

# Survey of Evaluation Projects in the National Science Digital Library

## Final Report

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## **PART I - BACKGROUND**

### **1 Overview**

In May 2006 the Core Integration (CI) team and the Educational Impact and Evaluation Standing Committee (EIESC) of the NSDL conducted an online survey of the Principle Investigators of the 204 NSDL projects funded by the NSF since 2000. The two main objectives of the survey were:

- to document the amount and variety of evaluation within NSDL projects
- to make available exemplar evaluation instruments and report excerpts to NSDL projects

The impetus for the survey arose at the EIESC standing session at the 2005 NSDL Annual Meeting, where participants noted a lack of sharing of evaluation experience amongst NSDL projects, and expressed a desire to share evaluation tools and information, to improve collaborative evaluation efforts, and to find and promote valid and reliable evaluation instruments and processes.

### **2 Prior NSDL Work on Evaluation Practices**

This survey builds on a number of prior NSDL evaluation activities.

#### 2002 Evaluation Practices Survey (46 responses)<sup>1</sup>

Among the findings of the survey were that projects turned to personal contacts rather than to NSDL for help with evaluation; and that barriers to evaluation included lack of money, test subjects, standard methods and instruments, and case studies from other NSDL projects.

#### 2003 Workshop - “Developing a Strategy for Evaluating the Educational Impact of NSDL.”<sup>2</sup>

The workshop emphasized the need for NSF solicitations to encourage NSDL projects to articulate the educational rationale of their activities, and emphasize the importance of evaluation. Participants expressed the need for support and funding for collaboration in distributed evaluation efforts.

#### 2005 Evaluation Practices Survey (38 responses)<sup>3</sup>

Survey responses reflected the growing maturity of NSDL projects, with projects asking for specific evaluation methods, tools, and user groups for testing. The survey recommended that NSDL and EIESC establish an online forum for posting evaluation resources; develop user panels; and design standard evaluation questions to address the impact of digital libraries.

#### 2006 Pathways Projects Evaluation Practices Survey<sup>4</sup>

A survey of NSDL Pathways PIs found that they used or intended to use a total of 123 data collection tools (surveys, webmetrics, etc.), in pursuit of a much smaller number of evaluation questions. 16% of the tools focused on identifying library impact, 15% on audience needs, and 14% on usage, and other evaluation foci included usability, content quality, technical quality, and sustainability. Many of the Pathways are not yet mature projects, and so the reported evaluation activities often represent proposed rather than actual work. The emphasis by the Pathways on investigating impact reflects the interest of NSF in the same question; at the same time, a review of the EIESC web pages<sup>5</sup> suggested that NSDL projects still not have arrived at standardized metrics for demonstrating impact.

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<sup>1</sup> [http://eduimpact.comm.nsdsl.org/evalPracticesSurvey/evalPractices\\_survey-analysis.doc](http://eduimpact.comm.nsdsl.org/evalPracticesSurvey/evalPractices_survey-analysis.doc)  
[http://eduimpact.comm.nsdsl.org/evalPracticesSurvey/evalPractices\\_survey-data.doc](http://eduimpact.comm.nsdsl.org/evalPracticesSurvey/evalPractices_survey-data.doc)

<sup>2</sup> <http://eduimpact.comm.nsdsl.org/evalworkshop/index2.php>

<sup>3</sup> [http://comm.nsdsl.org/download.php/679/2005\\_evalPractices\\_summary-v4.doc](http://comm.nsdsl.org/download.php/679/2005_evalPractices_summary-v4.doc)  
[http://comm.nsdsl.org/download.php/680/2005\\_evalPractices\\_results-v3.doc](http://comm.nsdsl.org/download.php/680/2005_evalPractices_results-v3.doc)

<sup>4</sup> Report not yet published and title/URL not yet available.

<sup>5</sup> [http://comm.nsdsl.org/download.php/691/EIESC\\_documents-v2.doc](http://comm.nsdsl.org/download.php/691/EIESC_documents-v2.doc)

