Large Lecture Discovery Work Report and Infographic



Large Lecture Discovery Work Report, 3/23/18

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The Student Experience in Large Lectures at CU Boulder



Project Background

Why Large Lectures?

Large lecture courses are a staple of the undergraduate student experience at CU Boulder. While there is no standard for what constitutes a large lecture, based on campus practices this discovery project defines large lectures as those with 75 or more students enrolled.

Throughout their undergraduate academic career, CU students take an average of 14.5 large lecture courses. This means that on average, 41% of our students' classroom experience is spent in a large lecture. Notably, students take most of these large lecture courses during their first and second years at CU: 53% of courses taken by freshmen are large lectures, and 54% of courses taken by sophomores are large lectures. Furthermore, the average and median class sizes during a student's undergraduate academic career are 97 and 51, respectively.¹

A one-question survey posed to CU students in December 2016 found that 48% of students dislike large lecture courses, 34% like them, and 18% feel neutral.² When asked what has helped students learn in large lectures, one student responded: "Nothing, it's very distracting and hard to pay attention because I feel I'm not as close to the professor." The ATDT is utilizing research findings from the Spring 2017 Large Lecture Discovery Work to inform our course design work on campus and to provide recommendations and resources for facilitating improved large lecture experiences on the CU Boulder campus.

Goals

1. Learn student assumptions about large lecture courses to better understand the reality and variety of the large lecture student experience.

How are students currently being engaged? What methods work best for student engagement in large lecture classes?

2. Develop resources and best practices for large lecture courses.

What strategies and resources can we provide to help students succeed in large lecture courses? What pedagogical recommendations can we provide for instructors of large lecture courses?

3. Better understand student preferences in large lecture courses.

What structural changes could the university consider to better support all types of learners?

¹ Original data from this section provided by CU's Office of Data Analytics and is based on students from all majors and colleges graduating with a bachelor's degree in 2015-2016.

² Numerous students reported liking large lecture courses due to the possibility of anonymity they offer.

Project Plan

The following activities were conducted between fall 2016-spring 2018, and inform this final report. The culmination of our discovery work was the May 2017 campus-wide student survey.

- 1. Conduct research and gather resources on the large lecture student experience at CU Boulder.
- 2. Plan research methods and a timeline for semester-long discovery work.
- 3. Conduct campus-wide research through surveying and interviewing students:
 - One-question survey shared with students across campus
 - Student focus groups
 - ° Canvassing students on campus with short iPad survey
 - ° Campus-wide student survey (May 2017)
- 4. Conduct observations of large lecture classes.
- 5. Analyze research results and develop data visualizations.
- 6. Provide OIT and the campus community with research results and suggestions or recommendations for improving the large lecture student experience.

Campus-Wide Student Survey

This online survey was distributed via CU Boulder Today and OIT's social media channels between May 3, 2017 and June 1, 2017. 80 students completed the survey, with response numbers varying by question. At the end of the survey, students were able to provide their email address to participate in a random drawing for a \$10 Amazon gift card. The survey was comprised of 17 single answer, multiple choice, multiple select, and free response questions. Questions covered the topics of engagement and distraction, getting help, and improving learning. The appendix of this report includes additional exploratory questions from the survey. The focal questions asked are as follows:

- Rate how often you are distracted during large lecture classes.
- What contributes to your being distracted during large lecture classes?
- · What could instructors do to limit distractions in large lectures?
- What helps keep you focused in large lecture classes?
- How often do you typically attend office hours for a large lecture class?
- Why do you to go to office hours?
- What prevents you from attending office hours? (Select all that apply)
- · What other ways do you get help in large lecture classes?
- Rate how helpful Clickers are to your learning in large lectures.
- · What is most helpful about using Clickers?
- What is the coolest thing that has happened in a large lecture class that helped you learn?
- What have you done personally to improve your learning in large lecture classes?

