How can you incorporate active learning into the classroom?

There are many ways to use active learning in the classroom. The following brief list summarizes some simple approaches described by others (Active learning, n.d.; Felder & Brent, 1994; Felder & Brent, Fall 2003; Felder & Brent, Summer 1994; Paulson & Faust, n.d.).

- **Clarification Pauses.** This is a simple technique aimed at fostering "*active listening*". Throughout a lecture, particularly after stating an important point or defining a key concept, stop, let it sink in, and then (after waiting a bit!) ask if anyone needs to have it clarified. Or, ask students to review their notes and ask questions on what they've written so far.
- **Writing Activities such as the "Minute Paper."** At an appropriate point in the lecture, ask the students to take out a blank sheet of paper. Then, ask the topic or question you want students to address; for example, "*Today, we discussed conductive heat transfer. List as many of the principal features of this process as you can remember. You have two minutes – go!"*
- **Self-Assessment**: Students receive a quiz (typically ungraded) or a checklist of ideas to determine their understanding of the subject. Concept inventories or similar tools may be used at the beginning of the semester or the chapter for students to help students identify their misconceptions.
- **Large Group Discussion**: Students discuss a topic in class based on a reading, video, or a problem. The instructor may prepare a list of questions to facilitate the discussion.
- **Think-Pair-Share.** Have students first work on a given problem individually, then compare their answers with a partner and synthesize a joint solution to share with the class.
- **Cooperative Groups in Class (Informal Groups, Triad Groups, etc) -** Pose a question on which each cooperative group will work while you circulate around the room answering questions, asking further questions, keeping the groups on task, and so forth. After an appropriate time for group discussion, ask students to share their discussion points with the rest of the class.
- **Peer Review:** Students are asked to complete an individual homework assignment or short paper. On the day the assignment is due, students submit one copy to the instructor to be graded and one copy to their partner. Each student then takes their partner's work and depending on the nature of the assignment gives critical feedback, corrects mistakes in problem-solving or grammar, and so forth.
- **Group Evaluations:** Similar to peer review, students may evaluate group presentations or documents to assess the quality of the content and delivery of information.
- **Brainstorming.** Introduce a topic or problem and then ask for student input. Give students a minute to write down their ideas, and then record them on the board. For example, "*What are possible safety (environmental, quality control) problems we might encounter with the process unit we just designed?* " could be a brainstorm topic in an engineering class.
- **Case Studies.** Use real-life stories that describe what happened to a community, family, school, industry or individual to prompt students to integrate their classroom knowledge with their knowledge of real-world situations, actions, and consequences.
- **Hands-on Technology**: Students use technology such as simulation programs to get a deeper understanding of course concepts. For instance students could use simulation software to design a radio antenna with the ultimate goal of understanding electromagnetism.
- **Interactive Lecture**: Instructor breaks up the lecture at least once per class to have all of the students participate in an activity that lets them work directly with the material. Students could observe and interpret features of images, interpret graphs, make calculation and estimates, etc.
- **Active Review Sessions (Games or Simulations):** The instructor poses questions and the students work on them in groups. Then students are asked to show their solutions to the whole group and discuss any differences among solutions proposed.
- **Role Playing**: Here students are asked to "act out" a part. In doing so, they get a better idea of the concepts and theories being discussed. Role-playing exercises can range from the simple (e.g., "What would you do if a client rejects your engineering design concept based on the cost and usability of the product?") to the complex.
- **Jigsaw Discussion**. In this technique, a general topic is divided into smaller, interrelated pieces (e.g., the puzzle is divided into pieces). Each member of a team is assigned to read and become an expert on a different topic. After each person has become an expert on their piece of the puzzle, they teach the other team members about that puzzle piece. Finally, after each person has finished teaching, the puzzle has been reassembled and everyone in the team knows something important about every piece of the puzzle.
- **Inquiry Learning**: Students use an investigative process to discover scientific or engineering concepts for themselves. After the instructor identifies an idea or concept for mastery. A question is posed that asks students to make observations, pose hypotheses, and speculate on conclusions. Then students are enlisted to tie the activity back to the main idea/concept.
- **Forum Theater**: Use theater to depict a situation and then have students enter into the sketch to act out possible solutions. If students were watching a sketch on dysfunctional teams, have students brainstorm possible suggestions for how to improve the team environment. Then, ask for volunteers to try to act out the updated scene.
- **Experiential Learning**: Plan site visits that allow students to see and experience applications to the theory/concepts discussed in the class.

