

**CONSTELLA**



**G R O U P <sup>SM</sup>**

**Usability: An Approach to Developing and  
Organizing Web Content**

**A White Paper**

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## BACKGROUND

Over the past decade, we have watched as the primary locus for Web content management has moved gradually from the IT shop into the Office of Communications. As Web sites have grown more sophisticated, site structure has become less arbitrary and begun to rely more on evidence-based data and best practices to guide content, layout, and design. The old practice of using an organization's departmental structure to dictate a Web site's main information architecture has become increasingly discredited, and is being used less frequently. However, many Web content managers have inherited Web sites structured in this outmoded fashion; these content managers are then tasked with re-thinking existing content and information architecture so that it works more fluently to meet the needs of their target audiences. And that, in a nutshell, is the backbone of the entire usability process, from planning through testing, analysis of results, and the ensuing changes made to a Web site's content based on test findings.

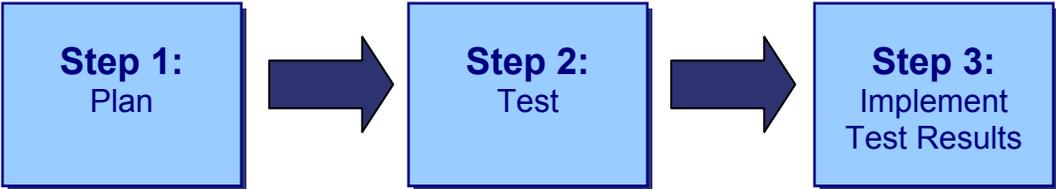
This paper focuses on usability techniques that will help you define user needs, develop effective content, and ultimately design the best information architecture for your Web site.

## WHAT IS USABILITY?

Usability is a practice and process often discussed, but little understood and often misapplied. Often, the term "usability" is used as a shorthand equivalent for "usability testing." However the usability process is much more than just testing. It is, in fact, a three-step process, informed in turn by a three-element mindset. Furthermore, the usability process can be used to develop more than just Web sites (although Web usability is the focus of this discussion).

**Successful Web content development begins with knowing and understanding your users.**

The steps and elements of the usability process are shown in the following diagram:



**Underlying Questions**

- 1. Who constitutes the audience for this information?*
- 2. What are their main goals and tasks?*
- 3. What constraints must be applied?*

Successful Web content development begins with knowing and understanding your users. Usability testing is one way to confirm what users are looking for on your Web site. As user needs are defined, you will be able to organize content based on those requirements.

A more detailed definition of usability can be found at [Usability.gov](http://www.usability.gov). Additionally, usability testing as a best practice is described further in the Web Managers Advisory Council report to OMB, "Recommended Policies and Guidelines for Federal Public Websites." ([http://www.firstgov.gov/webcontent/about/documents/icgi\\_report.html](http://www.firstgov.gov/webcontent/about/documents/icgi_report.html))

## WHAT IS USABILITY TESTING?

Usability testing is the second step in the usability process. For the most reliable and valid results, a recommended procedure for usability testing is based on "**scenarios**" that are written to reflect specific audience groups and information-finding tasks (defined in the planning step of the usability process). Test participants are recruited to represent the main audience groups. The test session (typically held one-on-one with a facilitator) is scripted around the scenarios, and results are observed and recorded using the "**think-aloud protocol**"—a testing method that allows the facilitator to remain objective and focuses on the mind-set and cognitive steps taken by the participant.

Usability testing can be performed in a "**usability lab**", which allows onlookers and note takers to observe the session through a one-way mirror, record the session on videotape, and transmit simultaneous views of the participant's overall body language and his or her mouse clicks and key strokes. However, a technologically sophisticated lab is not a prerequisite for doing usability testing; even a single observer with a notebook can achieve useful usability results.

Although the scenarios form the main part of the testing script, or "protocol," a usability testing session usually contains some exercises in addition to scenarios. For example, a very useful way to get inside users' minds and understand how they mentally understand and group concepts, is the "**What's behind the label?**" exercise, in which participants are asked to guess what content they would see if they clicked on various main headings or labels on a Web site. Very often, the protocol will also include some "first impression" and "final impression" questions. Other questions will include recommended improvements and one eliciting any final comments.

## WHAT IS A HEURISTIC REVIEW?

There may be circumstances in which you want to improve the usability of your Web site, but have neither time nor resources to invest in full-scale usability testing. You may instead request that a "heuristic" or "expert" review of your site be conducted by usability professionals. This approach is based on the fact that certain guidelines or "heuristics" have emerged from the usability research as being generally applicable rules for evaluating a Web site's effectiveness (see [Usability.gov](http://www.usability.gov)).

