Hybrid approaches for measuring use, users, and usage behaviors

By Anita Coleman and Muniram Budhu

NSDL GROW-NCERL is interested in participating in the NSDL Webmetrics Workshop because we want to integrate our current substantial efforts with other NSDL projects, CI and the Standing Committees. A short description of our evaluation efforts and future plans are described as well as some ways in which we would participate.

GROW's evaluation strategy was articulated in conjunction with the library design and development framework (Budhu & Coleman, 2002). A digital library is a complex thing to evaluate and the "interactives" evaluation framework we proposed uses hybrid methods to study distinct layers and objects in the digital library (resource itself, the interface, the search engine, etc.) and understand users and evaluate educational impact. Our Interactives Evaluation strategy has been shared with users and stakeholders at various venues such as the Harvill conference and the NSDL Participant Interaction Digital Workshop, February 2004.

Current evaluation efforts:
Our current approach to evaluation is best described as a mix and match of both qualitative and quantitative techniques for understanding usage behaviors and measuring impacts.

Significant Uses, Users and Usage Behaviors
We have been experimenting with a number of quantitative and qualitative approaches for understanding the use and impact of the library on learning.
1. Online site surveys: A site survey is available on the home page and three content area pages. This survey asks users general demographic questions as well as specific questions about their impressions of GROW design and use of resources. Only one question is displayed at a time and it is changed when the page is refreshed. The survey results are reported on and analyzed quarterly by the GROW working group. The results have provided valuable information about our users including that 62% of respondents state that they have a Master's or Ph.D. and 74% of respondents state that they are first time visitors to the site.
2. User testing: We are conducting usability studies to assess the most effective vocabulary for the GROW collection, which will ultimately impact site browsing. GROW's usability study will employ the following methods. We will recruit participants via flyers and listservs. Potential participants will be screened to determine their web-saviness and their knowledge of engineering. Participants will be scheduled for a 45-minute one-on-one session that will be held on campus. Each session will be videotaped to allow all members of the project team to observe the participant's comments, reactions, and use of the site. After an introduction by the facilitator, the participant will be asked to complete a series of tasks that will require him/her to find resources on the site and respond to various vocabulary sets. During each task the participant will use the think-out-loud protocol. After each task, the facilitator will ask a series of questions related to the specific task. At the end of the study the participant will complete a written questionnaire.
3) Card sorts: We investigated the language used by undergraduate engineering students engaged in virtual laboratories in the library. Learners' concepts and relationships in the area of soil consolidation were elicited in order to provide an understanding of the structural knowledge of novices and compare it with knowledge structures of a human expert and a thesaurus tool. Concept maps and pathfinder networks were used to visualize and analyze the resultant knowledge structures of novice learners, expert, and tool (Coleman, 2004).
4. Usage tracking: GROW has statistical data about usage since

March 2003 and we use both a generic web logging tool (Analog) as well as a custom developed one.

At this point in time, our custom tool (Segmentation Reports) analyzes our transaction logs using four different views which are described below and reports the usage analysis data in terms of low level user behaviors (counts, who is doing what). This tool automatically shows bar charts of the page views too.

1. Page view provides data about number of requests per page. For example, GROW home page was accessed 18573 times during January 2004 (Fig. 1)
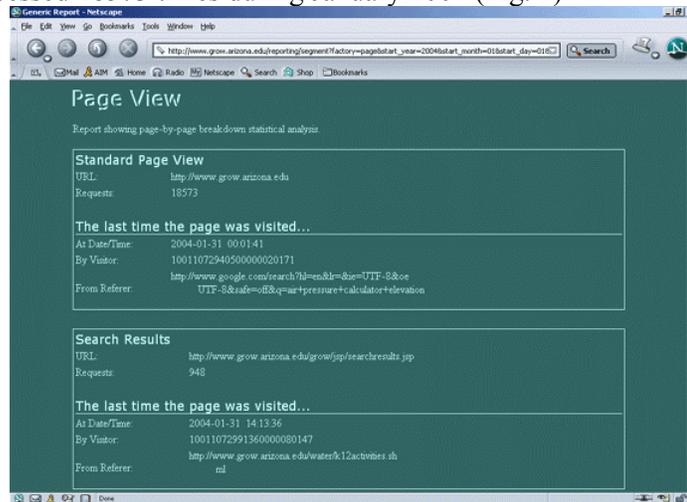