Campus-Wide Student Survey Results

Executive Summary

Throughout our discovery work surrounding large lecture courses on campus, we found that often students hold a negative perception of the large lecture course format. This negative perception seems to be fueled by the challenges surrounding learning in large lecture courses, as revealed by this campus-wide student survey. The most significant challenges for large lectures on campus relate to the ideas of distraction and engagement.

While we recognize that students are at least sometimes distracted during classes, a key takeaway from survey responses is that a combined 57% of students indicated that they are distracted half of the time or more in large lecture courses. Student distraction is most often caused by factors that could be mitigated by direct, real-time intervention from instructors or teaching assistants. The top two causes of distracted by other students talking, and 70% by other students' screens/devices. Another significant challenge students report in large lectures classes is difficulty hearing the instructor (51%) and seeing lecture materials and presentations (41%). These causes of student distraction could be addressed by instructors' improved use of classroom technology, such as mics and clearly visible presentation formats.

Student suggestions for mitigating the distractions outlined above include **instructors banning or limiting device use in the classroom.** While students suggested banning devices or limiting their use to specific zones in the classroom, they also recognize the importance of supporting students with device-related accommodation requirements. Additional suggestions included fostering student engagement with the course material through interesting lectures or presentations. **The majority of students (93%) indicated that an "interesting instructor" improves their ability to stay focused in a large lecture course.** Although this is a rather vague concept, this data point highlights the importance of instructors intentionally designing learning experiences that are engaging and connect with students. To improve engagement, students recommended more facilitated interaction with instructors, TAs, and peers through active learning activities in classes (group discussion or work, effective Clicker use, facilitating study groups). The perceived lack of connection with instructors could be mitigated through instructors learning students names, providing more opportunities for office hours (online, with TAs), and connecting lecture material to students' lives.

In addition to the above suggestions, the physical realities of large lecture classrooms merit further investigation. 34% of students indicated that they are distracted by background noises (such as noise from hallways). 41% of students indicated that classroom seating options are not ideal for engaged learning. Seating arrangements in lecture halls on campus are often not easily accessible for large numbers of students, put most students at a distance from the instructor, and make it difficult to see and hear.

We recommend sharing the results of this discovery work with the campus community to support instructors in addressing issues surrounding distraction and engagement in large lecture courses. Some universities are partnering with students and faculty to design a variety of large lecture classroom configurations that support different approaches to teaching and learning. We suggest CU Boulder review these models and consider improvements to the large lecture experience.

Large Lecture Discovery Work Artifacts

Large Lecture Infographic (page 15) - infographic summary of survey data

Large Lecture Classes: Tackling Distraction - tips for students and instructors

Large Lecture Student Personas

Engagement and Distraction

Student Distraction

Four survey questions asked students about their levels of engagement and distraction in large lecture classes taken on the CU Boulder campus. While we recognize that students are at least sometimes distracted during classes, **a key takeaway from survey responses is that a combined 57% of students indicated that they are distracted half of the time or more in large lecture courses** (see "Figure 1"). Although we do not currently have data on the rate of distraction in smaller classes on campus, this high percentage of distracted students warrants some examination of best practices around student engagement.

Rate how often you are distracted during large lecture classes:



Figure 1: 80 students responded to this single answer multiple choice question.

Causes of Distraction

Student distraction is most often caused by factors that could be mitigated by direct intervention from the instructor or teaching assistants (see "Figure 2"). The top two causes of distraction stem from the behavior of other students in the classroom: 74% of students reported being distracted by other students talking, and 70% by other students' screens/devices. Although classroom management often does not receive much attention in higher education, these findings suggest that instructors would benefit from learning strategies to directly address these challenges.

Other causes of student distraction could be greatly mitigated by an improved use of classroom technology. **51% of students indicated that they have difficulty hearing the instructor, and 41% of students struggle to see lecture materials and** presentations in large classrooms. Observations conducted in large lecture halls on campus revealed that there are a range of factors causing this challenge. In some cases, classroom AV technology goes unused, in other cases, it is not being used correctly. At times, current classroom technology is not adequate to compete with other environmental factors, such as squeaking seats caused by students arriving late and noise from halls outside of the classroom. 34% of students indicated that they are distracted by noise from the hall, etc.

