SMETE Information Portal

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

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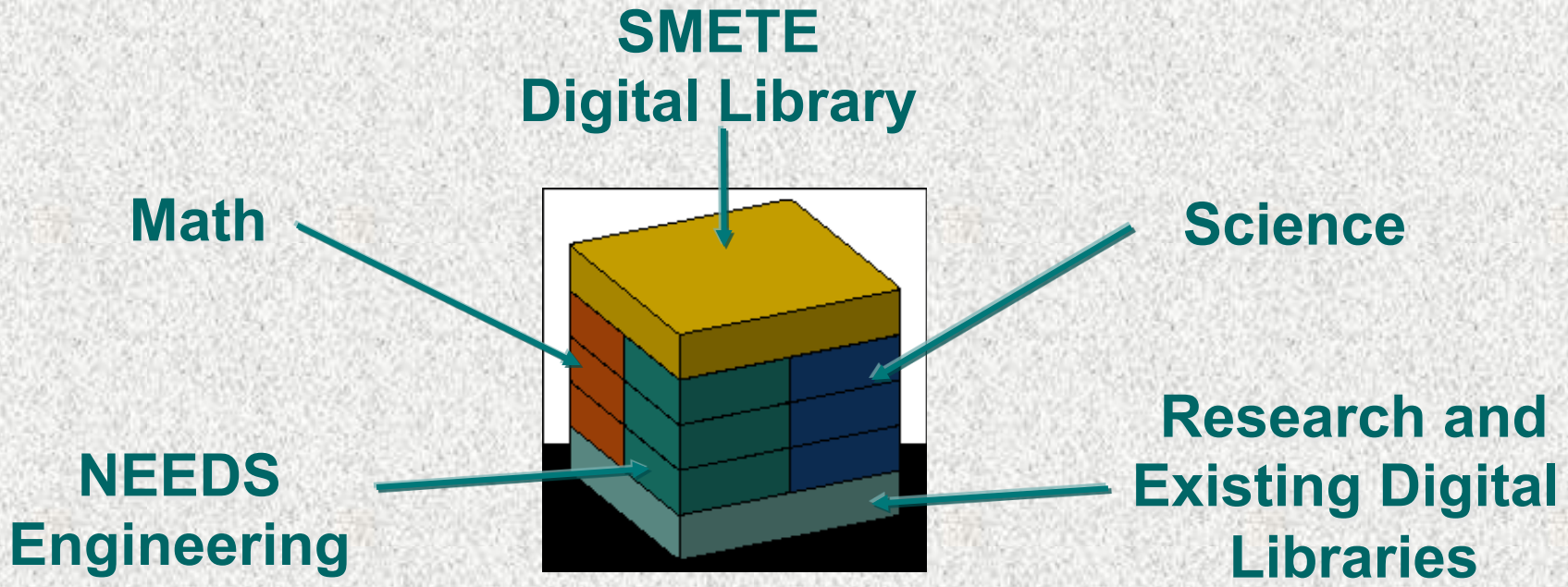
Development Vision

To contribute to the federated development of a global, interactive, digital learning space and community of learners in Science, Mathematics, Engineering and Technology Education (SMETE).



- **Identifying Best Practices**
  - Existing SMETE Digital Libraries
  - Lessons Learned From Existing Digital Libraries Metadata
  - Publications Related to SMETE Digital Libraries
  - Services and Tools for Digital Libraries
  - Strategic Visions for the SMETE Digital Library
  - User Studies and Requirements Analysis for Digital Libraries

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SMETE Digital Library Test-Bed Status Report

- **SMETE Digital Library Test-bed Developed based on NEEDS Infrastructure**
  - Improved interface
  - User Comments (user-based reviews)
  - User Registration
  - Improved Cataloging System
- **Expanded Collections**
  - Expanding into Chemistry, Physics, and Mathematics
  - Cataloged over 643 new learning objects since 9/98

Total Collection	
Engineering	58%
Chemistry	21%
Physics	14%
Math	5%
Other	2%

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Example Record: www.smete.org

INFORMATION PORTAL
A Digital Library for Science, Mathematics, Engineering and Technology Education

Search for Learning Resources

Go

Help Add Advanced

Info Portal | Search Results | MDSolids: Educational... HELP WITH INFO

Info | Download | Pedagogy | Comments & Reviews | Add Comment | Details

MDSolids: Educational Software for Mechanics of Materials

Premier Courseware of 1998

Download | Pedagogy | Comments & Reviews

Title: MDSolids: Educational Software for Mechanics of Materials

Authors: Timothy A Philpot

Publisher: University of Missouri - Rolla (08/1999)