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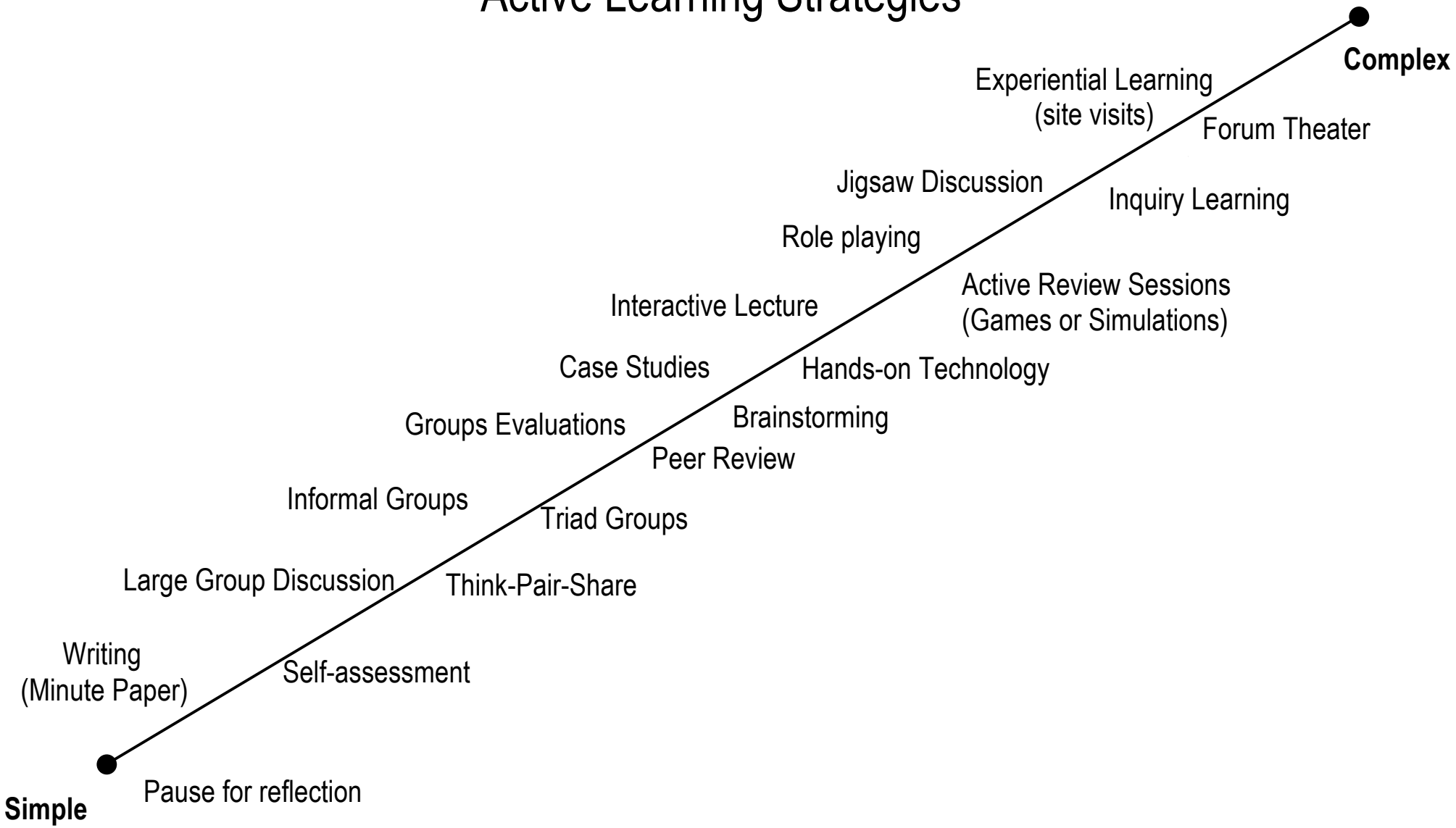
Active Learning Strategies



This is a spectrum of some active learning activities arranged by complexity and classroom time commitment.

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