

## **“RESULTS, NOT FEATURES”**

### **USER TESTING OF THE NSDL SEARCH RESULTS PAGE: PRELIMINARY REPORT**

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#### **Introduction**

A principal function of the nsdl.org website is to enable users to search for and locate exemplary STEM educational resources that match their individual pedagogical needs. NSDL users search for resources by entering a search query in a text box and clicking the ‘search’ button. They are then taken to a search results page that provides descriptions of and links to resources which NSDL thinks best fit the user’s search criteria. The search results page includes a range of features and contextualizing information that can support users to select the resources that they deem most appropriate to their needs. In terms of usability the design of the search results page features should therefore be optimized to support easy accomplishment of the tasks of resource selection.

This report outlines preliminary recommendations from a redesign of the nsdl.org search results page. The recommendations were derived from paper prototyping with eight users (four K-12 teachers and four university teaching assistants). Among the findings were that test subjects:

- Focused on the need for reliable search results, rather than on complex search features
- Rated the *resource title* and *resource description* as being the most useful cues as to whether or not a resource would be useful for them
- Liked being able to configure their search by audience/grade level, format and subject
- Disliked sites requiring logins and/or subscriptions
- Often ignored or found confusing search features such as links to subject browsing, collection icons, ‘search within these results,’ the catalog record, etc.

Principle recommendations include:

- Increase the length of descriptions on the search results page
- Increase the ‘real estate’ of the search results page to accommodate longer descriptions (by freeing up the width of the layout table, removing the left navigation, reducing the size of the top banner, etc.).
- Remove, or reduce the visibility of, search page features that are confusing and/or distracting
- Allow users to exclude resources requiring signon and/or login from their search
- Develop the advanced search page to address some of the and to support search and filtering across a range of criteria

In addition, a number of differences were found in the search behaviours of the K-12 teachers, and the student TAs, indicating the need for some kind of customizable search results pages.

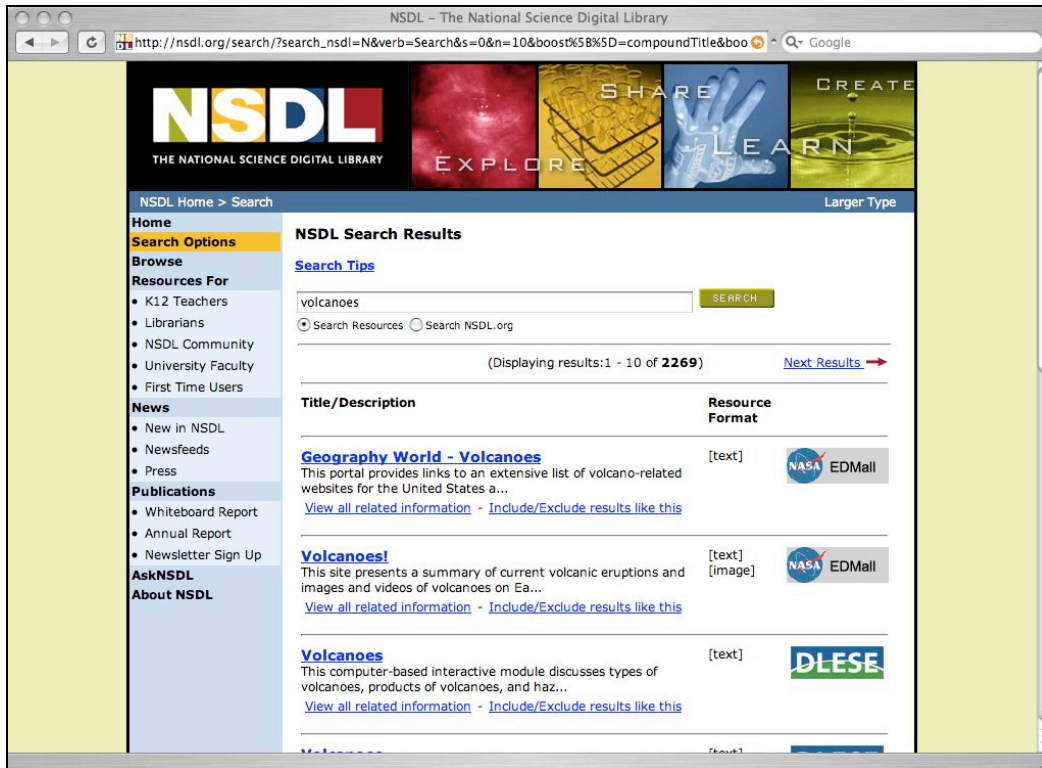


Figure 1: Existing nsdl.org search results page

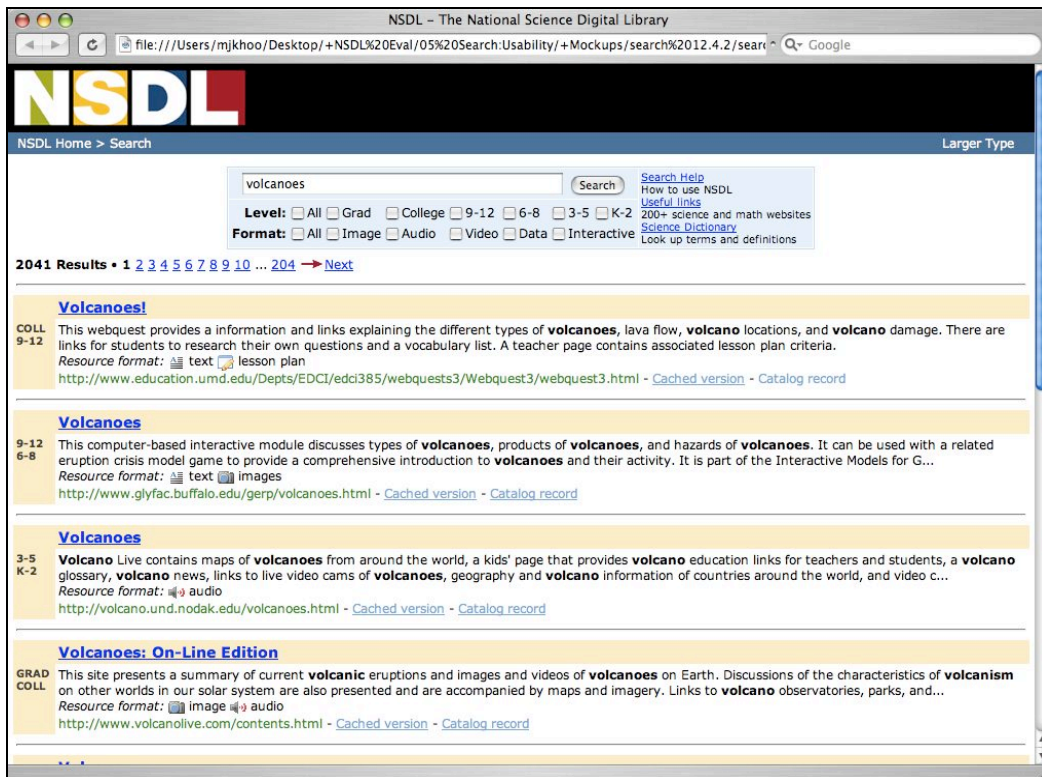


Figure 2: Proposed nsdl.org search results page

## 1 Main Findings

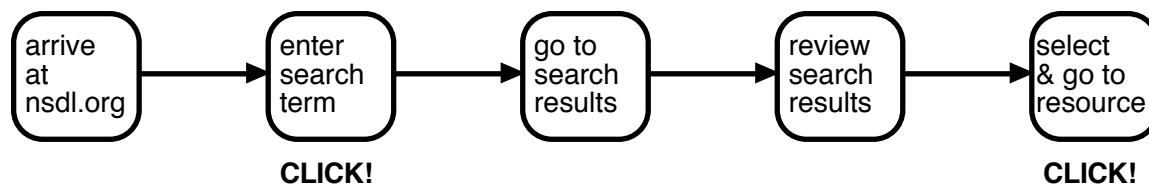
This section summarizes the findings from the user testing of the nsdl.org search results page. The overall aim of the testing was to understand users' interaction with the search results page. The testing involved a mixture of interviews, paper prototyping, surveys, and audio/video recording and analysis. The findings are described in more detail in sections 4 and 5. The recommended design changes are shown in Figure 2.

### Finding 1: Users liked a '2-click path' through nsdl.org

Test subjects expected the search results page to provide enough contextual information about a resource to enable them to make a judgement about the resource, *without* having to click through to the resource itself. In other words, the test subjects expected to achieve their goals on the search results page with just one click. If we take into account that the user has also clicked entered a search term or terms into the search box on the front page, and then clicked on the search button, then it appears that most users expect to be able to search for and retrieve NSDL resources with 2 clicks (of course, this number of clicks will increase if search filters are used).

This '2 click' analysis is supported by NSDL webmetrics. The most common action of visitors to nsdl.org who do not immediately leave the site is to enter the site at the front page, then proceed to the search results page, and then leave the site (approximately 11.9% of all visits from January 1 to June 30 2006). While we do not know for sure from the webmetrics alone what visitors are doing when they follow this path we can infer, probably with reasonable certainty if we include the user testing analyses, that visitors wish to accomplish the following task:

- arrive at the front page
- enter a search term (possibly refining this by audience, format, etc.)
- go to the search results page
- scan/evaluate the search results page for useful resources
- click on a resource link and get taken to the resource in question



As the figure shows, this task is accomplished with just two clicks: the first click (on the front page) triggers the search, and the second click (on the search results page) takes the user to the resource. This 2-click path is the most common path through nsdl.org, and supporting this 2-click path should therefore be a primary objective of the nsdl.org search and search results.

### Finding 2: Text versus icons: The description was rated as the most useful feature

The paper prototype of the search results page included a number of icons and text links (resource subject, resource format, audience level, URL, collection, etc.) which it was hoped would support test subjects to gain a richer understanding of their search results. When using the search results page however subjects generally turned first to the resource description, which they scanned/skimmed for keywords of interest to their immediate teaching needs. The resource description appears to provide a rich, semi-structured environment for contextualizing and selecting search results, and should be expanded/improved in future versions of NSDL.

**Finding 3: 'Evaluate then click' versus 'click then evaluate'**

Test subjects expressed a strong preference for evaluating the usefulness of a resource before clicking through to that resource (as opposed to clicking on a resource and then evaluating it). They preferred to evaluate resources on the search results page, rather than on the resource page itself. A click on a resource link that did not lead straight to a useful and usable resource was perceived as a waste of time and effort, particularly in the context of just-in-time teaching preparation. This makes it even more critical to have accurate descriptions on the search results page; and to make sure that once they click on the resource link, users are not led to login pages, subscription requests, catalog records, and so on (e.g. by allowing users to pre-filter to exclude login and subscription sites).