Courseware Series:

Version: 1.7

Summary: In the mechanics of materials course, students are challenged to develop problem-solving skills necessary for the design of machines and structures. MDSolids is multi-faceted software that offers students numerical, descriptive, and visual results and details that illustrate and explain many types of problems involving stress and strain, axial members, beams, columns, torsion members, truss analysis, and section properties calculations. MDSolids is a flexible and

SMETE Digital Library Needs Assessment

Purpose:

To understand the math and science 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 and programs are integral to success?
- What do users expect with regards to quality of the holdings?
- Who makes up the SMETE digital library community?

Needs Assessment Design

Method: 10 focus groups

(AAAS, AAPT, AMS, MC^2, & Learning on the Internet)

Participants:

Type of Institution
70% 4-year universities
20% Community Colleges
10% K–12 Teachers/Prof. Orgs

Enrollment
50% > 10,000 students
25% < 2,000 students

Experience with Technology
97% use Instructional Technology
77% developed own Instructional Technology
69% use Instructional Technology developed by others

Findings, Trends, & Design Implications

Quality

- Library as a marketplace/shopping mall of ideas and products
- Contents range from “works in progress” to highly rated products
- “Peer review” includes cognitive science, pedagogy, curriculum and user reviews

Findings, Trends, & Design Implications

Community

- Communication potential is most highly valued
- A place for networking, learning from peers and communication — not just a repository
- Users look to their peers first to learn about teaching — strong discipline identify

Contents

- Library holdings should be diverse:

  problem sets to entire courses, books to data sets, visualizations and simulations, instructors' guides and assessment tools

Translating Findings into Services & Features

Quality

- System to rapidly identify the quality of holding
- Place to comment about a learning object or regarding something of interest to the community
- Reviewers should include experts in pedagogy and content

Translating Findings into Services & Features

Community

- Embedded structures for developing and maintaining communication links
- Developing community should be on par with building content
- Build on discipline based communities to establish connection to a broader community

Content

- Useful content and community interaction will ensure user participation as authors, reviewers, adapters/ adopters, and consumers

Implications for Building the SMETE Digital Library

The wide range of users…

Those we understand	Those we need to understand
Experts	Novices
Innovators	Adopters/adapters
Baby boomers	Gen-X
Technological "have' s"	Technological "have-not' s"
Instructors	Learners

...requires a flexible design, and an adaptable organizational structure.

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SMETE Digital Library Prototype Project Goals

- **Expand partnerships**
  - Math Forum at Swarthmore College
  - University of California Nexus K–12 project
- **Collaborate with partners to develop the SMETE Digital Library Prototype**
  - test interoperability of federated searches and shared services with partners
  - expand requirements analysis to include K–12
  - develop criteria and standards to assess the impact of learning objects across disciplines
  - implement community feedback systems and evaluate services

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

Research in Community Development

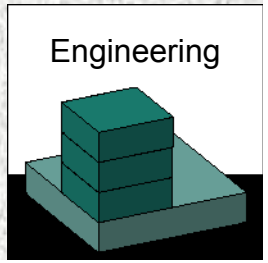
"Creating a Digital Learning Spaces for Science, Mathematics, Engineering and Technology Education"

- Develop a controlled vocabulary and semantic structures for SMET education
- Apply to organizing, indexing and retrieving educational materials stored in NEEDS (as a test-bed SMET Digital Library) and in federated searchers
- Use to structure discussion among our community of learners

NEEDS

NATIONAL ENGINEERING EDUCATION DELIVERY SYSTEM

- National digital library developed within the Engineering Coalitions program (1990-1999)
- Established Quality Review Programs
- Expanding to include Science, Mathematics, Engineering and Technology Education (SMETE)
- Developing digital learning spaces for SMETE teaching & learning communities



The Premier Award for Excellence in Engineering Education Courseware

- **A national competition to identify and reward the authors of high-quality, non-commercial courseware designed to enhance engineering education**
  - The *Premier Award* is about the entire experience of using the courseware by learners, not just the courseware itself
- **A dissemination system to distribute the Premier Courseware (via CD's, ASEE Prism ads, presentations at FIE and ASEE)**

WILEY Premier Award