Special Session – Does Size Matter?
Small Programs Contribute as Many Graduates to the Engineering Workforce as Large Programs Do

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Abstract - This special session focuses on the characteristics of small engineering schools: schools with fewer than 75 engineering faculty members. Based on the 2004 ASEE database, approximately 200 schools are in this category, about 60% of universities and colleges with engineering programs. Collectively these programs produced the same number of engineering graduates (14,000 or 25% of the total) as the 20 largest schools. Considering the collective impact of these programs, and their potential flexibility and nimbleness in implementing change, innovations at small engineering schools could have significant impact in transforming engineering education. Small schools must participate broadly in changing engineering education if all graduates are to be more like the Engineer of 2020. Small engineering schools need to collaborate in identifying their strengths and in overcoming impediments to change. This special session invites participants from small schools to share data, practices, and problems to increase awareness of the capabilities and challenges for innovative engineering education at smaller engineering schools.

GOALS OF THE SPECIAL SESSION
Through the activities in this session, participants will
- increase their own awareness of the number of students, faculty, graduates, and institutions involved in small engineering programs
- generate a few composite descriptions of small programs, focusing on their special capabilities and the challenges they face in implementing innovations in engineering education
- cultivate a community of interest to catalyze change and increase institutional success at finding opportunities for studying engineering education at smaller institutions and for partnering with larger institutions.

BACKGROUND
The ASEE data on engineering programs reveals many interesting things about the diversity among engineering programs. For instance, the mean, median, and mode of number of programs per institution is 6 programs, with a minimum of one (39 schools) and a maximum of 16 (University of Missouri at Rolla, now Missouri University of Science and Technology). The number of graduates produced annually by each institution has a mean of 165 graduates and a mode of 108 graduates.

Figure 1 shows the accumulation of graduates produced by each institution, ordered by number of faculty members. In terms of graduates, the smallest 200 schools make the same contribution as the largest 20, as 40 other large schools, and 74 mid-size schools. Considering the collective impact of small schools on the total engineering workforce suggests that we should also examine the special characteristics of these schools and the challenges and opportunities for innovative engineering education there.

Index Terms – engineering programs, institutional characterization, workforce impact

SESSION SCHEDULE

Data workshop (30 minutes)
Share and explore institutional data on number of engineering programs, faculty, enrollment, and graduation rates. The primary data source is the ASEE database, but NAE and NSF data will also be employed. Spreadsheet versions of the data will be available for all participants. Based on the data, participants will categorize themselves into three groups: very small, smallish, and medium small.

Small group topic explorations (30 minutes)
With at least one person from each size group, tables will characterize small programs in terms of 7-10 topics, depending on the number of tables in the room.
- enrollments, class sizes, and graduation rates
- faculty workload and expectations
- research and external funding activity
- institutional support
- use of part-time faculty, research associates, and graduate students
- relations with industry
- process for curriculum change
- academic pathways students follow

Other topics suggested by participants will be added if the number of groups and tables allow.
Participants will be asked to clearly identify characteristics as strengths or challenges in implementing change in engineering education.

Compilation of composite descriptions (20 minutes)
Each topic group will report out, in order for the entire group to compile a small number (1-3) of valid composite descriptions of small engineering schools. These descriptions are one of the major work products of this session. The descriptions will highlight the common characteristics of these types of schools and the special advantages they possess for implementing innovations in engineering education, as well as the challenges they need to overcome, individually and collectively, in order to have a significant positive impact on the engineering workforce.

Next steps (10 minutes)
Many ideas about next steps will emerge in the discussions; FIE attendees have a bias for action. We will identify 1-3 specific projects and questions that people are willing to explore further. This list is the other major work product of the session, and will be provided to all participants, as well as an opportunity for continuing the discussion in an on-line asynchronous setting.

AUDIENCE
Faculty members from small institutions who are interested in creating change, especially in collaboration with other folks from similar institutions. Often there are only one or two people interested in changing engineering education at a given institution—a lonely spot to be in. This session will help participants find like-minded individuals at institutions similar to their own.

But what about participants from large programs?
Somewhat like rides at the amusement park, size will affect whether one can participate or not. Faculty from larger institutions will be welcome at the session, of course, but every effort will be made to elicit comments from smaller schools.

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