

## WHAT IS NEEDS?

NEEDS—The National Engineering Education Delivery System is a digital library for engineering education. Our infrastructure supports the development, evaluation, use, and re-use of digital learning objects. Since 1994 NEEDS has provided a World Wide Web based interface for easy access to a variety of services that support technology enabled learning. As an innovation of Synthesis: A National Engineering Education Coalition, NEEDS supports a broad view of how a national digital library can be used to enhance learning. Our experiences with a wide variety of university partners, technologies, and content provide us with a strong background of how one can use this national resource, who can be its target audience, what instructional technologies can be made available, and what is needed to describe these resources.

## WHAT ARE DIGITAL LEARNING OBJECTS?

NEEDS accepts a broad view of the resources that we make available through our digital library. While in the past we have used the term “courseware” to describe the contents of NEEDS, we have recently adopted the less constrained phrase “digital learning objects.” The phrase “digital learning objects” better describes the resources contained within NEEDS and is consistent with IMS and the IEEE Learning Technology Standards Committee Working Group on Learning Object Metadata.

## NEW FEATURES

NEEDS is expanding its services as a digital library to serve as the foundation for a “digital learning community” for science, mathematics, engineering and technology education. Many of our new services are designed to provide community-based support to help users evaluate whether they should adopt or adapt a particular digital learning object. We will continue to expand our services, such as including discussion tools, to support our users in the formation of this “digital learning community.”

“A digital library has to be more than just content—it means developing a group of users. The users, depending on their expertise will want [different] support services.”

— Digital Library User

### S SEARCH

Search is a prominent part of our redesigned interface, appearing on each screen for easy access to the full contents of the digital library.

- Find and download digital learning objects.
- Find and download multimedia elements.

### A ADD

Anyone can add resources to NEEDS for widespread distribution and dissemination through our web-based cataloging system.

- Add digital learning objects from courseware & multimedia elements to applets.
- Add learning objects that you’ve developed or share those developed by others.

### Info

The ‘tabbed’ interface allows convenient access to the wide range of features available for a digital learning object. The Info tab provides the standard information to describe the learning object, and it should be familiar to longtime users of NEEDS. The Info tab allows easy access to three key services: Download, Reviews and Comments (see the other side for more detail on these services).

The screenshot shows the 'Info' tab selected in a tabbed interface. The title is 'The Virtual Disk Drive Design Studio'. Below the title are icons for 'Download', 'Reviews', and 'Comments'. The text below the icons provides details about the courseware, including authors, publisher, series, version, and a summary. The summary describes the courseware as an interactive multimedia case study for undergraduate engineering and science students, involving the design of a disk drive.

**Title:** The Virtual Disk Drive Design Studio  
**Authors:** David Y. Yu  
Alice M. Agogino  
**Publisher:** University of California at Berkeley (03/1997)  
**Courseware:** Multimedia Case Studies of Design in Industry  
**Series:**  
**Version:** 1.0b5  
**Summary:** The Multimedia Virtual Disk Drive Design Studio is an engineering design case study using interactive multimedia courseware for undergraduate engineering and science students. The purpose of this multimedia case is to introduce students to the world of mechatronics in the form of a disk drive. Students play the role of a project engineer for the ACME disk drive company and will have to mine out the necessary information from a multimedia archive in order to build a new disk drive model. Students will have to keep track of the development and production costs. They will also be asked to launch their new disk drives in a certain time frame, simulating the idea of time-to-market. This interactive disk drive case study is ideally complemented by hands-on mechanical dissection of an actual disk drive.

This entire project is put together using Macromedia Director. This cross-platform software will allow us to distribute CD-ROMs to a wide spectrum of students around the country with 2x CD-ROM drives. The author is currently collaborating with Western Digital Corporation and IBM Almaden Research Center in San Jose. Western Digital Corp. provided the mathematical model for performance calculations while IBM has contributed in the form of technical literature and expert opinions.