**Finding 4: 'Digitized library' versus 'digital library'**

The test subjects appeared to think of NSDL as a *digitized* rather than a *digital* library.<sup>1</sup> That is, when using NSDL, they expected to encounter a library that conformed to their existing expectations of a library. Ideally, NSDL functioned as a more efficient version of their school library, which would also allow them to download free resources at home. They generally did not expect to encounter a set of digital features and services which were, from the users' point of view, often vaguely and ambiguously defined. Allowing such tools and features to intrude too far upon users' expectations of NSDL as a *digitized* library appeared to confuse users and to make the search results page less usable for them.

**Finding 5: Users are confused by federated collections and federated search**

Confusion between 'digitized' and 'digital' libraries seemed to partly underlie test subjects' lack of understanding of features of the search results page that related to the concepts of federated collections and federated search.

For example, users did not understand what an NSDL 'collection' was in the context of NSDL, and further, they did not understand that the collection icons on the search results page represented NSDL partners, projects, or Pathways. For the users, clicking on a collection icon and being taken to another NSDL site implied 'leaving' NSDL, going somewhere unknown, and starting a new search on a new and unfamiliar site, with all the attendant problems of verification, trust, and so on, that these implied for the users. These problems not helped by the fact that some interpreted the collection icons as advertisements.

This suggests that when users arrive at NSDL, they want to feel that they are in NSDL, and they want to continue to stay in NSDL. This is not to say that NSDL abandon its federated collection and search approach; however, at the point where users interact with NSDL, NSDL should be presented as a single, coherent, library and organization, branded with both a general NSDL identity and also where relevant with specific partner/Pathway identities.

**Conclusion: Results, not features**

The design of the NSDL search results pages should reflect and support users easily and quickly to search for, sort, and choose appropriate educational resources, particularly for just-in-time pedagogical contexts.

The current search results page incorporates a number of features designed that are intended to help users make sense of their search results. However, a number of the users in the testing found these features to be ambiguous, confusing, or otherwise an impediment to their task of quickly selecting the most appropriate result(s) generated by their search query.

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<sup>1</sup> John Seely Brown and Paulo Duguid's *The Social life of Information*, Harvard Business School Press, 2002).

Why might this be the case? I suggest that it is important to recognize here that NSDL and the nsdl.org website are highly complex technologies, built by a large distributed team of developers over the course of several years; and further, that while the ways in which NSDL functions as a digital library may appear obvious to this developer community, as this model of NSDL has in fact been developed by the community incrementally over time, as the result of prolonged conversation, it is a mistake to expect users, who often expect to encounter a *digitized* library, to come to the same nuanced understandings of NSDL as NSDL developers have, in a single leap and as the result of a single visit to nsdl.org.

It follows therefore that NSDL and nsdl.org has to be represented to users, at least partly, in terms of how users may understand NSDL as a digital (and not a digitized) library, particularly in light of their existing experience with and understanding of information technologies such as school libraries, google, etc.

Of course, this is not to say that NSDL's existing tools and features should not be abandoned. However, care should be taken as to:

- how these are represented in ways that are relevant to users' tasks and requirements;
- how they integrate into users' task- and work-flows; and
- how they are presented on the NSDL website in such a way as they support rather than disrupt users' search experiences.

Suggestions for how to achieve this are outlined in the following sections.

## 2 Prior NSDL user testing, 2002-2006

The NSDL website (<http://nsdl.org/>) was launched in the Fall of 2002. Early usability testing of NSDL and nsdl.org was carried out by the Evaluation Working Group and coordinated through the NSDL Comm Portal.<sup>2</sup> More recent usability testing has been centralized within Core Integration.

Recent usability work has included an HCI review of nsdl.org conducted by an external expert in August 2005, semi-structured interviews with NSDL users conducted by a University of Colorado graduate student in April 2006, and the current round of paper prototyping (reported here), which focused on the search results page.

### NSDL work, 2002-2005

NSDL's previous usability specialist (Casey Jones) carried out a number of usability tests of the nsdl.org website, and frequently recommended that NSDL simplify the user experience of nsdl.org. In relation to the search results page, she observed that users liked to filter and select resources for further exploration *before* they clicked on the resource link itself, and that they see clicking through to a site that is then not relevant as being a waste of time.<sup>3</sup> One of the primary functions of the search results page should therefore be to help users choose which resources they wish to select for further exploration. Specific recommendations made by Casey in relation to searching and search results (a number of which have been implemented) included:<sup>4</sup>

- choosing one particular search metaphor and implement this throughout the site
- clearly demarcating and separating different search 'flavours' (basic, advanced, etc.)
- providing more information to support users' decision-making on the search results page
- providing clear summaries of search results
- making advanced search less confusing, and support this with instructions
- allowing users to search by formats such as lesson plan, animation, visualization, and interactivity
- providing titles that accurately describe the resource

### HCI testing, August 2005

The August 2005 HCI usability testing involved an external consultant, and six subjects, who used a live version of the nsdl.org web site. The subjects were given a set of NSDL-related tasks to attempt. Among the findings were:

- that users experienced difficulty with the nsdl.org search engine
- that the icons for 'include/exclude' items like this were confusing
- that users were confused by the differences between browse and search
- that NSDL should add functionality to the 'Explore/Share/Learn/Create' banner images, as these were assumed to have functionality

The HCI expert recommended that NSDL conduct further heuristic, think-aloud, and other lightweight testing on the site, aimed generating requirements for redesign.

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<sup>2</sup> Dean Krafft and John Phipps, 2002, 'NSDL testing framework':  
<http://comm.nsdl.org/download.pho/246/NSDLTestFramework.htm>

<sup>3</sup> Casey puts it: "Participants wish to make the decision on the usefulness of the site through the search results; they do not want to go to the resource itself to get that information."

<sup>4</sup> To the best of my knowledge these recommendations have not formally been published; they have been retrieved from a trawl of an archive of Casey's work documents, kept on the local network at CI-Boulder.

### User interviews, April 2006

These April 2006 interviews were conducted by a University of Colorado graduate student with four subjects, with the aim of identifying more specific questions for new usability testing. Two of the interviews were carried out over the phone, and two were carried out face-to-face. These interviews were not task-based, and did not ask the subjects to attempt to achieve specific goals with nsdl.org; rather, they asked subjects about their past experiences of using nsdl.org. Among the findings and recommendations were that NSDL consider providing the following information on the search results page:

- a teacher review/rating system to rate resources
- a description of the learning activity type (e.g. interactive, inquiry-based, etc.)
- an indication as to whether or not a resource requires a subscription
- the educational standards associated with a particular resource
- information about how objects in the library have been selected
- a brief description of each resource
- the ability to further refine searches (the 'include/exclude results like this' function)

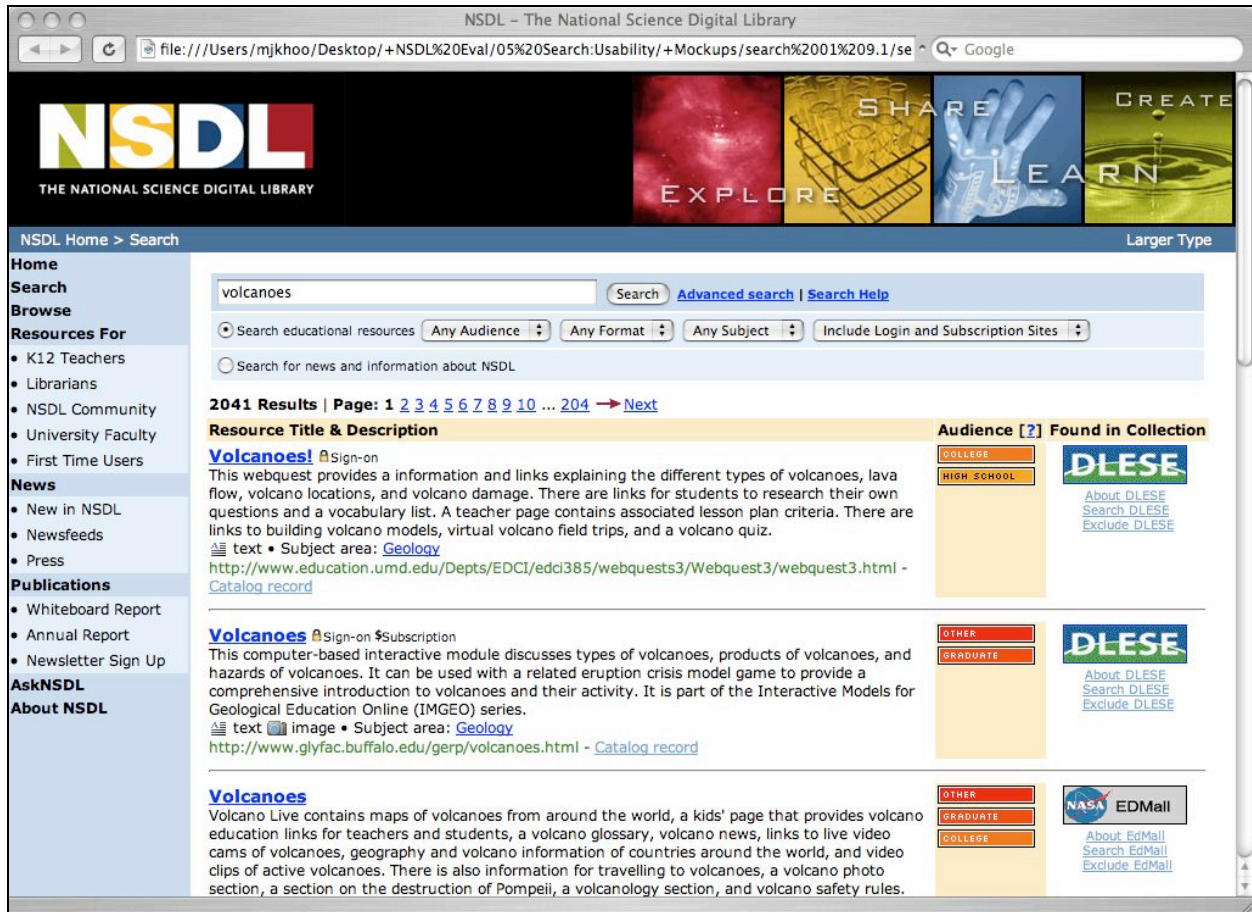
### 3 User testing, June 2006: Methods

Casey's work, the September 2005 HCI testing, and the April 2006 interviews, all identified 'search' as one general area of nsdl.org in need of improvement, and generated recommendations with regard to making the search process and the search results page easier to understand and use. The current round of user testing focused therefore on examining and testing design options for the search results page. Recommendations from the prior testing were incorporated into a mockup of a redesign of a new nsdl.org search results page. This redesign took as its starting point the existing HTML for the search results page, and then adapted the markup, a method that allowed the new design to retain many of the colors, themes, and images of the existing nsdl.org site. The initial redesign was emailed out to the NSDL Core Integration mailing list, and following a number of comments, the design shown in Figure 3 was chosen for the user testing. The design included:

- a resizing of the width of the page layout
- an expanded description for each resource
- adding functionality in the form of icons representing different types of metadata (resource format, audience, and so on)

For comparison, the existing nsdl.org search results page is shown in Figure 1. Both screenshots show the result of searches carried out for the keyword 'volcanoes.' Both figures show a screenshot of a browser window opened to full size in a 1024 x 768 monitor (1024 x 768 is the most common size of monitor used by nsdl.org users, as reported by Omniture).