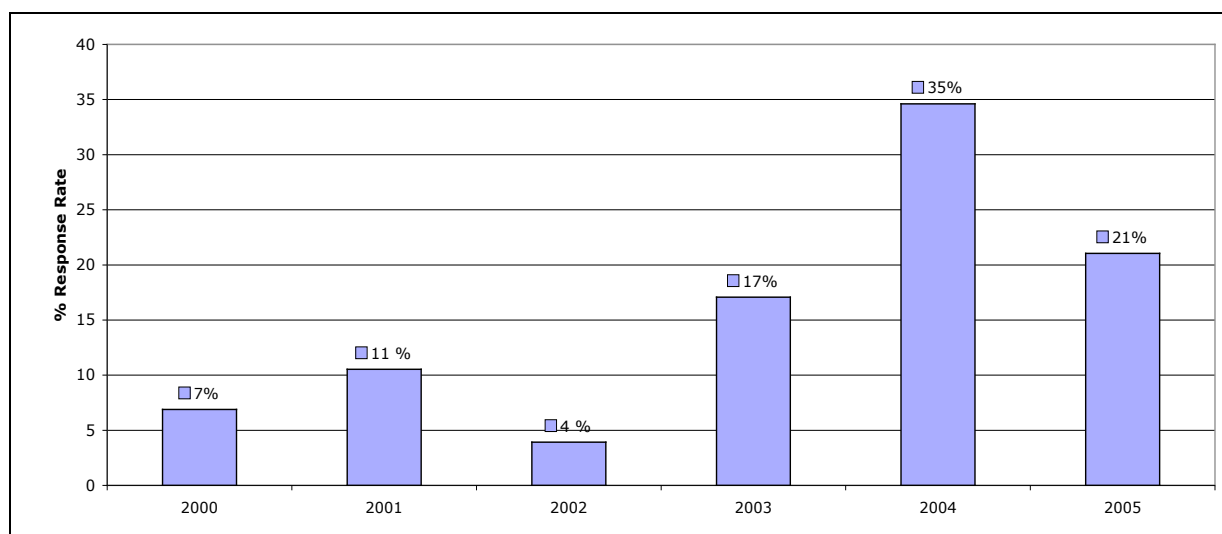
## PART II – SURVEY RESULTS

### 3 Respondent Profiles

With this background in mind, in May 2006 the NSDL project PIs were invited via email to complete an online survey form (supported by Survey Monkey) regarding the evaluation activities associated with their projects. Over the next month several reminders were sent to the PIs as well as to the members of the EIESC to encourage participation in the survey. 34 PIs responded for a response rate of 16.7%.

#### 3.1 Project funding date

The majority of survey respondents (approximately 56%) were from projects funded since 2004. 21% of responses came from PIs from projects funded in 2002 and 2003. Figure 1 shows the responses by year the project was funded. (See Appendix A for a summary of all responses to all survey questions.)



**Figure 1. Responses by Funding Year**

#### 3.2 NSDL program track

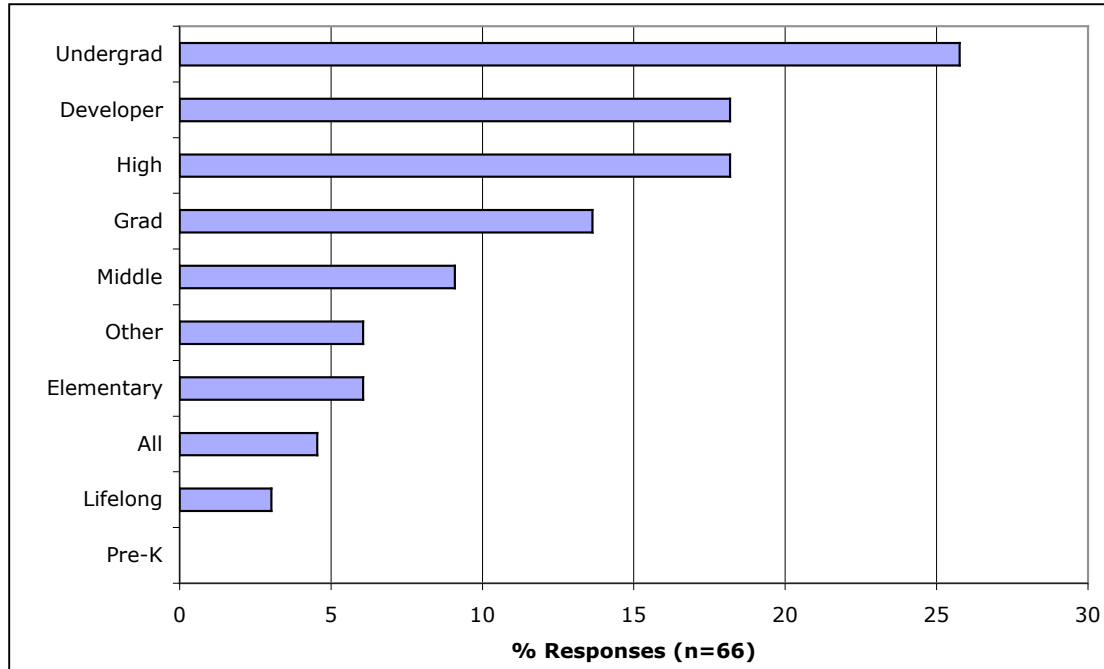
A higher number of responses came from the (more recently-funded) Pathways projects (46.2%) and CI projects (33.3%). Only 10% of projects funded through the collections track responded to the survey (See Table 1).

**Table 1: Responses by Program Track**

Project Track	Awards	Responses	Response Rate (%)
Collections	89	9	10.1
Core Integration	9	3	33.3
Pathways	13	6	46.2
Services	66	4	6.1
Targeted Research	27	7	25.9
Not sure/no answer	-	6	-
<b>TOTAL</b>	<b>204</b>	<b>35</b>	<b>16.7</b>

### 3.3 Target Audience of Project

Respondents' projects focused primarily at the undergraduate and graduate levels of higher education (approximately 39.4%). Middle and high school projects followed, with approximately 27.3% of responses, and 18.2% of respondents focused on developers. Only 6.1% of respondents focused on elementary audiences, and less than 5% focused on lifelong learning (See Figure 2).