Lastly, 41% of students indicated that classroom seating options are distracting. After visiting large lecture halls on campus, we gained further insight into issues surrounding classroom seating. Large lecture seats are often small, noisy, and grouped closely together. The close proximity of seats makes it difficult to shift your position in class or to type on a computer without bumping into the person next to you. More importantly, seating arrangements often prohibit students from walking in front of seated students to access seats in the center of the classroom. This results in a common sight on the CU Boulder campus: a dozen or more students sitting in the aisles of large lecture halls. Such a serious classroom seating challenge should be addressed by relevant campus entities.

What contributes to your being distracted during large lecture classes? (Select all that apply)



Other students talking



Figure 2: 76 students responded to this multiple select question.

Mitigating Distraction

An open-ended question asked students what instructors could do to alleviate distraction in large lecture classes, and **19 students suggested that instructors ban or limit device use.** While students suggested banning devices or limiting their use to specific zones in the classroom, they also recognize the importance of supporting students with devicerelated accommodation requirements.

Additional suggestions included fostering student engagement with the course material through interesting lectures or presentations (see "Figure 3"). Sample student comments below provide further clarification. Students also suggested that effective technology and Clicker use during lectures can limit distraction, while employing classroom management practices, such as addressing disruptive students, would further support student learning. What could instructors do to limit distractions in large lectures?



Figure 3: 64 students responded to this free response question. Responses were then categorized and counted. Counts can be found in Appendix C.

Figure 3 Sample Student Comments³

- Ban laptops except for students that need them due to disabilities. It worked really well in my psych class.
- I hate it, but it really does help when they don't allow computers or anything.
- Not sure maybe implementing a no electronics rule, but in the end I doubt that would help since some students actually take notes on their computers.
- Make the lecture more interesting or personally engaging. Probably talk to the board less.
- Make sure that they are always talking into a mic and having computer sections on the sides and a no computer section in the middle.
- To overcome MENTAL distractions (or your mind wandering), I think clicker questions help, and also working in small groups on problems.
- Be more engaging and also call people out if they are being disruptive by talking, etc. If you're not being quiet, they should be kicked out of class.
- Class interactions calling on people in class to keep them engaged.
- Walk around the room while lecturing and engaging with the students.
- Have more display screens across the classroom to display presentation slides and louder microphones.

³ Sample student comments are representative of the variety of student responses to survey questions and illustrate particularly insightful student feedback.

Encouraging Engagement

Students were asked "What helps keep you focused in large lecture classes?" and were provided with answer choices based on results from a onequestion survey distributed to students in Fall 2016. **The majority of students (93%) indicated that an "interesting instructor" improves their ability to stay focused in a large lecture course.** Additional factors that encourage engagement and focus include the course subject or materials, the use of demonstrations or simulations in class, and effective Clicker use (see "Figure 4").

Determining exactly what makes an instructor "interesting" is of course elusive and hard to achieve and reproduce. Students were also asked what was the "coolest" thing that has happened in their large lecture courses on campus (see "Figure A1" and Figure A1 sample student comments). This information could be considered in determining approaches to being an "interesting" instructor.

What helps keep you focused in large lecture classes? (Select all that apply)



93% Interesting instructor

Figure 4: 80 students responded to this multiple select question

Getting Help

Students responded to four questions about getting help in large lectures classes at the CU Boulder campus. While office hours attendance varies depending on student interest in the course subject, **61% of students surveyed reported that they either never attend office hours or attend only once a semester** (see "Figure 5"). The remainder of students attend office hours from several times a semester to weekly. The majority of students (83%) attend office hours to receive help in the class (see "Figure 6"). Just below half of students attend office hours because they want to connect with the instructor or are interested in the subject material.

How often do you typically attend office hours for a large lecture class?



Figure 5: 80 students responded to this single response multiple choice question.

Why do you to go to office hours? (Select all that apply)



Figure 6: 59 students responded to this multiple select question.