In June 2006, the design shown in Figure 3 was tested with eight users: one elementary teacher, one middle school teacher, two high school teachers, and four university graduate teaching assistants (TAs). The K-12 teacher subjects were selected/invited from a list compiled by NSDL CI Boulder office. The university graduate students were selected from responses to an email sent out by the University of Colorado Graduate Teaching Program. Subjects were told that the testing would take place at the NSDL offices; that the testing would take about an hour; and that they would be paid \$50 for taking part. Subjects were informed that the testing would be video-taped for further analysis, and they were asked to sign an informed consent form that gave their permission for the videoing, and all subjects signed the form.



**Figure 3. Mockup of search results page used in paper prototyping**

Some of the changes made from the existing NSDL search results page include:

- page automatically resizes to browser width
- inclusion of all text in 'description' field in catalog record
- introduction of colour-coded column with audience information
- redesign of search box to aggregate search functions in one area
- introduction of icons for resource format
- introduction of links for resource subject
- changed 'View all related information' to 'catalog record'



A combination of methods was used in the testing, including:

- 1 Introduction and short semi-structured interview
- 2 Paper prototyping
- 3 Usability testing
- 4 A rating/ranking survey
- 5 A 'think aloud' protocol
- 6 Video/audio recording and transcription

1. The testing began with a short introduction in which the aims and structure of the testing were explained to the subject, and the subject was asked to sign informed consent forms. This introduction was followed a semi-structured interview, the aim of which was to obtain background on each subject's teaching area, experience, Internet use, use of computers in the classroom, and so on.

2. The next step of the test involved paper prototyping, the construction of a 'paper computer' that reflects the proposed design for the web site; it allows the testing of a range of possible designs, without the commitment of producing fully functional hard-coded versions. The paper computer itself consists of a series of sheets of paper, representing (in the form of sketches, screen shots, etc.) web pages, which can be placed, one at a time, before the test subject. In the case of the nsdl.org testing, an additional screen shots of pages linked from the search results page, including the pages in the left navigation column, were printed out. The test subject is told to imagine that they are looking at an actual browser, and to comment on the page as if they were commenting on a browser window displayed on a monitor. Subjects are asked to interact with the paper prototype, and to treat any objects in the screenshot (blue underlined text, images, etc.) as hyperlinks (Figure 4). Subjects can point to objects with a pen and indicate that they want to click on them; and if the indicated object is a link, the experimenter 'loads' a new page into the paper computer (the exception being if the experimenter does not have an image of the target page in question). The paper computer also includes a paper 'back' button, which subjects could press if they wished to return to the previous page; drop-down menus in the form of sticky notes; and so on. In this way, subjects can 'navigate' around the site being tested.

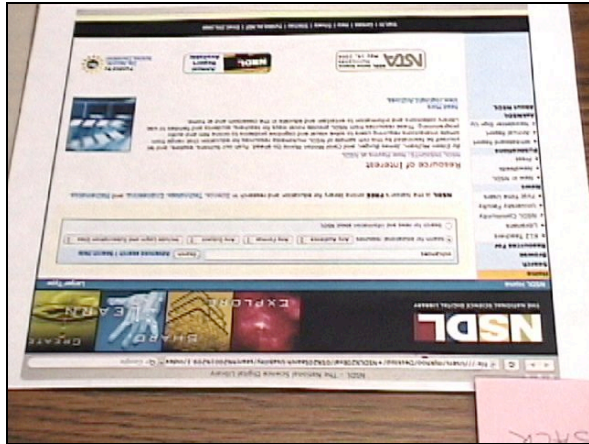
3. Using the paper computer, test subjects were then asked to complete a series of simple tasks, such as searching for a specific resource, or selecting three resources from the ten resources on the search results page.

4. At the end of the test, subjects were presented with a survey sheet (Figure 5) that asked them to rate and rank a list of features from the redesigned front page and search results page.

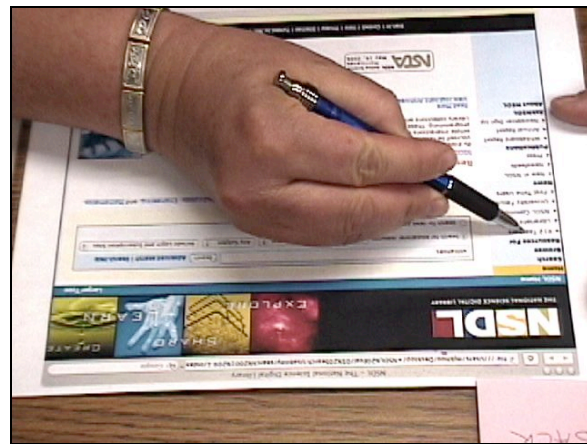
5. During both the paper prototyping, and the survey, subjects were encouraged to 'think aloud' and to vocalize their immediate thoughts and observations about the NSDL web site. At various points in the tests, the experimenter also prompted and asked questions of the subjects.

6. All comments were recorded as part of the video recording, and the audio was subsequently extracted and transcribed.

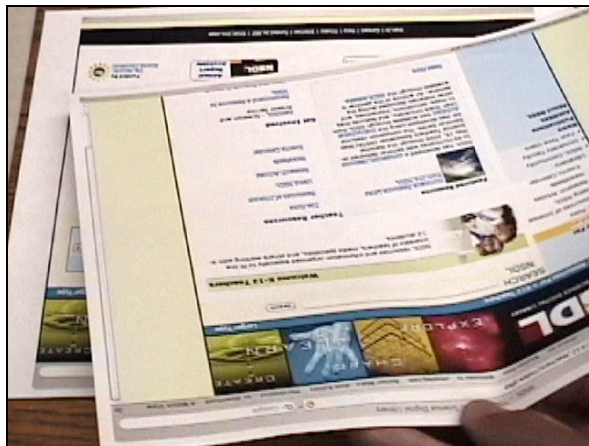
From beginning (semi-structured interview) to end (rating/ranking survey), each user test lasted approximately 35-40 minutes.



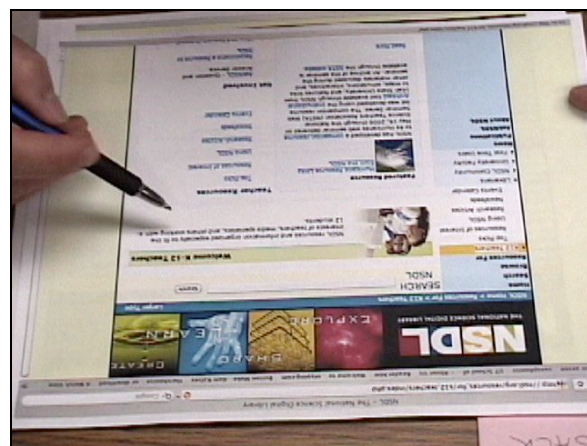
The paper prototype (experimenter's view)



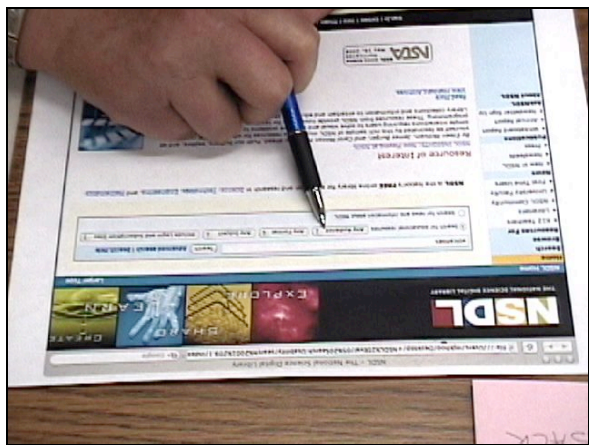
Subject 'clicking' a link



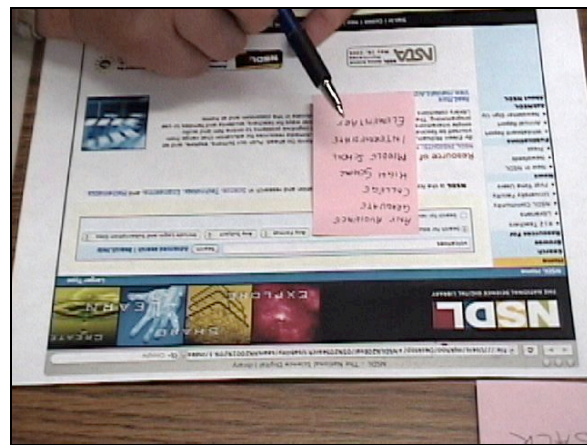
Experimenter 'loading' new page



Subject examining new page



Subject 'clicking' on a drop-down menu



Subject examining drop-down menu

Figure 4: Paper prototyping

<b>NSDL USABILITY – SEARCH RESULTS – POST-TEST SURVEY (Date: _____ )</b>					
<b>1.</b> Grade level(s): _____					
<b>2.</b> Subject(s): _____					
<b>3.</b> Years of teaching experience: _____					
<b>4. Please:</b>					
Left column – <u>Rank</u> the importance of these search page features (1 = most important)					
Right column – <u>Rate</u> these feature on a scale of 1 (not useful) to 5 (very useful)					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	NOT		NEUTRAL		VERY
<u>RANK 1-4</u>	IMPORTANT				IMPORTANT
SEARCH CHOICES					
___ Search by audience (high school, elementary, etc.)	0	0	0	0	0
___ Search by resource format (text, audio, etc.)	0	0	0	0	0
___ Search by subject (chemistry, physics, math, etc.)	0	0	0	0	0
___ Include/exclude sites with login and subscriptions	0	0	0	0	0
<u>RANK 1-9</u>					
SEARCH RESULTS					
___ Resource title	0	0	0	0	0
___ Login/subscription information	0	0	0	0	0
___ Description of the resource	0	0	0	0	0
___ Audience information (high school, elementary, etc.)	0	0	0	0	0
___ Format of the resource (text, audio, etc.)	0	0	0	0	0
___ Subject of the resource (math, physics, etc.)	0	0	0	0	0
___ Link to the collection the resource comes from	0	0	0	0	0
___ URL for the resource	0	0	0	0	0
___ Catalog record for the resource	0	0	0	0	0
<b>3. Any further comments?</b> Are there any other features that you would like to see?					
<b>4. If necessary, may we contact you later, to ask you about your answers?</b>					
___ Yes ___ No					
<b>5. If yes, please supply a contact name and an e-mail address where we may reach you. These will be kept confidential and will only be seen by the researchers.</b>					
Name _____					
E-mail _____					

