Construction and Fire Technology Interdisciplinary Experiential Learning Techniques

Rachel D. Mosier, Ph.D., PE, D. Lantz Holtzhower, Ph.D.
Bryan L. Hoskins and Robert J. Agnew, M.S., CIH, CSP
Oklahoma State University
Stillwater, OK

Hands-on student participation in engineering and math based courses can be difficult. Teaching labs are typically used for the math portion of structures courses, but can limited in the ability to use non-traditional methods. Experiential learning methods were identified to increase classroom participation and understanding. A comparison of exam and course grades was utilized to determine if students increased performance over previous classes. The experiment is two-fold. In the first part of the experiment, seniors are given the same project as freshmen. The project is a traditional truss project used in many structures related courses for hands-on learning. The seniors then mentor the freshman in the project. The freshman approach this problem without a basis in statics or strengths of materials. The seniors have these classes and are enrolled in structures which focus on the design of trusses, materials and connections. Experiential learning is utilized by the seniors teaching themselves and teaching others how to build the trusses. In addition to the traditional truss exercise, the Fire Protection and Safety Technology program illustrates structure failures under fire loading and utilized the truss project as an example. Students from both departments are able to demonstrate expertise and knowledge gained during their education. In both cases the learning technique was experiential, in that the students were teaching themselves by hands-on participation in building trusses. This work correlated with the coursework. Although there is no evidence that the truss building exercise changed their grades in Structures or in their exams, the overall enthusiasm for working on the truss and participating in the truss burn was exceptional. Further studies into the correlation between the project and test or course scores will be required.