting, firearms identification, and questioned documents. The guest speakers are still lecturing in the course via video conferencing tool. Each guest speaker has one class period to lecture on the unit topic, which is recorded and available for students to review afterward. The second weekly session focuses on reviewing the guest speaker content and is optional for students to attend. This is also recorded and posted for students to review. It is required that students attend one weekly session.

During the semester, three exams and a comprehensive final are given covering the course material. The final exam is given during an exam week and students are supplied materials to help prepare for the exam. As part of the exam week, a review session with the course instructor was developed using questions proposed by students prior to the session. Students are asked to comment on three questions before the review session:

1. What was most clear, helpful, or meaningful in the module?
2. What concepts or ideas from this module are still unclear?
3. What additional comments, insights, or questions do you have about this module's contents or ideas?

This allows the instructor to check for student understanding of the module content which is covered on the exam. It allows the review session to be tailored to the most ambiguous content from the student view (1). This feedback can also be used for future teachings by using methods that students like or are most helpful in student learning. The second weekly meeting is open for the students to complete the exam online. The students have a

24-hour period to complete the one-hour exam using an automated proctoring software. The exams are to be completed independently without course resources.

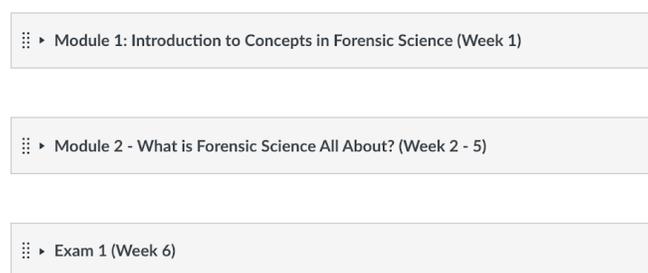
This teaching method allows for at least 25% live synchronous instruction and the remaining time to be spent on asynchronous learning which may include optional course meetings. This paper will look at ways that help manage large enrollment courses in an online classroom.

## Methods

There are key concepts which are important to use in the online, hybrid teaching model. These following will be highlighted and discussed with examples.

- Course organization and management
- Learning technology tools and student interaction
- Communication and feedback

An important feature to use in online education is the learning management system (LMS) (2). This tool should be used to deliver all course content in an organized and repeatable manner. The LMS used in this course is Canvas, which allows for all course content to be organized into modules. All assignments, quizzes, files/folders, and discussion tabs are hidden from students and all course material must be accessed through modules. Modules are open for students two weeks before the start of the material. For example, Module 3 which starts week 7, would open week 5 of the course. Each module is set up by a set of weeks which covers a specific group of topics. **FIGURE 1** shows each module with the week and topic listed.

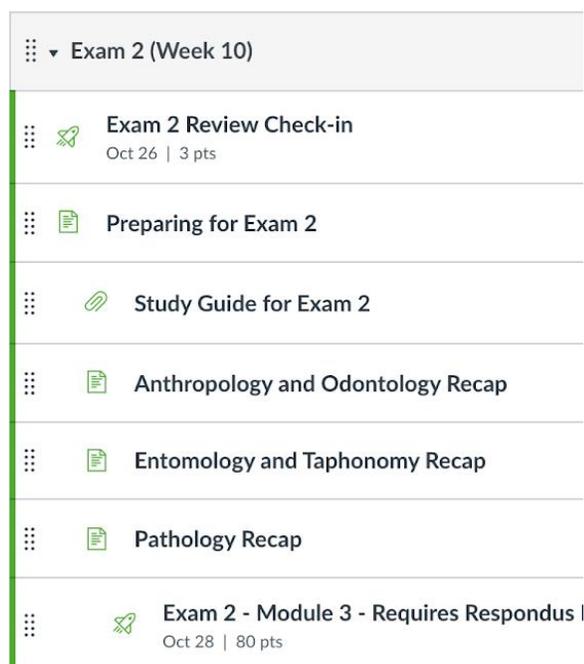


**FIGURE 1** Modules organized by week and topic

Another organizational technique is to have the same general contents within each unit. For a course that has scheduled meetings, the meeting link, date and time are essential. In addition to the meeting link, each unit contains an overview of the unit, lecture material, and assignments. There are also exam specific units which include quiz check-in, study tips on preparing for the exam, details and instructions for taking the exam, and reviews over each unit the exam is covering. Examples of unit organization can be seen in **FIGURE 2 and 3**.