**Figure 5: Post-test Survey**

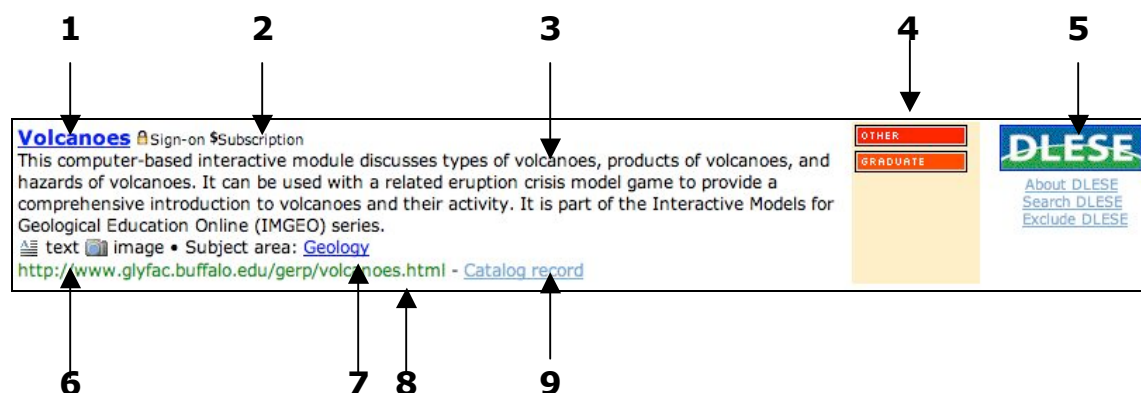
## 4 Detailed Findings

Findings from the user testing fall into two general categories:

- observations related to *features* on the search results page (section 4.1)
- observations related to the *layout* of the search results page (section 4.2)

### 4.1 Search results page features

The test subjects were asked to rank (from 1 = ‘most important’ to 9 = ‘least important’) the following features on the proposed design for the search results page (see Figures 3 and 6): (1) the resource title, (2) sign-on/subscription information, (3) the resource description, (4) audience information, (5) link to resource collection, (6) resource format, (7) resource subject area, (8) resource URL, and (9) catalog record (Figure 6).



**Figure 6. The search results page features ranked by the test subjects**

These rankings were converted into scores (a rank of 1, ‘most important’ was given a score of 9, and a rank of 9, ‘least important’ a score of 1), and the aggregated scores for each feature were expressed as a percentage of the total possible score (8 rankings x 9 points = 72), as follows:

Feature	total score (8 subjects)	% score (n/81)
Description	64	88.8
Title	60	83.3
Audience level	51	70.8
Resource format	46	63.9
Resource subject	44	61.1
Sign-on/subscription info	42	58.3
URL	32	44.4
Collection link	28	38.9
Catalog	14	19.4

There were some differences between the K-12 teachers’ and the TAs’ rankings, but both groups broadly agreed on the relative importance of following three groups of features (Figures 7a and 7b):

- Very important features: Description, title, audience level
- Medium importance features: Resource format, resource subject, sign-on/subscription information
- Unimportant features: Resource URL, link to resource collection, catalog record

Their reactions to these features are described in the following sections.

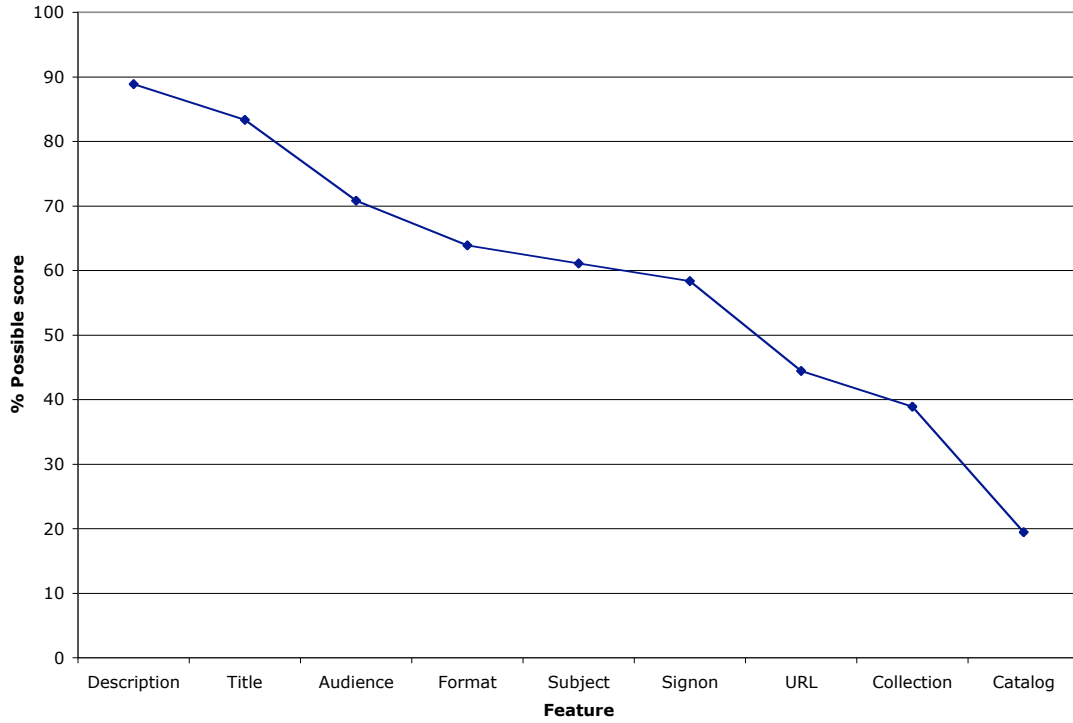


Figure 7a. K-12 Teachers and TAs combined rankings of search results features

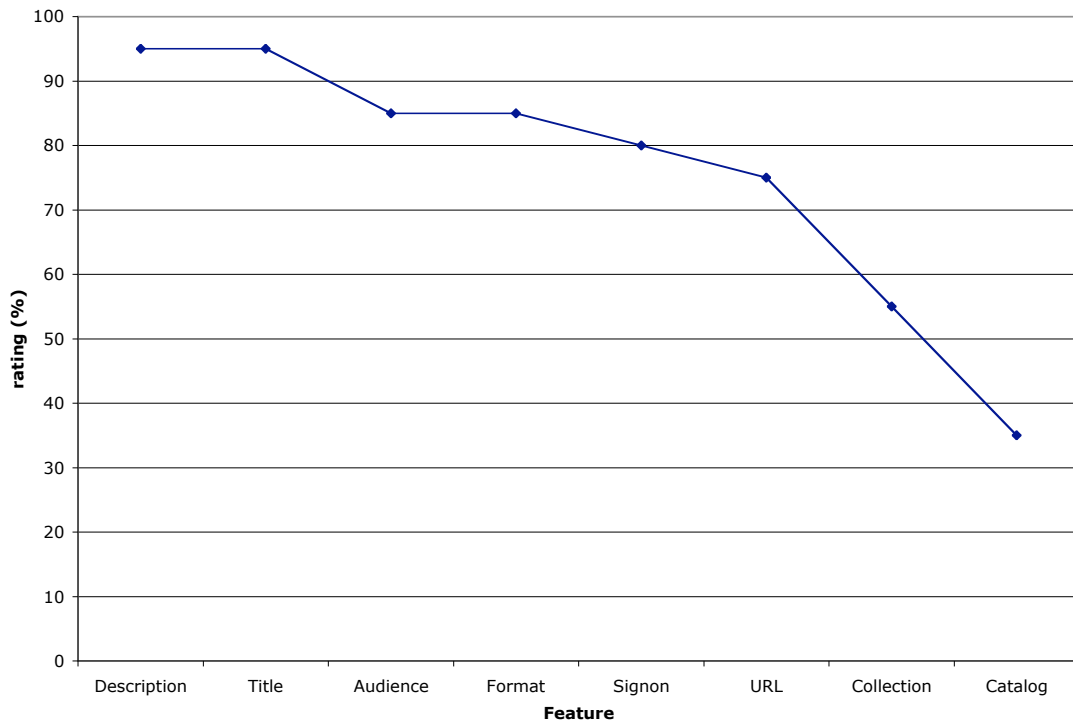


Figure 7b. K-12 Teachers and TAs combined ratings of search results features

#### 4.1.1 Resource description

The most popular feature of the search results page was the description of the resource that appears below the resource title. The resource description was both rated and ranked as either the first or the second most important feature of the search results page, by seven out of eight users.

The users liked the description because it provided them with the appropriate information that they needed in order to select a specific resource for their classroom. The description provided this information in an unstructured yet rich way. Most subjects did not read the description word-for-word; rather they ‘scanned’ or ‘skimmed’ the text, looking for embedded keywords that were significant in the context of their particular pedagogical practice, audience, and topic, such as ‘teacher’ (often linked to words such as ‘materials,’ ‘plan,’ etc.), and ‘lesson plan,’ ‘worksheet,’ ‘interactive,’ ‘video,’ ‘images,’ and so on.

The current nsdl.org resource description is quite short (100 characters long), and one user commented that the truncated sentence, followed by an ellipsis, suggested that NSDL could not be bothered to provide a proper description. However, the longer description provided in the mockup was thought to be too long. Subjects found the description to be too ‘wordy’ and difficult to read, and they emphasized the limited amount of time that they often had to read through search results and to select the resources that they wanted.

Several TAs commented that they would not read all the way through the descriptions, and they suggested that the descriptions could be made easier to read through one or more of the following:

- the highlighting of search terms (e.g. ‘volcanoes’)
- the highlighting of associated search terms (e.g. ‘volcano’ and ‘volcanology’ as well as ‘volcanoes’)
- the highlighting of resource format and type (e.g. ‘video,’ ‘lesson plan,’ etc.)
- presentation in a bulleted, ‘powerpoint’ format

What might be the ideal length for a description? Subjects differed on what might be the ideal length for a description, with the K-12 teachers preferring longer descriptions than the TAs; a finding which indicates the need perhaps for search results pages tailored to specific audiences. However, running the proposed layout in a browser on a 1024 x 768 resolution screen (according to Omniture webmetrics, this is the most common monitor resolution of visitors to nsdl.org), and with the browser window sized to fill screen, suggests that a 2-line description contains approximately 290 characters, including spaces.

Several test subjects mentioned the desirability of being able to include more search results on each search results page. This could be accomplished by a drop-down menu that allowed users to select (for example) 10, 20, or 50 search results per page.

#### Immediate recommendations for *resource description*

[For illustrations of all immediate recommendations, please refer to Figure 2 at the front of this report]

- 1) Increase the length of the description in the search results to 250 characters (including spaces), followed by an ellipsis.
- 2) Bold the search term(s) provided by the user.
- 3) Allow users to select the number of search results displayed per page.

#### Future recommendations for *resource description*

The test subjects preferred succinct sentences in descriptions; they are against long sentences; and some expressed a preference for bullets. Therefore, a series of two or three bulleted sentences might

be an appropriate description format. The proposed search results page layout in a 1024 x 768 resolution screen, with the browser window sized to fill screen, suggests that the maximum length of bullet that can be displayed without text wrapping is approximately 120 characters long (including spaces).