**Figure 2: Target Audience of Project**

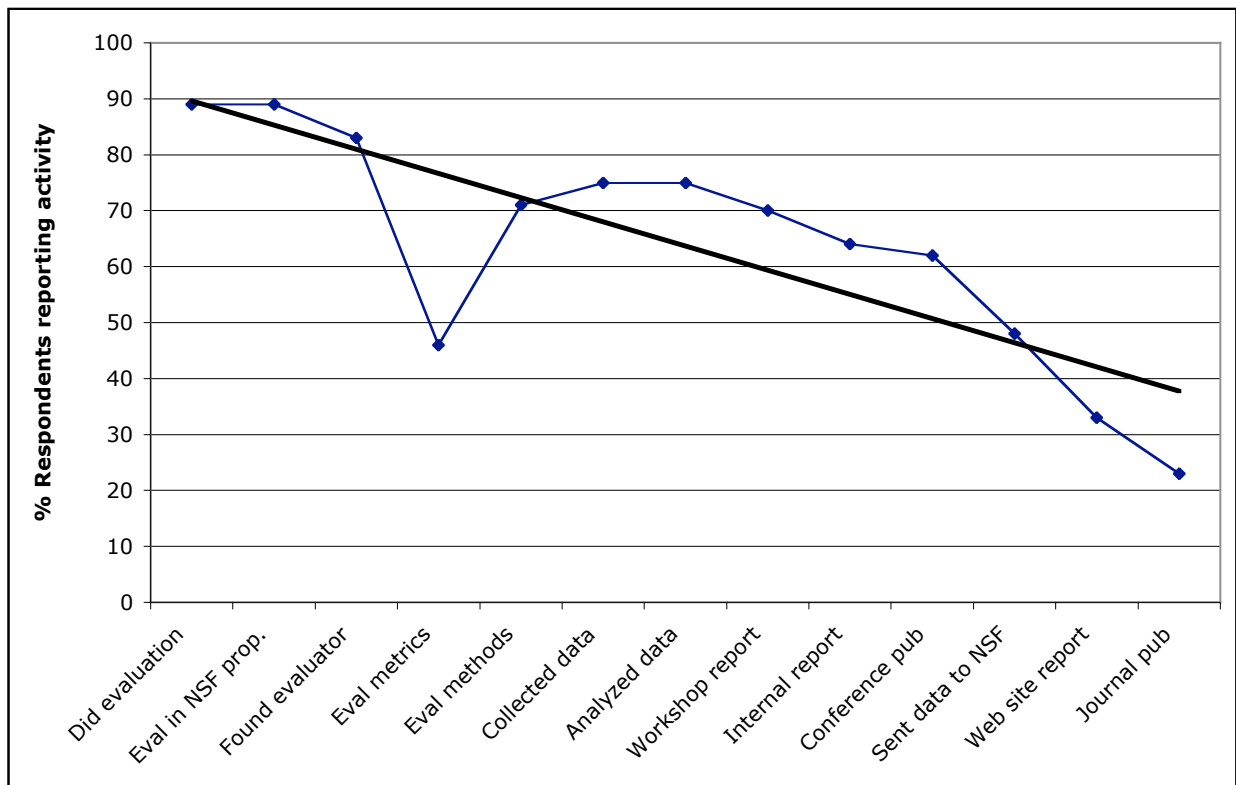
## 4 The Practice of Evaluation

The next set of survey questions focused on the evaluation practices of the responding NSDL projects. PIs were queried about three types of evaluation activities: planning for evaluation, implementing evaluation, and dissemination of findings. Table 2 lists the specific practices associated with each of the four types of activities.

In terms of *planning*, approximately 90% of the respondents reported both including an evaluation plan in their NSDL proposal, and carrying out some form of evaluation. Given that providing an evaluation plan is a required section for all NSDL proposals, is interesting to note here that not all PIs reported including this in their proposal. 83% of respondents had identified internal or external evaluators, only 46% of the respondents noted that they had developed formal measures of project success, a characteristic of most evaluation plans (in other words, only half of the projects who indicated that they had carried out evaluation, appeared to have followed a formal evaluation plan). In terms of *implementation*, 70% and 80% of the respondents reported that they had collected and analyzed evaluation data. *Dissemination* of evaluation data and reports varied: just over 70% of respondents reported findings at workshops, 64% reported findings in internal project reports, and 62% reported findings at conferences. 48% of respondents reported evaluation findings to NSF. Fewer projects shared findings via their project web site (33%), or through publication in journals (23%).

**Table 2. Type of Evaluation Practices (n = 28)**

Evaluation Activity	% Respondents Reporting Activity
Carried out some form of evaluation	89
Planning	
Evaluation plan included in NSF proposal	89
Designated internal/external evaluator(s)	83
Developed formal metrics of project success	46
Developed formal methods and instruments	71
Implementation	
Implemented evaluation plan & collected data	75
Analyzed evaluation data	75
Dissemination	
Presented findings at workshops	70
Made findings available in internal report	64
Presented or published findings at conferences	62
Sent evaluation findings to NSF	48
Made findings available on web site	33
Published findings in journals	23



**Figure 3: Evaluation Activities (N – 28)**

The activities listed in Table 2 might also be viewed as representing a “workflow” for the evaluation process. When looked at in this manner, these activities are roughly sequential, with each activity functioning as a foundation upon which the next step depends. For example, one must have an evaluation plan in order to identify the set of measures for identifying success, which are necessary to use to design data collections methods. Displaying the data graphically (see Figure 3) highlights how implementation of evaluation shifts over the workflow. Assuming that sharing of data and results are the final steps of the evaluation process, the graph suggests that each stage in the workflow needs to be accomplished in sequence for successful completion of evaluation.

Figure 3 exhibits a downward ‘attrition’ trend as projects proceed along the evaluation workflow. While 90% of respondents set out with good evaluation intentions (they included an evaluation plan in their proposal, and identified an evaluator), 80% collected and analyzed data, 67% wrote an internal report, and only 45% of respondents sent evaluation results to NSF. These declining numbers suggest that projects as they moved through this workflow, ‘fell out’ at various stages of the evaluation process. One potentially significant observation concerns the fact that less than half of the respondents reported that they had identified formal measures of project success at the beginning of their projects.

Levels of completion of the evaluation workflow differed by type of project (e.g. pathways, collections, etc.). Most of the projects show a similar decline in reported evaluation activities across the evaluation workflow. However, the targeted research track projects consistently reported higher levels of evaluation activity than other project tracks.

