



Usability Testing in Internet Time

by Catherine Brown

Today the roles of instructional designers, technical writers, and performance improvement consultants overlap more and more with web developers, content providers, and project managers. Tools for developing and maintaining websites are becoming more widespread and easier to use every day. With recent economic downturns, many people are suddenly finding themselves taking on website design and maintenance in addition to other responsibilities, sometimes with little time to prepare for their new duties.

Luckily, performance-centered design (PCD) emerges as a blueprint for novices and experts alike to develop websites that are models of simplicity and elegance. A critical iterative step of PCD is conducting performance-centered usability evaluations. Usability evaluations, also called usability tests, involve performers navigating and performing tasks on a website, while observers watch and take notes on their activity in the framework of the scientific method.

This article provides web designers and developers with guidelines for conducting usability tests to refine and improve sites. By following these guidelines, people who do not normally develop, test, or debrief usability scenarios can do a credible job of creating and running their own evaluations. Dickelman's *Pocket Guide to the Twelve Steps of Usability Engineering* (1996) will serve to frame these guidelines.

Why Test?

There is often pressure to quickly publish a website or implement changes on the fly. Information contained in a website, and the tasks performers come to the website to do are often critical. This urgency feeds the temptation to simply implement the changes and deal with the fallout later. Also, budgets for sites that are part of a larger intranet sometimes do not have allocated testing funds. Nevertheless, newcomers to web development will benefit from putting together a basic usability test during the early stages of the development cycle and before launch.

Some benefits of usability testing include the following:

- Catching major usability issues early: When corrected, performer frustration can be averted, as can limiting the number of help desk calls or requests for help to the webmaster.
- Ensuring repeat visits to the site: The expression “You only have one chance to make a good first impression” is particularly relevant to websites. If the first-time performer is frustrated when attempting to use an online form or navigate a complex hierarchy of hyperlinks, you can be sure that the site will not appear in that person’s favorites folder. Kuniavsky (1998) states:
Once you’ve lost a customer, you’ve lost him for good. The costs of flipping to another Web site are so low it doesn’t make any sense for people to go back to a site that failed them the first time. In the web world, this phenomenon is called churn...Churn is a fundamental measure of dissatisfaction with online products (p.1).
- Making use of evaluative, formative feedback: If used early in the development/design cycle, results from usability tests feed into the design process to continuously improve the site. One study reports that 13 usability engineers ranked iterative design as the activity with the greatest potential for improving usability (Harrison, Henneman, & Blatt, 1994, p. 12).

A robust usability test can help achieve other benefits to the final product:

For performers:

- Improved job satisfaction
- Decreased training time
- Less documentation
- Fewer errors
- Less fatigue and injury
- More effective work time, productivity, and work quality

For the organization:

- Lower support cost
- Ability to hire lower-level staff
- Lower turnover
- Lower maintenance cost
- Better employee morale
- Decreased absenteeism
- Improved return on technology investment
- Decreased development time and cost
- User-focused products (Harrison, Henneman, & Blatt, 1994, pp. 210-217)

Dickelman (2001) suggests a 12-step process that even people not trained in usability testing can follow to test their new or upgraded systems:

1. Determine test site.
2. Select evaluators.
3. Document usability goals.
4. Develop scenarios.

5. Develop evaluator briefing.
6. Develop evaluator debriefing.
7. Schedule evaluators.
8. Set up usability lab or evaluation area.
9. Select observation team.
10. Conduct dry run.
11. Conduct usability evaluation.
12. Document usability test findings.

1. Determine Test Site

Usability testing is usually done in one of two places: at a usability or human factors laboratory or in the workplace. A third option, testing over the Internet, is sometimes used. There are benefits and drawbacks to each.

Usability labs are away from the work place. There, evaluators (sometimes called testers, users, or performers) perform tasks while being observed by usability engineers, human factors engineers, or others who have an interest in the project. They are usually equipped with video and audio recording equipment, an observation room, the test lab, microphones, telephones, whiteboards, and other gear used to record information. Dickelman (1996) states that “a usability lab isolates the system by filtering out all other work activities, so users can focus on performing tasks that the system was designed to support” (p. 3). Observation rooms are usually equipped with one-way mirrors or cameras so that the evaluators cannot see out.

Sabre Inc. has an onsite usability (they call it human factors) lab with all this equipment and more. The human factors staff lets people use the lab, even if the staff is too busy to develop or run the test. Test developers who are not as lucky can make do with a meeting room or classroom. Molich (2002) suggests that a portable lab that can be moved easily from site to site can be set up with the following equipment.

Video equipment. Wireless camera and receiver. Use the kind of camera used in stores for surveillance. Make sure it can record audio, too, because you will want to record what the tester says and what he or she does. Also get a tripod to steady the camera and a TV monitor to watch the video from an adjoining room.

Recording the evaluator’s words and actions is helpful in case the observer’s notetaking doesn’t catch everything, or if some one other than the original observer wishes to see the tests. Kuniavsky (1998) says “At *Wired*, we’ve found it useful to videotape the sessions and make the entire production team—everyone who’s responsible for the features and design—watch the videotapes...there’s no feeling like watching someone founder with something that everyone thought was trivial” (p. 2).

Computer equipment. A monitor and PC for the evaluator, plus a slave monitor so that observers can watch how the

evaluator navigates the site. Be sure that a quality cable connects the two so that the signal does not deteriorate.

Use a portable lab if you want to bring the testing to the workplace. Testing in the workplace has advantages; for example, testing in a lab is an artificial environment. Evaluators might be more relaxed and natural in their own environment. There is a danger, however, of interruptions or distractions during the test.