- 1) Generate succinct, 120-character sentences, to be displayed as bullets, with bolded search terms and highlighted.
- 2) Adopt a 'powerpoint' syntax that strips the description of superfluous content, for instance introductory sentences such as "This resource contains a ..."

#### 4.1.2 Resource title

The resource title was a popular feature of the results page, although several users pointed out that when taken together on a single page, repetitive single word titles did not appear to be helpful. There were some differences here between the K-12 teachers and the TAs, with the TAs were more prepared to select resources on title alone.

##### Immediate recommendations for *resource title*

- 1) Keep the resource title as is.

#### 4.1.3 Audience level information

Audience level information was rated as highly useful by both K-12 teachers and TAs. Both groups indicated that they would like to be able to search for resources relevant to their particular teaching level. Within this approval, there were different patterns of behaviour:

- TAs were keen to search only for undergraduate and graduate resources
- High school and middle school teachers were keen to search for resources over a range of audience age ranges, indicating that they (as teachers) would be willing to adopt resources from outside their audience levels to make them relevant for their students
- The elementary teacher made the distinction between search by audience level for the teacher (e.g. in the form of lesson plans), and search by audience for the student (e.g. in the form of engaging resources for 2nd grade students)
- None of the subjects, apart from the elementary teacher, were able to identify the distinction between 'primary' and 'intermediate' elementary education; but the difference was obvious to the elementary teacher

A snapshot of the contents of the compoundAudience field in the NSDL metadata repository was taken in May 2006. A preliminary analysis of the data found 119 individual concepts in the compoundAudience field, in 47,392 records (Figure 8). As a consequence of work at Cornell, it is anticipated that the numbers of NSDL records with an audience description of some kind will increase greatly in the months to come. Further, as a consequence of work at SDSC, it is anticipated that it will be possible to map the large numbers of existing audience metadata descriptions onto a basic set of audience descriptions, which could then be incorporated both into search filters, and representations of search results. These new metadata should in turn be capable of supporting richer user sorting of search results by audience level.

##### Immediate recommendations for *audience level information*

- 1) Provide an easy way for users to search for resources by audience, by providing a dropdown menu under the search box.
- 2) Provide an easy way for users to scan search results by audience, by providing audience level information along with the resource.

#### 4.1.4 Resource format

Resource format was another popular feature for the users, and both K-12 teachers and TAs indicated that they would like to search for resources by format. They identified interactive resources as being particularly important to them.

Subjects defined interactive resources as resources that were engaging, stimulating, demanding of their students, etc. Test subjects described ‘interactive’ resources in a much broader way than is currently done so by NSDL, assimilating categories such as audio, video, and image under the catchall category of ‘interactive.’ They often associated format with the *pedagogical* format, rather than with the *file* format (text, audio, video, etc.) (although note that both types of format currently appear adjacent and undifferentiated on the resource format dropdown menu). Interactive resources were those that allowed student use, were engaging, promoted inquiry and exploration, could sustain a lesson, etc. In this sense, while the ‘interactive’ format is already included in NSDL’s resource format vocabulary, the notion of ‘interactive’ cross-cuts and intersects file formats; that is, an interactive resource would include audio, video, etc. Users therefore are defining ‘interactive’ in much broader ways than are currently accounted for in the NSDL catalog.

A number of the subjects referred to the increasing ubiquity of Powerpoint use in the classroom. Powerpoint allows the presentation of rich visual images, and also the post-lecture posting of lecture notes on the World Wide Web. Subjects were therefore very interested in identifying and retrieving engaging and relevant images that could be used in powerpoint presentations in class.

##### *Resource format description in the MR*

Currently, when users search for ‘interactive’ or ‘image’ resource types, how likely are they to find appropriate resources? NSDL includes and provides a rich array of format metadata. An analysis of the NSDL Metadata Repository in early 2006 showed that of 1,411,724 active records, and 893,010 records with a total of 961,986 type descriptions (i.e., 63.3% of active records included a description of the resource format; and of these 893,010 records with descriptions, a maximum of 68,796 records had two or more separate descriptions). The 893,010 records with descriptions contained 482 unique descriptions (e.g. ‘text,’ ‘image,’ ‘thesis,’ ‘InteractiveResource,’ ‘research article,’ ‘meeting abstract,’ ‘Still Image,’ etc.) (Figure 8). Note that these 482 unique descriptions contain a smaller number of unique terms; for instance ‘image’ appears in ‘image,’ ‘Still Image,’ and so on. The distribution these data is highly skewed, with a single word, ‘text,’ accounting for 81.7% of all resource description fields. The next most common terms, ‘image,’ ‘thesis,’ and ‘InteractiveResource,’ accounted for 2.1%, 1.7%, 1.2% and of all descriptions, and no other terms accounted for more than 1.0% of all descriptions.

One consequence of this skewed distribution is that the resource format ‘text’ is not useful as a search filter. If ‘text’ is selected as the search format, then most records with resource format descriptions are returned; and if it is not selected, then most resources are excluded.

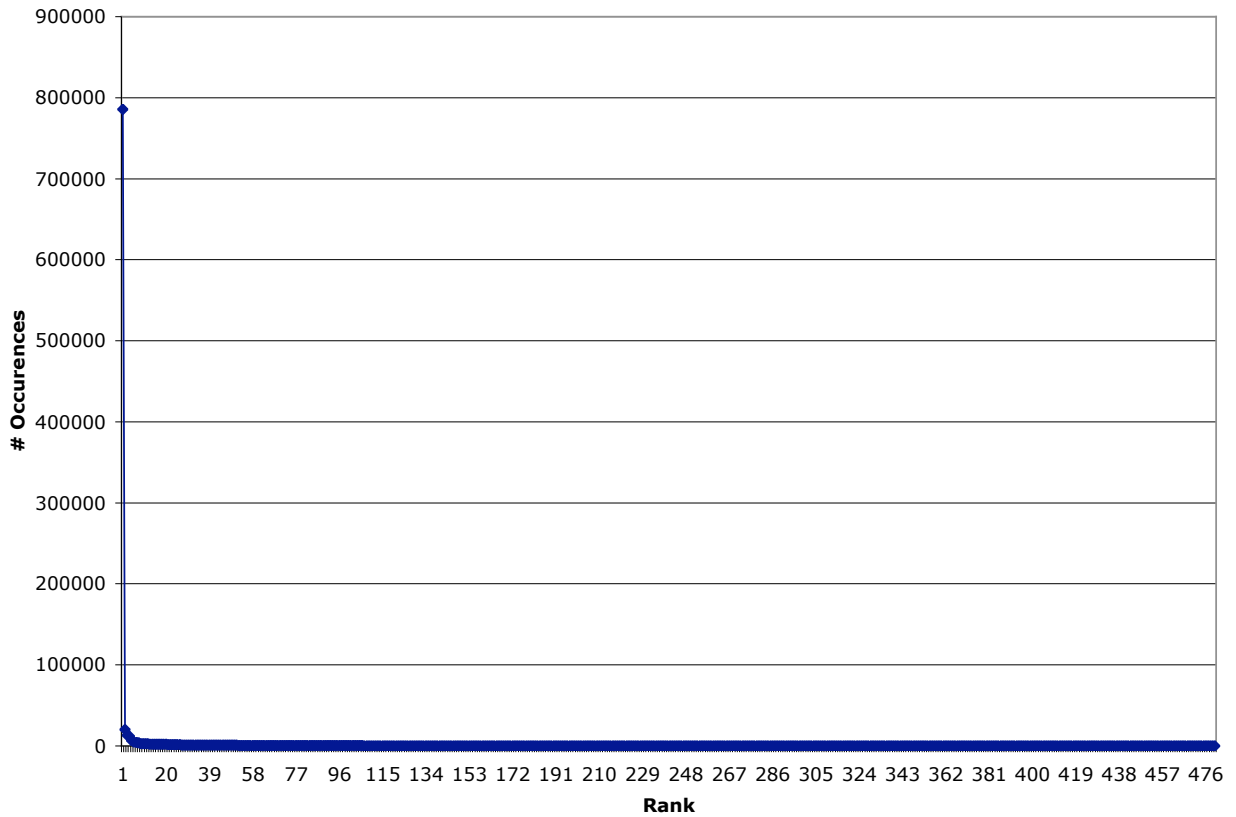
##### *Immediate recommendations for resource format*

- 1) Provide an easy way for users to search for resources by format, including ‘interactive’ format, by providing a dropdown menu under the search box.
- 2) Provide an easy way for users to scan search results by format, by providing format information along with the resource description.
- 3) Remove ‘text’ as a resource format search option

##### *Future recommendations for resource format*

- 1) Look for ways to find and better describe ‘interactive’ resources.





Term	n	%	Dataset	n	%
Text	785876	81.69%	Dataset	1532	0.16%
Image	20386	2.12%	Learning materials:Classroom activity	1493	0.16%
Thesis	13060	1.36%	Organizations	1402	0.15%
InteractiveResource	11914	1.24%	Online interactive activities	1310	0.14%
image	6319	0.66%	Research news	1298	0.13%
Research article	5182	0.54%	Review	1278	0.13%
stillimage	4602	0.48%	Event	1273	0.13%
Research	3651	0.38%	Visual:Photograph	1273	0.13%
Text:Reference	2859	0.30%	Book	1268	0.13%
Article	2855	0.30%	Phonology	1260	0.13%
Meeting abstract	2836	0.29%	movingimage	1237	0.13%
Visual:Scientific visualization	2823	0.29%	Detailed Description	1222	0.13%
Lesson/activity plans	2408	0.25%	Other curriculum resources	1142	0.12%
Full text short readings/articles	2360	0.25%	Learning materials:Lesson plan	1093	0.11%
Other information resources	2354	0.24%	Journal Article (Print/Paginated)	1080	0.11%
Collection	2193	0.23%	Genesis Translation	1035	0.11%
Software	2168	0.23%	Other professional development resources	1013	0.11%
Technical Report	2118	0.22%	Visual: Scientific Illustration	943	0.10%
Still Image	2045	0.21%	Curriculum units/projects	939	0.10%
video	2014	0.21%	Journal Article (Online/Unpaginated)	928	0.10%
Sound	1744	0.18%			
Photographs/images	1553	0.16%			
Poster presentation	1550	0.16%			

**Figure 8: Frequency of terms in Resource Type field**

#### 4.1.5 Resource subject information

Subjects were generally in favour of information related to the subject of a resource. This preference was more marked in the TAs than in the K-12 teachers. The K-12 teachers seemed more interested in topics ('volcanoes') than subjects (e.g. 'chemistry'), and several observed that they did not need a subject feature, as they had already entered what they thought to be the subject into the search box.

##### Immediate recommendations for *resource subject*

- 1) Provide an easy way for users to search for resources by audience, by providing a dropdown menu under the search box.
- 2) Provide an easy way for users to scan search results by audience, by providing audience-level information along with the resource.