## **5 Sources of Help for Evaluation**

Survey respondents were also asked about sources they used for finding help in conducting evaluation. The most popular sources were other NSDL projects (15 responses) and the annual meeting and workshops. Significantly, NSDL resources such as email lists and the NSDL wikis were extremely unpopular, with only two respondents reporting that they read the listserve. No respondents reported using the wiki. (These results reflect findings from the previous NSDL-CI survey on projects’ resource creation and review processes, which showed that project PIs preferred personal and/or face-to-face contacts to the NSDL wikis and email lists). About a third of the respondents (10 responses) reported that they did not seek help – some of these respondents may have hired an outside evaluator.

## **6 Evaluation Budgets**

Respondents felt that they had adequate funds for conducting evaluation activities. Over 20 had allocated between 5 and 10% of the overall budget to evaluation, which is often considered a standard for evaluation projects in education. Three reported allocating over 10% but less than 20%, while two had allocated over 20% of their funds for these kinds of activities. Two respondents noted that they did not know how much of their budget was allocated to evaluation. About a fifth (19%) of the respondents felt that this was not enough funding to support these activities. As one respondent noted: *“We could have gotten more data from more users if we had more time and more money.”* Financial constraints as reported by these respondents, did not seem to be a significant enough factor to stop them from carrying out evaluation.

## 7 Barriers to Evaluation

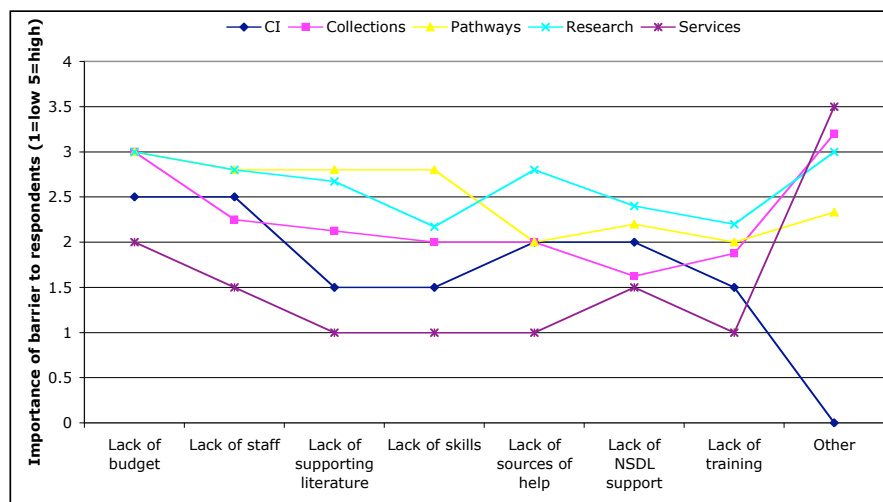
Respondents were asked to rate the importance of a variety of barriers to carrying out evaluation. No one barrier was rated as being significant across all projects. Table 3 summarizes the mean responses for each potential barrier.

**Table 3. Barriers to Implementing Evaluation (n = 28)**

Barrier	Mean Response
Lack of budget	2.7
Lack of Staff	2.4
Lack of familiarity with literature	2.2
Lack of skills	2.0
Lack of sources of help	2.0
Lack of NSDL support	2.0
Lack of training	1.8
Other	3.0

Scale: 1 = not a barrier; 5 = substantial barrier

‘Other’ responses tended to focus on a lack of time or staff, especially for longitudinal evaluations, evaluation that might require qualitative methods, or involve instructors in situ. Several respondents noted that they had experienced problems identifying and hiring outside evaluators with appropriate experience. Perhaps the greatest impact these barriers had on implementation of evaluation is that the respondents have not been able to conduct studies regarding the impact of their programs. Instead they have been limited to short-term studies that focused on identifying immediate gains. This general lack of evaluation resources is reflected in respondents’ comments that they lacked the time to conduct and analyze the types of studies they had wanted to implement.



**Figure 4: Barriers to Evaluation by Program Track (N = 25)**

Figure 4 illustrates that projects did experience barriers differently. Note that the research projects and pathways projects seemed to identify barriers as being more significant, whereas the services projects rated evaluation barriers as being less important than other projects. This difference may reflect the fact that researchers and professional evaluators (hired by pathways projects) recognize the complexity (or barriers) involved in conducting digital library evaluations.

The complex nature of evaluation as a task is suggested by respondents' detailed responses on barriers in the 'further comments' section. Lack of time, money and staff appear to be interrelated in complex ways, which suggests that the problems cannot be resolved by simply providing more staff, funds and personnel. Four general areas emerged from the 'other' barrier responses: logistics, time, respondents, evaluation skills, and resources. Although these areas sometimes overlap (i.e. the lack of evaluation skills in a project team requires training which takes time), it is useful to examine each area in turn.

### **Logistics**

Several respondents ran into logistical problems concerning their evaluation. One project changed focus and suddenly required a new type of evaluation which will take time. Another found it difficult to find a good space to carry out an evaluation as there was no quiet space available.

### **Time**

Respondents perceived several aspects of time as a barrier to evaluation. In one case the study simply wasn't far enough along to merit an evaluation, in another case respondents found it difficult to find teacher research subjects for their evaluation since the school year calendar did not match the scheduled evaluation. Evaluations often come after a project's completion while budgets typically only cover the length of a project, leaving little or no time to evaluate.