The heuristic review typically consists of one or more of the following elements:

- Established checklists for evaluating the level of usability

- A scenario-based review done by the expert using themselves as a reference point
- A sequential walk-through of the site.

The expert review, like usability testing, must be grounded in an understanding of the audience, goals, and constraints of the Web site. During the sequential walk-through part of the review, the reviewer checks all sub-sections (or "chunks") of the site to make sure that the following four questions are being clearly addressed:

- 1) ***What are you telling me here?*** (Does the terminology reflect my underlying mental definitions, and resonate with my view of the world? Is there so much text that I feel overwhelmed and may be tempted to just skip this part? Are the buzz-words I'm looking for easy to spot in the overall view of the page?)
- 2) ***What do you want me to do here?*** (Is it clear where and what I am supposed to type or click on?)
- 3) ***How does this fit in with what you told me before?*** (Is it clear how this section is related to the site as a whole? Can I retrace my steps easily so that I feel oriented within the overall structure?)
- 4) ***Why should I care?*** (Does this section address one of my fundamental information-finding needs in using this Web site?)

## CASE STUDIES

The National Institutes of Health (NIH) increasingly employs usability engineering and testing to produce successful Web sites—sites that actually work for their users. Specific case studies from within NIH are examined below to illustrate usability's role in producing that success.

### NATIONAL CANCER INSTITUTE (NCI) – OFFICE OF WOMEN'S HEALTH

NCI's Office of Women's Health Web site, [women.cancer.gov](http://women.cancer.gov), used usability techniques to gauge the target audience's ability to locate specific information on their newly redesigned Web site. An initial heuristic review was also done to pinpoint possible trouble spots that would benefit from testing, and to make initial improvements to the site before the test sessions were held. The testing was instigated to see if known problems had been addressed and to uncover any problems that had not been foreseen.

**This informal process—no lab, no recording technology—turned out to be a cost-effective method, yielding invaluable results.**

The testing was completed in the participants' offices with a tester and, if available, a note taker. Each participant was tested against the same scenario tasks. This informal process—no lab, no recording technology—was a cost-effective method, yielding invaluable results. The test protocol consisted of first-impression questions, scenario exercises, and post-test impression questions, including a request for critiques or possible improvements on the site.

Overall, the Web site performed well. A few information-finding tasks presented usability problems for the test participants. Most of these problems were easily addressed with the

addition of additional scope notes (parenthetical descriptions of what content to expect behind a label), and text editing. Other problems were solved with a more frank and straightforward tagline, so that clear ownership of the page was firmly established, and by modest changes to the labels of main information categories. The resulting feedback from participants justified several recommendations for improvement. The suggestions, which involved updating content labels and updating the layout of selected content, were prioritized and integrated.

Since the usability recommendations were implemented, the number of unique visitors increased by nearly 18%, the number of visits increased by 22%, and the number of page visits increased by 18%—all increases from the month prior. (NCI Office of Women's Health AWStats Report, March 2006)



## NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES (NIGMS)

NIGMS, [www.nigms.nih.gov](http://www.nigms.nih.gov), implemented usability testing to provide recommendations for organizing site content. Before the NIGMS redesign launched, study participants were tested against the development site. The testing was conducted when the migration of the newly designed NIGMS Web site into the Microsoft Content Management System (CMS) was nearly complete. The purpose of the study was to uncover usability problems on the new site so that they could be addressed in future iterations.

Participants answered questions about their first impression of the Web site, perception of site audience, site ownership, and the kind of information they were expect to find on the site. The “think-aloud” protocol was used for scenarios questioning. In addition, participants answered post-test questions covering their general reactions, including areas that they liked and disliked about the site.

Several interesting problem areas emerged from testing, which resulted in recommendations to change labels, update content layout, and/or reorganize content. The most important finding from the test sessions was that the new NIGMS Web site was thoughtfully planned and designed, and in general met or exceeded the users' expectations of an NIH Web site—particularly in terms of quality and ease-of-use. Both first and final impressions were generally positive for all participants.

As a result of usability testing, many of the recommendations were prioritized and implemented on the NIGMS Web site. Future usability testing will be completed using the initial study as a baseline and to further test specific sections of the site—Training & Careers, Research Funding.

