

Fostering Campus Collaborations Between Colleges of Engineering and Education

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Abstract

In an increasingly technology dependent society, the need for a technologically literate citizenry is becoming a basic necessity. It is crucial that current and future teachers have the resources, skills, knowledge and support to empower students to make informed decisions as citizens, consumers and as members of the workforce. Colleges of Engineering and Education can take a leadership role in this effort. Fostering collaborations between engineering and education will not only assist future and current teachers acquire the necessary skills to teach technologically oriented subject matter, but can help engineering faculty with curricula reform, educational outreach and instructional approaches for the classroom.

This panel session will feature: 1) a summary of Deans Summit II: Fostering Campus Collaborations attended by deans and faculty from colleges of education and engineering, and 2) representatives from up to three universities discussing successful campus collaborations between Colleges of Engineering and Education that have impacted teacher preparation, outreach to the pre-college community, and engineering curricula reform.

Background

In the past there have been many efforts to form partnerships between Education faculty and faculty in Science and Mathematics to address the needs of science and mathematics education, but efforts to include engineering faculty have not been formalized. Yet, with the increasingly important role of technology and the publication of *Standards for Technological Literacy: Content for the Study of Technology*, and the publication of *Technically Speaking: Why All Americans Need to Know More About Technology*, the benefits of bringing engineers into the teacher training picture are becoming readily apparent. Engineering is a profession that depends on the application of mathematics and science and the practice of design to develop new advances in technology that assist society's development.

Colleges of engineering and education are in a unique position to improve technological literacy throughout society and to help ensure an adequate number of well-prepared

engineers and scientists. It is crucial that current and future teachers be technologically literate with the knowledge, skills, and resources to empower students to make informed decisions as citizens, consumers, and as members of the workforce.

The need also exists to enhance teaching, learning and assessment in the engineering curricula. Engineering faculty can collaborate with education faculty in the areas of instructional strategies and pedagogical approaches.

Technically Speaking: Why All Americans Need to Know More About Technology is a report of the National Academy of Engineering published to inform the public and policy makers of the urgent need for technological literacy. This report states, "To take full advantage of the benefits and to recognize, address, or even avoid some of the pitfalls of technology, we must become better stewards of technological change. Unfortunately, we are ill prepared to meet this goal."

Dr. Joseph Bordogna, Deputy Director of the National Science Foundation, and an engineer by training, recognizes the power of collaboration in education when he states:

Scientists and engineers are increasingly exploring the rich territory at the borders among disciplines. This multidisciplinary research calls for increased collaboration, and for more integration of knowledge. New clusters will emerge at the moving edge of discovery, and these will inevitably transform the "core" disciplines. We need to accommodate these transformations in the design of our education and research activities.

Overview of Deans Summit II: Fostering Campus Collaborations

Deans Summit II: Fostering Campus Collaborations (FCC) expanded the partnerships that were started at *Taking the Lead: A Deans Summit on Education for a Technological World* held in 2001. Over 150 attendees participated in FCC. These included deans, department chairs, associate deans and faculty members from colleges of engineering and education from institutions around the world. FCC featured presentations that demonstrated how collaborations between colleges of engineering and education can positively impact teacher preparation, outreach to the pre-college community, and pedagogical approaches for engineering education. During breakout group sessions FCC attendees developed: 1) common themes that will have broad impact on campus reform, 2) strategies for an action agenda of effective collaborations, and 3) collaborative action plans focusing on programs to improve teacher preparation, outreach to the pre-college community, and pedagogical approaches for engineering education.

Panel Session Overview

This panel session will showcase effective collaborations between colleges of education and engineering that have enhanced the level of technological literacy in the pre-college community through teacher preparation programs and outreach efforts, and have impacted engineering curricula reform and professional development. Representatives from various universities will describe their collaborative efforts and will discuss how

they overcame the barriers and constraints that arise when undertaking any new campus-based curricula reform program.

Tentative panelists include:

- Don Evans and James Middleton to describe an Arizona State University collaboration focusing on promoting technological literacy among pre-service teachers,
- Les Sternberg and Ralph White to discuss the University of South Carolina's collaboration focusing on enhancing pedagogical approaches for engineering faculty, and
- David Wormley and David Monk to describe a partnership involving six Penn State University colleges and dozens of pre-college school districts to promote community outreach and enhance pre-college science and engineering.

Bibliography

¹ Bordogna, Joseph. Remarks, AAAS Colloquium on Science and Technology Policy, May 3, 2001.

² National Academy of Engineering. 2002. *Technically speaking: Why all Americans need to know more about technology*. Washington, DC: National Academy Press.

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Dr. Douglas Gorham is the Manager of Pre-college Education for the Institute of Electrical and Electronics Engineers. Prior to joining IEEE in July 2000 he served as a pre-college educator for over twenty-five years, including 12 years as a high school principal. He serves as a member of the Advisory Board for the City College of New York's "CityTech: Stuff That Works" project and is a member of the Advisory Committee for the International Technology Education Association.

PETER CROUCH

Dr. Crouch obtained his Bachelor's degree in Engineering Science and his Master's degree in Control Theory from Warwick University, England. He obtained his Ph.D. in Applied Sciences from Harvard University. His principal research interests lie in nonlinear, systems and control theory. Dr. Crouch is best known for his work in the synthesis of nonlinear systems. He has published over 150 papers and one monograph, and is a Fellow of the Institute of Electrical and Electronics Engineers.

BARBARA COBURN STOLER

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