*The timing of evaluation is often an impact and is tied with budget. Sustained impact cannot be measured immediately and often budget's do not support that sort of long term impact.*

### **Evaluation skills**

Perhaps the most oft cited barrier was the lack of evaluation skills within the project team itself. In one case, for example, the evaluation activity itself fell outside the area of the targeted research project, making it difficult for the researchers to get the evaluation accomplished. Although in most cases the lack of evaluation skills was recognized well before carrying out the evaluation, hiring experienced evaluators from the outside proved problematic for a number of projects:

*Our original plan was to hire an outside evaluator, partly to help us locate school sites, but we had difficulty identifying an adequate consultant after two evaluation companies were dropped...*

Complications arose with evaluators not understanding the content area of the project or consultants going out of business.

### **Respondents**

Another important barrier was that of recruiting the necessary respondents for an evaluation. Teacher respondents are not only hard to find, they are also hard to schedule as they are very busy people. It is also not always easy to persuade users to participate in a study.

*It is very difficult to evaluate use of materials posted in NSDL collections. The users are diverse and not easily located. When located they do not necessarily respond to evaluation instruments.*

Another problem cited concerned subjects dropped out during the evaluation, resulting in a very small sample size by the time the evaluation was completed.

### **Other observations**

As was noted above, different project tracks experienced barriers differently (although the survey numbers are small here). One respondent points out that evaluation goals should be tailored to the different tracks. Collections should be evaluated differently from Services for example.

*Adopt different evaluation goals for the different tracks. For example, the collections track should be judged on the quality, completeness and availability of their collection.*



## **Suggestions**

While some of the evaluation barriers cannot be solved by NSDL, as they are very specific to respondents' projects, several suggestions provide food for thought. To address the problem of finding skilled evaluators, some respondents suggested developing a centralized NSDL pool of respondents (teachers and participating schools) and evaluators with digital library and STEM education experience, with NSDL acting as a broker between projects, evaluators, and subjects. The problem of project funding ending before the evaluation takes place could be addressed by re-educating funders and projects as to the importance of making available funds just for evaluation.

Appendix C lists the evaluation barriers identified by respondents, and their comments on how these affected their evaluation activities and what NSDL might do to help with these barriers.

## **8 Evaluation Support for Individual Projects**

None of the six respondents who had sought help from the NSDL rated the quality of that help as being good or excellent. Three felt that the support had been adequate but that they had worked out a lot on their own – the others felt the support was irrelevant or did not receive the help they requested. Respondents were asked to describe what they felt to be the most useful in terms of contact with the NSDL. Most comments mentioned the value of communicating directly with others in the NSDL community, either via the EIESC or through personal contacts. Comments regarding the least useful aspects of NSDL support noted that there remains a lack of definition of evaluation, that the EIESC website needed to be kept up to date, and that there needed to be a centralized NSDL source for existing evaluation research and reports.

## **9 Evaluation Reports and Instruments**

Respondents were also asked if they would be willing to share evaluation reports and instruments. 11 of the respondents indicated a willingness to do so, but eight reported that they did not have reports ready to share. Respondents also submitted citations for reports that had been published. A list of the publications and instruments that respondents were willing to share is in Appendix B.

## **10 Summary and Ways Forward**

The survey indicates that NSDL projects have good evaluation intentions, and have access to evaluation resources, but that many still experience difficulty in carrying out evaluation. It is difficult to identify with precision any one simple barrier to evaluation, with the open-ended responses indicating that evaluation barriers differ significantly between projects, and arise out of complex local interactions between evaluation questions, resources and expertise. The survey thus emphasizes the difficulty in identifying a 'one-size-fits-all' evaluation strategy for NSDL projects.

The survey also emphasized the ongoing need to develop evaluation capacity in NSDL, particularly with regard to developing centralized evaluation resources and services that are easy to find and easy to use for the wider NSDL community. This latter finding is currently shaping ongoing evaluation work by NSDL Core Integration and the EIESC. This work includes: the redesign of the NSDL evaluation wiki to focus on substantive evaluation reports and links to online evaluation resources; providing strategic financial support for the focused development of specific evaluation capacities which can then be made available to the wider NSDL community (including webmetrics and user panels for interviews and usability testing); building partnerships with organizations with substantial evaluation capacity, such as Project Tomorrow (<http://www.tomorrow.org/>); supporting opportunities for regular face-to-face interaction and network-building amongst NSDL evaluators (e.g. at workshops, meetings, etc.); and initiating and supporting evaluation discussions on the EIESC mailing list.

## Appendix A: Survey Questions and Responses

This survey was administered through SurveyMonkey, an online commercial survey software. The following are the questions asked included in the survey; the actual survey layout was different.

### 1. INFORMED CONSENT

I have read the informed consent form. I know the possible risks and benefits of participation. I know that this study is voluntary, that I choose to take part, and that I can withdraw at any time.

You must click either Yes or No.

Clicking 'Yes' will take you to the beginning of the survey, and clicking 'No' will take you to the end of the survey.