Info	Download	Reviews	Comments	Add Comment	Details
<b>The Virtual Disk Drive Design Studio</b>					
<b>Windows/Macintosh Hybrid CD-ROM</b> <span style="float:right">DOWNLOAD</span>					
<b>Version:</b>	1.0.1				
<b>Size:</b>	N/A - CDROM-based software				
<b>Minimum Requirements:</b>	Windows 95/NT with QuickTime 2.1.2 or Mac OS				
<b>Installation Notes:</b>	This item is available on a hybrid CD-ROM containing both Windows and Macintosh versions. For information on how to obtain this CD-ROM, please e-mail <a href="mailto:aagogino@me.berkeley.edu">aagogino@me.berkeley.edu</a> . Problems? Check the Frequently Asked Questions at <a href="http://www.needs.org/premier/1997/faq.html">http://www.needs.org/premier/1997/faq.html</a> .				
<b>Download Sites:</b>	NEEDS, Berkeley, CA, USA				

## Download

NEEDS supports downloading and linking to the learning objects in the digital library. The Download tab provides information describing the available platforms, minimum hardware and software requirements, and installation notes. NEEDS supports multiple redundant distributed archive servers to allow the user to have your choice of download locations.

Info	Download	Reviews	Comments	Add Comment	Details
<b>The Virtual Disk Drive Design Studio</b>					
<b>NEEDS Editor @ Berkeley, CA, USA, May 1, 1999</b> Premier Courseware of 1997					
The Virtual Disk Drive Design studio provides an immersive, virtual design environment in which the learner designs ACME Engineering's newest disk drive. Designing the disk drive according to the specifications provided, the user first learns the key features and functionality of hard disk drives and then learns about the design trade-offs required to meet the specifications.					

## Reviews

The Reviews tab will provide Peer reviews, Feature reviews and reviews about Premier Courseware. Peer reviews, like academic journal-type reviews, evaluate courseware based upon questions such as: Is the content error-free? Are the target audience and educational goals consistent with learning object's content? And can the learning object be used by others? Feature reviews will be commissioned reviews written by recognized experts and well-known educators.

Info	Download	Reviews	Comments	Add Comment	Details
<b>The Virtual Disk Drive Design Studio</b>					
<b>Alice Agogino @ Berkeley, CA, USA, May 1, 1999</b> Supplementary Information about the Virtual Disk Drive Design Studio					
I've attached our Instructor's Guide to help everyone understand just some of the ways the Virtual Disk Drive Design Studio can be used.					
See Also: <a href="#">Multidisciplinary, Multimedia Case Studies in Engineering Design: Instructor's Guide</a>					
The Instructor's Guide is intended to accompany the courseware series titled: Multidisciplinary, Multimedia Case Studies in Engineering Design. This guide provides suggestions for using the courseware in several instructional settings, as well as problems with solution strategies that can be used in a number of existing courses in the engineering curriculum at the university or pre-college level.					

## Comments

The Comments tab accesses community-based user reviews and support materials for learning objects. Users can contribute their experiences with the learning object. By adding a comment, the user can also attach a related resource, which might be a related website, a homework or lab assignment using the learning object, or some other pedagogical application.

## Premier Award for Excellence in Engineering Education Courseware

The Premier Award for Excellence in Engineering Education Courseware developed by NEEDS, Synthesis, and John Wiley & Sons "recognizes high-quality, non-commercial courseware designed to enhance engineering education." The Premier Award recognizes the entire learning experience, not just educational software. In its third year, we have already recognized six outstanding learning objects as Premier Courseware.



### Premier Award Criteria

The evaluation criteria used in the Premier Award judging process are arranged into three categories that mirror the design and development of digital learning objects.

**Instructional Design:** interactivity, cognition/conceptual change, content, multimedia use, and instructional use/adaptability

**Software Design:** engagement, learner interface and navigation, and technical reliability

**Content:** accuracy, organization, and consistency with learning objectives

