

Exploration Learning Techniques

Technique	Description	#students in class			Degree of difficulty (does it require a whole curriculum redesign, or can it be slipped into an existing class?)				Related references
		<25	25-100	>100	Easy out-of-class add	Easy in-class add	Req's planning	Major redesign	
	Connective Qs (link across disciplines), Comparative Qs (compare two or more), Evaluative Qs (judge relative values of different points), Critical Qs (examine validity of an argument). Ask students how they can apply class concepts to their own experiences; important to think about Questions for the class how concepts relate to oneself.	x	x	x		x			
	Minute questions Rather than asking, any questions? give the students a minute to write questions on paper and then compare with other students before asking. Use this a few times before ever asking the question straight -- any question? And then give them more than 3-5 seconds to answer.	x	x	x		x			
	Minute paper Similar to other techniques: a three minute summary of main points of lecture. Can ask a student to read what they've written and announce that this will be happening.	x	x	x		x			Weaver and Cotrell (1985)
	Inner Circle ~6 to 16 students form a discussion group; the rest are observers. Gets shy students talking in discussion group. Observers can comment after.	x	x	?		x	x		
	Peer Learning Class is split into groups of 4 to 6. First introduce themselves, then choose reporter, get one idea from each group member on the topic posed, then choose one to report to class. Can be 5 minutes or the whole class or more in length.	x	x	?		x	x		
	Learning through discussion 1. Understand that getting reactions to your ideas makes a big difference in learning, retention, and knowledge use. 2. Be willing both to talk and to listen; easy to deceive ourselves with our own insights; can ask student to paraphrase what they heard before responding. 3. Plan the discussion in class and the actions to be taken after. 4. Build on others' ideas so as to increase their motivation rather than make them feel punished or forgotten; not a competition 5. Evaluate a discussion's effectiveness at its end. 6. Attend to emotions. Discussing underlying emotions (guidelines for effective discussion) may be more productive than focusing on content.	x	x	x			x		Haines and McKeachie (1967); cooperative discussion methods encourage more effective work and better morale than competitive methods do.
	Taking minutes Assign one student to give a summary of the class at the end, or to begin the next class with a summary of the previous one	x	x	x		x			Boris (1983)
	Break the class into 10-min events Students' attention tends to wane after ten minutes. Break up into pairs, small group activities, a problem everyone works on, a minute paper, etc.	x	x	x		x	x	x	Hartley and Davies (1978) in Programmed Learning and Educational Technology (vol 15)
	Improve listening by starting Ask students to write for one minute on, "What do I hope to get out of this lecture?" and explain that this will make them a better listener in any lecture.	x	x	x		x			
	Avoid lectures that tell the whole story and reach conclusions. A concise summary of knowledge with a conclusion excludes the listener from the story. Instead, show students how to learn and think by analyzing materials, formulating problems, developing hypotheses, bringing evidence to bear, criticizing and evaluating alternative solutions.	x	x	x		x	x		
	Student summaries Ask every student to summarize the lecture at the end of the period. This will help them remember, and help you understand what to improve.	x	x	x		x			
	Prequestions The introduction to a lecture should point to a gap in the student's existing cognitive structure or should challenge or raise a question to arouse curiosity. This technique has been shown to increase learning on the topic of the question.	x	x	x		x			Berlyne DE, 1954a, b; Wilhite, 1983
	Graphical representations An organized framework of concepts is important for further learning and thinking. The professor can organize concepts into a tree or map, and ask students to fill in the missing parts, or give them the parts and ask them to organize them, or use a growing tree structure as an introduction to their progressive lectures.	x	x	x	x		x		Naveh-Benjamin et al., 1986, 1989
	Peer tutoring Teaching others leads to big gains in retention of learning by the teacher, largely attributable to deeper studying of material while preparing to teach. Students can be asked to present on certain topics, or to lead small discussions in class.	x	x	x			x	x	Annis (1983), Bargh and Schul (1980)
	Syndicates The class is divided into teams (or syndicates) of four to eight students. Each syndicate is given assignments or perhaps three or four questions. References are suggested, and members of the syndicate may divide up the reading. Their findings can be discussed in their small groups during class periods, and then they may make a written or oral report to the class as a whole. Remind students that they have probably sometimes been bored by student presentations, and encourage them to think of ways to make the presentation interesting.	x	x	x			x		Hartman (1989)
	Jigsaw groups The class is divided into small groups, each of which is given an assignment. The group decides on what and how to present to the rest of the class. Instead of a presentation to the whole class, new groups are formed, each of which has one member from each of the original groups. Each student is responsible for teaching the new group what her original group learned. Cases are usually descriptions of real problem situations or challenges, and this style of learning teaches problem solving. Cases are usually presented in writing or with role-playing. Allow students to ask questions about the process they are to use, and to clarify the nature of the problem presented, but not about possible approaches or solutions to the problem. Encourage the students to ask, What is the problem?, to develop hypotheses about what causes the problem, to try to gather evidence in support of or to discount these hypotheses, and finally to draw conclusions. The cases can be worked on individually or in teams.	x	x	x			x		Elliot Aronson first developed this.
	The Case Method Students that work in groups on open-ended problems that have several reasonable approaches and more than one possible satisfactory answer develop better intrinsic motivation and better strategies for meaningful learning.	x	x	?			x	x	
	Open-ended problems Ask two or three students to act as process observers for a day, to report at the end of class or the beginning of the next their observations on how the discussion went, what problems they noticed, and what suggestions they have. This is a very good way to even out a class that has unruly discussions or one or two students who dominate the discussion.	x	x	?		x			Ege, Coppola, and Lawton, 1997
	Process Observers Motivation is a function of one's goals and expectations about what will lead to those goals. Having students write specific goals for learning in the course should increase their motivation. They might start by answering, What do I want out of my life? What do I hope to get out of college? Why did anyone think this course should be required? What would I like to get out of this course? You might also ask the students to write short- and long-term goals for the course, goals and have them record progress toward their goals.	x	x	x	x	x			
	Student-led discussions Students who learned in small, student-led discussion groups perform as well on finals, have higher curiosity, more freedom to ask questions, and better complex problem-solving skills than those who attended normal lecture. Meet with the student leaders to discuss issues and share questions, and be available to answer questions or provide reading that will.	x	x	x			x	x	Gruber and Weitman (1962), Romig (1972), Beach (1960, 1968), Webb and Grib (1967)
	Be enthusiastic Murray (1997) showed that enthusiastic teachers move around, make eye contact, use gestures, use more vocal variation. People model themselves on other people with characteristics that can be admired and emulated.	x	x	x		x			Murray (1997)
	Importance of structure Cognitive theory sees information as being stored in structures such as networks with linked concepts, facts, and principles. The lecturer needs to bridge what is already in the student's mind to the new material, using metaphors, examples, and demonstrations.	x	x	x		x	x		Naveh-Benjamin et al. (1989) showed that students begin with little organization but develop a structure during the course that more and more resembles that of the instructor.