A follow-up question displayed to students who indicated they "Never" attend office hours found that **the most common reasons for not attending office hours were that the office hours timing did not fit their schedule or that they did not feel comfortable speaking with the instructor** (see "Figure 7"). One student responded that "since the class is so large I feel the professor won't know who I am or remember." This statement is indicative of the importance for instructors to seem approachable to students and to form connections with them.



What prevents you from attending office hours? (Select all that apply)

Figure 7: 20 students responded to this multiple select question posed to the 21 students that reported they "Never" attend office hours.

A potential solution for making office hours more accommodating for students might be virtual office hours. When students were asked about their preferences for virtual office hours, **82% of students indicated that they might attend online office hours if offered** (see "Figure A2"). Concerning the modality of online office hours, 41% of students would prefer instant messaging, and 40% a combination of video conferencing and instant messaging (see "Figure A3").

Other Ways of Getting Help

The majority of students also seek help in large lecture classes by asking a friend or Teaching Assistant (TA), followed closely by students utilizing online resources or attending a review session (see "Figure 8"). Some students indicated that they ask an undergraduate Learning Assistant (LA), use a study group, or ask an undergraduate Course Assistant (CA).⁴

⁴ At CU, LAs and CAs are undergraduates that support teaching and learning in larger classes and receive varying degrees of pedagogical training.

What other ways do you get help in large lecture classes? (Select all that apply)



Figure 8: 79 students responded to this multiple select question.

Improving Learning

Students were asked four questions about what improves learning and Clicker use in large lecture courses. Responses show that **67% of students find Clickers to be very or somewhat helpful to their learning in large lecture courses** (see "Figure 9").

Rate how helpful Clickers are to your learning in large lectures:



Figure 9: 80 students responded to this single response multiple choice question.

Clickers are helpful for student learning by checking for understanding, encouraging engagement, and reviewing material and preparing for exams (see "Figure 10"). Clickers are also helpful in providing instant feedback to the instructor, encouraging further thought, reinforcing learning, encouraging group work and discussion, providing interaction, and answering questions. Based on student comments (see "Figure 10 Sample Student Comments" below), it should be noted that effective Clicker questions, as well as enough time to answer Clicker questions, serve to improve student learning. Additionally, students suggested that instructors not use Clickers for predominantly attendance purposes. These responses indicate that instructors could benefit from training on how to effectively implement Clickers in the classroom.





Figure 10: 64 students responded to this free response question. Responses were then categorized and counted. Counts are included in the graphic above in addition to sample student comments from each category.

Figure 10 Sample Student Comments⁵

- They check my knowledge in real time or about things that I was supposed to read in preparation for the class period.
- It keeps you focused, and is a fast way to see if you are learning the material or not before waiting for the test.
- Keeps you engaged because you have to have been focused on the lecture before the Clicker questions to know what's going on.
- It's a good idea of the kinds of questions that will be on the exam, and things we're responsible for knowing.
- Immediate feedback about my understanding.
- Clickers are most helpful when they challenge me to retain or think further about the lecture material.
- Testing my knowledge and seeing where I need to learn more, for my use and the instructor's use. I like when they are participation points, but not when it is a grade for what answer I chose since it is so quick.
- Makes you remember material better if you have to answer a question about it.
- Keeps students engaged, but I think Clickers should be a social, discussion based tool to get students talking about the questions in order to teach each other the material.
- · Collaborating with other students to solve the problem.

⁵ Sample student comments are representative of the variety of student responses to survey questions and illustrate particularly insightful student feedback.

Student Strategies for Improving Learning

Students were asked about what they have done to improve their own learning in large lecture classes. **Responses were grouped into four main categories: self-monitoring, independent learning, instructorrelated, and peer-related. Students reported self-monitoring behavior to improve their learning in large lecture classes that included sitting in the front of the classroom and avoiding or limiting technology use** (see "Figure A4"). The independent learning behaviors that students reported to improve their learning in large lecture classes included taking notes (often handwritten notes) and reviewing their notes (see "Figure A5"). Instructor-related strategies included students asking questions and attending office hours (see "Figure A6"), while **peer-related strategies included forming study groups** (see "Figure A7").

