

Workshop: Research-based Tips for Cultivating Tomorrow's Talent
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Abstract

The aim of the workshop is to empower participants (1) to be able to personally utilize research-based tips for recruiting, retaining, and advancing female students in engineering by better engaging the diverse skills, interests, and backgrounds of their female students and by connecting educational activities to engineering opportunities, as well as (2) to be able to engage faculty, K-12 teachers, and outreach volunteers in these activities.

Introduction

The Center for the Advancement of Scholarship on Engineering Education (CASEE) of the National Academy of Engineering (NAE), through its Engineering Equity Extension Service (EEES) project, aims to increase the enrollment, retention, and graduation of women as baccalaureate-level engineers, specifically in mechanical and electrical engineering. We work through various collaborating organizations that have chosen a targeted population for training, such as mechanical engineering faculty, K-12 outreach volunteers, and high school teachers. These collaborating organizations include the American Society of Mechanical Engineers (ASME), the Institute of Electrical and Electronics Engineers (IEEE), and Project Lead The Way (PLTW), as well as individual mechanical and electrical engineering departments. Drawing on the research base in gender equity, engineering education, and project management, the training for each organization focuses on how more female students can be encouraged and retained in their programs.

Our multi-pronged strategy includes the goals of 1) adapting three areas of gender equity knowledge and practice (instructional practices, precollege and undergraduate engineering curricula, and outreach strategies) to the particular needs of our Collaborating Organizations and their circumstances and 2) maximizing the effectiveness of our clients in attracting, retaining, and promoting to the next stage of education girls and women in engineering study. CASEE has developed specific research-based guidance to enable K-12 teachers, college/university faculty, and outreach volunteers to improve awareness of, preparation for, and success in engineering fields of study by middle school, high school, and entry-level undergraduate students. Particular emphasis is placed on research-based strategies proven effective with female students, including women of color and women with physical disabilities. Our experience in translating research in gender equity to practical tips for faculty members, teachers, and outreach volunteers contributed to the creation of the *New Directions in Engineering Excellence (NDEE)* resources that will be used during the workshop. These resources include a series of three 30-page booklets, three 10-minute videos, and presentations slides for displaying key points and lessons to instructors and volunteers. The booklets have contributed to the knowledge base on the EEES website and will help clients to attract, retain, and promote girls and women in engineering. Workshop participants will have opportunity to actively use the materials in their scenarios and will be provided with the materials and take home products.

The NDEE resources focus on three key areas for increasing women's representation in engineering; recruiting or career awareness, retention, and advancement. Many high school students do not know about the field of engineering, and their teachers may hold misperceptions of engineering being a males-only field (Hoh and Toh 2007). Presenting accurate images of engineering as a dynamic and exciting field is crucial to attracting students to the field, and activities to introduce girls to engineering can occur in formal or informal educational settings (Anderson and Gilbride 2007; Reyer 2007). Good role models can also attract girls to the field, and if the role model relationship develops into one of mentoring, women will stay in the field (Buck, Clark, Leslie-Pelecky, Lu, and Cerda-Lizarraga 2008). Women will not consider entering a field if they do not feel comfortable in the environment, so maintaining a friendly environment is crucial to all three areas (Murphy, Steele, and Gross 2007; Cheryan, Plaut, Davies, and Steele 2009). Increasing the representation of women in engineering may also encourage all students to consider the field (Murphy et al 2007).

Workshop Logistics

Attendees should be WIE or MIE staff members, faculty members, or K-12 teachers in any field. The goal of the materials is to present ready-to-use resources for the attendees to hold their own workshops for teachers and outreach volunteers on gender equity in engineering. The workshop will be broken into three 40-minute segments, one each for (1) building engineering career awareness and recruitment among middle and high school students, (2) enhancing retention within academic programs and adjustment to the culture of engineering, and (3) enhancing success in academic engineering study. Within each segment the workshop leaders will review the current literature, provide successful strategies, and identify practical steps and activities for educators to take. Workshop participants will be challenged to develop questions and scenarios for the using this information in their local contexts. Participants will also be asked to surface barriers to engaging others in use of research-based methods and to brainstorm strategies to overcoming the barriers. Group-work will be emphasized in each segment.

References

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