



<http://www.foundationcoalition.org>

From Jeff Froyd, Project Director

Active/Cooperative learning (ACL, <http://www.foundationcoalition.org/acl>), one of the underlying ideas in Foundation Coalition (FC) curriculum renewal efforts, is a set of pedagogical approaches designed to increase participation and ownership of each student in her/his own learning. Across the FC and across the world many faculty members are incorporating ACL into their classes. As part of our dissemination efforts, the FC has developed a CD and Web site to assist faculty members who wish to increase student engagement in their classrooms through the use of ACL. The content of the CD and Web site was derived from interviews with twenty FC faculty members, experts in the field of ACL (including Karl Smith, Rich Felder, P. K. Imbrie, César Malavé, and Jim Morgan), and industry representatives. Their experiences, advice, and materials were organized into categories, such as team formation and team building, classroom management, and lesson planning. The resulting multimedia product includes video clips, text, and downloadable documents. These materials are organized to serve as a useful guide to faculty who have never used ACL but also provide sufficient depth so that more experienced faculty may benefit from them as well. If you would like one or more copies of the CD, contact either Susan Ledlow, who directed the project, at Arizona State University (e-mail: susan.ledlow@asu.edu, phone: 480.965.8645) or myself (e-mail: froyd@tamu.edu, phone 979.845.7574). Please take a look at the Web page (<http://clte.asu.edu/active>) or the CD and consider contributing classroom materials you have developed. We look forward to your comments and participation in this ongoing FC project.

Upcoming Events

- Jul 21–Aug 3 Engineering Workshop for High School Girls** at Union College, Schenectady NY.
See http://fc1.tamu.edu/events/news/workshop_union.html for information.
- Aug 11–16 E-technologies in Engineering Education: Learning Outcomes Providing Future Possibilities** (United Engineering Foundation conference) in Davos, Switzerland.
E-mail Sarah Pfatteicher at spfatt@engr.wisc.edu.
See http://fc1.tamu.edu/events/conferences/e_technologies.html for information.
- Sep 16–17 Pedagogical Network for Engineering Education Workshop** in Denmark.
E-mail Jeff Froyd at froyd@tamu.edu or call 979.845.7574.
- Sep 30–Oct 1 Engineering and Computing Education Grantees Conference** in Washington DC.
E-mail Susan Kemnitzer at skemnitz@nsf.gov or call 703.292.8382.
See http://fc1.tamu.edu/events/news/grantees_conf.html for information.
- Nov 6–9 Frontiers in Education 2002** in Boston MA. See <http://www.wpi.edu/News/Conf/FIE2002> for information.
- Mar 16–18 Share the Future IV**, the cross-coalition conference, will be held in the Tempe Mission Palms Hotel, near Arizona State University.

Don Richards



“Prior to joining Rose-Hulman in 1988, I was a faculty member at Ohio State. My education has been in mechanical engineering, with degrees from Kansas State, Iowa State, and Ohio State. My industrial experience includes time spent on pump design, safety analysis of gas-cooled nuclear reactors, and development of gas-fired absorption heat pumps.

“My first contact with nontraditional teaching was at Kansas State, where a required experimental methods course was taught using the Keller Plan. In this approach, the final grade is based on completing a specified number of modules. Each module is graded satisfactory/unsatisfactory and can be repeated without penalty until satisfactory. I still remember and appreciate this novel approach with its parallels in today’s competency grading and mastery learning.

“In July 1991, Carl Erdman and Charles Glover invited me to attend an NSF-sponsored workshop on the new engineering science core curriculum developed at Texas A&M University. Their approach meshed well with my own views for thermal science education; however, their use of conservation and accounting to unify the entire engineering science core opened my eyes to new possibilities. Little did I know the impact these ideas would have on my future.

“In May 1993 I joined the local FC management team as the member in charge of human-interface development (HID). As one of four initial FC thrust areas, HID focused on changing faculty-faculty, student-faculty, and student-student interactions in the educational process. Student teaming, faculty collaboration, and active learning all grew out of early HID activities.

“After the first year, I concentrated my FC activities on the integrated sophomore curriculum, specifically the Rose-Hulman/Foundation-Coalition **Sophomore Engineering Curriculum** (SEC). Since the summer of 1994, I have served as team leader for the development, implementation, and maintenance of the SEC. Beginning in the summer of 1994, a ten-member faculty team did high-level design and obtained Institute approval. In the summer of 1995, a twelve-member student-faculty team did the detail design of the SEC. The first offering of the SEC was in the fall of 1995.

“The SEC is currently required for all mechanical, electrical, and computer engineering majors at Rose-Hulman. It consists of five engineering science courses organized around key concepts in engineering analysis—selecting a system, keeping track of the pertinent extensive property (accounting), selecting the appropriate constitutive relations, and developing a problem-specific model. Three mathematics courses developed as part of the SEC are taken in parallel with the engineering science courses.

“The SEC uses a common framework for presenting and interpreting the basic physical laws for mass, momentum, charge, energy, and entropy. This approach emphasizes the underlying similarities in topics often viewed as unrelated by students (and faculty). In addition, it allows a common problem-solving approach that is uniquely suited to engineering problem solving. In the fall of 2002, I completed a 400-page text that describes this approach: *Basic Engineering Science—A Systems, Accounting, and Modeling Approach*.

“One of the most significant FC events at Rose-Hulman was a series of seminars on active learning, teaming, curriculum development, and the Texas A&M engineering science core (the model for the SEC). The seminars, presented by Lynn Bellamy in 1993, served as the kickoff for the first faculty team working on the SEC, although many other faculty members attended. The repercussions of these seminars—team process and agendas in meetings, active learning in the classroom, Bloom’s taxonomy as a tool for assessing learning, and actively thinking about the educational process, to name only a few—were immediate and are still felt by faculty and students at Rose-Hulman.

“These seminars and the SEC are just two examples of the way faculty now think about curricular innovation as more than just changing a single course. The FC has provided faculty both tools and opportunities to think outside the box with faculty in other disciplines and institutions. I believe that the changed climate for collaboration and the faculty experiences with this broader view of curricular innovation will be one of the most significant legacies of the Foundation Coalition. The current FC curricula will change, but the tools and processes for managing change and innovation are a lasting legacy.”