Active Learning for Online Teaching

Active learning approaches help instructors maintain student engagement and motivation in the virtual classroom. Research demonstrates active methods facilitate greater student interest and achievement (Freeman et al, 2014). Engagement opportunities do not have to be hands-on or completed in groups. Active learning's foundational premise is to engage students cognitively…as Hake (1998) said, "heads-on (always) and hands-on (usually) activities."

Things to keep in mind when implementing:

- Technology may not work as intended. Try to keep instructions as clear as possible. Thoroughly pretest all links. Provide an FAQ page and/or troubleshooting guide in advance. Asking students to familiarize themselves with resources and tools before class can help reduce technical difficulties.
- Interaction in an online environment can be facilitated via the software's breakout room functionality. Allow additional time to organize and launch the breakout rooms. Avoid allowing too much time for breakout activities. It is preferable to bring the class back together before all groups have completed the activity rather than after most groups have finished. The energy of the ongoing process can be redirected into the post activity discussion. Encourage students to signal if they have a question so that the breakout time is not wasted.
- Instructor/student communication can be delayed due to the nature of virtual communication. It is more challenging to gauge student interest and/or engagement since it can be very difficult or even impossible to read students' nonverbal cues. Plan longer wait times for student responses. Some students may prefer to submit responses via chat or nonverbal feedback tools rather than voice.
- Transparent communication characterized by clear expectations, specific instructions, and detailed rationales defines both process and purpose which helps to increase student motivate and engagement.

Online Active Learning Strategies (All can be modified for either synchronous or asynchronous contexts.)

Think-Group-Share	Instructor poses a question to the students. Students have quiet individual time to formulate their response before instructor puts students into online breakout rooms of 4-5 students each. In the breakout groups, students share their ideas for 3-5 minutes based on the question's complexity. Instructor then brings everyone back into the main meeting room and groups report back. This activity can be simplified to a think-share where students use the chat feature.

Guided Notes	Students are given in advance a partial set of class notes with critical information and/or examples missing or incomplete. Documents should be provided to students beforehand via the learning management system. Students complete and annotate the notes during the class session.
Minute Paper	During the last 5 minutes of class, instructor asks students to answer one or two questions in a discussion forum designated for this purpose. Questions can include: "What was the most important thing you learned during the class?" "What important questions remain unanswered?" Instructor can review responses and use the information to prepare for the next session.
Muddiest Point Paper	Can be used at any time during a class session. Students are asked to write down in a discussion forum designated for this purpose what they found least clear or most confusing in a teaching presentation or activity: "What was the muddiest point in the (lecture, assignment, discussion, play, film, video etc.)?" These responses provide information valuable for the start of next class session. Also called MUD (Most Unclear Detail) cards. Other tools to capture this information could be Google Forms, the chat function in learning management system or Zoom, or a Google Doc.
Background Knowledge Probe	Students complete a simple online quiz, questionnaire or poll within the learning management system or Zoom that gives instructor a quick look at their knowledge and preparedness prior to beginning a content area or class session. Google Forms, Poll Everywhere, or Survey Monkey can all be useful tools for this activity.
Misconception/Preconception Check	Focuses on uncovering students' prior knowledge or beliefs that may hinder or block further learning. Create an online questionnaire or poll in the learning management system or Zoom to elicit information about students' ideas and/or beliefs in an area identified as being associated with troublesome misconceptions or preconceptions. For instructor, this check identifies specific problem areas, how these might interfere with learning in the course, and how deeply embedded the misconceptions/preconceptions are in student thinking. Google Forms, Poll Everywhere, or Survey Monkey can all be useful tools for this activity.
Best Summary	For a short amount of the class session, students write a summary at the end of a unit, lecture, or other assignment. Then using breakout rooms, student groups work to compare their summaries, choosing the best one. Instructor then brings everyone back to the main meeting room and designated group speakers report out.

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Current Event Reflection	Instructor incorporates a current event example from a news source connected to a course concept (students can also be asked to contribute current events). Depending on class size, students can either speak in the general meeting room or can be sent to breakout rooms to discuss with the current event with peers. Then, instructor can bring the class back together to debrief.
Concept Maps	Drawings or diagrams showing mental connections students make between a major (new) concept, and other, previously learned concepts. Provides an observable and assessable record of students' conceptual schemes and/or the associations they make in relation to a given focal concept. Students can either use online concept mapping tools and save their work as image files or take cellphone pictures of hand drawn work and then share in the online class meeting or submit in the learning management system. Micro, Coggle, or Creately are good for creating concept maps. Students could share and comment on each other's concept maps in a discussion forum hosted in the learning management system.
Pro and Con Grid	Instructor can use the grid as a quick overview of students' analysis of pros/cons, costs/benefits, advantages/ disadvantages of an issue or concern. Forces students to go beyond first reactions, to search for at least two sides to an issue, and to weigh the value of competing claims. Grid should be prepared listing issues or concerns as row headers and basis for analysis as column headers. Students are to write in a short response in each cell on the grid. Students can do these grids either in Word or by hand. If by hand, they will share a picture of their work. Grids can be shared in the online class meeting or via the learning management system. Other tool options include Padlet, Miro, or Google Docs.
Think Again	Instructor presents information illustrating a common misconception or misunderstanding in the discipline and then takes a quick poll asking students to agree or disagree. Instructor then identifies the information as a misconception or misunderstanding and students to prove why. Students can be put in breakout rooms to discuss the results of the poll, formulate responses, and return to the main online room for discussion with the entire class.
Visual Prompt	Students respond to an image (photo, graph, etc.) by describing relevant features, interpreting meaning, explaining how the graphic came to be, or suggesting a hypothesis (MIT Teaching & Learning Lab, 2016). Initial discussion can be in breakout rooms or online discussion forum.

Comprehensive Factors	Students use information they have gained from a reading, lecture, video, etc. and make a list of as many relevant factors as they can for a topic. Can be done in a discussion forum designed for this purpose.
Entry and Exit Tickets	To begin or conclude a chapter, module, session, etc. Students reflect on assignment or activity by writing a brief response to instructor provided question in a designated discussion forum providing information about their understanding.

Angelo T. A, & Cross, K. P. (1993). Classroom Assessment Techniques: A Handbook for College Teacher. San Francisco: Jossey-Bass.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning boosts performance in STEM courses. Proceedings of the National Academy of Sciences Jun 2014, 111 (23) 8410-8415; DOI: 10.1073/pnas.1319030111

Hake, R. R. (1998). Interactive-engagement vs. traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. American Journal of Physics, 66, 64-74.