### 2. In which year did your project start?

Project Funded	Response (n)	Response (%)
2000	2	6.9
2001	4	10.5
2002	2	3.9
2003	7	17.1
2004	9	34.6
2005	4	21.1
Not sure/no answer	7	
TOTAL	35	16.7

### 3. How is/was your project funded?

Project funding track	Response (n)	Response (%)
Collections	9	28.1
Core Integration	3	9.4
Pathways	6	18.8
Services	4	12.5
Targeted Research	7	21.9
Non-NSDL funding	1	3.1
Not sure	2	6.2
TOTAL	32	100

### 4. Who are your most important project audiences (please select all that apply)?

Project Audience	Response (n)	Response (%)
Pre – K	0	0
K – 4	4	12.9
5 – 8	6	19.4
9 – 12	12	38.7
Undergraduates	17	54.8
Graduate students	9	29.0
Lifelong/Informal	3	9.7
Curriculum developer	12	38.7
All	3	9.7
Other	5	12.9
TOTAL	31	

### 5. Responses to 'other'

- k-12 teachers
- higher education faculty and instructors
- k-12 teachers and Ed Media specialist
- faculty and librarians who serve undergraduates
- teachers, catalogers

**6. Which of the following evaluation practices do you or did you carry out with your project?**

Evaluation practice	Yes (%)	No (%)	N/A (%)	Not Sure (%)	Response (n)
We carried out some form of evaluation	90	3	7	0	29
We included an evaluation plan in our NSDL proposal	86	7	3	3	29
We hired an external evaluator	32	68	0	0	28
We designated an existing project member as evaluator	48	41	10	0	29
We developed formal measures of project success	48	31	10	10	29
We developed formal evaluation methods and instruments	72	21	7	0	29
We implemented an evaluation plan and collected data	76	14	10	0	29
We analyzed our data	76	14	10	0	29
We sent our findings to NSF	46	43	7	4	28
We made our findings available in an internal project report	62	24	14	0	29
We made our findings available on our web site	32	57	4	7	28
WE presented our findings at workshops	68	25	4	4	28
We presented, published our findings at conferences	59	30	7	4	27
We published our findings in journals.	22	63	11	4	27

**7. Approximately what percentage of your budget was spent on your evaluation activities (please include project staff time)?**

Percent of Budget	Response (n)	Response (%)
0 – 5	8	27.6
5 – 10	14	48.3
10 – 15	1	3.4
15 – 20	2	6.9
20 +	2	6.9
Don't Know	2	6.9
TOTAL	29	99.6

**8. With hindsight, was your evaluation budget:**

Budget level	Response (n)	Response (%)
Not enough – we wanted to do more evaluation work	5	18.5
About right – we accomplished what we set out to do	22	81.5
Too generous – we had evaluation funds left over at the end of the project	0	0
TOTAL	27	100.0

**9. Please list any financial constraints that you faced in carrying out evaluation (e.g., were evaluation services more complex and expensive than you had anticipated, etc.)**

**10. Are you finding, or did you find, the task of project evaluation to be:**

Difficulty of Evaluation	Response (n)	Response (%)
Easier than expected	1	3.4
About as difficult as expected	21	72.4
Harder than expected	7	24.1
TOTAL	29	99.9

**11. Which of the following resources are or have been useful for you in carrying out your evaluation activities?**

Useful Resources	Response (n)	Response (%)
NSDL committee wiki	0	0.0
NSDL committee e-mail lists	2	4.3
NSDL Annual meeting sessions and workshops	11	23.4
Contacts in other NSDL projects	12	25.5
Contacts in DLESE	3	6.4
Other	7	14.9
Did not seek help	12	25.5
TOTAL	47	

**12. If you answered ‘other’ please describe.**

**13. If you sought help specifically from NSDL, on a scale of 1 (low) to 5 (high), how would you rate the quality of the support that you received?**

Quality of support	Response (n)	Response (%)
Asked for but did not receive support	1	14.3
Received some support, but it was insufficient, irrelevant, hard to understand, etc.	2	28.6
Received adequate support, but we had to work a lot out for ourselves	3	42.9
Received good support	1	14.3
Received excellent support	0	0
TOTAL	29	100.1

**14. In carrying out your project evaluation, what are/were the most useful aspects of your contact with the NSDL?**

**15. What were the least useful aspects of your contact with the NSDL? (For instance: was it clear which NSDL service were available?)**

**16. If you have evaluation reports and/or instruments available, would you be willing to share them?**

Evaluation reports and instruments	Response (n)	Response (%)
Yes	11	44
No – we do not have reports (go to the bottom of this page and click ‘next’)	8	32
No – our reports are confidential (go to the bottom of this page and click ‘next’)	1	4
Not sure	5	20
TOTAL	29	100

**17. If you have published project evaluation results in a journal or conference proceedings, please supply a reference or references. (For list of results, see Appendix B)**

**18. If you have evaluation reports and/or instruments available online, please provide the URL(s). (For list of results, see Appendix B)**

**19. E-mailing your reports**

**If you have evaluation reports or instruments that are not available online, or which are in draft form, but which you are willing to share with the NSDL, please attach them to an e-mail by clicking on this link. (For list of results, see Appendix B)**

**Please add the subject line ‘Evaluation,’ and include a brief background description in the email of the document you have attached.**

**Please also state whether or not you wish your evaluation to be shared with the wider NSDL community, in the form of reports from the CI and EIESC.**

**Are you planning to make these reports public in the future?**

Making public in future	Response (n)	Response (%)
Yes	14	87.5
No	2	12.5
TOTAL	16	100

**20. Please rate the importance of the following factors as barriers to carrying out evaluation, from 1 (not a barrier) to 5 (a substantial barrier).**

Factor	Not a Barrier 1	2	3	4	Substantial Barrier 5	mean
Lack of budget, financial resources	15%	19%	42%	15%	8%	2.81
Lack of evaluation staff	35%	23%	23%	12%	8%	2.35
Lack of familiarity with evaluation literature	44%	22%	15%	11%	7%	2.15
Lack of evaluation skills	41%	33%	15%	7%	4%	2.00
Lack of NSDL support	50%	15%	27%	4%	4%	1.96
Lack of training	48%	28%	16%	8%	0%	1.84
Lack of sources of help	52%	8%	32%	4%	4%	2.00
Other	31%	0%	15%	46%	8%	3.00

