

Collaborative Models for the Creation of Online Teaching Material

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NEEDS and SMETE Open Federation



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Outline

- **Collaborations and observations...**
 - Synthesis
 - Collaboration
 - **NEEDS and the *Premier Award***
 - Developing online materials
 - **SMETE Open Federation**
 - Collaboratively developing educational digital libraries

Lessons learned will fall into two categories

- Info about developing online learning materials
- Info about collaborative development

Synthesis: Background

- **NSF-funded Engineering Education Coalition (1989-1998)**
- **8 Diverse Institutions**
 - Research, Undergraduate Teaching and Historically Black Colleges and Universities
- **Geographically Distributed**
 - Challenges in meeting and communicating
- **Developed a number of courseware modules to support reform efforts**
- **Developed NEEDS—A Digital Library for Engineering Education**

Synthesis: Lessons Learned

- **“Local” support necessary to develop materials in a distributed manner**
 - Hardware and software
 - Most importantly expertise
- **Collaboration is difficult**
 - Need to find common ground/shared understanding
 - Need to develop **common** vision and work as a team
 - Need to have a compelling reason to do so

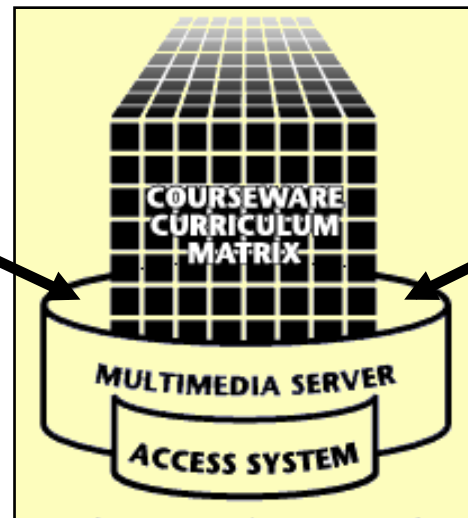


**NEEDS—A Digital Library for
Engineering Education
www.needs.org**

Delivery

- Classrooms
- Instructional Labs
- Small Study Groups
- Residences
- Libraries
- Anywhere

Database



Development

- Courseware Studios
- Instructional Labs
- Faculty Offices & Residences
- Libraries
- Anywhere

NEEDS is the foundation for the National SMETE Digital Library and Learning Community at www.smete.org.

Why Develop the Digital Library in NEEDS?



- **Need to share and distribute courseware beyond original developer**
- **Saw potential to go beyond an index of resources and/or a repository of resources**
- **Need to determine metrics for quality**
- **Need to provide mechanisms to recognize time and effort to develop courseware**

NEEDS: Lessons Learned for Developing Online Materials



- **Developing Materials**
 - Many authors don't design with distribution in mind
 - Lack of support materials demonstrate lack of understanding of pedagogy and use
 - Materials aren't well cataloged or even well described by author (on his/her website)
- **Collaboration**
 - Instructors (and students) are finding many new uses for materials
 - Use through NEEDS show additional support structures needed

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 publicize and distribute the Premier Courseware**



Premier Award: Lessons Learned for Developing Online Materials



- **Supporting materials are critical in evaluating quality (and how to adopt/adapt) courseware**
 - Instructor's guides, etc.
- **Winning courseware develops higher level cognitive skills**
- **Courseware should be adaptable to different learning environments**
 - E.g., classrooms, labs, self-study
- **Courseware should address different learning styles**



The SMETE Open Federation



- **Developed to build a successful National SMETE (STEME) Digital Library for deployment in Fall 2002 in response to NSF...**
 - That focuses on science, technology, engineering and mathematics at all levels
 - And more importantly, it focuses on education
- **...we needed to develop a team...**
 - To overcome the challenges we face in developing a National SMETE Digital Library
 - To cover target audiences and disciplines
 - To share in the development efforts

Vision



- **The SMETE Open Federation is committed to providing a service...**
 - to support learning
 - across disciplines in science, mathematics, engineering and technology
 - providing access to high-quality resources
 - in support of education reform and cross-disciplinary learning
 - from K-12 to higher education to professional development
 - by identifying and working with partners

