Session F2F

Panel - The Technological Literacy of Undergraduates: Developing Standard Models

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Abstract - This panel will report the results of a workshop and symposium on the technological literacy of undergraduates convened at the National Academy of Engineering (NAE) on March 26-27, 2007. The NAE advocates that all Americans become more knowledgeable about technology. Here technological literacy is defined as the broad understanding of all types of technological devices and process not just computers. The opportunity to utilize undergraduate education to further technological literacy of all students must not be neglected. Educators in Computer Science, Engineering and Technology have a responsibility to educate all students not just those intending technical careers. Despite the need for all Americans to become technologically literate, technical literacy is not likely to gain wide acceptance until the scholarly community develops standard courses that are supported by textbooks and other course materials. This National Science Foundation (NSF) sponsored workshop sought to identify and define several models of technological literacy courses. In this FIE panel, short presentations about these models will be made by participants in the NAE/NSF symposium. This will be followed by a discussion with the audience. A goal of the discussion will be to seek the input from FIE participants on the technological literacy course models.

Index Terms – Engineering for all students, Engineering for non-engineers, Technological Literacy.

INTRODUCTION

In publishing “Technically Speaking [1].” The National Academy of Engineering has established the importance that all Americans understand and appreciate our technological infrastructure. The central nature of technology in our daily lives, and our dependence upon technology products and processes is readily apparent. The National Science Foundation’s “Shaping the Future” challenged science and engineering faculty to insure that: “All students have access to supportive, excellent undergraduate education in science, mathematics, engineering and technology [2].”

This call for technological literacy has resulted in some action; however, the national efforts are thus far directed largely toward the pre-college population. The International Technology Education Association (ITEA) with support from the NSF and NASA has produced a set of standards that help define the concept of technological literacy [3]. These are intended for K-12 students. The ITEA is also working to develop program and assessment standards and curriculum materials for the K-12 audience [4]. The engineering community has responded enthusiastically to the need to increase the awareness and understanding of engineering as a career, by initiating a number of programs aimed at the K-12 students.

The college-age non-engineering student has not benefited from this level of attention. If technological literacy is important, it must be included as an aspect of a liberal education at the college level. Efforts at technological literacy cannot stop at the 12th grade. A meaningful presence in the college years must be established.

NSF/NAE TECHNOLOGICAL LITERACY WORKSHOP

To achieve widespread impact, standard classes must be taught at many institutions around the country. To accomplish this, standard models of technological literacy courses must be developed. As a beginning to this process, a workshop was convened at the NAE of representative individuals with experience relevant to improving the technological literacy of undergraduates. Participants included individuals who successfully implemented courses on technological literacy for undergraduates, representatives other disciplines such as Science Technology and Society (STS), history of technology, education, and the humanities, and representatives of the

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Developing Standard Models: Participants

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At the workshop, groups defined several models of technological literacy courses. An eventual goal is to create materials for both students and instructors with the intention of easy adoption and widespread use.

Based on a review of courses already developed and comparisons to other disciplines, four candidate standard models were identified:

- The Technology Survey Course.
- The Technology Focus or Topics Course.
- The Technology Creation Course (Design Course).
- The Technology Critique, Assess, Reflect, or Connect Course.

The technology survey courses offer a broad overview of a number of areas of engineering and technology. The technology or topics or focus course is narrower in scope and develops one well-defined area. The engineering design course, or course creation, places an emphasis on the engineering design process to develop technological solutions to problems. The last model to emerge is concerned with assessing technological impacts, connecting technological developments to other areas of society, history and culture, or reflecting on engineering in a broader context.

### PANEL TOPICS

In this FIE panel, short presentations about these models will be made by several of the participants from the NAE/NSF workshop. This will be followed by a discussion with the audience.

Topics of discussion will include:
- Review and revision of potential standard models for technological literacy classes.
- Definition of learning outcomes and assessment methods.
- Characteristics of the course models.
- Course outlines and resource material available.
- Identification of areas needing further work.

A goal of the discussion will be to seek the input from FIE participants on the workshop outcomes, and to help establish consensus on the types of courses that can serve as models for the technological literacy of undergraduates.

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### REFERENCES


