Educational Impact and Evaluation *Standing Committee*

NSDL
THE NATIONAL SCIENCE DIGITAL LIBRARY

Committee Charter

Ensure that participatory and stakeholder evaluation principles are integrated into the design, development, and implementation of NSDL.

2003-2004 Focus on 5 Tasks

- Developing a Controlled Vocabulary for
  Assessment of NSDL Collections and Items
- Surveying Principal Investigators
- Workshop on Developing a Strategy for
  Evaluating the Educational Impact of NSDL
- Workshop on Using Webmetrics for Evaluation Purposes
- Project Impact / Disseminating Evaluation Information
  Web Clearinghouse & ***Annual Report***

http://eduimpact.comm.nsdl.org

Hybrid Approaches

Integrating Bricolage with Science/Engineering

A bricoleur is a thinker tinkerer; she focuses on the immediate objects and materials at hand to fashion solutions for problems faced. Levi-Strauss explains that when he presented a bricoleur in a dichotomous category and compared it with the engineer, he was trying to explain that "there is no gap between the way so-called primitive peoples think and the way we do." Very simply, in the binary view, primitive minds are made up of bricoleurs, and domesticated minds are made up of engineers. The differences are often explained in the types of data and materials each group uses; in bricolage the engagement is with the materials at hand (improvisational assemblage to solve an immediate problem) and reflects humanistic values while the scientific or engineering mind engages with the abstract, the representations of the material and proceeds in a more formal, often deterministic way. DL evaluation is increasingly being viewed as bricolage - a blend of humanistic and scientific methods - and DL evaluators are bricoleurs - storytellers and scientists - as the following brief descriptions of our projects show.

Working Groups

Collections Assessment

Objective
Develop a methodology by which the breadth and depth of the NSDL metadata repository (MR) can be assessed. Specifically, to examine the number of items and collections in the MR by *subject*, *audience*, *resource type*, *format* in order to
- Develop recommendations that can inform collections development priorities and practices
- Trace Growth
- Perform Gap Analysis

Bricolage
The identification and blending of methods and tools used in different disciplines

Science/Engineering
Conducting experiments to see which approach or combination of approaches work better

Activities
1) Developed Controlled Vocabularies for Evaluation Purposes
2) Examined & Experimented With Three Possible Implementation Approaches
    - **Crosswalks** [*Scalability and Maintenance Limitations*]
    - **Lexical Analyses** - Performed a preliminary analysis of collection-level metadata
      [*Automatically map metadata records into categories using word level information (synonyms, hypernyms) in specific record fields*]
    - **Machine Learning** - Developed training data - 240 randomly selected NSDL metadata records were indexed by professional cataloguers [In Progress - Apply trained classifier to item-level metadata records and evaluate results]
      [*Supervised and unsupervised classifiers - uses multiple sources of text in the metadata record, including the brief description, to do the mapping*]

Results
Determined Support Vector Machine Classification (Machine Learning) to be more flexible because it accounts for the data in the description fields.

The EIESC Recommendations include generating reports at regular intervals, monitoring terms that do not fit into the predetermined cross-walks, and developing a mechanism to support the addition of new collections or changes to existing collections.

Number of collections by subject as of June 2003*

Total number of collections = 118

Number of Collections:
- Health: 14
- Science: 105
- Mathematics: 49
- Engineering: 22
- Computing: 4
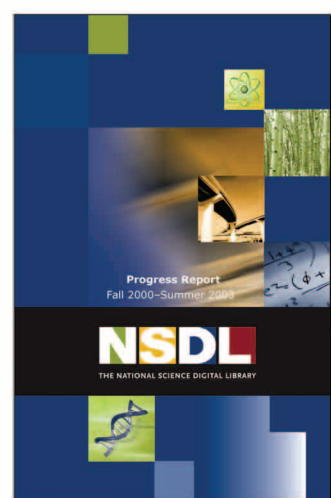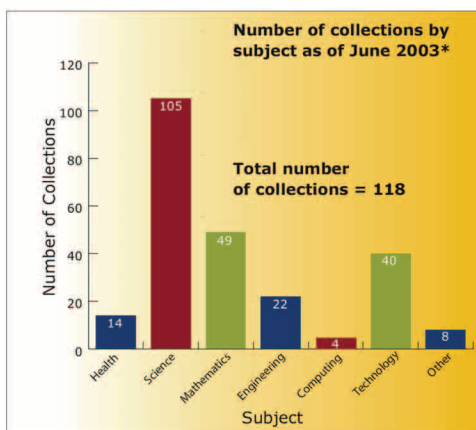- Technology: 40
- Other: 8

Subject

Next Steps
- Work with the Content Standing Committee to formulate policy and practice recommendations for collections growth and accessioning.
- Work with CI to integrate collections assessment tools and work practices into their activities.

NSDL Annual Report

Conceptualized by the EIESC as a mechanism to disseminate evaluation information. The success of the first NSDL Progress Report in 2003 led to another NSDL Annual Report in 2004.

