NEEDS—A Digital Library for Engineering Education (Core Collection)
SMETE Digital Library at www.smete.org (Core Collection)
NEEDS—A Digital Library for Engineering Education (Gender Equity Collection)

Collection Development Policy

1.0 Introduction

The Collection Development Policy described herein provides the framework for and guides the development of the following collections:

- NEEDS—A Digital Library for Engineering Education (Core Collection) (see www.needs.org)
- SMETE Digital Library at www.smete.org (Core Collection)
- NEEDS—A Digital Library for Engineering Education (Gender Equity Collection)

This policy describes the scope and audience of the collections, as well as the manner in which resources are included in the collection.

For questions or further information about the collection development policy described in this document please contact Brandon Muramatsu, NEEDS and SMETE Project Director, at mura@needs.org or +1-510-643-1817.

2.0 Scope of the Collection(s)

2.1 Subject Scope and Audience

The subject scope of the collections includes distinct academic areas (e.g., engineering, physical sciences, etc.) and disciplines (e.g., mechanical engineering, physics, etc.). Each collection focuses on specific academic areas and within each academic area one or more disciplines. For example if engineering is an academic area, mechanical engineering is a discipline within that academic area.

Users of the collections include undergraduate educators, undergraduate learners, K-12 educators, K-12 learners and life-long learners. This policy uses the term "educator" as an individual involved in teaching or mentoring a learning process. Thus an educator might be a teacher, professor, instructor, parent or even a student in a team/peer learning situation. The term "learner" describes an individual involved in acquiring knowledge or skills in a particular area. Similarly a "learner" might be an individual usually described as a teacher, professor or instructor in addition to the commonly used term "student".

The primary and secondary users along with subject scope of each collection are described below.

Table 1 – Target Audience and Subject Scope

Collection	Primary User	Secondary User(s)	Subject Scope
NEEDS Core Collection	• Undergraduate engineering educators	• Undergraduate learners needing information in engineering • Undergraduate educators in related academic areas such as the physical sciences and	• Engineering

		mathematics • K-12 educators and learners needing information in engineering	
SMETE.ORG Core Collection	• Undergraduate physical science educators • Undergraduate mathematics educators	• Undergraduate learners needing information in the physical sciences and mathematics • Undergraduate engineering educators • K-12 educators and learners needing information in the physical sciences and mathematics	• Physical sciences (especially physics and chemistry) • Mathematics
NEEDS Gender Equity Collection (Still under development)	• Undergraduate engineering educators looking for digital learning resources with a special emphasis on equitable resources • Female undergraduate students considering careers in engineering.	• Undergraduate learners needing information in engineering • K-12 educators and learners needing information in engineering	• Engineering

2.2 Types of Resources

The collections contain a wide variety of resources. This document use the term "digital learning resources" as an all-encompassing term to describe the types of resources available through these collections. The digital learning resources contained within these collections range from highly granular, for example Java applets, images and movies, to highly integrated, such as courseware and course modules.

Because these collections allow authors and others to submit materials to the collection, and because the developers of the collection recognize the importance of diverse materials in the collection, resources in the collection may be at varying levels of completion. This policy encourages authors of materials to make their resources available for testing and comment by a wider audience than they might typically expect. To alert the user to the potential state of completeness of the resources in the collection, the cataloging guide (see the NEEDS and SMETE "Cataloging Guide") suggests a best practice for notating 'alpha' and 'beta' status of a resource in the version number.

2.3 Other Principles

The collections will, to the extent possible, adhere to the following principles.

Subject scope (see 2.0 above):

- The digital learning resources that are collected are intended to be readily useful for the target audience(s).

- The digital learning resources that are collected are intended to meet the subject scope(s) of a given collection.
- Digital learning resources that may be useful for the target audience and might be outside the subject scope of a given collection may be included.
- Documents and resources about the teaching techniques, assessment instruments and other materials to help support the use of the digital learning resources in the collections may be included.

Language:

- The primary language of the collections is English.
- The primary language of the metadata describing the resources is English.
- In as much as the metadata standard for the collection allows for resources and metadata in other languages, they will be accommodated by the collection (though services will likely not be available for other languages).

