Building a National Science, Mathematics, Engineering and Technology Education Digital Library

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Outline

- What is an NSDL?
- Towards a National SMETE Digital Library
- Emerging NSDL Designs and Prototypes
  - DLESE
  - WWW.SMETE.ORG

Copies of this presentation will be available at:
http://www.smete.org/info/presentations/
Vision...

“... a network of learning environments and resources for Science, Mathematics, Engineering and Technology education, will ultimately meet the needs of students and teachers at all levels—K-12, undergraduate, graduate, and lifelong learning—in both individual and collaborative settings.”

National Science Foundation
Towards A National SMETE Digital Library...

NSF should establish and fund a National Science, Mathematics, Engineering and Technology Education Digital Library

- **April 1996 - NSF Committee Meeting (LIBUSE)**
  - “Towards a National Library for Undergraduate Science Education Resources in Science, Mathematics, Engineering and Technology”

- **August 1997 National Research Council**
  - Digital National Library for SME&T Education Workshop

- **July 1998 National Science Foundation**
  - SMETE-Lib Workshop

- **January 1999 National Science Foundation**
  - Digital Libraries and Education Workshop
National SMETE Digital Library Program

• Test-bed funding under the Digital Libraries Initiative—Phase 2, 1998-2001
• Demonstration and full scale development, 2000-2006?
  – Four focus areas
    • Core Integration System
    • Collections
    • Services
    • Targeted Research
Anticipated 2000-2001 Projects

- Core Integration System
  - Cornell University
  - Eastern Michigan University - TeacherLib
  - University of Missouri
  - UCAR - DLESE, and Columbia University Press
  - WWW.SMITE.ORG
Emerging NSDL Designs and Prototypes

DLESE and WWW.SMTE.ORG
Digital Library for Earth System Education

A Community Resource
**DLESE’s Purpose**

- The goal of the DLESE is to help educators and learners find, evaluate, use, and create resources that support active learning about the Earth system.
Built by the Community

- To support learning about the Earth
- To improve science education
DLESE Vision

- Rapid, sophisticated access to collections of peer-reviewed teaching and learning resources
- Interfaces and tools to allow student exploration of Earth data sets
- Services to help users effectively create and use materials
- A community center to facilitate sharing and collaboration
Essential Design Strategies

• Responding to the needs of the Earth system education community

• A distributed network built as a community effort
Coordinating the Community Effort

• DLESE Community Governance
  – Steering Committee
  – Standing Committees

• DLESE Program Center
What is www.smete.org?

• Learning and teaching resources for science, math and engineering
• “Re-use” of learning materials:
  – Evaluate quality
  – Locate resources
• User comments
• Online discussion

Proto型 of a National Science, Mathematics, Engineering, and Technology Education Digital Library

This site contains:

• Working prototype of a National SMETE Digital Library, Search for learning resources.
• Prototype federated search for the Math Community and the American Mathematics Metadata Task Force (AMMTF).
• Survey about visions, features, and lessons learned for a NSDL.

The Math Forum

Their goal is to build an online community of teachers, students, researchers, parents, educators, and citizens at all levels who have
Needs Assessment with Members of the Math, Science and Engineering Community

Purpose:
To understand the math, science and engineering communities of educators and examine their needs in order to design services and structures to support users from multiple communities.

Research Questions:
• What services, features & programs are integral to success?
• What do users expect with regards to quality of the holdings?
• Who makes up the SMETE digital library community?

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
Translating Findings into Services & Features

Content, Quality and Community

• a system to easily identify the type/quality of holdings
• a place for comments and discussion
• a review system that addresses pedagogy and content
• quality content and community interaction to ensure participation by authors, reviewers, adapters/adopters & consumers
• embedded structures for developing & maintaining a community of users
• a flexible design, and be a facile, adaptable organization that can meet the needs of changing learning community
Systems Development

• **Expand [www.smete.org](http://www.smete.org)**
  – Continue participation in the development of IEEE/IMS Learning Object Metadata Standards
  – Adopt emerging IEEE standards
  – Implement discussion systems
  – Expand user comments
  – Implement customized user profiles

• **Expand Collections**
  – Chemistry, Physics, and Mathematics

**Total Collection**

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<td>5%</td>
</tr>
<tr>
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Collaboration with Partners

Eisenhower National Clearinghouse and Math Forum

– Identify common metadata
– Exchange records for common searching
– Work together on the American Mathematics Metadata Task Force

www.enc.org  www.mathforum.com
Collaboration with Partners

- University of California Office of the President - (10 campuses)
  - Develop TLT@UC Website to showcase teaching and learning with technology at the University of California
www.smote.org Goals

- Develop a NSDL Core Integration System
  - Provide seamless access to services and resources
  - Create a dynamic learning community that promotes and supports SMET education in the 21st century
- Demonstrate effectiveness of collaboration to provide
  - Expanded services
  - Resources
  - Community
Challenges - Core Integration System

To help users find what they’re really looking for and to personalize content

• Expand understanding of user needs and develop mechanisms to support changing needs

• Improve ability to encapsulate instructional intent and use of materials
  – Metadata standards and cataloging practices

• Support Communities
  – Pedagogy and Content
Challenges - Community

• Search for learning resources
• Catalogue (adding) learning resources
  – Standards, IEEE and IMS
• Evaluate the quality of learning resources
  – “User” reviews
  – “Expert” reviews
• Form a community of users in SMETE
  – PKAL workshops and seminars
  – Research on adapters
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