### NIGMS Home Page



**National Institute of General Medical Sciences**  
*One of the National Institutes of Health*

Search NIGMS  GO

[NIGMS Home](#) | [Site Map](#) | [Staff Contacts](#)

Initiatives
Research Funding
Training & Careers
Minority Programs
News & Events
Publications
About NIGMS



*Supporting research that is the foundation for disease diagnosis, treatment, and prevention*

**Quick Links**

- [Welcome](#)
- [New on This Site](#)
- [NIGMS Feedback Loop](#)
- [Free Resources for Teachers and Students](#)
- [Job Vacancies](#)
- [Congressional Materials](#)
- [Advisory Council](#)
- [Electronic Grant Submission](#)
- Summary Statement and JIT Actions:
  - [Research Grants](#)
  - [Fellowship Applicants](#)
  - [MORE Applicants](#)

**Funding Opportunities**

[NIGMS Center for the Determination of Structures of HIV/Host Complexes \(P50\)](#)  
April 13, 2006 • RFA-GM-07-001  
Supports research centers aimed at the determination of the high-resolution structures of complexes between components of HIV and the host cell.

[Molecular Probes for Microscopy of Cells \(R01\)](#)  
March 31, 2006 • PAR-06-288  
Supports research to evaluate promising but unproven enabling technologies for the detection of single molecules and single molecular events inside cells.

[Program Projects for Basic Research on Human Embryonic Stem Cells \(P01\)](#)  
March 27, 2006 • RFA-GM-07-002  
Supports research on the basic biology of human embryonic stem cells (hESC) and promotes the use of hESC as a model system to address significant questions in the basic biomedical sciences.

[Developmental Biology and Regeneration of the Liver \(R01/R21\)](#)  
March 10, 2006 • PA-06-231

**Results**

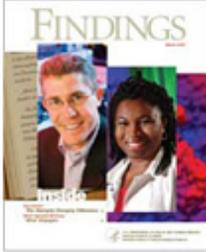
[Gene Variant Associated with Obesity Risk](#)  
April 13, 2006 • Harvard University  
A statistical technique developed by NIGMS-supported scientists has helped identify a common gene variation associated with an increased risk for obesity. The variant was found in 10 percent of the populations studied.

[Reversing Steps in Cell Division](#)  
April 12, 2006 • Oklahoma Medical Research Foundation  
NIGMS-supported scientists have been able to reverse steps in the process of cell division, a feat with implications for the treatment of cancer, birth defects, and other disorders.

[Cell Surface Profiling Could Yield Cancer Blood Test](#)  
April 12, 2006 • Lawrence Berkeley National Laboratory  
NIGMS-supported scientists have developed a technique for quickly testing the chemical properties of certain cell surface proteins. Such chemical profiles could be used to detect cancer and other diseases.

[Targeted Drug Delivery Possible with Peptide](#)  
April 12, 2006 • Yale University

**Free Publications**



**FINDINGS**  
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## NIH CLINICAL CENTER

At the Clinical Center, [clinicalcenter.nih.gov](http://clinicalcenter.nih.gov), a usability-engineering process guided the entire redesign of the public Web site, ultimately demonstrating measurable benefits in ease-of-use, speed of information finding, and satisfaction level.

Three usability studies were completed with a baseline comparison.

### FIRST STUDY

After initial analysis, and after examining written user feedback, two versions of the Clinical Center home page were prototyped. The difference between the two versions was not in the basic information architecture, but rather how each home page's center real estate was used. The first version was created to represent a 'newspaper feature' approach to this area, while the second version was intended to represent an 'outline' or 'table of contents' approach.

The purpose of the first study was to get preliminary feedback on both versions of the prototype. Primarily, the desire was to test the intuitiveness of its information architecture and labeling.

In addition, it was hoped that any major problems with the existing 'Search the Studies' tool—the database of clinical trials at the Clinical Center—would be uncovered. Since so many users who come to the Clinical Center home page are looking for information on ongoing clinical trials, the efficacy of this tool was inseparable from that of the home page and its top tiers. Therefore, it was included in our test protocol.

