218f Student-Directed Learning Modules

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It's become cliché that students learn best by being involved in their own instruction, i.e., through active learning, rather than through passive instruction in a lecture format. This paper is a description of a very old method that is brought into the chemical engineering classroom in a new way.

In a nutshell, advanced topics from a particular course are selected. The topics are those that might not be covered each year, and are those on the "fringe" of what is considered to be the core of a subject. Each topic is assigned to a single team, and each team is composed of approximately six students. The team is given the assignment to learn the topic on their own, outside of class, develop a 30-minute presentation to give the class, and to develop a relevant homework assignment. References are suggested, and expert consultation (the professor) is available.

This has been done in Transport Phenomena I and II, with great success. The teams have been consistently enthusiastic in completing the assignment and thorough in learning the topic and teaching their fellow students. And, while students are learning applications of Transport Phenomena, they're also practicing team work, open ended design, formulating engineering problems, and engaging in self-directed learning. Each of these are criteria for ABET-accredited programs.

This also gives the students an important opportunity to think and learn about the teaching and learning processes, i.e., metacognition. It appears that the experience enables students to improve their own learning abilities in other classes.