N=27

**21. If you answered ‘Other’ to the above question, please describe the particular barriers that you encountered.** (For list of responses see Appendix C)

**22. If you have identified barriers, please explain how these affected your ability to carry out evaluation.** (For list of responses see Appendix C)

**23. How might the NSDL and CI help individual projects overcome these barriers?** (For list of responses see Appendix C)

**24. If necessary would you be willing to talk to use about your responses to this survey?**

Talk about responses	Response (n)	Response (%)
Yes	17	68
No	8	32
TOTAL	25	100

**25. If yes, please supply a contact name and an email address where we may reach you. These will be kept confidential and will be seen only by the researchers.**

**26. About how many minutes did you spend responding to the survey?**

Minutes	Response (n)	Response (%)
0 – 15	16	61.5
15 - 30	8	30.8
30 – 45	2	7.7
45 – 60	0	0
60 +	0	0
TOTAL	26	100

**27. Did you find the survey:**

Level of survey difficulty	Response (n)	Response (%)
1 – easy	11	44
2	4	16
3 – Okay	10	40
4	0	0
5 – Hard	0	0
TOTAL	25	100

## **Appendix B: Submitted evaluation publications, results and instruments**

### **Journal or Conference Proceedings**

- Fait, H. A. , and Hsi, S. (2005) "From Playful Exhibits to LOM: Lessons from Building an Exploratorium Digital Library," proceedings from the Joint Conference on Digital Libraries, Denver, CO. (PDF).
- E.A. Fox, M.A. Goncalves, M. Luo, Y. Chen, A. Krowne, B. Zhang, K. McDevitt, M.A. Pérez-Quñones, L.N. Cassel (2003) Harvesting: Broadening the Field of Distributed Information Retrieval. In Lecture Notes in Computer Science, eds. Jamie Callan, Fabio Crestani, Mark Sanderson, pp. 1-20. Springer Verlag.
- H.R. Hartson, P. Shivakumar, M.A. Pérez-Quñones (2004) Usability inspection of digital libraries: a case study. In International Journal on Digital Libraries, v4(2), pp. 108-123.
- Jordi Cuadros, Gaea Leinhardt, and David Yaron, "One firm spot: the role of homework as lever in acquiring conceptual and performance competence in college chemistry", Journal of Chemical Education (accepted).
- Liddy, E.D. (2005). MetaTest: A Tripartite Evaluation. American Society for Information Science & Technology. Charlotte, N.C., Oct 30 – Nov 2.
- Liddy, E.D. (2005). Generating & Evaluating Automatic Metadata for Educational Resources. Poster. European Conference on Digital Libraries. Vienna, AU, Sept. 19-21.
- Liddy, E.D. & Finneran, C. (2003). MetaTest: Three-Way Evaluation of Automatic Metadata Generation. Joint IMLS/NSDL Conference. Dec. 1 –2, 2003.
- Liddy, E.D. & Finneran, C. (2003). Developing & Evaluating Metadata for Improved Information Access. NSF-NSDL Annual Meeting. Washington, DC. Oct 12-15, 2003.
- S. Perugini, K. McDevitt, R. Richardson, M.A. Pérez-Quñones, R. Shen, N. Ramakrishnan, C. Williams, E.A. Fox (2004) Enhancing usability in CITIDEL: multimodal, multilingual, and interactive visualization interfaces. In JCDL '04: Proceedings of the 4th ACM/IEEE-CS joint conference on Digital libraries, pp. 315-324. ACM Press.Tuscon, AZ, USA.
- Yilmazel, O., Finneran, C.M. & Liddy, E.D. (2004). MetaExtract: An NLP System to Automatically Assign Metadata. In Proceedings of the 2004 Joint Conference on Digital Libraries.

### **Online evaluation reports and/or instruments**

<http://www.exploratorium.edu/partner/nsdl/pubs.html>

[http://www.chemcollective.org/stoich/stoich\\_matrix.pdf](http://www.chemcollective.org/stoich/stoich_matrix.pdf) Report on dissemination efforts of the ChemCollective: Concept matrix that serves as basis for learning evaluations of our materials covering stoichiometry (tests are also available)

