NEEDS, SMETE, MERLOT and the National STEM Education Digital Library Program

Brandon Muramatsu
mura@smete.org
Outline

• NSF’s National STEM Education Digital Library Program
• SMETE Open Federation and MERLOT
  – Cooperatives of educational collections, services, user groups and professional societies
• NEEDS
  – Engineering education digital library
• Working Together…
• Demos
The SMETE Open Federation is an e-learning partnership that:

- Offers a comprehensive collection of SMET education content and services to learners, educators, and academic policy-makers.
- Serves as the integrative organization and distribution mechanism for pedagogical material through a tightly coupled federation of digital libraries.
- Promotes educational reform through participatory communities of learners.
• Believes the NSDL should...
  – Cover science, mathematics, engineering and technology not just “Science”
    • And we should emphasize the interdisciplinary and interconnectedness of learning materials
  – Focus on teaching and learning not only research and “primary source materials”
  – Focus on the social aspects as much, if not more than the technical aspects of building the NSDL
  – Be tightly federated/integrated to allow users the best possible experience
Reach of the Open Federation

- Identifiable audience of **9.25 million** users
- About **250,000** directly accessible community members
- Collectively has **42,000** high-quality, web-accessible digital learning resources
  - 28% Math
  - 17% Physical Sciences (physics, chemistry)
  - 19% Life Sciences
  - 4% Engineering
  - 3% Computer Science
  - 29% Non-STEM (History, World languages, etc.)
- **K-12/Higher Education**
  - Higher education resources 65%
  - K-12 education resources 35%
<table>
<thead>
<tr>
<th><strong>SMETE Open Federation</strong></th>
<th><strong>Industry</strong></th>
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<tr>
<td><strong>American Association for the Advancement of Science</strong> (<a href="http://www.aaas.org">www.aaas.org</a>)</td>
<td>Cisco Systems (<a href="http://www.cisco.com">www.cisco.com</a>)</td>
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<td><strong>Association of Women in Science</strong> (<a href="http://www.awis.org">www.awis.org</a>)</td>
<td>John Wiley &amp; Sons* (<a href="http://www.wiley.com">www.wiley.com</a>)</td>
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<td><strong>BioQUEST Curriculum Consortium</strong> (<a href="http://www.bioquest.org">www.bioquest.org</a>)</td>
<td>Collegis (<a href="http://www.collegis.com">www.collegis.com</a>)</td>
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<td><strong>Biosci Ed Net</strong> (<a href="http://www.benproject.org">www.benproject.org</a>)</td>
<td>MathWorks* (<a href="http://www.mathworks.com">www.mathworks.com</a>)</td>
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<td><strong>Coalition for Networked Information</strong> (<a href="http://www.cni.org">www.cni.org</a>)</td>
<td>Microsoft Research* (research.microsoft.com)</td>
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<td><strong>CITIDEL</strong> (<a href="http://www.citidel.org">www.citidel.org</a>)</td>
<td>Sun Microsystems (<a href="http://www.sun.com">www.sun.com</a>)</td>
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<td><strong>Computer Science Teaching Center</strong> (<a href="http://www.cstc.org">www.cstc.org</a>)</td>
<td>*Involved with NEEDS</td>
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<td><strong>Digital Library for Earth Systems Education</strong> (<a href="http://www.dlese.org">www.dlese.org</a>)</td>
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Key Features available at www.smets.org

• Users can...
  – Search and browse for learning resources
  – Access content from “federated” collections
  – Catalog (add) learning resources
    • Based upon emerging international IEEE standards
  – Evaluate the quality of learning resources
    • Using “user” reviews and “expert” reviews
  – Form a community
    • Through partner collections and activities
    • Building upon PKAL workshops and seminars
  – Get personalized recommendations

Brandon Muramatsu, mura@smets.org
“Federated” Collections

- Center for Highly Interactive Computing in Education (local, new wireless collection)
- Computer Science Teaching Center (harvested)
- Eisenhower National Clearinghouse for Mathematics and Science (pass through federated search)
- Mathematical Association of America MathDL (partial harvest)
- Math Forum (partial harvest)
- Michigan Teacher Network (partial harvest)
- National Library of Virtual Manipulatives for Interactive Math (harvested)
- NEEDS—A Digital Library for Engineering Education (local)

Brandon Muramatsu, mura@sмете.org
• Collaborative to improve access to quantity and quality of teaching and learning resources and to help faculty identify and use those materials

• Institutional partnerships with 20+ systems of higher education in the U.S. and Canada
  – Reaching 8 Million students
  – 350,000 faculty

• Broad collection extending beyond STEM
  – Search, browse, catalog, comments, assignments
  – Including: History, Music, World Lang., etc.

• 13 Disciplines doing peer review
  – Including engineering in collaboration with NEEDS
• Building relationships with professional societies
  – American Association of Physics Teachers
  – Journal of Chemical Education
  – Through SMETE Open Federation
    • American Association for the Advancement of Science (and related societies through BEN Project)
    • Mathematical Association of America
NEEDS—A Digital Library for Engineering Education

www.needs.org

- Established circa 1992 from NSF Synthesis Coalition (engineering education reform)
- Collection of digital learning resources for engineering education (search, browse, catalog)
- Served as technology platform for SMETE.ORG
- Recently re-launched to incorporate advances from SMETE.ORG
Premier Award

• National competition to recognize “high-quality, non-commercial courseware designed to enhance engineering education.”

• In its 6th year
  – 11 packages recognized since 1997
  – 10,000 CD-ROM packages of winners distributed

Brandon Muramatsu, mura@sметe.org
Working together…

• Professional societies and educational digital libraries
  – Develop new collections of educational resources
  – Link to existing collections of educational resources
  – Link to disciplinary education journals (e.g., Journal Engineering Education, Journal of Chemical Engineering)
  – Collaborate on peer review (professional recognition for reviewers)
  – Make collections available via professional society web sites

Brandon Muramatsu, mura@smete.org
Contact Info

www.smete.org

Brandon Muramatsu, Project Director
mura@smete.org