

Table 1. Some common active learning strategies and how those strategies can be adopted for inclusive online teaching. Please note this is not a comprehensive list of active learning techniques but is meant to provide a quick-reference framework.

Active Learning Technique	Description/Definition	Level of effort to implement	Best for (small, large, either) class size	Online considerations or adaptations	Inclusive teaching considerations
Clarification Pause	Taking time to pause during a lecture, particularly after discussing complex material, to get student feedback and questions.	Easy	Either	Would work best in a synchronous format, but if recording video lectures instructors could ask students to pause video to think and to jot down questions or summarize concepts. Thoughts/questions/summaries could then be posted to a question board. Could also use PlayPosit or other software to incorporate questions and pauses directly into videos.	For students uncomfortable asking questions in front of the class, this could be coupled to anonymous polling
Minute Paper	Students respond for a minute (or a few minutes) to a prompt that encourages reflective dialogue on the topic.	Easy	Either	Could be especially beneficial for gauging student understanding if the course is asynchronous. Thoughts/questions/summaries could then be posted to a question board or to an LMS-based journal. Could also use PlayPosit or other software to incorporate pauses directly into	Could allow students to submit responses in written, audio, or video format
Think-Pair-Share	Students consider a question individually then compare answers and discuss with a peer.	Easy	Either	Likely best in synchronous courses and students will need a space to collaborate. This could be google hangouts, google docs, Blackboard groups, Zoom breakout rooms, etc.	Discussing a topic with a peer instead of with the instructor may be more comfortable for certain students and thus allow them to get their questions answered. Peer-to-peer teaching in an effective way to increase learning and engagement
Clickers	A polling device or “clicker” is used to assess student understanding of concepts. Usually done during lecture and is a type of formative assessment.	Easy	Either	Many clickers can be used with video clients. Services, such as Poll Anywhere and Top Hat can integrate with slideshows.	Allowing anonymous responses can aid in student participation and can allow students to assess their own knowledge without fear. However, clicker devices or software can be expensive and/or difficult to use. Accessibility issues with various devices can
Formative Assessments	Provide opportunities to check student understanding. Can be graded or ungraded and take multiple formats. Clickers are one example.	Easy	Either	Could take advantage of adaptive or conditional release features in LMS so that students must complete a type of formative assessment (e.g., concept check or pass an ungraded quiz) prior to moving on with material. (also see clickers above)	Incorporation of multiple assignment types and learning checks increases student performance and self-efficacy. Offering multiple graded assignments can help with overall performance as it removes reliance on a single or a few major exams.
Current Events	Incorporation of relevant, current events into the class learning experience	Easy	Either	This can be as simple as providing relevant new stories or could be more involved (e.g., by making a problem-based learning situation or discussion out of current events)	Adding relevance of material to daily life can increase motivation and is in-line with UDL principles. Increasing opportunities for students to bring their lived experiences to the class is important, but creating a safe environment where all student views can be heard and respected is critical.
Concept or Mind Maps	A visualization of the organization among topics, ideas, and/or evidence	Easy	Either, but if class is large or instructor intends to grade assignments, effort level increases.	This could be done in synchronous or asynchronous online courses. There are multiple online tools designed for creation of concept mapping. Alternatively, students could draw by hand and photograph to upload.	Access to online tools and ease of use can be an issue. Allowing students to show mastery of concepts visually, with a mindmap, is in-line with the UDL framework.
Group Discussion	Breaking students into smaller subsets of the class to discuss a topic or prompt	Easy	Either, but format will likely depend on class size	Could be done as a whole class synchronously online (rooms) or discussion board (either as a whole class or in groups by using group settings in LMS)	Managing group work and interactions can be important. Making sure groups collaborate, work together, and value contributions of all members is important.

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Self-Assessment	These can take a variety of formats, but involve students assessing their own work for strengths and weaknesses	Medium	Either	There are many ways this could be accomplished, but instructors could leverage tools available in LMS (e.g., journals, discussion boards, practice quizzes, self-assessment options in Blackboard, etc.).	Could allow students to submit responses in written, audio, or video format. Self-assessment can aid in metacognitive thinking and can help students learn how to study.
Problem-Based Learning, Inquiry-Based Learning, or Case Studies	These take a variety of formats, but generally ask students to apply course material to solve a (open-ended) problem or answer a series of questions.	Medium	Either, but logistics for large classes can pose a challenge	Can be done in synchronous or asynchronous courses, but students will need a space to collaborate. This could be google hangouts, google docs, Blackboard groups, Zoom breakout rooms, etc.	Managing group work and interactions can be important. Making sure groups collaborate, work together, and value contributions of all members is important.
Peer-review	Students use a rubric to assess a peer's work	Medium	Either, but logistically easier in small courses	Many LMS have built-in features to facilitate peer review.	Can take advantage of LMS rubric options to help students fairly evaluate their peers. Peer-review can also help students think metacognitively about the course and their work.
Peer Instruction	Requires students to apply class concepts and explain those concepts to a peer.	Medium	Either	Many LMS have options for student-student communication or interaction.	Peer-to-peer teaching in an effective way to increase learning and engagement. Allowing students to design their approach to the topic can increase motivation and self-efficacy. Students may be more comfortable asking a peer questions.
Public Service Announcement (PSA)	Students create a PSA related to course content (format types vary - audio, video, infographic, billboard, etc.)	Medium	Either, but grading could be difficult in very large courses.	Assignment can take a variety of formats and could be turned in digitally via LMS.	Can take advantage of LMS rubrics to increase transparency in expectations and grading. Also allows for easy feedback options. Allowing students the option of format (e.g., video, audio, graphical, etc.) is in-line with the UDL framework.
Persuasive letter or Op-Ed	Students create a scientifically sound argument about a topic related to class. Paper can be framed as an Op-Ed or letter to an elected official.	Medium	Either, but grading could be difficult in very large courses.	Assignment could be turned in digitally via LMS.	Can take advantage of LMS rubrics to increase transparency in expectations and grading. Also allows for easy feedback options. Instructors could make the writing assignment an interactive process and allow students to make multiple edits to their draft. This drafting process could be managed in the LMS.
Experimental Design and Experimentation	Students design and/or perform experiments related to class content	Medium to Difficult	Small	Virtual labs can be challenging but there are several opportunities for conducting experiments online. Students can easily design experiments and make predictions in an online setting. They can also analyze data that were previously collected. If resources are limited, focusing on design and research methods can be beneficial.	Doing virtual labs may aid in participation as not all lab spaces are accessible for all students. Allowing students to show mastery of material via proposed experiments or interpretation of data is in-line with UDL principles.
Course-Based Undergraduate Research Experience (CURE)	Course-based research project that engages whole classes of students in addressing a research question or problem that is of interest to the broader scientific community	Medium to Difficult	Small (25 students or less)	Works best with a synchronous format. Depending on the project, external digital imaging equipment may be necessary such as document camera, hand held microscope or digital camera.	Access to high speed internet to allow for online synchronous learning.
Wikipedia Assignments	Term-long series of assignments that involve the assessment, critique, editing and contribution of content (information and media) to either existing or newly created wikipedia articles	Medium to Difficult	Variable depending on class size, level and complexity of assignments	Online and asynchronous with some synchronous meetings (optional) to support students and for students to have discussions with peers.	Possible with the right scaffolding, course dashboards already include some tools and are very customizable to meet course needs