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http://www.foundationcoalition.org

The Foundation Coalition Newsletter

....an agent of change

*From **Jeff Froyd**, Project Director* At the Share the Future III Conference, the Foundation Coalition (FC) will offer nine engineering-education workshops on topics ranging from "Faculty Learning Communities" through "Learning Theory" to "Concept Inventories for Engineering Sciences." In addition to offering workshops at the Conference, the FC will work with institutions interested in offering these and other FC workshops on their campuses. The FC will cover all of the facilitators' expenses (including travel), so that the host institution need only cover costs associated with presenting the workshop. The FC offers over twenty different workshops, and host institutions can select any combination of workshops. Institutions can host several workshops at a time, and we will work with institutions to tailor workshop material and lengths to the particular campus environment. For more information about hosting FC workshops, please contact me at froyd@tamu.edu or 979-845-7574. We look forward to presenting proven and innovative topics in engineering education to your faculty members.

UPCOMING EVENTS

Mar 3–5 **Cross-coalition Conference in Gainesville FL**
Share the Future III, University of Florida. The four coalitions (SUCCEED, Gateway, Greenfield, and Foundation) are jointly sponsoring a conference that will feature ~25 interactive two-hour workshops designed to share experience and knowledge gained by the coalitions during the past decade. The conference is open to anyone. See the schedule of workshops at http://www.foundationcoalition.org/future.htm.

Mar 11 **Workshops at the University of Maine**
Active/Cooperative Learning in Capstone Design (Russ Pimmel) and First-year Curricula and Programs across the Foundation Coalition (Jim Morgan; e-mail: jim-morgan@tamu.edu).

Mar 15–16 **Assessment and Evaluation Workshop** at Louisiana Tech
Presenters will be Susan Haag (ASU), Rita Caso-Esposito (TAMU), and Ann Kenimer (e-mail: a-kenimer@tamu.edu).

May 9–10 **Freshman Innovations Miniconference** at the University of Michigan, Ann Arbor
This FC-funded miniconference is by invitation. The contact person is John Mitchell (e-mail: mitchell@engr.wisc.edu).

Jun 16–19 **American Society for Engineering Education Annual Conference and Exposition** in Montréal, Québec, Canada
http://www.asee.org/conferences/annual2002/default.cfm

Dr. Jim Yao of Texas A&M University posts a summary of engineering education papers on his Lohman Professorship Web site: http://lohman.tamu.edu.

Workshop feature: EC 2000 Skills

Russ Pimmel

Electrical Engineering, University of Alabama

The new EC 2000 criteria have generated considerable interest in assessment—establishing goals, objectives, and outcomes; identifying assessment tools; and defining feedback mechanisms. In contrast, developing classroom material for newly emphasized skills and knowledge, as defined in Criteria 3 (a) through (k), has received little attention. Some criteria are easy to address because programs have traditionally focused on technical (mathematics, science, engineering) content. Others (those involving problem solving, teaming, communication, ethical interpretation, lifelong learning) are more difficult.

Engineering faculty members have usually presumed that students developed these skills, called soft or processing skills, by working with the technical content and by observing instructors in the classroom. Educational research and reports from industry indicate the ineffectiveness of this ad hoc approach. Because EC 2000 requires an assessment process that demonstrates acquisition of these processing skills, engineering programs must ensure that their curriculum includes instruction and practice in these skills. A workshop developed by Dr. Russ Pimmel of the University of Alabama considers approaches for dealing with these issues and asks:

- **Why** should engineering faculty be interested in teaching "a–k" skills?
- **What** does it mean to teach "a–k" skills?
- **Where** and **when** should engineering curricula teach "a–k" skills?
- **Who** should teach "a–k" skills?
- **How** should engineering curricula teach "a–k" skills?

Using an interactive approach, participants develop ideas in the workshop (to be presented at the University of Maine this month) by responding to questions. Workshop material is available at http://ece.ua.edu/faculty/rpimmel/public_html/teaching-workshops.

We begin by defining a skill as knowledge, ability, and expertness in a process. For example, design skill is knowledge, ability, and expertness in the design process; having this skill means an awareness of the design process and experience (and eventually proficiency) with the process.

After a quick look at the "a–k" skills, we review new ideas on teaching processing skills. Skills cannot be learned by watching the instructor or other students use them or by using them in homework without guidance and feedback. Skills must be taught explicitly, so an engineering curriculum must instruct all students in the EC 2000 skills. To be effective, this instruction must occur more than once, be integrated into standard technical courses, and be taught by engineering faculty. Students must practice the skills while the instructor provides feedback and serves as coach. The workshop then develops guidelines for teaching skills:

- **Explicitly identify the skills and teach them,**
- **Use workshop or cooperative learning format,**
- **Provide feedback—instructor serves as a coach,**
- **Encourage monitoring and reflection, and**
- **Include discussion activities.**

Engineering professors may be uncomfortable with coaching because they have no experience or formal training in it. A lack of instructional material compounds the problem. Short instructional modules enable engineering instructors to integrate this material into existing engineering courses. These modules include supervised interactions to practice with others, emphasize that there are no single right answers, provide experiential group activities, learn by watching, observe others' mistakes, and observe the instructor coaching others. We conclude with a summary of the FC program and some of the FC modules. This material is available at http://ece.ua.edu/faculty/rpimmel/public_html/ec2000-modules.