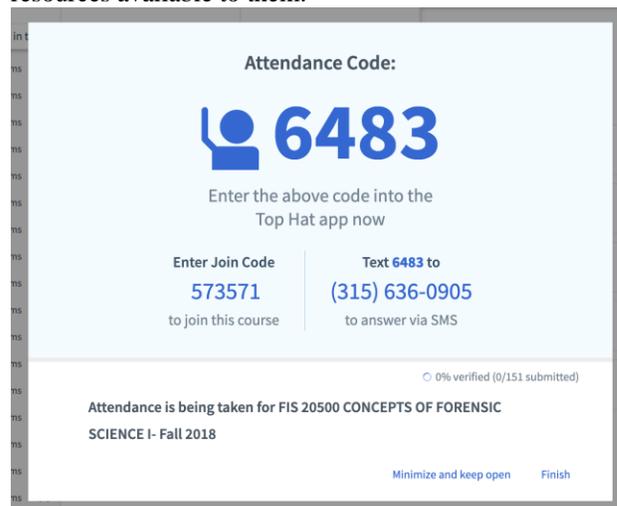
**FIGURE 2** Unit organization



**FIGURE 3** Exam week module organization and content

Finding the right learning technology tools is a necessary topic in remote instruction (3). In addition to the LMS, other technologies are used to help instruction, engage students with course content and deliver assessments. Attendance is a regular part of the normal class routine, even in a large lecture course. It is important to record and report attendance, especially for struggling students. Students without regular attendance are contacted by both the instructor and their academic advisor using the Student Engagement Roster (SER) tool, with hopes of retaining students. Currently a response system is used to take and record student attendance during the required weekly remote class meeting. Response systems can also be used to engage the students throughout the lecture by asking questions on the materials. This can ensure that students are listening and interacting with the

lecture. This is done using Top Hat. Students are given a unique daily code that can be entered into the Top Hat app or texted to a phone number. **FIGURE 4** shows an example of a shared screen with the course meeting attendance code. Student attendance is reported on the SER along with academic issues and instructor suggestions for the student. This is done a few times during the semester, keeping students on track with their grades and resources available to them.

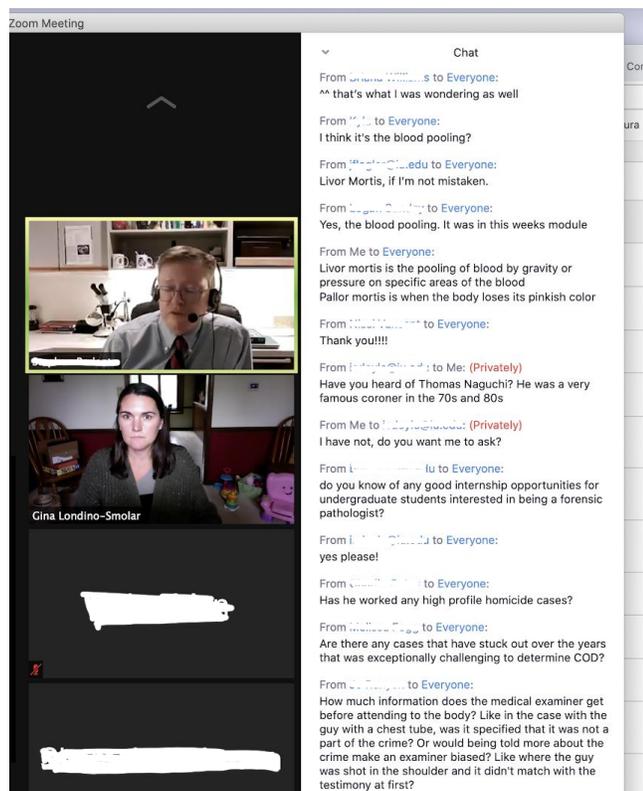


**FIGURE 4** Attendance code screen share for students

Student to student interaction is usually lost in the online environment. Students have a difficult time meeting fellow students, forming study groups, and interacting with each other. Therefore, it is necessary to develop an online community for students to interact with each other, especially in large lecture classes. Discussion boards are a useful tool to foster student interaction, however, with large enrollment classes, it is best to form small groups for discussion. This builds a sense of community in a large course and helps students meet others remotely. The LMS can create randomized small groups which can be used for group assignments and discussions. Students are placed in groups of ten throughout the semester. The small groups are used in breakout rooms on the video conferencing tool (Zoom), discussion boards, and joint Google Docs. Students are able to collaborate and form a community in the virtual classroom.

