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The Foundation Coalition Newsletter

....an agent of change

*From **Jeff Froyd**, Project Director*

Following their bold, initial visions, faculty members across the Foundation Coalition (FC) worked to restructure all four years of the undergraduate engineering curricula. They began with the first year and planned to work progressively through the four years of the undergraduate experience. Although they did not achieve their initial goals, they created intriguing, well-tested pilots of first-year (http://www.foundationcoalition.org/home/keycomponents/firstyearcurriculum.html) and sophomore (http://www.foundationcoalition.org/home/sophomore/index.html) engineering curricula and stimulated revision of upper-division curricula in industrial, electrical, and computer engineering (http://www.foundationcoalition.org/home/keycomponents/upper.html). Several FC partners restructured their curricula for all engineering majors based on what had been learned from the pilot curricula. In the process, faculty members learned about the process of curricula change, not only at their institutions, but also across FC. To collect, organize, and synthesize learning about curricular change processes across the FC and integrate FC experiences with the literature on organizational change, the FC has sponsored a project in which engineering faculty members are working with team members from education on a qualitative research project on curricular change. Researchers have interviewed more than 150 faculty members and administrators across the FC and searched the literature on change. Now they have begun the hard work of synthesizing the information that has been acquired into resources that other institutions will be able to draw upon. The first conference paper (http://www.foundationcoalition.org/publications/journalpapers/asee2003/curricular_change.pdf), to be presented at ASEE 2003 illustrates some of the ideas that the project team has generated. Further, participants from across the FC will meet in Banff, Alberta, on 23–25 July 2003 to review documents that the project team has generated and to construct further ideas and resources for other institutions. Hopefully, one of the legacies of the FC will be a rich set of resources on which other change agents can draw.

Upcoming Events

Jun 22–25 **American Society for Engineering Education Conference**, Nashville TN

July 23–25 **Change Conference**, Banff, Alberta, Canada. E-mail mailto:froyd@tamu.edu

Nov 5–8 **Frontiers in Education Conference**, Boulder CO

Assessing Open-ended Activities

Ann Kenimer, Susan Haag, and Rita Caso, members of the FC Assessment Tools Field Testing Project, have developed a workshop on rubrics for open-ended activities. This workshop has been presented at the 2002 ASEE International Conference and Exposition, at the Share the Future IV Conference, and at individual campuses. Ann is in the Biological and Agricultural Engineering Department at Texas A&M University (TAMU), Susan directs Assessment and Evaluation for the College of Engineering and Applied Sciences at Arizona State University, and Rita is with TAMU's AMP Program and Engineering Educational Assessment Resources. A summary of material presented in the rubrics workshop is described below.

Using Rubrics

Rubrics are tools that provide a systematic framework for objectively evaluating student work. The systematic framework is developed before assessment begins and includes well-defined indicators of performance and scores associated with various performance levels. Descriptive criteria forming the framework of a rubric serve as guidelines for the scorer, thus making grading of open-ended assignments more structured and objective. In addition to aiding assessment, rubrics can be provided to students to give them information about grading procedures and characteristics of quality work.

Susan Haag at Louisiana Tech Workshop

Characteristics of a Good Rubric

A well-constructed rubric will demonstrate both validity and reliability. Validity is analogous to accuracy and indicates whether the rubric truly measures what it was intended to measure. Reliability is analogous to precision and is related to the repeatability of results. When a rubric is valid and reliable, it will yield reasonably consistent results from one scorer to the next (inter-rater reliability), with the same scorer over time (intra-rater reliability), with different applications, and with diverse student populations.

Ann Kenimer and Rita Caso at Louisiana Tech workshop

Building a Rubric

Development of a rubric that is both valid and reliable requires up-front planning. Fortunately, time and effort saved during the assessment process often offset that spent developing the rubric. The following steps are suggested for developing a rubric:

1. Develop appropriate performance goals and objectives: Determine the critical components that you believe must be accomplished for a student to successfully complete the open-ended activity. What do you hope students will accomplish and learn through this assignment?
2. Select the assessment tasks that reflect and demonstrate the performance goals: Using the results of step 1, identify components of the assignment that address your defined goals and objectives.
3. Differentiate between performance levels and assign relative values to each of the levels: For each component identified in step 2, determine characteristics indicating that a student has done an excellent job. Likewise, define characteristics that indicate intermediate and poor quality work. Establish point values to assign to each level of quality.
4. Develop descriptive criteria for each level of performance which correspond with local norms: Write a clear definition for each level of performance quality defined in step 3.
5. Identify and collect three typical examples of excellent, intermediate, and poor quality student work: Document these models along with their scoring, with some explanation of that scoring, for each assignment component to be assessed.
6. Create a Scoring Rubric Document: For each assignment component, give the precise number of scoring points merited for the particular characteristics observed. Indicate whether the scoring of the overall work will equal the sum of its component scores, or whether it will be holistic. Include scored examples (step 5 above) in the documentation.
7. Train scorers in application of the rubric: If the rubric will be used by several scorers, discuss performance goals and objectives, tasks and components to be assessed, definitions of performance levels, and scores appropriate for each performance level. Make sure scorers agree about interpretation of performance levels and associated scores.
8. Pilot the rubric: Conduct a test of the rubric involving all scorers. Compare results from each scorer to identify any definitions in the rubric that require refining.
9. Modify the scoring rubric: Based on scoring results and response analysis, modify the rubric to improve validity and reliability.

Want to learn more? Attend a workshop!

Engineering faculty members frequently employ open-ended activities in their classes and curricula. Rubrics provide a structure for evaluating student work on complex projects. When well constructed, rubrics give consistent evaluation results across time and across different reviewers. The FC offers a 2- to 4-hour workshop, Constructing Rubrics for Open-ended Activities, that explores application of rubrics to open-ended assessment and characteristics of well-constructed rubrics through interactive hands-on activities. This workshop will be offered at the ASEE International Conference on Sunday, 22 June 2003. This workshop can also be conducted on your campus. Contact Jeff Froyd, FC Project Director, at mailto:froyd@tamu.edu for details.

Terms used in Workshop