Time Scope:

- The collections will contain materials that are generally readily available to the audience.

Geographical:

- The resources in the collections are primarily from and for use in the United States of America.
- Worldwide resources are included in the collection if they meet the subject scope(s) and needs of a collections' target audience(s).

Diversity:

- The resources in the collections will, to the extent possible, reflect cultural diversity or exhibit cultural neutrality.
- The resources in the collections will, to the extent possible, reflect gender neutrality.
- The resources in the collections will, to the extent possible, exhibit sensitivity to issues related to disability and underserved populations.
- Special emphasis will be placed on resources that provide positive images and role models for gender equity in engineering in the NEEDS Gender Equity Collection.

3.0 History of Scope and Coverage of the NEEDS & SMETE Educational Digital Libraries

From its inception in the early-1990's NEEDS' collection development efforts focused on cataloging and providing a repository of courseware developed by Synthesis: A National Engineering Education Coalition (see www.synthesis.org) focused on undergraduate engineering education. With support from the National Science Foundation, Synthesis and NEEDS focused on development of a base infrastructure and features for educational digital libraries with the emergence of the Internet and World Wide Web [Agogino/Wood 1994].

Beginning in the mid-1990's through 1998 NEEDS expanded its collection development efforts to include locating and cataloging high-quality, Web-based digital learning resources to support undergraduate engineering education. During this period it also focused on cataloging the digital learning resources developed by the other NSF-sponsored engineering education coalitions (i.e., SUCCEED, Gateway, Foundation and Greenfield). This work led NEEDS to develop the notions of "affiliations" or "sub-collections" for these engineering education coalitions.

In 1994, NEEDS initiated an effort to determine criteria for evaluating the quality of digital teaching and learning materials for engineering education. This Quality Review of Courseware effort led to the institution of a three tiered review system in NEEDS—un-reviewed materials, peer reviewed materials and the *Premier Award for Excellence in Engineering Education Courseware* [Eibeck 1996].

In 1998, NEEDS expanded the scope of its courseware cataloging efforts to include digital learning resources designed to enhance teaching and learning in the physical sciences and mathematics across K-12 and higher education. This effort included a requirements analysis of user needs in the physical sciences and mathematics. This expansion coincided with the initiation of a new NSF program to develop a national digital library for Science, Technology, Engineering and Mathematics Education.

In 1999, NEEDS began to develop an alliance encompassing disciplinary collections, researchers, commercial and non-profit education organizations, and industry to develop a national digital library for science, mathematics, engineering, and technology education. The goal is to establish a national digital library for SMETE that is much more than a static information repository. The alliance is creating a dynamic learning community that promotes and supports SMET education in the 21st century by providing a broad and deep infrastructure of disciplines, collections, services and targeted research to serve a community of learners in science, mathematics, engineering and technology education. This educational digital library will be a place where members of the community of learners interact with one another to develop, locate, use and discuss digital resources that enhance teaching and learning. The SMETE community needs services and resources to support both novices and experts in technology-enhanced learning in their classrooms, in their coursework, across disciplines and with each other [Muramatsu 2000].

Initial deployment of the SMETE Digital Library in 1999-2000 (originally under the moniker of the SMETE Information Portal) was based upon the underlying infrastructure provided by the NEEDS. Beginning in 2000-2001 the SMETE Open Federation (see www.smete.org/about_smete) initiated the development of a new infrastructure to meet the interoperability goals of the SMETE Open Federation and to provide a main portal into the collections of the Open Federation. The SMETE Digital Library contains the NEEDS Core Collection and NEEDS Gender Equity Collection as well as it's own core collection. The SMETE Digital Library core collection focuses on digital learning resources for undergraduate education in the physical sciences and mathematics. It also provides interoperability through a number of different mechanisms (federated search, harvesting, etc.) to SMETE Open Federation partner collections and hence resources may be cataloged according to a partner's collection development policy. (For more details the reader should visit the collection development policies of partner collections.)

In 2002, NEEDS initiated a project to develop criteria for gender equity in engineering education. This project will result in metadata to describe gender equity in a collection of digital resources for engineering education; this collection will become a sub-collection within NEEDS.