The Student Experience in Large Lectures at CU Boulder



Average = 97

Large lectures per course load

Student satisfaction with recent large lectures

<image>

Contributors to student distraction

I hate to admit it, but it really does help when professors don't allow computers or anything in class."



74% Other students talking



Frequency of distraction



Student suggestions to reduce distractions



Office hours attendance





What keeps students focused





Appendix A: Additional Survey Questions

What is the coolest thing that has happened in a large lecture class that helped you learn?



Figure A1: 55 students responded to this free response question. Responses were then categorized and counted. Counts are included in the graphic above.

Figure A1 Sample Student Comments⁶

- Physics had a lot of awesome demonstrations that made conceptualizing the ideas easier.
- I had a professor connect every lecture to a popular song in some way. It was easier to remember the broad scope of the learning in the class using these cues.
- An instructor used case studies as well as videos during the lecture.
- Periodically during class, we cluster in groups of 4 or 5 around white boards to collaboratively work on problems. I guess white boards aren't "the coolest thing," but they are very helpful in learning and it would be an easy thing for other profs to start using.
- A well-timed joke.
- When the lecturer emphasized that participation in clicker questions was important, but not getting the correct answer (e.g. class participation grade based on response rate rather than correct responses), students felt free to respond to clicker questions without fear of getting the answer wrong. When this initial question was followed by a period of discussing your answer with the students around you, peerto-peer instruction emerged organically and this often resulted in achieving a better understanding of difficult or tricky concepts.
- Demonstrations during chemistry or guest speakers.
- Watched movie clips that related directly to Freudian psychology.

⁶ Sample student comments are representative of the variety of student responses to survey questions and illustrate particularly insightful student feedback.

- Todaysmeet.com. Everyone can type in their answers and read everyone else's. And it can be anonymous. My Boccaccio teacher used it a lot.
- Recording video of each lecture, which I could re-check later (or watch if I had to miss a class). This was an extremely valuable tool.



If your instructor offered online office hours (video conferencing or instant messaging), would you attend?

Figure A2: 80 students responded to this single response multiple choice question.

Which would you prefer?



Figure A3: 63 students responded to this single response multiple choice question.

What have you done personally to improve your learning in large lecture classes?

62 students responded to this free response question. Responses were then counted and grouped into four main categories: self-monitoring, independent learning, instructor-related, and peer-related. Counts are included in the graphics below in addition to sample student comments from each category (see "Figures A4-A7 Sample Student Comments").



Figure A4: Students reported self-monitoring behavior to improve their learning in large lecture classes that included sitting in the front of the classroom, avoiding using technology, attending class, limiting technology use to taking notes, and not talking to their peers.



Figure A5: Students reported independent learning behavior to improve their learning in large lecture classes that included taking notes, reviewing their notes, handwriting notes for class, printing out notes and lecture slides, and watching lecture capture.



Figure A6: Students reported instructor-related behavior to improve their learning in large lecture classes that included asking questions, going to office hours, and connecting with the instructor.



Figure A7: Students reported peer-related behavior to improve their learning in large lecture classes that included connecting with their peers and forming study groups.

Figures A4-A7 Sample Student Comments⁷

- Make sure to sit closer to the front so I don't get distracted by people who don't pay attention.
- Well, I try to ask questions in class, and I just regularly go to office hours where I can talk to the prof like I used to talk to my teachers in high school.
- Take notes by hand rather than electronically to reduce distractions and allow for the drawing of figures.
- Study the material before the lecture and spend more time paying attention than taking notes in the lecture itself.
- Started watching the lecture capture. The video provides better help when rewatching after attending the lecture in person. It allows me to pay attention to the professor in lecture and not get caught up in having to take notes as fast as I can.
- Put away my phone during lecture, and if taking notes on my laptop, turn the internet off.
- Print out PowerPoint slides/outlines and filled them in during lecture so that I'm not scrambling to get everything from a Slide down on my paper.
- I use mindfulness to work to be able to refocus my attention when my mind begins to wander away from the subject.
- Engage with other students -- set up homework dates, small-group exam study sessions, etc.
- Attendance, attendance, attendance! And don't be scared or shy about reaching out for a little help, extra information, etc.

