Panel - The Technological Literacy of Undergraduates: Identifying the Research Issues

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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 on April 18-19, 2005. This National Science Foundation sponsored workshop sought to identify and define the current research issues regarding the broad understanding of technology by all 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 National Science Foundation and the National Academy of Engineering. The symposium included: a review of successful implementations, obstacles to courses on technology, learning objectives and student outcomes, relevant assessment tools and techniques, strategies for developing a scholarly community in the area, potential means of stimulating growth of interest in the topic, implementation in different types of institutions including community colleges, perspectives and issues concerning women and underrepresented minorities.

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 Technological 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.

The last major initiative to address technology literacy among undergraduates was the Sloan Foundation’s New Liberal Arts Program [5,6]. It has been nearly two decades since this initiative was completed. The New Liberal Arts Program ended just as the Internet was becoming widespread, the audio compact disk was a still a novelty, and the vast array of digital devices which now permeate daily life were just appearing in crude form. Also occurring in the past 20 years are major changes in assessing educational outcomes [7,8], the consolidation in understanding how people learn [9], and the revolution in the criteria used by ABET to accredit engineering programs. In light of these developments, it is time to reconsider technological literacy among undergraduates.

NSF/NAE TECHNOLOGICAL LITERACY WORKSHOP

As one component of a beginning to this process, a workshop was convened of representative individuals with experience relevant to improving the technological literacy of undergraduates. The purpose of the workshop was to help define the research issues needed to address technological literacy at the undergraduate level. Participants included individuals who successfully implemented courses on technological literacy for undergraduates, representatives other disciplines such as Science Technology and Society.

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35th ASEE/IEEE Frontiers in Education Conference
T3B-1
In this FIE panel, short presentations about these issues 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:

- Lessons from successful implementations.
- Obstacles to courses on technology.
- Learning objectives and student outcomes.
- Relevant assessment tools and techniques.
- Strategies for developing a scholarly community.
- Potential means of stimulating growth of interest in the topic.
- Implementation in different types of institutions including community colleges.
- Perspectives and issues concerning women, minorities

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 research issues surrounding the technological literacy of undergraduates. John Krupczak and David Ollis, the organizers of the NAE/NSF symposium, will moderate the panel.

ACKNOWLEDGMENT

The work was supported by the National Science Foundation under award: DUE-0444677.

REFERENCES