#### 4.1.6 Sign-on/subscription info

Subjects were in favour of being presented with information that described whether or not a resource required either a sign-on or a subscription, with the main use of such information being to enable users to skip resources requiring sign-on. However, the proposed 'sign-on' and 'subscription' labels and logo were only ranked as being of middle importance by the test subjects.

The subject of sign-on and subscription resources itself raised strong feelings amongst almost all test subjects, and many were in favour of being able to remove such resources from their search results altogether (see Appendix for examples of subjects' opinions on sign-on and subscription).

In general, subjects did not distinguish between a resource that required a free sign-on, and a resource that required a subscription or a fee. Both types of resources appeared as 'not free' to subjects, particularly in terms of ease of access. They emphasized that clicking on a link to a resource in the search results page, which then took them to a registration process, was a 'pain,' even if the registration itself was free. While 'free sign-on' resources may indeed be free in monetary terms, they still incurred an expense on the part of the user in terms of time, effort, and trust. An additional possible cost to the user here is that of uncertainty. The subjects were not readily able to distinguish between the many different collections that make up NSDL, and they expected NSDL to be the same everywhere; and so they were confused when they clicked on a link in the search results page, only to be faced with a further sign-on page. Here, they were unable to determine whether the collection they had arrived at was part of NSDL or not. (Note: These remarks do not refer to NSDL's 'Single Sign-On' feature, which was not tested in this paper prototype.)

##### Immediate recommendations for *signon/subscription*

- 1) NSDL does not currently have metadata that describe whether or not a resource requires a sign-on or a subscription. As these metadata are a prerequisite to providing users with features that enable them to filter sites by these characteristics, the only immediate recommendation is therefore that NSDL develop metadata that indicates whether a resource requires a sign-on or a subscription. Given the strength of subjects' feelings on this issue, it is recommended that such metadata be developed as soon as possible.

##### Future recommendations for *signon/subscription*

- 1) Provide an easy way for users to exclude resources requiring sign-on and/or subscription, by providing a dropdown menu under the search box.
- 2) Provide an easy way for users to see if a particular resource requires a sign-on or a log-in, by providing this information in text and graphic form next to the resource title.

#### 4.1.7 Resource URL

While subjects did not rate the resource URL as being of high importance, at the same time, observations of their use of the paper prototype showed that they did use the URL as a marker of the perceived quality of the resource in question. In particular, the Internet domain was thought to be an important marker of provenance, with certain domains (such as .edu and .gov) being perceived as being of higher quality than other domains (e.g. .com, .org). This selecting behaviour appeared to be more prominent amongst the TAs than the K-12 teachers.

Subjects mentioned that they liked being able to print out the search results page for later use/scanning/annotation, and here again, the resource URL provides a useful indicator of the provenance of a resource.

Finally, a coloured URL provides a distinct frame within which the resource description itself can be displayed.

#### Immediate recommendations for *resource URL*

- 1) Keep the URL and reformat this to green text (c.f. Google, Yahoo, etc.).
- 2) Place the URL at the bottom of the resource description.

#### 4.1.8 Image (logo) and text links to collection the resource came from

Opinions differed as to the usefulness of the logos of and links to contributing collections, displayed to the right of the resource description. The K-12 teachers were more open to these logos and links, while the TAs had definite negative feelings about them, seeing them as confusing, distracting, and possibly advertisements (see Appendix for examples of subjects' opinions on sign-on and subscription). As the TAs were tested after the K-12 teachers, it may be useful to go back and re-test more K-12 teachers, focusing specifically on their attitudes to the collection logos.

The TAs were generally not in favour of the collection icon and link. They found the collection logos to be a distraction, particularly when they were skimming/scanning the results page, focusing on the description, and so on. The collection icons – whose relationship to NSDL was not apparent – were associated by them with advertising (thus leading to a loss of trust in a collection). In addition, the links associated with the icons, intended to support search/navigation across NSDL member collections, were also not easily understood. Subjects found the concept of multiple collections, and in particular the notion of 'federated' collections and search, to be confusing. They did not understand the concept, even after I had attempted to explain it to them. For instance, the concept of leaving NSDL to visit the collection that had contributed the resource that the subject had just viewed, was confusing, as subjects were unsure as to whether or not they were leaving NSDL or not.

This is not to say that there are not other ways of representing the federated nature of NSDL. However, care will have to be taken to make sure that the relationships between NSDL and other collections are made clear and explicit. For instance, it may be possible to include a line in the resource description which says something like 'Resource contributed by DLESE – Go to DLESE home page' (although here again confusion may arise between collections that create their own content, and collections that aggregate content from elsewhere on the Web).

It should be noted that subjects who found their way to the 'browse by collection' page liked this page (although as a browsing rather than a searching tool). It may be desirable, therefore, to redesign the browse by collection page to include collection logos and short collection descriptions.

**Immediate recommendations for *collection logos/links***

The architecture of nsdl.org contains a number of implicit references to the federated structure of NSDL. At the same time, engaging with the notion of a federated collection seemed to cause a certain amount of cognitive gear-grinding for subjects, particularly when they were already engaged in the ‘flow’ of sorting through the search page results. The search results page is therefore perhaps not the most appropriate place within nsdl.org to surface the federated nature of NSDL.

- 1) Remove the collection icons.
- 2) Remove the features ‘include/exclude items like this.’
- 3) Possibly include a text link to the contributing collection, under the resource description.

**Future Recommendations for *collection logos/links***

- 1) Explain the federated nature of NSDL more explicitly on the front page of nsdl.org, and provide links to individual pathways here.
- 2) Develop an image rich ‘browse by collection’ page that explicitly describes the structure NSDL’s federated collections, and that includes NSDL ‘brand’ icons.
- 3) Develop/design co-branding strategies that support user comprehension of federated collections.

**4.1.9 Catalog record**

The catalog record was the lowest-ranked feature of the search results page for both the K-12 teachers and the TAs. Almost everybody expressed confusion and uncertainty regarding what the catalogue record was supposed to represent. Further, the text of the link to the catalog record – ‘View all related information’ – was confusing to the subjects. When asked about this wording, users responded that they expected the link to lead to more relevant pedagogical resources (see for instance the ‘Similar pages’ link in Google).

**Immediate recommendations for *catalog record***

- 1) Reformat the catalogue record link to pale blue font.
- 2) Rename the link to the catalog record from ‘View all related information’ to ‘catalog record.’

**4.1.10 Cache link**

Although the test subjects were not asked about their opinion of the link to the cached version of a resource, it is recommended that a link to the cached version of resources held at SDSC be included after the resource URL.

**Immediate recommendations for *cache link***

- 1) Add a link to the cached version of a resource after the URL.
- 2) Format the link in pale blue font.

**4.2 Search results page layout**

Users focused on the resource description as the most useful feature of the search results page, and so it makes sense to design the page layout to accommodate as many search results as possible, while at the same time reducing the amount of scrolling required. This can be accomplished by:

- Resizing the width of the table that controls the search results page layout
- Removing the left navigation
- Removing and/or resizing the NSDL brand image currently in the top right-hand corner of the page layout
- Increasing the number of search results viewed on a page

#### 4.2.1 Resize table cell layout to 100%

Currently, the width of the search results page is fixed, and is determined by the size of the NSDL logo and the NSDL brand clip art at the top of the page. Resizing the width of the table that controls the search results page layout to a free-flowing layout that resizes according to the width of the browser window, will enable more search results to be displayed across the width of the browser window, and will reduce the need for users to scroll through search results.

##### Immediate recommendations for *table cell layout*

1) Reformat the width attribute of the relevant table cell to “100%”, to allow the page layout to flow to the full width of the browser window.

#### 4.2.2 Remove the left navigation menu

The left navigation takes up approximately 170 pixels of page layout. It also contains links that are confusing and/or distracting and/or irrelevant for the users. The left navigation does not appear to be very useful to visitors to the search results page. An analysis of traffic between January and June 2006 shows that of a total of 33,396 visitors to the search results page:

- 18,333 (54.9%) exited the site
- 7,016 (21.0%) went back to the front page
- 2688 (8.0%) went to the advanced search page

Most of the remaining visitors clicked on one of the links in the left navigation (Figure 9). Of these, 2030 went straight back to the search page; 1111 left nsdl.org; and 476 went to the front page. Only 1575 visitors (4.7% of visitors to the search results page) explored the left navigation, and of these, a significant proportion also left the site, went back to the search results page, or went to the front page. Most visitors to the search results page do not therefore use the left navigation. Removing the left navigation from the search results page, and moving search-related left navigation links (e.g. the browse link) next to the search box, enables more search results to be displayed across the width of the browser window and reduces the need for users to scroll through search results.

##### Immediate recommendations for the *left navigation menu*

1) Reformat the left navigation menu.

#### 4.2.3 Resize/remove the NSDL ‘brand image’ icons from the top of the page

The NSDL ‘brand image’ clip art at the top of the page reduces the amount of space on the page for displaying search results. Further, its purpose and function are not obvious to some subjects. As one of the TAs commented: “It just seems like this is taking up a lot of the page ... I almost feel like it’s too big. I mean it looks – it’s a nice logo. But it’s kinda – yeah, it’s just big.”

##### Immediate recommendations for *NSDL ‘brand image’*

1) Remove and/or resize the NSDL logo currently in the top right-hand corner of the page layout.

#### 4.2.4 Increase the number of search results on the page

Several subjects commented that they would like to be able to view more search results per page, and/or to be able to select the number of search results they viewed per page.

##### Immediate recommendation

1) Allow users to select the number of search results that they can view on the page.

## 5 Next steps and new research questions

In addition to the formal recommendations for the search results page discussed in the previous section, during the course of the testing, several new research questions were identified, which would benefit from further testing and research:

- the design of the nsdl.org front page (section 5.1)
- the design of a consistent search box for use across the site (section 5.2)
- the design of help pages to support new users (section 5.3)

### 5.1 The front page layout

At the start of the paper prototyping session, subjects were shown a screen shot of the nsdl.org front page, that had been redesigned to include a search box that matched the search box on the search results page (Figure 10). They were then asked to search for resources related to ‘volcanoes.’ The initial purpose of this stage of the experiment was to introduce the subjects to the nsdl.org web site in general, and to contextualize their journey through the site to the page that I was really interested in testing, that is the search results page.

This stage showed some interesting results, however, in that a number of subjects, including all the K-12 subjects, began this task, not by clicking on the search button next to the search box in the middle of the page, but by clicking on various items in the left-hand navigation column, including (but not limited to) the item that was, at the time of testing, labeled as ‘search’ (NOTE: this link has now been renamed ‘search options’).

These observations indicate that more work needs to be done on the design of the front page. One option here is to increase the width of the front page layout, a move that would also help to accommodate some of the proposed design changes in the search box itself.