Please share any other comments you have about large lecture classes at CU Boulder.

39 students responded to this free response question.

- The most noted suggestion for improving large lecture classes on campus is to provide more engaging experiences for students.
 - Further suggestions include reducing class sizes, providing more and/or online office hours, changing seating arrangements in classrooms, providing more peer interaction during lectures, employing effective Clicker use, and restructuring recitations.
- There were very few positive or neutral comments about large lectures on campus.
- The most referenced negative aspect of large lecture classes on campus is that they lack engagement (see suggestions above).
 - Further negative comments note that large lectures lack interaction and connection with instructors and peers, are difficult to succeed in, require more self-motivation, are noisy, and present challenges for seeing lecture materials clearly.

Additional Student Comments⁸

- The success of large lecture classes really depends on the ability of the instructor to be engaging.
- Great for subjects where the student has intrinsic motivation. Terrible for subjects students don't love as much or don't excel in, helps squash that further because there isn't one on one connection or as much time to ask for help if they aren't understanding material.
- Honestly it's fine for 1000 and some 2000 level classes that are used to build a foundation. Past that, I think classes need to start to get smaller so that actual discussions can happen that aren't guided by a first year graduate student.

⁷ Sample student comments are representative of the variety of student responses to survey questions and illustrate particularly insightful student feedback.

⁸ Sample student comments are representative of the variety of student responses to survey questions and illustrate particularly insightful student feedback.

- I have done my first 2 years at a community college, so I was surprised [at] the size of the large lecture classes. If I sit in the back, it's like auditing, not engaging to the class. So, some monitors at the middle of the classes would be helpful.
- Again, film the lectures. Alternatively, just direct students to online lectures that already exist. I'm a
 computer science student. Nobody in their right mind thinks that CU's competitive advantage lies in the
 production of interesting/informative lectures when MIT and Berkeley are recording their best lectures
 and putting them online for free. Why duplicate that work for the sake of specificity? Instructors pick
 and choose from textbooks all the time. Why not do the same for "video textbooks?" Ideally, all lectures
 would instead be office hours.
- I understand why a university of this size needs to have them, but I rarely find them as interesting or engaging as smaller classes. It is unfortunate that most intro classes (when you are first exposed to material that may spark further interest) are so large that it can take away from natural engagement with material; it seems like students' first interaction with a particular topic should be as interesting and interactive as possible.
- I don't like how nonpersonal they are. I learn much better when the professor knows me and sees me every lecture. Even after talking to some professors 5 or 6 times during office hours and after class, some professors never remembered me. Getting distracted and feeling like it's okay to be distracted is a major outcome of large lectures.
- Even as a junior, I'm debating a different school because I don't learn as well as I used to when I had 20
 person classes at FRCC [Front Range Community College]. I used to enjoy showing up to courses, and
 staying after to talk to the instructor about ideas, but now I cannot wait to leave.

Appendix B: Exploratory Survey Questions

Would you prefer an online textbook over a physical textbook?



Figure B1: 80 students responded to this single response multiple choice question. 29% of students reported that they would prefer an online textbook, 23% might, 36% would not, and 13% did not have a preference.

Why would you prefer or not prefer an online textbook over a physical textbook?

62 students responded to this free response question. Responses were then counted and categorized. Counts are included in the graphics below in addition to sample student comments from each category.







Figure B3: Students reported not preferring online textbooks because of difficulty reading screens, difficulty flipping through pages and navigating, and material being presented differently compared to physical textbooks. Students preferred physical textbooks because they found them to be better for studying, more engaging, better for marking up, and provide a tactile object.

