

## Active Learning Techniques

**Think-Pair-Share** - First, students individually *think* for a few minutes about a question posed by the instructor, then get together for a short period in groups of two (*pair*) to four students to discuss their thoughts, and one or more groups *share* the results of their discussion with the class. In addition to engaging with course content, students can reflect before speaking, and share their ideas in a low-risk situation before participating in full class discussion. Thus, both the quality of class discussion and students' comfort in contributing to class discussion may improve.

**Jigsaw** - A class is divided into multiple teams of students. The instructor gives each team a slightly different but well-defined task with clear instructions that each member of the team will do to represent the group at the end of the work. Each team then collaborates on the task, developing expertise in the designated area. The instructor is available for questions and guidance as the groups work to learn their material. Then the instructor rearranges the groups to create new groups that are composed of one member from each of the original groups. Within the new groups each student has designated expertise and is responsible for teaching the information learned in the original group as well as learning the information from the other groups.

**Roundtable** - The instructor asks students to collaborate in small groups on a specific prompt that can generate multiple responses. Students share a single piece of paper that gets passed around their circle rapidly. The goal is to generate as many responses as possible from all members of the group in a defined period of time. A small prize (candy, extra credit point, etc.) may be offered to increase the stakes if desired. Roundtables are often followed by a reporting mechanism in which the professor calls on groups to share their responses. The report-out instructions might ask for no repeated answers, the most predictable answer, the most creative answer, etc. Finally, the instructor may choose to collect the Roundtable papers after the exercise to get a full record of all the small group conversations.

**Problem-Based Learning** - Challenged with a complex, real-world problem, students work in collaborative groups or teams to understand the problem and propose solutions. Often such problems do not have an obvious solution, but are examples of challenging, open-ended problems faced in our world today. Students must analyze the nature of the problem, identify what they need to know and how to find needed information, reach informed judgments, and apply what they learn to generate ideas for possible solutions.

**Team-Based Problem Solving** - In Team-Based Problem Solving, students form collaborative teams to solve a problem or undertake a project. Across each team, members should bring a diversity of complementary talents, knowledge and experience to the problem-solving process.

Team-based learning has many pedagogical benefits. Students engaging in teamwork typically develop greater problem-solving skill and content understanding, higher motivation to learn and enthusiasm for course content, and present higher quality solutions. At the same time, through ongoing, focused team interaction, they develop more effective communication and interpersonal skills, and greater comfort participating in collaborative groups.

With learning teams, the instructor takes on the important role of facilitator. Beginning with group assignment, the facilitator must nurture student groups to become functioning, self-directed, productive teams.

**Project-Based Learning** - Project-Based Learning focuses on real solutions to a problem. Once a problem is identified, student teams develop and demonstrate their understanding of the problem by proposing one or more solutions, often designing, constructing, and delivering a prototype.

The focus is on building students' ability to develop creative, realistic, tangible solutions to sometimes difficult problems through teamwork. Once a solution is agreed upon, the team must decide how to realize that solution with a product or service. Attention then turns to designing and developing a prototype of the product or detailed definition of the service. When completed, teams may present their solution to the class or in a demo session to a broader audience.

**Case Method Teaching** - In Case Method Teaching, students review a real-world situation (a case) that poses a thought-provoking problem or dilemma. Students are placed in the role of decision maker and asked how they would resolve the problem.

The real-life nature of cases brings interest and relevance to the application of abstract concepts and theory in practice. Students have to sort out and analyze data presented in the case, consider relevant theory, draw conclusions, and present solutions. Through teamwork and whole-class discussion, collaborative learning plays a large role in uncovering different solutions, understanding the pros and cons of each, and weighing benefits.

### **Experiential Learning**

Experiential learning is a process through which students develop knowledge, skills, and values from direct experiences outside a traditional academic setting. Experiential learning encompasses a variety of activities including internships, service learning, undergraduate research, study abroad, and other creative and professional work experiences. Well-planned, supervised and assessed experiential learning programs can stimulate academic inquiry by promoting interdisciplinary learning, civic engagement, career development, cultural awareness, leadership, and other professional and intellectual skills.

Learning that is considered "experiential" contain all the following elements:

1. Reflection, critical analysis and synthesis
2. Opportunities for students to take initiative, make decisions, and be accountable for the results
3. Opportunities for students to engage intellectually, creatively, emotionally, socially, or physically
4. A designed learning experience that includes the possibility to learn from natural consequences, mistakes, and successes

### **Resources**

Activities to Boost Student Engagement | Teaching Commons. (n.d.). Retrieved October 6, 2017, from <https://teachingcommons.stanford.edu/resources/learning/activities-boost-student-engagement>

Angelo, T. A., Major, C. H., & Cross, K. P. (2001). *Collaborative learning techniques: a practical guide to promoting learning in groups*. San Francisco, Calif.; Chichester: Jossey-Bass Pfeiffer ; Wiley.

Barkley, E. F. (2005). *Collaborative learning techniques: a handbook for college faculty* (1st ed). San Francisco: Jossey-Bass.

Faust, J. L., & Paulson, D. R. (1998). Active learning in the college classroom. *Journal on Excellence in College Teaching*, 9(2), 3–24.

Increasing student engagement, by design. (2016, June 8). Retrieved October 6, 2017, from <https://blog.peerinstruction.net/2016/06/07/increasing-student-engagement-by-design/>

Lom, B. (2012). Classroom Activities: Simple Strategies to Incorporate Student-Centered Activities within Undergraduate Science Lectures. *Journal of Undergraduate Neuroscience Education*, 11(1), A64–A71.

Mazur, E. (2014). *Peer Instruction for Active Learning*. YouTube. Retrieved from <https://www.youtube.com/watch?v=Z9orbxoRofI>

Prince, M. (2004). Does Active Learning Work? A Review of the Research. *Journal of Engineering Education*, 93(3), 223–231. <https://doi.org/10.1002/j.2168-9830.2004.tb00809.x>