Progress Report
Fall 2000–Summer 2003

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We recommend that the EIESC continue to participate in the production of future Progress Reports
- Reporting needs can help to organize and focus ongoing committee activities
- The collaborative production process offers a positive example illustrating how a standing committee can work with CI on a larger community project

Evaluation committee activities contributed to four major areas
- *Assessing Community Needs* - 2003 PI Survey
- *Developing Collections* - activities of Collections Assessment Working Group
- *Measuring Library Use* - 2002 EIESC Pilot Study and Core Integration webmetrics
- *Providing Leadership in Technology-Based Education* - 2003 PI Survey & literature analyses

Surveying Principal Investigators

Bricolage - Descriptive data in addition to scales

Science/Engineering - Survey Method

The NSDL PI Survey measures
- NSDL's communications infrastructure
- Level of projects' participation in NSDL organizational structures
- Extent and success of projects' collaboration
- Information needs and motivations of the community building NSDL

to answer the question, ***How are the distributed library building and community governance processes working?***

Survey Questions Sought to Identify
- Levels of use, effectiveness, and extent of participation
- Barriers to use, effectiveness, participation, and suggestions for improvement
- Information needs and motivations

Types of scales -- Likert, multiple choice, open-ended

Primary audience -- NSDL PIs (all project members encouraged to contribute to survey completion)

Distribution -- survey available online for four weeks during June-July 2003

Verification -- one survey per project (NSF award number used to verify results, then disassociated from the results for further analysis)

Results & Recommendations

PI Expectations of NSDL Participation and Support
Individual projects are not aware of whose expectations they should meet, what level of participation is expected or what the outcomes of participation should be when using the NSDL communications infrastructure, pursuing collaborative opportunities and participating in NSDL organizational structures.
 * *Establish a process for defining and communicating shared priorities and expectations.*
 * *Provide targeted "entry points" for project or individual participation.*

Respondents identified what type of support they would like from the Core Integration (CI) project; however, this could be a moving target because projects are at different stages of development.
 * *Identify specifically what projects need in terms of technical support.*
 * *Define & communicate what levels of support can be realistically expected from CI.*
 * *Leverage the expertise of NSDL projects.*

The current communications infrastructure is not meeting projects' information needs and the multitude of communications channels present too many choices when deciding what to read regularly and where to look for information to support project work.
 * *Establish one resource that is continually maintained and updated with basic technical information and other information relevant to project development.*

PI Perceptions of Collaboration across NSDL
Respondents indicated that they were unsure how collaboration was being defined and what were the expected results of collaborative efforts.
 * *Establish process to define & measure collaboration in a distributed environment.*
How much emphasis should be placed on collaborative achievements as success factors?
How can NSDL organizational structures provide project connections at a finer-grained level?

Next Steps
- Address the challenges of purpose and timing of the Annual PI survey relative to other data-gathering activities occurring across NSDL
- Determine if the survey functions well as a tool for identifying projects' immediate technical or information needs
- Determine if the survey should respond to shifting NSDL organizational needs and goals

Develop a taskforce with representation from all NSDL Standing Committees to address these next steps and the next implementation of the survey.

Workshops

Bricolage
Hybrid approaches to indicators and measures of impact

Science/Engineering
Log standard and definitions of impact measures

Webmetrics

Joint effort with NSDL Technology Standing Committee

There are at least four kinds of user, use and usage data that can be collected about digital library users. The word webmetrics literally translates into measures of website, or webpage, usage and often refers only to data that is collected on the server and maintained in server logs.

Server logs record user transactions every time a user visits the site and comprise the first type of usage data that can be collected; the second comes from registration processes; the third and fourth types of data are collected using client-side monitoring tools (software that is installed on the user's computer) and online surveys. In addition, log protocols that enable cross-project usage data sharing and comparisons are also of interest.

Primary Activities
1. Information gathering (literature review, best practices)
2. Understanding the scope of logging and analysis
3. Rerunning the pilot study with original 6 participants and volunteers
4. Listing of projects developing tools
5. Sampling log data (at specific times in year) from participants

Evaluating Educational Impact

Objective
Articulate a strategy to ensure that future design, development, and evaluation activities can effectively contribute to the larger NSDL educational mission.

Outcomes
Evaluation Strategy document
Annotated Bibliography
User-Friendly Guide to DL Evaluation

Attendees
NSF
NSDL projects
Invited Members of the Research Community

Bricolage
Utilization of existing project materials and research to understand and resolve NSDL's educational impact

Science/Engineering
Current documentation and evaluation of research. Future plans to incorporate technical advancements.

Workshop Outcomes
Premature to look for educational impact, particularly on student
  learning, for NSDL as a holistic entity
Acknowledge NSDL as inherently developmental (i.e., continually
  being designed and enhanced, projects at different stages)
Important to examine educational impact from 2 perspectives
  Actual NSDL & Intended NSDL

Actual NSDL - Recommendations
Document current state of NSDL
Collect baseline data (e.g. number of resources in NSDL aligned with
  educational standards, audience and geographical definitions of people
  accessing NSDL, number of faculty using NSDL in course planning)
Perform classroom use case studies
Develop shared methodologies and instruments
Develop structure for information gathering and dissemination

Intended NSDL - Recommendations
Articulate the *value* of 'Intended NSDL' for NSDL leadership, NSF, and Congress
Nurture and promote DL educational evaluation research within NSDL
Encourage inclusion of educational significance in new proposals
Enable NSDL as a test environment and create new models of research in
  education and educational technology