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## Group Learning in Technical Courses

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## FORUM

**GROUP LEARNING IN TECHNICAL COURSES**

Donald E. Smith

It is one thing to utilize group learning techniques in non-technical courses in which a group discussion on the meaning of a literary passage or the effects of an economic or political decision could take advantage of a group dynamic and all that group participation has to offer. It is quite another when the subject material is purely technical and relatively unyielding as in math or physics based courses.

After attending the outstanding Summer Teaching Institute at the University of Prince Edward Island, I was curious as to how I would apply recently acquired group learning techniques in my technical course Aerodynamics, and its follow-on course, Aircraft Performance. It had been easy to see how learning was enhanced in a group setting when dealing with non-technical material such as determining the meaning of a literary passage or contemplating the result of a political or economic decision. Problem solving, even at technical levels was enhanced by the group dynamic and the combined knowledge of the group. My question though was, would a group be able to teach itself complex mathematical and physics concepts? Agreed, once learned, the concepts could be handily applied to practical applications or problem solving by a group but could the concepts be effectively group taught?

I used my two sections of Aerodynamics classes to try to resolve the question. One group was the beneficiary of my lecturing; direct instruction if you will. The other section was divided into groups and assigned problems associated with each chapter in the textbook. They were instructed to answer the question for the entire class and to thoroughly explain the theory and concepts behind the problem at hand. They were allotted approximately twenty minutes to formulate their responses to the assigned questions. I encouraged different spokespersons to present the problems to the class to ensure full participation in the individual groups. I discouraged friends from participating in the same group, as they tend to dominate the group. Random group selection techniques can assist in this also.

Individuals from each group then presented their findings to the entire class.

The allotted times for each section were comparable. We covered the same amount of material in each section. The test scores of the two sections were within one point of each other. This in no way is a meaningful statistical sample of course but mentioned just in passing. What I feel is significant is the lackluster way the students presented the material. It was classic "check the block and be done with this" mentality. The problems were solved but the background information, which is so important to the understanding of yet to be presented concepts, was severely lacking and not well understood. I felt compelled to expand on the material because I knew a full understanding was necessary if the students were to be successful with future concepts which integrated a particular idea. My participation probably resulted in the comparable test scores. Mea culpa. I blew the experiment but I couldn't allow these students to proceed with a less than adequate background for that which was yet to come. And that to me is the crux of the problem of using group techniques to master technical concepts. Students seem to have a difficult time mastering technical concepts on their own. Perhaps they would do better if quizzes were administered prior to the group work on the reading assignment. Group quizzes might work as well as individual ones. This would ensure all had at least looked at the material prior to the class and would most likely enhance the learning process. I still feel though, that the students would still be more oriented toward the problem solving exercise and not the supporting

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material. Even if the exercise was to only explain the concept, instructor intervention is still important in the context of the big picture and to show why a particular concept is important to learn.

I suppose this is an indication of job security and a nice feeling of knowing you are needed but I would still endeavor to make this self-teaching work. Perhaps a nice

mix of teaching techniques would lend itself to these technical courses. The students do seem to prefer to work with each other and given my very limited look at this problem, initial indications are positive with respect to time allocation and test scores. I feel it is worth an ongoing attempt to make it work.□

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