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**

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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
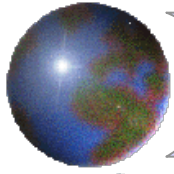 - WWW.SMETE.ORG

Emerging NSDL Designs
and Prototypes

DLESE and WWW.SMETE.ORG
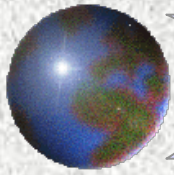
Digital Library for Earth System Education
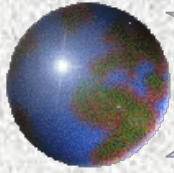
A Community Resource

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.
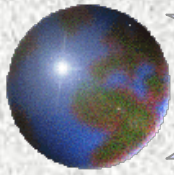
Built by the Community

- **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**
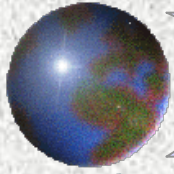
Coordinating the Community Effort

- **DLESE Community Governance**
  - Steering Committee
  - Standing Committees
- **DLESE Program Center**

WWW.SMETE.ORG

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**

PKAL,Keystone, CO - July 2000

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**
  - 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	
Engineering	54%
Chemistry	21%
Physics	17%
Math	5%
Other	3%

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

Demonstration: www.smete.org

NACME

WebCT

John Wiley

BioQUEST

Math Forum

Berkeley

ENC

UMBC

AAAS

UCOP   ILT   Utah State

PKAL

Stanford

Cisco

DLESE

Virginia Tech

SRI

Northern

GDL

Eduprise

Sun

Arizona

MAA

TI
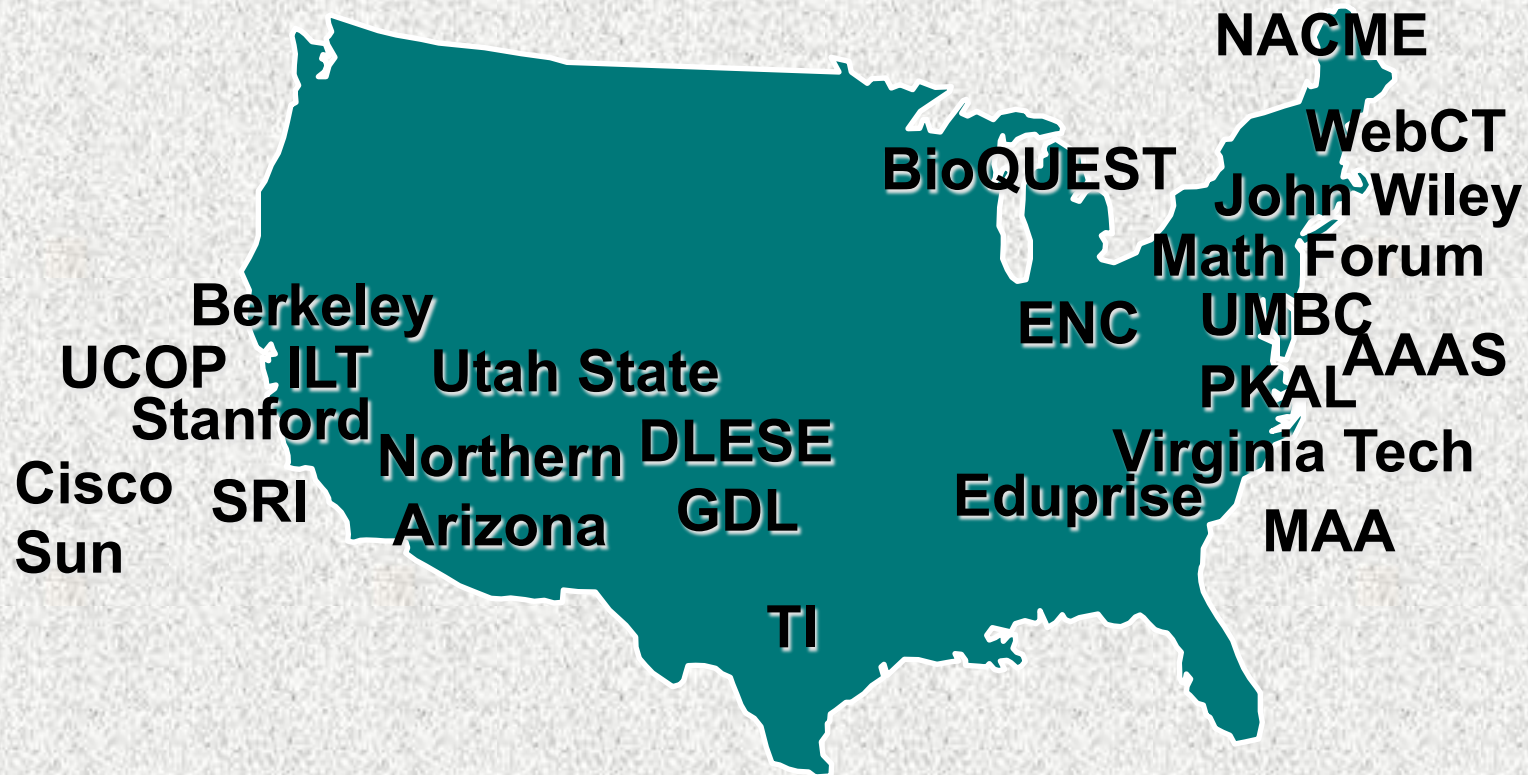
www.smete.org Goals

- **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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