Development Philosophy



- **The difference is *learning*, not just bibliographic information retrieval**
 - Teaching and learning require something more
- **Guided by *user needs* and philosophy of education that is constructivist**
- **Link content to community and services**
- **Build integrative tools and incorporate “best of breed” tools from partners**

SMETE Open Federation

Universities

Access Excellence @ the National Health Museum (www.accessexcellence.org)

American Association for the Advancement of Science (www.aaas.org)

Association for Women in Science (www.awis.org)

Biology Education Online (www.accessexcellence.org/LC/BEOn/)

BioQUEST Curriculum Consortium (www.bioquest.org)

Biosci Ed Net (www.benproject.org)

CITIDEL (www.citidel.org)

Coalition for Networked Information (www.cni.org)

Computer Science Teaching Center (www.cstc.org)

Digital Library for Earth Systems Education (www.dlese.org)

Education Development Center (www.edc.org)

Eisenhower National Clearinghouse for Mathematics and Science Education (www.enc.org)

iLumina (www.ilumina-project.org)

Instructional Architect (ia.usu.edu)

Interactive University (iu.berkeley.edu)

Internet Scout Project (scout.cs.wisc.edu)

Learning Matrix (thelearningmatrix.enc.org)

LearningOnline Network with CAPA (www.lon-capa.org)

Mathematical Association of America (www.maa.org)

Mathematical Sciences Digital Library (www.mathdl.org)

Math Forum (www.mathforum.org)

MERIT Network (www.merit.edu)

Michigan Teacher Network (mtn.merit.edu)

MERLOT (www.merlot.org)

National Center for Supercomputer Applications (www.ncsa.org)

NEEDS—National Engineering Education Delivery System* (www.needs.org)

Project Kaleidoscope (www.pkal.org)

SRI International, Center for Technology in Learning (www.cilt.org & www.escot.org)

TeacherLIB (www.teacherlib.org)

California State University (www.calstate.edu)

California State University, Sacramento (www.csus.edu)

Eastern Michigan University (www.emich.edu)

University of California Teaching and Learning with Technology Center (www.uctltc.org)

University of California at Berkeley (www.berkeley.edu)

University of California Office of the President, Academic Initiatives (www.ucop.edu/acadinit/)

University of Florida (www.ufl.edu)

University of Maryland, Baltimore County (www.umbc.edu)

Utah State University (www.usu.edu)

Virginia Tech (www.vt.edu)

Strengths of Partners



- **Partners with existing collections each have a decade of experience providing digital SMETE resources to their target audiences and disciplines**
 - ENC, NEEDS, Math Forum, BioQUEST
- **Most partners each have more than a decade of experience as organizations promoting SMETE reform**
 - AAAS, Project Kaleidoscope, Mathematical Association of America, SRI International

Making it All Work



- **We want to provide “seamless access to collections and services”**
 - Existing and new collections
 - Existing and new services
- **We recognize there are different types of agreements necessary to provide “seamless access”**
 - Social
 - Technical

On Working Together



- **Understand history and heritage of each organization**
 - Translation of terminology
- **Communicating openly and honestly**
 - Not about competition, but rather collaboration
- **Respect and preserve individual focus while achieving group goals**
- **Ready to work on a number of common projects**

Examples



- **Simultaneous search across multiple collections**
 - Partners running collections for quite some time
 - Many had similar experiences with user needs
 - How to describe resources, find resources, provide access to resources
 - Desire to expand into other disciplines
 - Many had similar infrastructures
 - Technical implementation respects interests of partners

Examples (cont.)



- **Building a “shared” service**
 - Utah State University interested in providing pedagogical support to digital learning resources in SMETE Partner collections
 - Main portal at SMETE.ORG interested in providing value added services
 - USU Instructional Architect (ia.usu.edu) accesses resources at SMETE.ORG and allows the user to combine them into their own lesson plans (pedagogical support coming Spring 2002)

Examples (cont.)



- **Comments and Reviews**

- A number of collections have user comments (Amazon.com) and peer reviews
 - Describing new and novel uses
- Fostering use of these features can lead to developing a community of users
 - MERLOT has a number of thriving disciplinary communities

Lessons Learned from the Audience?

- **Info about developing online learning materials**
 - www.needs.org/premier
 - www.merlot.org
- **Info about collaborative development**

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