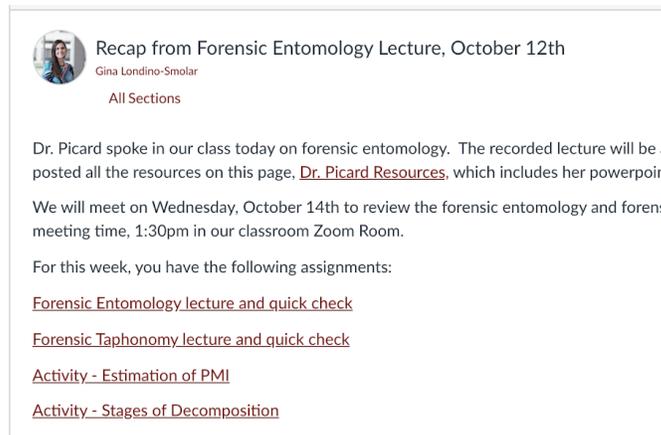
In a traditional classroom, a line would form at the end of class where students would ask questions over content or advice on their major. Much of this is lost in the online environment but students still have questions and need feedback on assignments. During live synchronous lectures, that chat is open to all students and monitored throughout the lecture. This allows students to ask questions during class while the course material is being presented. Generally, students are shy in large lecture halls and do not feel comfortable asking questions in front of all the other students. However, in the online classroom,

students are more open and comfortable with using the chat feature in Zoom to ask questions. **FIGURE 5** shows an example of the lecture with the chat open. This has been a great tool that can be used to open the lines of communication with students. Questions can be answered simultaneously during the lecture or held until the end for a guest speaker. The chat can also be saved and posted for students to use as a resource for study or while reviewing the recorded lecture.

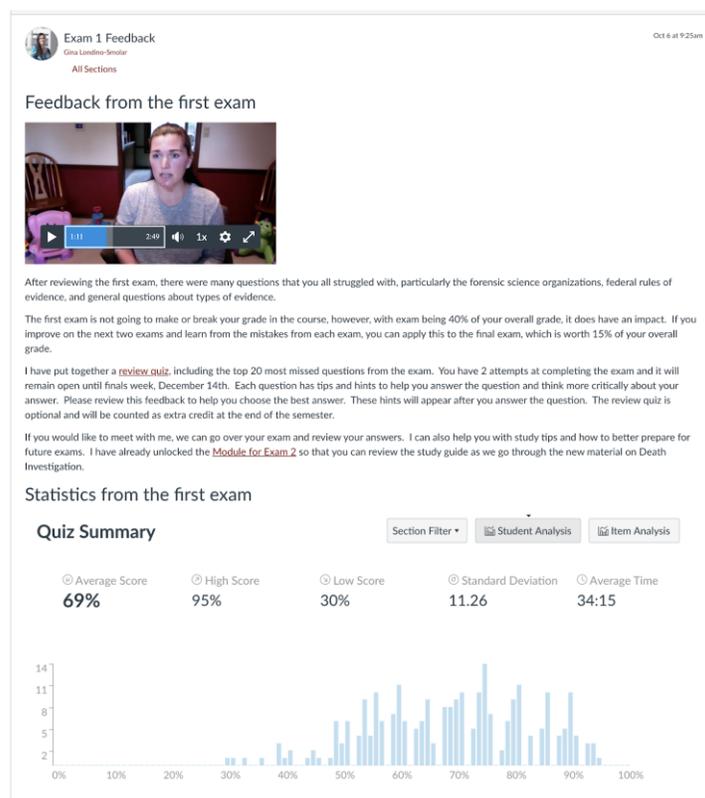


**FIGURE 5** Zoom screen with presenter and open chat communication

Feedback is paramount when teaching in the online environment (4). Not having in-person communication can be difficult for both the student and the instructor, therefore it is important to have an online presence which can be done via recorded videos (5). Weekly announcements for assignment reminders and upcoming lecture topics are a good way to keep communication open with students. This can be done with recorded video or text and linking assignments or resources to give students quick access to what needs to be completed. **FIGURE 6** shows a weekly recap announcement with descriptions of assignments and resources for students. **FIGURE 7** shows an example of video feedback after an exam and includes key points in text below.



**FIGURE 6** Weekly lecture recap announcement



**FIGURE 7** Video exam feedback with exam statistics and additional resources

### Discussion and conclusion

Teaching remotely can be difficult, especially with a large enrollment course. Making sure to use organization methods for course materials and assignments can be helpful for students in an online environment. It is also important to utilize learning technology tools to help with student interaction and engagement with the course material. This can include tools within the LMS, such as discussion boards, as well as outside the LMS, such as Top

Hat and Google Docs. Having an open line of communication and continuous feedback is needed in an online environment. Student familiarity with the chat feature is critical for this step. Weekly recaps and detailed feedback on assignments is important so that students are familiar with course expectations.

This is a new learning experience for all parties and there is much more to learn about distance hybrid teaching. As the semester continues in the remote learning environment, development of new tools and resources will be used. Assignments will change with the need for student engagement with each other and the course materials. Feedback and communication between the students and the instructor will continue to increase as we approach the end of the semester. It is imperative to use best practices in teaching online to engage and help students reach course expectations. Overall, teaching remotely can be successful as long as there is continuous engagement from both the instructor and the students.

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