### 5.2 A new search box

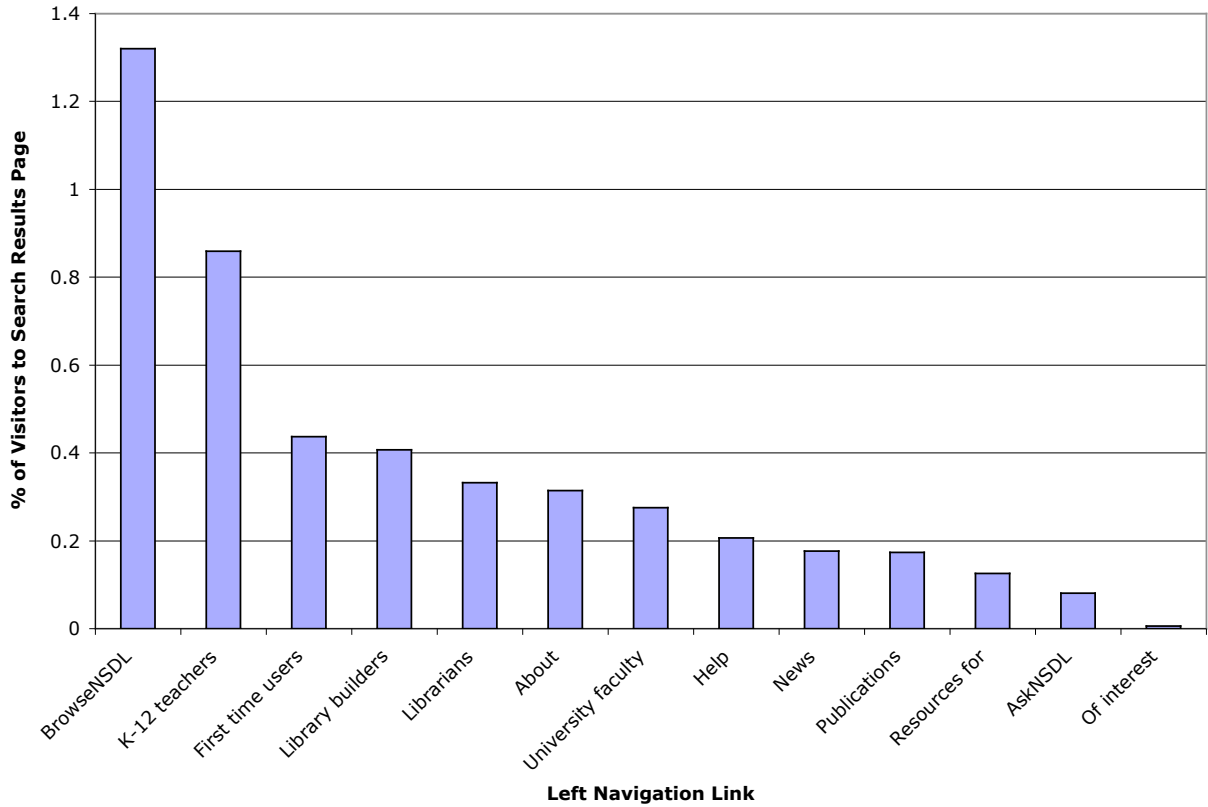
Currently, a number of links that are helpful or useful to users conducting searches – such as search tips, FAQs, help for first time users, advanced search, browse, etc. – are scattered around the search results page. It is recommended that these links be consolidated into two or three main links – such as ‘search help,’ ‘useful links,’ and ‘science dictionary’ - grouped to the left of the existing search box.

In addition, it is recommended that the current ‘advanced search’ choices be displayed below the existing search box. These choices will act as reminders to the users of the search choices that they have previously made, and they will also remove the need currently to have an ‘advanced search’ page on nsdl.org (the existing ‘advanced search’ page is somewhat limited, and also dependent upon incomplete metadata).

### 5.3 A new ‘Help’ page

All information that supports new, first-time, or otherwise inexperienced users of NSDL should be consolidated onto one page, and made accessible by a consistently named/labeled link across the NSDL site. This help page should:

- combine the elements of the current ‘search tips’ page, perhaps reworded/rewritten.
- include help with advanced search.
- include information from the ‘First time users’ page.
- include a section that describes how NSDL search results are ranked and chosen.



Left navigation link	Total # visitors	Exited site	Went to front page	Went back to search page	Stayed in left nav
Resources for K-12 teachers	1358	330	154	587	287
BrowseNSDL	807	158	34	174	441
Help	754	82	37	566	69
Resources for first time users	395	69	54	126	146
Resources for university faculty	372	85	35	160	92
Resources for librarians	361	83	54	113	111
Resources for library builders	308	76	24	72	136
About	264	70	28	61	105
News	206	68	24	55	59
Publications	179	46	11	64	58
AskNSDL	95	39	15	24	27
Resources for X (top page)	75	1	6	26	42
Of interest	8	4	0	2	2
	5182	1111	476	2030	1575

**Figure 9. Percentage of visitors to Search Results Page, January-June 2006, who explored left navigation links**

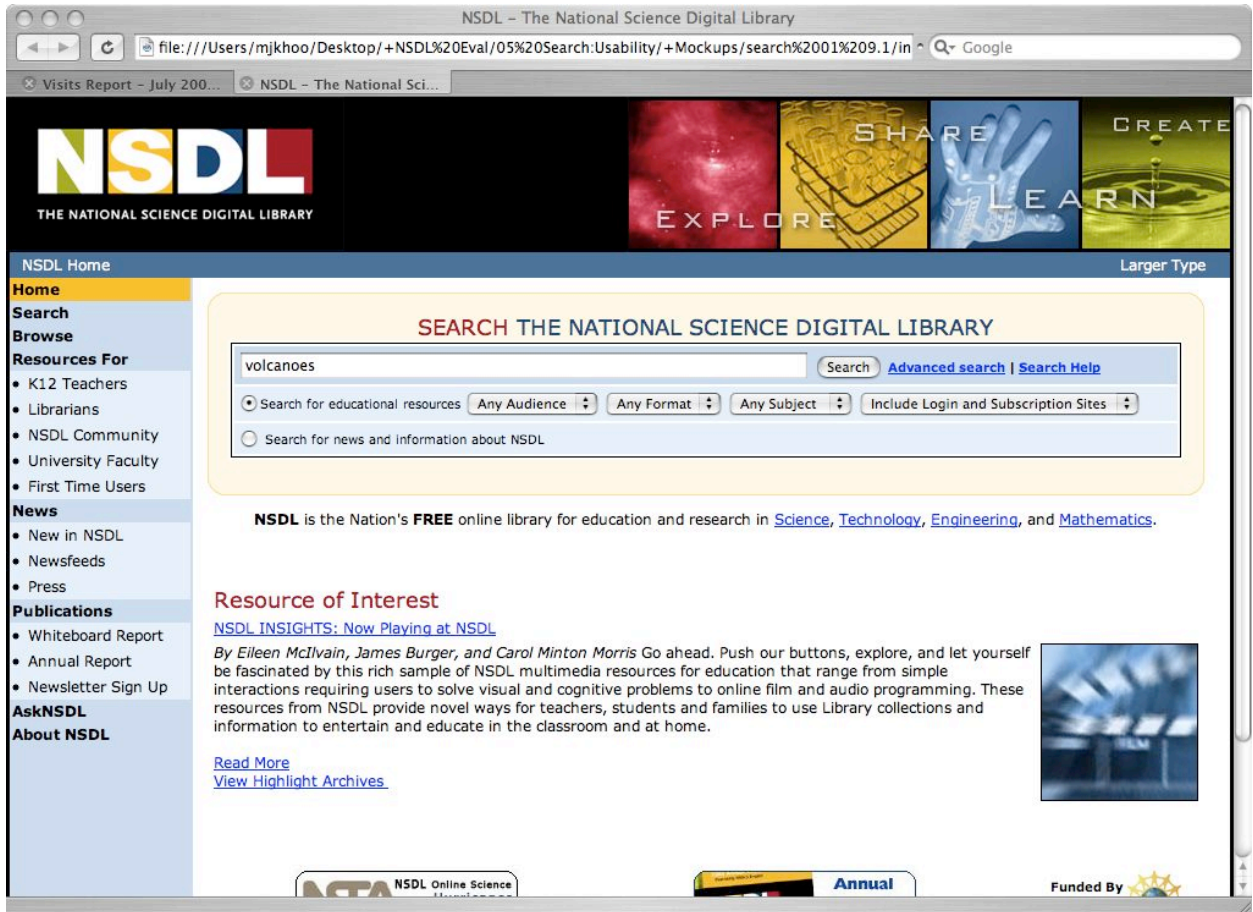


Figure 10: Mockup of the front page used in the paper prototyping



**APPENDIX: Extracts from transcriptions of user testing sessions****A: Subjects' opinions on login and subscription sites****Subject 1 (K-12)**

[Talking about being able to exclude login and subscription sites from searches]:

*Subject:* I think this is nice. So, is the pulldown [menu] on that – “do not include” [sign-on and subscription sites in my search]?

*Interviewer:* Yeah. Do not include [sign-on and subscription sites in your search].

*Subject:* Yeah. I think that's a nice feature to have because I know I've hit a wall after even searching for a couple of minutes and then you realize that you've wasted your time because it's a subscription. So, I think that that is a nice toggle to have ... So, you don't have any come up initially. Yeah.

**Subject 2 (K-12)**

*Subject:* So, I would notice things like when if I used this lesson, what would be required and what sort of resources would there be for teachers. Some of these require subscription. And let's see. I would probably look at the first few and then decide which one to try, so I would probably skip that because it needs a subscription.

That's the first thing I would do and if there was something that said subscription, I would just skip that one over, because of time, but I would think about it later, because it could be a more valuable resource at some point.

...

*Subject:* And this is nice that they tell you that there's a subscription or a sign on that you need to deal with.

**Subject 3 (K-12)**

*Subject:* Let's see. The next one: Volcanoes sign on subscription. Okay. This is an interactive model. So I'd be interested. This one I'd like to look at.

[Talking about being able to exclude login and subscription sites from searches]:

*Interviewer:* Describe where it says 'sign on and subscription.' Are those useful? Is thus useful information for you, there?

*Subject:* No. I don't know. I'm not sure. I saw that subscription. It might worry me that this is only gonna' be a site where they want me to pay or something.

*Interviewer:* That's what it's supposed to be saying.

*Subject:* Okay. Yeah. And so again, I'd probably go to it, just to see what information I can get off it; sometimes it gives you some information and then later on, there's like a site Ed Helper. And there was like a year where you could ... keep going into it and getting a lot of information for math. And then eventually it became where you could only go in and get those data - subscriber. But, I went to it so many times and got such neat things now, that a lot of us at our school, we do subscribe to that and help each other out. But, I would want in the beginning, hopefully, that it would give me this information before I had to go back in.

