

Title:

A National Digital Library for Science, Mathematics, Engineering, and Technology Education

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Abstract

The National Science Foundation has been examining the creation of a National Digital Library for Science, Mathematics, Engineering and Technology Education (SMETE) over the past few years. Two key National Science Foundation (NSF) reports, "Systemic Engineering Education Reform: An Action Agenda" and "Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering, and Technology," urge the formation of a national resource to provide access to quality learning objects and to disseminate successful educational practices. This national resource is envisioned as something that is much more than a traditional academic library in digital form, it will be a digital learning space where learners and instructors can come together to locate and discuss teaching and learning. It will provide ready access to a wide range of resources to enhance learning and it will help users identify quality materials from the vast variety of materials currently available on the Internet and World Wide Web.

We will discuss the partnerships between the mathematics and engineering communities to develop a prototype of the SMETE Digital Library. The Math Forum, Math Metadata Working Group and NEEDS-The National Engineering Education Delivery System have formed a partnership to further explore user requirements and metadata development in the mathematics community. The Math Forum has a strong presence and record of service in mathematics; they provide access to resources and knowledgeable individuals to enhance learning, with an emphasis on pre-College mathematics. The Math Metadata Working Group is examining the metadata requirements for instructional materials in mathematics and hopes to improve the ability to locate appropriate resources for mathematicians. NEEDS is a digital library for engineering education that we are using as a prototype in the development of a SMETE Digital Library.

We will review the history of a national SMETE digital library to date, lay out the issues surrounding its development, and review our findings regarding the needs of potential users of such a system. Since April 1996, NSF has sponsored a series of workshops to examine the prospects of developing a Digital Library for Science, Mathematics, Engineering, and Technology Education. Within the Digital Libraries Initiative - Phase 2, NSF is funding several test-bed efforts to examine various aspects of creating the SMETE Digital Library. After reviewing the status of the Library to date, we will discuss the findings from our research regarding SMETE community user needs. These findings include results from a series of focus groups conducted with participants of the American Association of Physics Teachers, American Mathematical Society, American Association for the Advancement of Science, members of the NSF Chemistry Consortia and the NSF Engineering Education Coalitions.

We are in the process of building a prototype SMETE Digital Library by upon the infrastructure we have developed through NEEDS-The National Engineering Education Delivery System (a digital library for engineering education). The NEEDS infrastructure provides many of the features that we feel are important in a SMETE Digital Library. We have developed search and catalog services to allow users from multiple disciplines to find and use instructional software to enhance the learning experience. We are in the process of testing and deploying additional services including: peer review, feature reviews, user analyses, and electronic community development. In collaboration with our partners, we are also developing a meta-portal model to allow distributed, multi-view access to the content and services.