Seven Ideas for Effective Curricular Renewal

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Program Description

The Foundation Coalition, a NSF Engineering Education Coalition, was established as an agent of systemic renewal for the engineering educational community. Seven ideas have guided curricular renewal, classroom design, and faculty development projects for the past ten years and will guide curricular research and renewal for the next ten years. Reflecting the seven ideas in light of past accomplishments provides valuable foundations for future efforts to improve engineering education.

Abstract

The Foundation Coalition (FC), one of eight Engineering Education Coalitions funded by the National Science Foundation, was established as an agent of systemic renewal for the engineering educational community. FC partner campuses: Arizona State University, Rose-Hulman Institute of Technology, Texas A&M University, University of Alabama, University of Massachusetts Dartmouth, and University of Wisconsin Madison have restructured their curricula, renovated or built new classrooms, and created faculty development projects. Seven ideas have guided FC curricular renewal, classroom design, and faculty development projects. The same seven ideas are thought to be the principles underlying curricular research and renewal efforts the next ten years.

- Active and cooperative learning: increasing student participation in and ownership of their learning
- Increasing the participation (recruitment, retention, and graduation) of white women and underrepresented minorities in engineering: if the learning environment works for a more diverse student body, then it will be a better learning environment for all students
- Student teams in engineering: helping students develop their abilities to work within and lead teams requires more than assigning students to group projects
- Technology-enabled learning: creating learning environments in which routine access to ubiquitous technology is assumed and the revision of learning activities is based on this assumption
- Continuous improvement through assessment, evaluation, and feedback: develop assessment processes to collect data on the impact of changes to the curricula and learning environments, reaching conclusions about the efficacy of those changes and making improvements where indicated
- Curriculum integration and inclusive learning communities: helping students make connections between various disciplines and between academic topics and lifelong careers and helping them to build learning relationships with other students
- Organizational development and change: making significant curricular changes requires a complex, thoughtful change model that is based on research and experience

As the FC and all Engineering Education Coalitions draw to a close, reflecting on each of the seven ideas in light of past accomplishments may provide valuable starting points for

future efforts to improve engineering education. For each of the seven ideas, the paper will review past research and suggest opportunities for future efforts.