Figures B2-B3 Sample Student Comments⁹

- I can access it at any point. I have reduced the amount of books I carry and I no longer carry notebooks. I like doing assignments between classes and dislike carrying everything around. It gets really heavy.
- Less expensive and I bring my laptop everywhere anyway.
- The online textbooks typically have a search feature so that it takes a lot less time to find what you are looking for.
- Computers are lighter to carry around and have a lot of features to help with learning that regular books do not have. Although it is harder to read from a computer for a long period of time than a physical textbook.
- It is not healthy to read a screen for that long, and it makes note-taking more difficult with an online textbook. I would use an online textbook if they were INCREDIBLY less expensive than the hard copy, and that would be the only reason.
- It's easier to flip through a physical one to study and review. Plus, I remember where things are on a page and it makes me remember it better.
- A physical textbook keeps me more engaged and less likely to be distracted by other things on the internet.
- Online textbooks are difficult to focus on and are hard on my eyes. I find it easier to annotate and engage with printed material.
- When I need to do large amounts of reading, eye strain is an issue -- especially when many other assignments need to be completed on a computer. Paper is much easier to read; it is also easier to annotate and/or highlight the text in a way that makes it visually easy to review later.
- Can't always have wifi.

⁹ Sample student comments are representative of the variety of student responses to survey questions and illustrate particularly insightful student feedback.

Appendix C: Accessible Survey Question Data

Rate how often you are distracted during large lecture classes:

Answer	Count	%
Never	3	4%
Sometimes	31	39%
About half the time	25	31%
Most of the time	14	17%
Always	7	9%
Total	80	100%

What contributes to your being distracted during large lecture classes? (Select all that apply)

Answer	Count	%
Other students talking	56	74%
Other students' screens/devices	53	70%
Difficulty hearing the instructor	39	51%
Your own screens/devices	37	49%
Classroom seating options	31	41%
Difficulty seeing the class material/instructor	31	41%
Other things going on (noise from the hall, etc.)	26	34%

What could instructors do to limit distractions in large lectures?

Technique	Count
Banning/limiting devices	19
Interesting/engaging lectures	18
Improve tech use	13
Clear audio	10
Effective Clicker use	10
Address/remove disruptive students	8
Interact with students	6
Improve learning space	5
Group work/discussions	4
Improve presentations	4
Clear visuals	3
Regulate room environment	2

What helps keep you focused in large lecture classes? (Select all that apply)

Answer	Count	%
Interesting instructor	74	93%
Course subject/material	52	65%
Demonstrations/simulations	47	59%
Clickers	44	55%
Guest speakers	26	33%
PowerPoint presentations	25	31%
Videos	24	30%
Whole class discussion	18	23%
Group work	11	14%

How often do you typically attend office hours for a large lecture class?

Answer	Count	%
Never	21	26%
Once a semester	28	35%
2–3 times a semester	14	18%
4–6 times a semester	6	7%
Weekly	7	9%
Other	4	5%
Total	80	100%

Why do you to go to office hours? (Select all that apply)

Answer	Count	%
Seeking help	49	83%
Connect with instructor	27	46%
Interest in the subject	26	44%
Approachable instructor	23	39%
Want a good grade	23	39%
If I have time	21	36%

What prevents you from attending office hours? (Select all that apply)

Answer	Count	%
Office hours don't fit my schedule	12	60%
Uncomfortable talking with instructor	11	55%
Don't have time	8	40%
Don't think it would be helpful	7	35%

Answer	Count	%
Prefer to speak with TA	4	20%
Not interested in subject	3	15%
Unsure of office location	3	15%

What other ways do you get help in large lecture classes? (Select all that apply)

Answer	Count	%
Ask a friend	63	80%
Ask a Teaching Assistant	60	76%
Online resources	51	65%
Attend a review session	45	57%
Ask a Learning Assistant	27	34%
Study group	27	34%
Ask a Classroom Assistant	13	16%

Rate how helpful Clickers are to your learning in large lectures:

Answer	Count	%
Very helpful	22	28%
Moderately helpful	31	39%
Slightly helpful	17	21%
Not at all helpful	10	12%
Total	80	100%

What is most helpful about using Clickers?