### SECOND STUDY

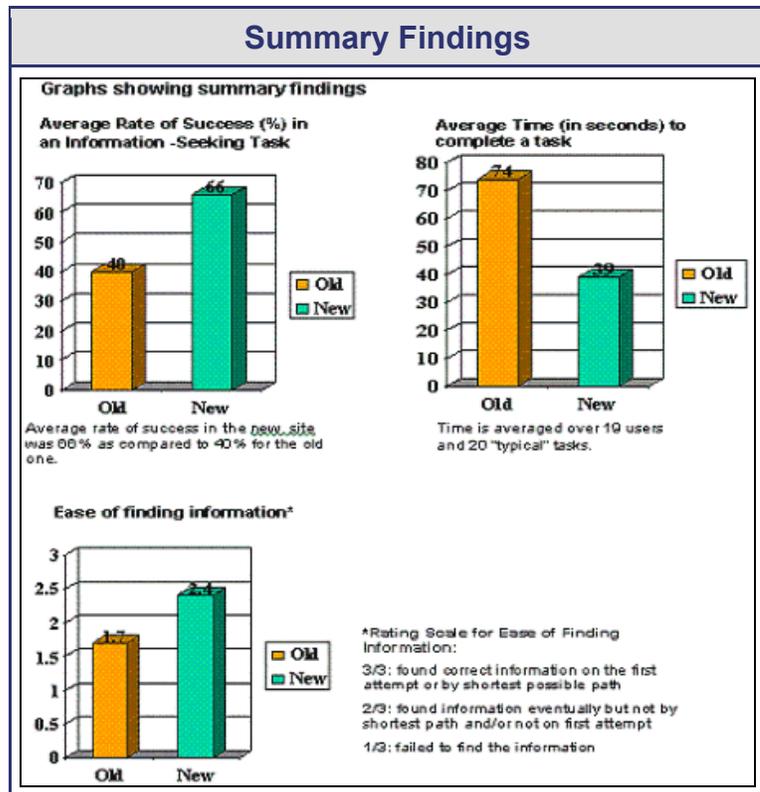
The purpose of the second study was to answer to following questions:

- *How well can less-educated and/or less NIH-sophisticated people understand and navigate the Web site?*
- *Have the problems uncovered from the first study been repaired?*

In addition, a few new questions were formed that derived from the first study.

### THIRD STUDY

The third study was done to compare the usability of the original site with that of the revised site (baseline comparison).



The study addressed the following questions:

- *On which site is it easier to find information to complete task scenarios?*
- *Which site is preferred overall?*
- *Which visual "look" is preferred overall?*

The third study, the baseline comparison, demonstrated that the revisions had, indeed, increased the usability of the Clinical Center Web site. Summary quantitative results can be seen in the above graphs.

**NIH Clinical Center–Home Page**

NIH Clinical Center  
NATIONAL INSTITUTES OF HEALTH

Contact Us | Site Map | Search | Staff Only

About the Clinical Center | For Researchers And Physicians | Participate in Clinical Studies

**HIGHLIGHTS**

News & Events  
 \* [Press Room](#)  
 \* [Medicine For the Public](#)  
 \* [Events Calendar](#)  
 \* [More...](#)

Jobs & Opportunities  
 \* [Careers](#)  
 \* [Volunteering](#)  
 \* [Diverse Environment](#)  
 \* [More...](#)

Education & Training  
 \* [Clinical Research Training](#)  
 \* [Great Teacher Series](#)  
 \* [Fellowships & Other Opportunities](#)  
 \* [More...](#)

**HOSPITAL CONCIERGE**

[Telephone Numbers](#)  
[Planning Your Visit to the Clinical Center](#)

Places to Stay  
 \* [Family Lodge](#)  
 \* [The Children's Inn](#)  
 \* [Hotels and Motels](#)

Patient Services  
 \* [Children's School | \(Spanish\)](#)  
 \* [Dietary Services](#)  
 \* [More...](#)

[NIH dedicated the Mark O. Hatfield Clinical Research Center in ceremonies September 22, 2004.](#) The Center will provide a unique opportunity for clinicians, scientists, and patients to study and conquer both chronic and acute disease in the 21st century. This new 870,000-square-foot facility will connect to the existing NIH Clinical Center, which opened its doors to patients in 1953. [Read more...](#)

[Virtual Colonoscopy](#)  
 A look at a virtual colonoscopy, which is being studied as a tool for diagnosing colorectal cancer.

[Blood Donors Needed](#)  
 Take some time to save a life. Become an NIH volunteer blood donor.

[Search the Clinical Studies](#)  
 NIH researchers conduct more than 1,000 studies at the Clinical Center.

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National Institutes of Health | Department of Health and Human Services | FIRST GOV

## CONCLUSION

Usability is an in-depth process and practice that may take many forms—from the informal setting to the recorded, lab session. Planning, testing, and implementing test results is the process used to get the most out of your results. Defining the best solutions based on the usability study results, will derive from participant interactions with the Web site in conjunction with input from an experienced usability professional or Web Designer. Following up with additional studies after recommendations have been prioritized and implemented allows for baseline comparison analysis. This will ensure that integrated results have addressed the specific problems that were uncovered during testing.