Figure 1: Segmentation Report (our custom tool) showing Page view (number of pages served)

2. Metadata view provides a subject report in terms of how many metadata records were viewed in each subject. For example, using the same period above (January 2004), Rock Mechanics received 497 views (Figure 2). In addition, there is a Popular metadata view which shows how many views there were of metadata.
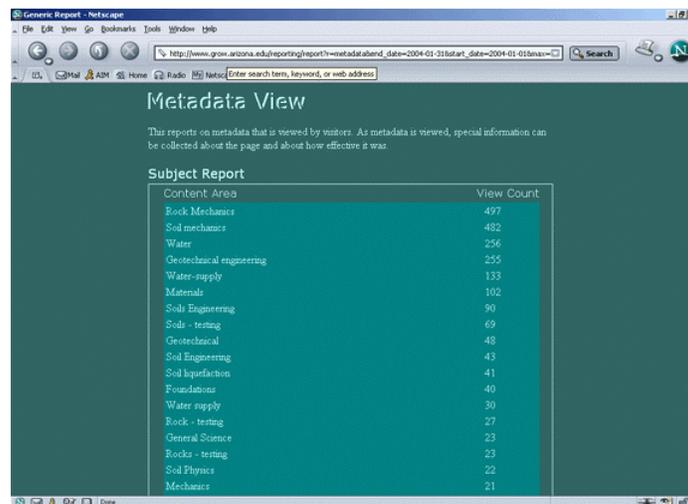

Figure 2: Segmentation Report (our custom tool) of metadata view (subject search terms used during period of report)

3. Clickstream data shows views of a single user, how many hits the user had, and what the user did during a visit.

GROW Synergies with Webmetrics Taskforce:

In collecting and reporting this variety of qualitative and quantitative data, we have identified a number of outstanding issues and would like to work with the Webmetrics taskforce (which will be a joint working group of the Evaluation and Educational Impact Standing Committee and Technology Standing Committee) to ensure conformity with standard NSDL evaluation and logging practices.

The main thrust of our participation will be to align current usage logging and tracking processes to conform to CI and NSDL needs. We propose doing this by:
1) refining our custom logging and reporting tools to support the logging standard protocols that the NSDL already has/ may have
2) identifying best practices that are in keeping with accurate, secure data collection that does not violate users' privacy and trust
3) identifying best practices and definitions that help in measuring unique users, significant use and high level user behavior (the educational impact)
4) comparing use with statistics from SiteMatch (this may help us to understand "community" growth)

Specifically, first, we will attempt to characterize who exactly is accessing GROW in terms of geography, audience, and diversity (the metrics definitions could come from the 2002 Evaluation SC pilot logging study or we could participate in the next logging pilot study that is conducted):
1) Incoming Top-level domains
2) Incoming specific domain
3) Incoming browser type
4) Top 10 External Referring URL
5) Registration information (number of registered users, etc.)
6) Total pages served
7) Number of pages for each category of use

Categories of use will include (among others and again this is in conformity to the pilot study mentioned above):
1) Community services
2) Resource discovery
3) Resource contributions
4) Resource use

Second, we will triangulate methods and identify a subset of resources (virtual laboratories) by incorporating online surveys within them to collect baseline "interactives" data:
(2) how many and what classes of faculty use them and how they use them
(3) how many and what classes of students use them and how they use them

Third, software enhancements by application of greater accuracy in data collection or adaptation of logging protocols to our reporting tool could also be proposed as this will help us understand significantly high level user behavior (such as who are our repeat users, what is significant use and specific impact of use). For example, some are listed below.
1) We want to compare clickstream data to see what the browsing behavior is and we want to add more criteria to our analysis. For example, we'd like to look at views per URL based on clickstream session or based on metadata criteria. Specifically, we'd like

to look at what sessions involve the person looking at resources in Water and then compare to other sessions where water has been looked at and see if there are patterns of use emerging (patterns in terms of subjects, formats, time, audience).

2) Likewise for search - what effect is search having on resource viewing.

3) Likewise for URL - patterns of use that emerge around any URL (for example, we could see what is drawing users to our affiliates)

4) Develop metadata and resource view with more specific information for civil engineering.

5) Cross site views

Benefits of GROW Participation at NSDL Webmetrics Workshop:

The benefits to GROW are significant advancement in measuring our users and usage. The benefits to NSDL will be our contribution of the lessons we've already learned doing webmetrics and software development in this area.

References:

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