4.0 Managing the Collection

There are a number of methods by which resources are cataloged or 'added' to the collections described by this policy. Resources may be submitted or suggested for inclusion (a) directly by the author, (b) by a user (educator or learner) who believes the resource might be valuable by others, (c) by request to the staff of the collections or may be selected for inclusion (d) by a staff member of the collection.

The infrastructure of the collections uses the concept of 'role' to delineate what user has what privileges. The role of 'Cataloger' is typically reserved for a collection staff member. A 'Cataloger' has access to all resource records within the collection and can modify or update any record at any time. The role of 'Author' and 'Submitter' each provide similar privileges but only for the resource for which they are that they submitted to the collection.

4.1 Criteria for Selection

This policy sets for general guidelines for criteria for selection of resources because the collections allow a variety of mechanisms for resources to be submitted, suggested or selected for inclusion.

Resources submitted or suggested for inclusion in the collections, by authors and users, should be:

- Appropriate for the principles of the collection (see 2.3 above);
- Appropriate for the subject scope(s) of the collection;
- Appropriate for the target audience(s) of the collection;
- Well designed, readily usable and available by the target audience(s) of the collection;
- Generally error-free; and
- Present concepts in a generally accepted manner for teaching and learning in the subject area or discipline and provide appropriate support materials (e.g., lesson plans or teacher's guides).

Resources selected for inclusion in the collections, by staff catalogers, should:

- Adhere to the guidelines for submission and selection above;
- Be in a subject area or discipline for which the cataloger has an appropriate working knowledge; and
- Be readily useful to the target audience(s) of the collection.

Resources consider unsuitable for the collections include:

- Resources that are primarily advertising or promotional in nature.
- Resources that are poorly developed or maintained technologically, or that provide unreliable service.

4.2 Reviewing Submissions

The collections do not adhere to a strict review policy before resources are included in the collections. Instead the collections provide for a number of value-added services to allow users of the collection to determine the quality and appropriate use of the resources (such as peer reviews, user comments, the *Premier Award for Excellence in Engineering Education*).

Resources submitted or suggested for inclusion in the collections:

- May be briefly reviewed upon initial submission and periodically thereafter by staff catalogers for adherence to the general guidelines for submission or suggestion.

Authors of resources submitted, suggested or selected for inclusion in the collections:

- Will be immediately provided the opportunity to review and update or modify the description of their resource.
- Will be able to update or modify their resource description at a later time.
- Will be periodically contacted regarding their resource.

[A brief historical note, of the 1500+ resources cataloged in the collections as of February 2002, staff catalogers have been contacted less than ten times by "authors" of resources, in most cases this contact was because staff catalogers had misidentified the author of a particular learning resource.]

4.3 Removing and Deleting Resources

As a general policy resources are not removed completely from the collection. At the request of the author, submitter or other legally binding entity a resource may be marked as 'un-searchable'. Staff catalogers and/or the system itself may also mark a resource as 'un-searchable' if they are no longer available to users of the collection or if the resource

4.4 Updating Resources

Resource descriptions in the collections should be reviewed and potentially updated on a regular basis.

On an annual basis the author of a resource:

- Should be notified and asked to update the resource (with authors of multiple resources receiving a single notification)
- May be provide usage statistics of the resource; and
- May be asked to participate in a study or survey.

On a weekly or monthly basis the system should:

- Poll the platform location to check for availability and
- To the extent possible check for changes in the content of the resource.

5.0 Metadata

5.1 Resource Description

The collections use a customized implementation of the IEEE Learning Object Metadata (LOM) Draft Standard version 1.0 (see ltsc.ieee.org/wg12/). The internal representation of the IEEE LOM has been refined based upon the over decade of experience NEEDS has had in cataloging and making available digital learning resources.

The system is capable of exporting an IEEE LOM record using the IMS XML binding and can be configured to support additional export formats (such as Dublin Core, an RDF binding of the IEEE LOM, etc.)

5.2 Other Types

A number of other types of metadata are in use or are being developed by the collection.

5.2.1 Gender Equity Metadata

The Gender Equity metadata is still under development.

6.0 Related documents

How to Get Started: Recommending a Resource
How to Get Started: Adding and Editing a Resource

7.0 Bibliography

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