NEEDS — The National Engineering Education Delivery System

Today and in the Future

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Outline

• Vision
• NEEDS — Expanding Services
• Premier Award
Vision

*Develop a global digital library and community of learners in Science, Mathematics, Engineering and Technology Education (SMETE).*

To do this we build upon our experience with NEEDS — the National Engineering Education Delivery System — as the foundation for the SMETE Digital Library coupled with on-going research.
Develop a global digital library and community of learners in Science, Mathematics, Engineering and Technology Education (SMETE).
- An Established Dissemination Tool
  - National program developed within the Engineering Coalitions Program (1990-1998)
  - Courseware readily searchable and accessible
  - Expanding to include Science, Mathematics, Engineering and Technology Education (SMETE)

- Established Quality Review Programs
  - Criteria for evaluating courseware
  - *The Premier Award for Excellence in Engineering Education Courseware*
  - New user-based review mechanisms
Goals

• Provide a service to the engineering education community
• Grow and evolve NEEDS as the foundation for an on-line engineering education community
• Expand courseware review and evaluation efforts
• Serve as a bridge to the development of a SMET Digital National Library
Search the NEEDS Database for Courseware

Title: 
Author: 
Subject Heading: 
Keywords: 

Title: Frog Island
Author: Dev Pravati
Publisher: SUMMIT- Stanford University Medical Media and Information Technologies
Year: 1998
Version: 11.20.98
Summary: Frog Island is an environment where students explore a 3D virtual outdoor habitat and visit various “in-situ” to learn about topics such as anatomy, physiology (digestion, respiration, circulation) biomechanics. They have a workbook to outline the various lessons and that allows them to enter observations, to raise questions, or to enter answers to questions that are posed. There is a supplementary window where relevant text, images, and videos can be displayed. To facilitate unstructured learning modes, students are encouraged to explore the virtual environment, interact and noting any observations they may care to make. When a student has finished her lesson plans, she can produce a web document that summarizes her progress, the places she has visited, and the annotations she has made along the way. This summary will be made available to her teachers who are then free to post them to the web at the appropriate time. Applications in BioEngineering.
Expanding NEEDS Services to develop the Foundation for an On-line Community

• User and Author Services
  • User reviews of courseware
  • User-provided links to related information
  • On-line discussion
  • Adoption/Adaptation Usage statistics for the author

• NEEDS Services
  • Extended Usage Tracking
  • User Registration and Profiles
New Services Available from Catalog Records

- Affiliations
- Discussion
- Peer Review
- User Review
- Feature Review
- Awards
- Support Materials
Using NEEDS as the Foundation for a Test-bed SMETE Digital Library

- Develop a test-bed SMETE Digital Library using NEEDS as a foundation
  - Partnership with the University of California System
- Begin development of a SMETE on-line user community
- Evaluate the test-bed SMETE Digital Library
Digital Library Research

• Develop a controlled vocabulary for SMET education
• Apply this Controlled Vocabulary as metadata for organizing, indexing and retrieving educational materials stored in NEEDS (as a test-bed SMET Digital Library)
• Use courseware in NEEDS and the Controlled Vocabulary to structure discussion among our community of learners
Premier Award for Excellence in Engineering Education Courseware

• Why Create the Premier Award?
  • Establish NEEDS as a source of quality learning materials
  • Provide recognition to developers for time and intellectual
What is the *Premier Award*?

- 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)
How do we Decide the Premier Award?

• A rigorous, on-site 2-day review process with 6-10 judges
  • Engineering content experts
  • Instructional designers
  • Students
  • Publishers

• Apply the Premier Award Criteria
Premier Award Criteria

- Instructional Design
  - Will students learn from the courseware?
- Software Design
  - Is it well designed and usable?
- Engineering Content
  - Is the content error free?

We recognize that all the categories are interwoven.
Evaluation Criteria

• **Instructional Design:**
  - Interactivity
  - Cognition/conceptual change
  - Content
  - Multimedia use
  - Instructional use/adaptability

• **Software Design:**
  - Engagement
  - User interface and navigation
  - Technical reliability
Evaluation Criteria, cont.

- **Engineering Content:**
  - Accuracy of content
  - Organization of content
  - Consistency with learning objectives
Premier Courseware of 1998

• **Della Steam Plant**
  - By P. K. Raju and Chetan Sankar
    at Auburn University

• **MDSolids**
  - By Timothy Philpot at Murray State University

• **SEVE-UNH**
  - Robert M. Henry at the University of New Hampshire

**Distribution**

2000 CD-ROMs

Premier Courseware of 1997

- Virtual Disk Drive Design Studio
- Drill Dissection and Bicycle Dissection
- Mars Navigator

Distribution - 3000 CD-ROMs
100 Copies to Authors
650 Copies to FIE `97 Participants
300 Copies to Engineering Deans
400 Copies to ASEE `98 Participants
200 Copies to ICEE `98 Participants
200 Copies to FIE `98 Participants

See http://www.needs.org/premier/1997/ for more info
1999 Premier Award Competition

• Submit by Friday, July 30, 1999 to be eligible for the 1999 Premier Award Competition
• To be presented at FIE 1999, San Juan, Puerto Rico

See http://www.needs.org/premier/1999/ for more info

Visit us in Booth 306 at ASEE 99
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