- And be able to use it; know that I could use it before I would pay the money and subscribe to it.
- Interviewer:* Like a sort of trial?
- Subject:* Yeah. Trial thing, definitely.
- Interviewer:* Interesting.
- Subject:* Otherwise, I'd probably just go back and click on to another one; if it just said, "You've got to do this right away." Because of resources for school; we don't have that much money.
- Interviewer:* I understand.
- Subject:* And again though, if it gave me information and I thought I could use it and try it out, then I would know, that, "Oh well, this is really neat. This is better than a lot of the other things that I could order and spend all this money on. But here, I've got a subscription for \$25-30 and this is gonna' be good for my kids for this whole six weeks lesson."
- [Talking about being able to exclude login and subscription sites from searches]:
- Subject:* Include login and subscription sites. Okay. You know for me, I don't know. I mean it's not an option that I remember looking at before. I mean I could get to everything else I wanted probably without ... login and subscription sites. But for my classes, I mean it's possible that I might need the subscription sites if they were going to document it. I see it really happening more in the 8th grade class, that this would be beneficial for them.

#### **Subject 4 (K-12)**

- Subject:* So, I guess I'm still confused by this. By what's a login. Okay. I'm with you. Sites where I would have to login before I could look or sites I would have to be subscribed to, like Ed Weekly or NSTA specific subscription. Okay. So, that makes sense to me, now ... If it's a subscription site, I don't want to go there, unless -- Because I would already go to places like NSTA and CTM; those kinds of things. And so if it -- It's a waste of my time to go to something that I can't fully access. So, that's my feedback on that one.
- ...
- Subject:* If I was looking for information for me, I'd go to the text; probably- If I were looking for something for the kids -- where was the one that I saw? -- okay, so, I'm looking at this one and it says "Interactive module. Discusses types of volcanoes." But then I see it's subscription. I'd wipe it out right there just 'cause I don't have time and money to waste on - - not waste, but to go there and do that.

#### **Subject 5 (TA)**

- Subject:* The one thing that would scare me I think going in here would be the sign-on. I'd be a little bit wary about those probably. And of course this would be as if I had never read anything else to figure out what some of this information means. But I would probably go. "Ooh, sign on." I wonder if I don't have access to that.
- Interviewer:* So that would be off-putting to --
- Subject:* Yeah, it would be a little off-putting. I might go, well this one sounds better, or where's my favorite one with the stars. And [the other resource] looks like the right level, and it doesn't have a sign-on, so this site so far [would be] my choice site that I'd probably go to.

*Interviewer:* What about subscription sites?

*Subject:* I don't know what that means either.

*Interviewer:* Okay.

*Subject:* Sign-on -- I would -- if it just said subscription I'd probably also be wary because although through a university system I'd try it at least once to see that well maybe we have a subscription to it that I don't know about. But if I was at home I'd probably click one of these and click another and see what happens with sign-on.

[*Talking about being able to exclude login and subscription sites from searches*]:

*Subject:* I probably wouldn't worry about that until it becomes a problem, like my first twenty hits all are ones that I can't get into. And then I would maybe start to say that, okay, that's definitely important. So a lot of these log-in descriptions are -- we don't know if we can get to them or not or?

*Interviewer:* Yeah.

*Subject:* Like what would I find when I hit this, when I'm not going to be able to get there?

*Interviewer:* You'd have to create some sort of account when you go on there.

*Subject:* Oh, yeah I wouldn't want to use that. (*Laughter*) So I mean even if I was free I probably wouldn't do it because I don't just want a description of the resource.

[*Talking about whether to include information in the search results that indicates whether a resource requires login/subscription or not*]:

*Subject:* The log-in/subscription information -- if I'd have to log-in at all I'd probably actually look for that as important, but it wouldn't be probably the first thing I would look at. But it's still very important because I don't want to spend the time to have to put a new sign-in every time I go to a different place. And then probably after that I would [look] for the log-in/subscription [information] just as my kind of quickly looking through -- "Oh I can't get in there even though it all looks good." I'm not going to worry about it. Once I find one that I like that I can -- it doesn't have a log-in then I might actually check the URL just because I don't exactly know what these mean yet but I would know at least okay this comes from -- it looks like a university [*i.e. it is a .edu URL*].

## **Subject 6 (TA)**

*Interviewer:* Well, something else I should ask you about, is when we -- would you be interested in anything which requires you to sign-on to an account or subscription?

*Subject:* I think I instinctively avoid signing in kind of unless it's unavoidable. Or unless it's something I really need. Like if I'm reading the news and I get sent to the New York Times website and I get the sign-in, sign-out -- the hell with it. Forget it. Although if it were something that I would really use quite a bit and this is something I would use quite a bit I don't think I would mind necessarily. But generally kind of a -- I'd almost prefer it to be like an all or nothing sort of thing. Either you have to sign-in to use the resource which I'd be happy to do or not at all. But to have some things you have to sign in, that would -- I would find that kind of confusing. Or not necessarily confusing but just kind of a pain.

...

*Subject:* I wouldn't be particularly interested in including or excluding log-in and subscription sites.

### **Subject 7 (TA)**

*Interviewee:* Sign-on subscription - that's kind of a pain. Maybe if you could search just with sign-on subscription to the back because people are going to try to do that and then it's going to slow them down and irritate them. Or at least it would me.

[Talking about being able to exclude login and subscription sites from searches]:

*Subject:* And exclude or include [login and subscription] sites; well, I vote for excluding them because -- or at least giving you the option to do that because, what a pain. How many people are really going to want to take the time to do that or have the ability to subscribe? When there's so much free stuff on there I would never do that.

*Interviewer:* What about sites where you just need an account, like a free-

*Subject:* I skip them.

*Interviewer:* You still skip them.

*Subject:* Yeah. And I know they're just trying to figure out who's accessing their page and keep records but I find it to be too much of a pain. And I always worry that my e-mail address is going to get sold somehow or get publicized and then I'll get tons of spam. So in terms of importance; well, I think that [excluding] log-in and subscription [sites] is the most important because that's such a pain. And then the rest of those could come or go as far as I'm concerned.

### **Subject 8 (TA)**

[Talking about being able to exclude login and subscription sites from searches]:

*Subject:* So it looks like right now, I can have any audience, any format, any subject and log into subscription sites. So I would do that [exclude login and subscription sites], although I know, using CU, that it drives me crazy when I have to -- when they send me some place where I have to have a login code that I don't have. So I might click on this and tell it not to include that and then search to make it easier.

[Talking about being able to login and subscription sites]:

*Subject:* Because the thing is, what always hangs me up when I'm prepping, I'm just looking for quick answers and if it's going to take me to a bunch [of sites requiring login] -- that's why I'm saying I don't like to sign on. Because if it's going to take me to a bunch of different sites where I have to have different password or user name or so on and so forth, I don't use these. And so I just look for the readily available stuff. And I'm sure that there are people -- if I were a K through 12 teacher who uses a certain site every single time, then I would just sign onto that site and search within the site.

*Interviewer:* Oh, I see.

*Subject:* That's kinda -- if I know a site is useful, then I wouldn't do it this way. So that's why I wouldn't be interested.

*Interviewer:* So, for instance, if you could just sign onto NSDL once when you got there ...

*Interviewee:* Oh, that would be great.

## Subjects' opinions on collection links and collection icons

### Subject 4 (TA)

*Interviewee:* [Referring to the DLESE icon] Link to the collection the resource comes from? When I'm looking for something specific, I don't care where it comes from.

### Subject 5 (TA)

*Subject:* ... And then one thing that I don't understand, and probably wouldn't pay attention to, is 'found in these collections' just because I don't know what these collections are.

*Interviewer:* Okay.

*Subject:* So, so far I'm just not paying attention to that side [points to DLESE logo].

...

*Interviewer:* Any more links that you were looking at?

*Subject:* I would eventually probably want to go back to this 'first time user' [link in the left nav] just to see if I can gain some information especially about this 'found in collection' over here [points to DLESE logo]. As that would help me interpret where these [resources] are coming from and their validity. So if I was in a rush I probably wouldn't do that the first time but eventually I would want to -- I am interested to see what information is there.

[Subject goes to first time user link, to find out more about DLESE]

*Subject:* This is a list of links. So I, like, the, where do I start? Otherwise this list is just a -- if I'm busy it's just too long to look through. If I had more time now that I was -- really wanted to know more about it. But like the thing that I was looking for was where's that collection from. I don't see it right off hand. So I'd probably go to frequently ask questions just scroll through there and see if there's some information that would be helpful for me to choose or searching.

### Subject 6 (TA)

*Interviewer:* Well, so let's try and -- I just want to try and tease out a couple of things here. And that -- so you kind of said -- well, you kind of really ignored the icons there.

*Subject:* Well, no it's more just that they serve as a bit of a visual distraction. Although I suppose the found in collection icons, I find that to be pretty distracting. I just don't think that's particularly necessary. The audience bar -- maybe it's just the color. If it were a -- I mean the -- it looks like most of the colors in the rest -- well, with the exception of the red -- to have something like maybe have it be shades of blue. Or something like that that's just not quite as jump out at you. That would probably reduce my tendency to just kind of -- the eye to continue wandering over there.

*Interviewer:* And are you saying that because you actually want to focus on [the resource description]?

*Subject:* Yeah. Yeah.

[Later:]

*Subject:* Link to the collection the resource comes from. That's not so important to me.

**Subject 7 (TA)**

*Subject:* Well, here's that DLESE right? [points at DLESE icon]. And that's -- I wondered, actually, it seems to be a bit like self promotional to have DLESE on every single thing. But that's just sort of like a preference thing.

*Interviewer:* [Referring to DLESE icon] I guess it's not obvious that it's a button.

*Subject:* Oh, I think it is.

*Interviewer:* [Places screen shot of DLESE front page in front of subject] If you click that icon, you go through to the [DLESE] collection front page.

*Subject:* Yeah. So why would anybody want to go here?

*Interviewer:* Well, that's a great question. What we are, I guess, is a collection of other collections.

*Subject:* Right.

*Interviewer:* But that's something that we often find that our users don't have a very good grasp of.

*Subject:* No. I don't even know what that means. I know the collections things, but I didn't -- and I've seen the list [of collections on the search results page] but I didn't know what any of that referred to.

*Interviewer:* Okay. Well, DLESE collects stuff on geoscience and earth system science. They have their own collection with their own front page and, but you can access DLESE through us because we have their catalogue records as well ... But it's something you just have found a little bit confusing?

*Subject:* Well, it just seems a bit like, why is that [icon] at every single one [of the search results]? Well, here it's NASA. I guess it depends on where that page is catalogued. I just would never go -- it's distracting. Yeah, it's distracting and I would never go there. And to me, it seems sort of like an ad.

*Interviewer:* Okay, which is bad?

*Subject:* It strikes me as bad because then it seems sort of commercial. And when you do these searches you really hope that it's not commercial because then you worry that someone's deciding what's included and what's not.

*Interviewer:* Okay. So you would like to think of NSDL as just one library?

*Subject:* Yeah, I think so. I don't know why, I mean it doesn't really matter. The one good thing is, it's [the logo is] way over there on the side. And your attention is here [points to the resource description]. So really you almost never go over there [to the logo]. And so, it's at least out of the way. If it was on this side [to the left of the description] then it would be a problem I think.

...

*Subject:* The link to the collection; the collection over here?

*Interviewer:* Which is the DLESE thing.

*Subject:* Oh, I totally think that's not important.