Technique	Count
Checks understanding	22
Encourages engagement/focus	18
Review material/prepare for exams	13
Instant feedback from instructor	9
Encourages further thought	7
Other	6
Reinforces learning	6
Encourages group work/discussion	6
Interactive	6
Answers questions	6
Motivation to attend class	5

What is the coolest thing that has happened in a large lecture class that helped you learn?

Example	Count
Real-life examples	30
Demonstrations/experiments	28
Videos/music	8
Connecting with students	6
Interacting with students	6
Student Activities	6
Other	6
Clickers/trivia	5

If your instructor offered online office hours (video conferencing or instant messaging), would you attend?

Answer	Count	%
Yes	27	34%
Maybe	38	47%
No	15	19%
Total	80	100%

Which would you prefer?

Answer	Count	%
Video conferencing	12	19%
Instant messaging	26	41%
Both	25	40%
Total	63	100%

What have you done personally to improve your learning in large lecture classes?

Self-Monitoring	Count
Sit in front	18
No tech use	11
Attend class	5
Limit tech use for notes	3
Don't talk	2

Independent Learning	Count
Take notes	9
Review notes/study	8
Handwritten notes	6
Print notes/slides	3

Independent Learning	Count
Watch lecture capture	2

Instructor-Related	Count
Ask questions	6
Go to office hours	4
Connect with instructor	2

Peer-Related	Count
Connect with peers	6
Study groups	4

Would you prefer an online textbook over a physical textbook?

Answer	Count	%
Yes	23	29%
Maybe	18	23%
Νο	29	36%
No preference	10	12%
Total	80	100%

Why would you prefer or not prefer an online textbook over a physical textbook?

Prefer	Count
Cheaper	19
Lighter/easier to carry	15
Convenient to access/use	13
Easy to search	6
Environmentally friendly	5
Other	2

Not Prefer	Count
Difficult to read screen	16
Physical better for study/focus/memory	13
Want tactile book	11
Difficult to flip pages/navigate	8
Physical more engaging	8
Physical better for mark up/notes	6
Material presented differently	3
Other	3

Appendix D: References and Additional Resources

Active Learning Articles

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- Scott Freeman, Sarah L. Eddy, Miles McDonough, Michelle K. Smith, Nnadozie Okoroafor, Hannah Jordt, and Mary Pat Wenderoth. "Active Learning Increases Student Performance in Science, Engineering, and Mathematics." Proceedings National Academy of Sciences (PNAS), vol. 111, no. 23 (June 10, 2014).

Device Policy Articles and Examples

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- Gooblar, David. "Smartphones in the Classroom? Let Students Decide." ChronicleVitae for Higher Ed Jobs, Career Tools and Advice. January 23, 2014.
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- Kamenetz, Anya. "How To Get Students To Stop Using Their Cellphones In Class." NPR. November 10, 2015.
- Lang, James M. "The Distracted Classroom." The Chronicle of Higher Education. March 13, 2017.
- Smith, Tovia. "A School's Way To Fight Phones In Class: Lock 'Em Up." NPR. January 11, 2018.
- Speer, Carolyn. "Distractions and Disruptions in Your Classroom." Wichita State IDA. January 24, 2017.
- Warner, John. "Cell Phone Policies: Still Struggling." Inside Higher Ed. April 6, 2015

Other Large Lecture Models

- George Washington University Learning Space Design
- Indiana University Mosaic Initiative
- Oregon State University Learning Innovation Center (LINC)
- North Carolina State "Scale-Up" Initiative

Large Lecture Articles

- Ruff, Corinne. "The TEDification of the Large Lecture." The Chronicle of Higher Education. May 10, 2016.
- Straumsheim, Carl. "Indiana's Active-Learning Mosaic Expands." Inside Higher Ed. May 12, 2017.
- Shernoff, David J., et. al. "Separate worlds: The influence of seating location on student engagement, classroom experience, and performance in the large university lecture hall." Journal of Environmental Psychology, vol. 49, nos. 55-64 (April 1, 2017).