

Activating Your Lecture Series

PART 1: Incorporating Active Learning into a Large Lecture Course

Active learning practices can boost student engagement with course material, enhancing learning and increasing performance on assessments in all fields. Integrating active learning practices into your high enrollment lecture sections also helps to personalize learning and build a learning community among students and instructors. Some examples of recent research findings on the impact of active learning include:

- Freeman et al. (2014) conducted a meta-analysis involving high enrollment lectures and found that active learning increased student performance on exams by an average of 6%, and decreased failure rates for these courses from 34% to 22%.
- Reimer et al. (2016) found active learning to be particularly beneficial to first-generation college students in STEM courses, boosting both retention and passing rates.
- Gray et al. (2010) found students who used ‘hands-on’ active learning outperformed the control group, who passively received a lecture, on a concept test by a mean of 68%.

How can I start pairing active learning activities with my lecture?

Break up lectures with active learning activities like pair- or group-work, problem-solving, or low-stakes assessments. Lectures are effective for conveying information, but not for learning outcomes that require higher-order thinking, or inspiring new interests, values, or behavioral skills in students (Bligh, 2000). Implementing a format like Smith et al.’s (2005) bookend-strategy (Figure 1) can help organize your time in the classroom to cover content and accomplish learning goals:

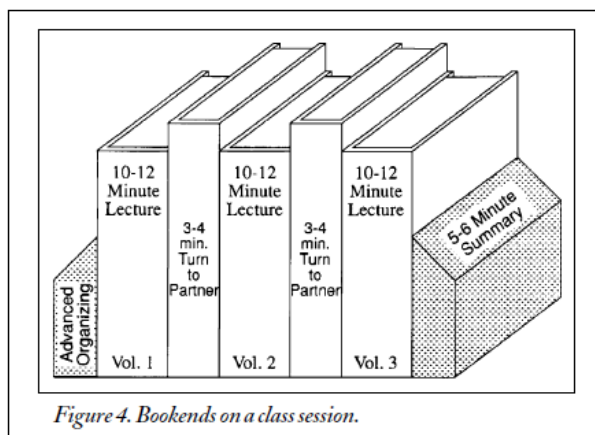


Figure 4. Bookends on a class session.

Figure 1: Bookend Model (Smith et al., 2005)

Using this bookend-strategy to organize your lecture into 10-12 minute portions followed by 3-4 minute active learning activities should provide a balance between supplying students with new concepts and allowing them to work with those concepts in groups or on their own. Below are suggestions for several active learning activities to incorporate into your lectures:

Activities	Descriptions	Example Activities
Learning Cell	Have students complete a reading or problem set before class, and write questions that deal with the major points of the assignment. Then in class, students pair up. Partner 1 asks their questions of Partner 2, who answers	After reading a chapter that focuses on ethics in human subjects research, students compose questions that deal with points they'd like clarified (ie "What does the Internal Review Board process entail?"), or central concerns of the chapter, (ie "In what situations



	them. If necessary, Partner 1 corrects their answers, or adds to them to make them more complete. Then repeat for the other pair member.	do the benefits to research subjects outweigh the risks?"). Students pose these questions to one another in class and in the ensuing conversation, help clarify misconceptions and engage key concepts from the reading.
Minute Paper	Have students write down their thoughts on a topic or question for one or two minutes and ask for volunteers to share their thoughts.	"We've been talking about random sampling in psychological data collection. Come up with at least two ways to collect a random sample and tell me how you know that these techniques will truly be random."
Small Group Projects	Assign a problem set or critical thinking task to groups of 3-5 students. Groups may turn in their solutions in class, and/or share their responses verbally.	"In Star Trek: Into Darkness, the starship Enterprise is shown hiding underneath the surface of an ocean. NASA engineers have said that a starship designed to survive deep space wouldn't survive the sea. Why do you think this is?"

How do I incorporate active learning and still cover all the content that student need?

Lecture has its place, but content coverage alone does not ensure student learning. Streamline content in order to have enough time for in-class activities. Allowing students to engage fully with course material in small group activities can increase student satisfaction with the learning experience and student performance on comprehension measures (Yazedjian & Kolkhorst, 2007). If instructors ensure class activities are complementary to lecture topics and aligned with course learning goals, a similar amount of content can be covered as in a standard lecture-only class (Oliver Hoyo, 2011). Below are some suggestions for streamlining course content. Additionally, see our resource series titled "[Content Coverage](#)" for more strategies and suggestions.

Strategies	Teaching Suggestions
Carefully define class learning outcomes and unit objectives.	This allows you to really focus in on the important content and to make sure your activities are aligned with your learning outcomes. (Fink, 2013, Wiggins & McTighe, 2005).
Decide on lecture sections to be skipped if there isn't enough time left in class.	Thoughtfully preparing your lectures and marking the sections that can be skipped without compromising student learning allows you more flexibility in the classroom.
Consider shortening your lecture.	Shortening your lecture while using an active learning activities can help to reinforce or further explore the content you cover. For example, you could have students research and present on the content themselves in pairs or groups.
Practice will make the activity run efficiently.	The first time you plan to use active learning, try it with your TAs, or let them help you devise it. If that is not possible, think about how long it would take you and triple the time (Svinicki & McKeachie, 2013). Then when you run the activity, monitor how long students took on the assignment so that you can better manage your time in the next iteration.