<http://www.chemcollective.org/pdf/papers/jcdl05.pdf>

<http://cnlp.org/presentations/present.asp?show=conference>

### **Submitted Instruments**

#### **Project #1**

Workshop – daily evaluation

Post-workshop evaluation

#### **Project #2**

Educator/science/Internet experience survey #1

Educator/science/Internet experience survey #2

#### **Project #3**

Interim report

Student survey

JCDL publication

## Appendix C: Reported barriers to evaluation

What particular barriers have you encountered?	How do these affect your evaluation activities?	How might NSDL help with these barriers?
Project is recently funded and not yet evaluated		Have a separate pool of money for evaluations given out separately from project funds. Have NSDL offer suggestions of what type of evaluation they would like to see on the project and then fund appropriately.
The timing of evaluation is often an impact and is tied with budget. Sustained impact cannot be measured immediately and often budget's do not support that sort of long term impact.	More of the evaluation is then tied to immediate gains and does not make it down to the next level of either sustained impact or extended impact (such as student learning)	Lobby and educate those in position of funding.
It is very difficult to evaluate use of materials posted in NSDL collections. The users are diverse and not easily located. When located they do not necessarily respond to evaluation instruments.		Develop tools for tracking users and surveying them.
It is sometimes hard to find a quiet low-activity space in our museum to carry out evaluation activities that require controlled settings like those you find in university usability labs. Scheduling participants to come in for testing is sometimes challenging, given teachers are busy people.	Sometimes studies take longer than expected to accomplish because of recruiting participants and scheduling meeting space to carry out studies.	The barriers are internal and don't require help from NSDL
I clicked 'Other' only to emphasize that we did not investigate the NSDL resources available to us for evaluating. Most of the research scientists on the project weren't familiar with methods of evaluating nor the importance in doing so. The Lead Educator (a classroom teacher) was extremely helpful in this regard, although, she was a bit outside of her comfort zone (in terms of subject matter). We've all gained a tremendous amount in appreciating the necessity of evaluations.	I think in the end we acquired some very useful data through our evaluations. Now that we are more aware of the NSDL resources and the potential to see what other projects are doing we will be able to improve on what we did this time around.	I think you're doing it - just taking this survey is great PR for the resources you seem to have. Knowing that perhaps other PIs will submit evaluation templates means we might be able to peruse them for information useful to our projects.

What particular barriers have you encountered?	How do these affect your evaluation activities?	How might NSDL help with these barriers?
	<p>We budgeted evaluation into our plans as well as have staff who work with the outside evaluator. Because of EIESC &amp; now CI's participation, we get help from NSDL. If none of these factors had been in place, they would all be 5s for us.</p>	<p>Having an NSDL/CI evaluation coordinator is extremely helpful and needs to be continued.</p>
<p>I think the largest barrier to evaluation is finding people who are both skilled at evaluation and who understand the content being taught. Many times professional evaluators lack the experience in the field that they are evaluating to act as equal partners in project planning, and finding the right fit is often extremely difficult.</p>	<p>We managed to find the right fit in our evaluator, who has been very helpful at the level of effort capable under our current funding, so while I think that in principle finding and funding the right evaluator is a barrier, on this project we have been fortunate in both.</p>	
	<p>Generally it's just difficult to do evaluation on top of everything else, and to do it well.</p>	<p>Not sure.</p>
<p>In the past, keeping numbers of people in the study from beginning to end has been a problem. The sample has shrunk in each study to smaller than we hoped. We have not yet begun the evaluation phase of the pathway project.</p>		
		<p>The X program has a motivated group at the _____ Center, led by Y. They regularly solicit requests for evaluation assistance, have begun the process of collecting and disseminating instruments, and have regular evaluation oriented workshops at the annual meetings. Developing the capacity within each project to conduct effective and efficient evaluation should be one responsibility of program leaders or contractors.</p>



What particular barriers have you encountered?	How do these affect your evaluation activities?	How might NSDL help with these barriers?
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Our barriers are primarily logistical. Our project involves algorithms research, followed by software development, followed by deployment. Initially, we didn't think we would get to deployment, and hence our planned evaluation activities centered on evaluating the progress of our work toward deployment, as measured against milestones. However, now that it is clear we will be able to deploy a solution, what we really want to evaluate is the efficacy of the deployed solution, but the opportunity for doing that will mostly occur after the end of the grant. What we have done instead so far is limited internal testing of a small scale prototype. Consequently, our plans for final evaluation are not yet complete, as they will depend on the time and resources left once our solution is deployed.

Lack of time.	Couldn't spend as much time on the analysis as I would have liked.	Not related to my problem.
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	The evaluations we carried out were not the kind of evaluation that NSDL wanted to carry out. 'They' were interested in educational impact but one of our projects was a collection project and the other one was a research track. Neither one of these can be judged on educational impact. The services track can be judged along those lines, the others can't.	Adopt different evaluation goals for the different tracks. For example, the collections track should be judged on the quality, completeness and availability of their collection.
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Given that we are a targeted research project, some of the activities required for evaluation fall outside of the main, disciplinary research activities of the graduate students and the faculty. However, the evaluation activities have gone very smoothly.

What particular barriers have you encountered?	How do these affect your evaluation activities?	How might NSDL help with these barriers?
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For classroom trials -- identifying teachers that can take part and and/or schools that allow introduction of supplementary curriculum materials that were not specifically board-approved or state-adopted. Locating schools that allow teachers to access online streaming media and websites outside those that were subscribed to by districts. Scheduling evaluation activities with teachers, because of the many demands on their time, including increased testing. One other barrier encountered that may fit with lack of sources of help or staff question. Our original plan was to hire an outside evaluator, partly to help us locate school sites, but we had difficulty identifying an adequate consultant after two evaluation companies were dropped (in one case, the owner died and the company went out of business before the project got underway; Another that had looked promising did not seem to be a good match after all, in terms of their experience with digital libraries or online education and ability to locate appropriate school sites. Several other consultants discussed evaluation plans with us but advised us to do our own evaluation, since our focus is formative and the team needs to be directly involved in gathering feedback. One PI has formal evaluation training, so this is not a hardship, but we were surprised at the lack of appropriate consultants in our region.

Evaluation activities must be spread out over a longer time, so it is harder to maintain a schedule that works within the constraints of the academic school year.

Identify particular school districts, contacts, teachers that would like to take part in evaluation activities. Have a staff person that could help with these arrangements. Develop a list of outside evaluators and consultants that have experience with or would be appropriate for NSDL projects.

It took us a bit longer to get going on the evaluation as we needed to train up some project staff.

Have a separate pool of money for evaluations given out separately from project funds. Have NSDL offer suggestions of what type of evaluation they would like to see on the project and then fund appropriately.