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Active Learning (3) Three Easy Pieces

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“The new learning paradigm...balances the delivery of content with the discovery of knowledge”.
(Saunders, 2000).

One of the most common obstacles in introducing active learning in the classroom, is the perception that it takes away from the lecture. The typical 40+ contact hours that a professor has with his/her students during a semester are usually considered to be barely enough to cover the “content” of the course. Yet thanks to excellent classroom research (McKeachie et al., 1990) we know a great deal about how learning happens, and not much of it will be happening in the classroom unless students are actively engaged. Research comparing lecture versus discussion techniques (McKeachie et al., 1990) concludes that

*“When measures of **knowledge** are used, the lecture proves as efficient as other methods. However in those experiments involving measures of **transfer of knowledge** to new situations, or measures of **problem solving, thinking, or attitude change, or motivation** for future learning, the results show differences favoring discussion methods over lecture.”*

So, the question becomes: should instructors sacrifice content coverage (i.e. knowledge delivery) in order to allow active/collaborative learning (i.e. knowledge construction)? The answer is: not if they **shift** some of the **responsibility** of “content coverage” to the students. Students, working in groups or individually, can be **guided** to explore the course content through active learning, where they “do most of the work... use their brains...studying ideas, solving problems, and applying what they learn” (Silberman,M.1996). In so doing they engage in the process of **building their own knowledge** from the information they are acquiring.

The following describes three commonly used interactive/collaborative learning structures that can be used **in-class**, and can be adapted to many disciplines or situations. In each case the instructor could deliver one or two mini-lectures per class, and separate them by a brief group work session. Students can work in teams of two or four students, and one of them could be randomly assigned to be the group recorder.

1. Think-pair-share (TPS)

TPS was first introduced by Lyman (1981) and is recommended for instructors who have not used collaborative learning previously. The instructor poses a question or a problem (work through derivation, explain observation, list assumptions, errors or ethical dilemmas in a problem or a case study, etc.) and gives the students a minute to think and write about it. They then pair with a partner(s), compare their answers and, if possible, synthesize a joint response.

After a few minutes the instructor has the pairs share their solution (comments) with other pairs, or with the class. The exercise allows the students the opportunity to reflect upon their learning, to express their ideas, and to find out what they know and what they don't know. It enhances their oral communication skills, and helps them better understand the concepts at hand.

The peer instruction method which we discussed in *New Chalk Talk's* Sept. 14, 2004 issue is a variation of this collaborative learning structure.

2. Short Writes

At the end of a lecture the instructor hands out 4x6 cards and asks the students to write on one of the sides a summary of the main points covered during the lecture. (He/she can also ask them to relate these points to the overall goals of the course, topic or chapter). Students then discuss what they have written with a partner for about two minutes, after which they rewrite a revised version on the other side of the card which they hand in as they are leaving the class.

3. Thinking Aloud Pair Problem Solving (TAPPS)

TAPPS, a problem-solving collaborative technique has been called "*arguably the most powerful classroom instructional technique for promoting understanding.*" (Felder, R.M. and Brent, R., 2003) Students work in pairs on a problem (work through a derivation, explain an observation, find assumptions, find error in a solution etc.), with one of the students acting as a Listener and the other as a Problem Solver (they switch roles during the next activity). The latter reads the problem aloud and orally goes through the solution (answer) while the former listens to each step. If the Problem Solver's thought processes become fuzzy, the Listener can ask questions without prompting the solution. He/she can also point out if an error is made without mentioning what the error is. This goes on until a solution is reached to the satisfaction of both.

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