How can I involve my TAs?

One study of six high enrollment biology lectures found that both students and TAs were more satisfied with coursework when TAs played an active role in learning activities, freeing up time for the instructor to interact directly with students (French & Russell, 2001). Below are some examples of how to involve TAs in coursework:

- Ask TAs to field questions and circulate amongst groups during active learning activities.
- At the beginning of class, ask TAs to provide a 5-minute review of the previous lecture.



- Ask TAs to assist with logistical concerns like time-management, distributing and collecting materials, managing technology, and listing key terms on the board.
- Divide the lecture hall up into smaller sections, and ask TAs to facilitate discussions or activities in each section.
- Hold weekly meetings for instructors and TAs to make sure everyone is prepared, and to allow TAs to take ownership of a specific upcoming activity. This allows for motivation and pride in doing a good job, benefitting both the TA and the students.

Additional Resources

- On integrating effective classroom practices, visit the [CEE teaching support website](#)
- For academic technology support, visit either [Academic Technology Services](#) or [EdTech Commons](#), a site designed to help support teaching with technology.
- For the TA handbook and instructional materials, visit the [CEE's TA orientation webpage](#).

Citation

Center for Educational Effectiveness [CEE]. (2018). Activating Your Lecture Series. *Just-in-Time Teaching Resources*. Retrieved from <https://cee.ucdavis.edu/JITT>

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PART 2: Using Technology Make Lectures more Interactive

There are a variety of different classroom technologies that can be used to help make high enrollment classes more interactive. These technologies include classroom response systems (i.e., clickers) and webcasting/podcasting lectures, among other technologies and programs. Education technologies like these provide students with opportunities to more actively engage in course material (MacArthur & Jones, 2008), and can help to improve students academic performance (Mayer et al., 2009; Traphagan et al., 2010).

How can “clickers” help?

Integrating classroom response systems (e.g., clickers) into high enrollment lectures has been shown to increase student engagement and collaboration (MacArthur & Jones, 2008). In-class, low-stakes assessments (like the ones that clickers make possible) can help instructors quickly identify common misconceptions and measure specific learning outcomes, making the teaching environment more effective (Sevian & Robinson, 2011). A large-scale study of clickers found that students who responded to questions with clickers had a higher gain in understanding than students who responded to questions on paper (Mayer et al., 2009). For help integrating clickers into your classroom, see [Academic Technology Services](#). Below are a few suggestions to help you get started:

Strategy	Example Question #1	Example Question #2
Make sure your questions focus on higher-order understanding of concepts, as well as rote memorization or recall. While clickers lend themselves well to yes/no questions, you can build up to questions requiring problem-solving, the demonstration and/or application of new skills, or the integration of ideas across topics.	<i>Think about the different mental biases we’ve gone over today. Nikki decides to buy a small car because it is good for the environment. When she goes to look at small cars, she is surprised that they came in luxury versions because she expected them to be very basic and uncomfortable. What bias has Nikki been using? What does this suggest about Nikki and her bias(es)?</i>	<i>Today we’ve been discussing climate change. Think about climate change in a broader context. Given what you know about the water cycle from last week’s discussion, what part of the water cycle is under the biggest threat from climate change, and why?</i>

If technology doesn’t appeal to you or your classroom faces some possible connectivity issues, try using analog clickers made from differently colored index cards or sheets of paper with different colors in each quadrant. Students can hold up the color which represents their response option, allowing you to easily see trends in student responses.

Does webcasting/podcasting really work?

There are numerous benefits to students when instructors webcast or podcast their classes. Podcasting has been shown to lead to less absenteeism than posting powerpoint slides online, and students who watched webcasts multiple times saw an increase in academic performance (Traphagan et al., 2010). Podcasting can support active learning because it enables students to assess their own understanding of course content (for example if they listen to a podcast after studying a chapter on the same material); it encourages efficient and independent time management; and it enhances students’ motivation (Fernandez et al., 2009). Podcasting can also be particularly useful for English-language learners and international students, because it allows them to repeat sections of the lecture that may include difficult academic language or jargon. Here are a few factors to consider before deciding to incorporate webcasting or podcasting with your lecture:



- Some UCD classrooms are already configured for both video and audio recording, allowing you to webcast full lectures and post them online for students to view. Check the listing on the [Registrar's Office website](#) for details on existing classroom setups.
- UCD has a limited amount of portable podcasting equipment available for instructor use, allowing you to record audio-only versions of lecture and post them online for students to download. Contact [Academic Technology Services](#) to find out if this technology is available for your use.
- If official equipment is not available, consider asking a student to record class on their personal device and send it to you for posting online, or use your own personal device to record the lecture.

Where can I find more resources?

- On integrating effective classroom practices, visit the [CEE teaching support website](#)
- For academic technology support, visit either [Academic Technology Services](#) or [EdTech Commons](#), a site designed to help support teaching with technology.
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