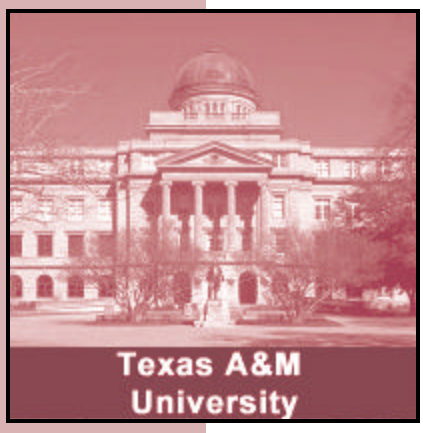
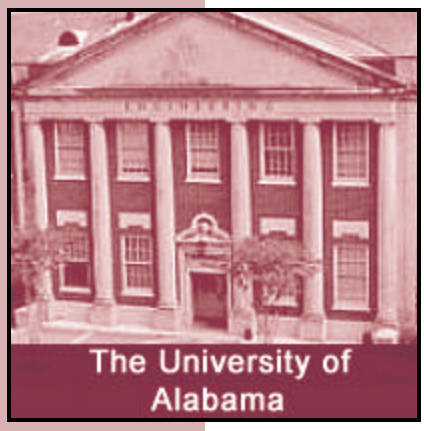
The Foundation Coalition

....an agent of change





Over ten years ago, the National Science Foundation envisioned changing the culture of engineering education. The result of that vision was the Engineering Education Coalitions Program, the goals of which included:

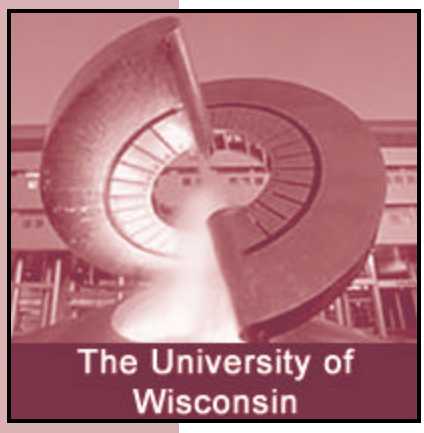
- The design, implementation, evaluation, and dissemination of new curricula, delivery systems, and educational tools for undergraduate engineering education;
- A dramatic increase in both the quality of engineering education and the number of degrees awarded in engineering, especially for women and underrepresented minorities.

Funded under the Coalitions program in 1993, our partner institutions began making fundamental changes in their engineering programs, both in what was taught and how it was taught. However, today's engineering educational environment is vastly different. Motivated by a desire to improve student recruitment, performance, and graduation rates, as well as by external influences such as ABET's EC 2000 mandate, more institutions are ready to make fundamental changes in their programs.

As these institutions explore the research on engineering education, they quickly conclude that the pedagogical theories proposed by the Foundation Coalition (FC) – integrated programs, active and cooperative learning, technology enabled learning, and continuous improvement through assessment and evaluation – can effectively address today's issues. Institutions who are considering alternative curriculum models can use current FC partner institutions as tremendous resources. From the early years of the FC when pilot curricula were first implemented, to today's institutionalized curricula, partners have developed, implemented, assessed, and evaluated dozens of different models of integrated courses in engineering. Over 250 faculty members have engaged in these efforts and have utilized active and collaborative learning, technology-enabled instruction, and curricular assessment of student outcomes. These faculty are able to provide syllabi and exam questions for different curriculum models as well as articulate strengths and weaknesses on the various models and the degree of alignment with numerous system factors at their institutions.

A COMPREHENSIVE SET OF DIVERSE CURRICULUM MODELS

This coming fall, thousands of first-year engineering students will converge on over 300 U.S. campuses. Of these, perhaps half will complete their degree in engineering. On Foundation Coalition (FC) campuses, however, the prospects for new first-year engineering students will be significantly brighter, especially for women and minority students. Students in the FC programs are much more likely to graduate in engineering, will have a firmer grasp of the engineering fundamentals, will be more effective team members, and be better able to make connections across subject areas. FC campuses have



different names for their versions of the FC program, but they all build on a single set of core competencies, including curriculum integration, cooperative learning, technology-enabled learning, and assessment driven continuous improvement.

Research shows that to increase student retention, especially for women and underrepresented minorities, students must establish more connections - to each other, to faculty, to industry, to academic material, and to their chosen career. In order to help students establish these connections, each of the FC programs has established learning communities in which students enroll in common sections of two or more required engineering courses. They work in small teams, improve their appreciation of diversity, and interact to a much greater degree with industry. The FC schools have seen between a 10% to 25% improvement of retention of first-year students in engineering, and in many cases even greater improvements in the retention of women and underrepresented minorities.

One of the major reasons the FC chose to move into a second five year funding with two new partners, the University of Wisconsin and the University of Massachusetts-Dartmouth, was to demonstrate that our reforms could be adopted more quickly and with less expense by institutions willing to learn from the FC. These two campuses considered all FC models, even those that were not adopted on our campuses.

For the freshman year, UMD chose to pilot a highly integrated model for one year and after considering the assessment data, institutionalized that model. They are now in the process of piloting the sophomore year. UW chose to pilot a model more like the institutionalized TAMU version, with strong links across different cohort groups. They have doubled the size of the pilot, and will institutionalize after one additional year of modification. These institutions understood that constraints, timing, and politics were likely to influence the final form of their curriculum. They considered why some models, even those with very high results in student performance, were not adopted and why others were. This information was as valuable to them in making their decisions as was detailed information about course syllabi and classroom design. What they can now offer to others in the engineering education community is the perspective of a “Phase II” prototype: why they made their decisions and how they were able to capitalize on the experiences of FC institutions.

Foundation Coalition
Box 870200
University of Alabama
Tuscaloosa, Alabama 35487
205.348.4090
http://www.foundationcoalition.org