The virtual world of remote usability evaluation is another test site worth exploring. This method, described by Perkins (2001), is a great way to collect usability data from geographically dispersed testers. This is useful if your site will be used in more than one country or culture and your test budget does not include flying evaluators in from all locations. Perkins explains, "Live remote testing can be an effective way to gather usability data quickly, conveniently, and inexpensively by using the Internet as a viewing tool. It enables you to expand the demographic of your participant base to any part of the world" (p. 153, 154). He goes on to explain that there are many software applications available at reasonable prices, or free, that can be used to conduct live remote testing.

Benefits of live remote testing include savings in travel, time, and facility expense, access to unrestricted demographics, ease of recruiting testers, opportunity to observe testers in their own environment, and the ability to do it can be done in either a low-tech or high-tech way (Perkins, 2001).

2. Select Evaluators

Selecting evaluators is the next step in the usability testing process. There are two possibilities: using evaluators who are representative of the performers who will be using your website and heuristic evaluation. Heuristic evaluation involves using human factors or usability experts as evaluators during the test. It is:

a usability engineering method for finding the usability problems in a user interface design so that they can be attended to as part of an iterative design process. Heuristic evaluation involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles (the "heuristics") (Nielsen, 2002, p. 1).

Heuristic evaluation is growing in popularity. From 1998 to 2002 a Google search for heuristic information grew from 600 pages to 9,500 pages (Nielsen, 2002).

By the time you are planning a usability test, you should already have an idea of the target audience for your site. Your challenge is to find the best representatives of your target audience who can participate in your test. Evaluators can be found a number of ways. If you are testing your

department's intranet site, for example, you can contact human resources and ask for lists of managers, new hires, interns, or trainees, or department lists. From there, you can compose a short invitation letter that gives a brief description of the test, test location, date, directions, and other pertinent information.

If the site will be used by individuals outside your company, you will have to try other methods to locate evaluators. Fleming (1998) suggests using customer lists, marketing mailing lists, organization membership lists, email discussion lists, and conference attendee lists. If you have a budget, you might contact a temporary agency and provide them with a list of characteristics you are looking for, or you could place an ad in a local newspaper or an organization's newsletter.

Molich (2001) gives a few more suggestions for finding evaluators:

- For ongoing tests, ask evaluators to recommend other evaluators. Create an informational flyer they can give to friends and colleagues.
- If you need testers with unusual characteristics, use a market research firm. To get people with no specific profile, set up a booth at a flea market or other public gathering.
- Consider inviting people who have contacted customer service. Take care, however, to avoid those who are extremely dissatisfied, and recruit no more than 40% of your evaluators this way. Speak on the topic of usability testing anywhere customers gather; then ask for business cards from those who would consider being evaluators.
- Look for evaluators in their natural habitat, depending on what type of product you are testing. For example, contact real estate agents or church secretaries if you are testing an online real estate site or an administrative tool. Offer to make a per-evaluator donation to a charitable organization that the evaluators might be likely to support.

Number of Evaluators. The more care taken in selecting just the right evaluators in the first place, the fewer evaluators need to be used. Kuniavsky (2001) observes that the majority of interface problems can be surfaced after four or five people run through the test. Approximately five evaluators per round is usually sufficient (Pearrow, 2000). Pearrow advises that if there are multiple user profiles (or personas) around which the site was designed, then it is wise to consider a few evaluators representing each user profile.

Compensation. Molich (2001) recommends compensating evaluators with something they value. "Although the incentive should not be the driving force behind participation, a substantial gift shows that you appreciate that the test participants have set aside precious time to help you. In 2001, decent incentives seem to be in the \$40-\$100 range for a 90-minute test" (p. 12). Fleming (1998) agrees that compensating evaluators makes sense, noting that compensation can help recruit the right evaluators. She adds "...make it clear

that you are paying for their time and valid reactions, not for validation or ego stroking” (p. 3). Make sure that your evaluators are allowed to accept compensation before you give it.

What to Avoid. Heed the experts’ advice to avoid making a mistake in evaluator selection. Fleming (1998) recommends caution when using colleagues, friends, and family, as they might be less than candid in their comments. Molich concurs. “Friends and relatives often are not representative users. If they aren’t typical users, the test may result in them feeling foolish—not something you want to do to someone you care about. They may also be overly nice or critical (2001, p. 10). Molich also suggests that people who know a programming language or know how to create a web page are not good candidates for most usability tests. He also recommends that evaluators should not be invited back more than twice per year and that they not test the same kind of product the second time (2001, p. 11). It is important to avoid selecting evaluators who have a preconceived notion, or bias, toward the site or product being tested (Kuniavsky, 2001). Avoid problems with viewing the video later by having evaluators sign a viewing permission statement.

3. Document Usability Goals

How can the novice usability test designer make sure that the right things get tested? The first step is to prepare usability goals that focus on the site’s most important activities—in quantitative and measurable terms where possible. When creating the test goals, focus on the site’s core tasks, or key selling points, the activities that must be easy to use. Documenting test goals keeps the focus on need-to-know information, prevents tangents, and keeps the testing on track.

Test developers determine whether they are testing to gather formative information for use in an iterative design process or summative information “aimed at assessing the overall quality of an interface, for example, for use in deciding between two alternatives or as a part of a competitive analysis” (Nielsen, 1997, p. 1545). The main goal of gathering formative information according to Nielsen is “to learn which detailed aspects of the interface are good and how to improve the design.

Pearrow (2000) suggests writing short questions or problem statements that summarize why the test is being conducted. The problem statements should be concrete and narrow in scope. These summary statements drive the next step, developing scenarios.

4. Develop Scenarios

Test scenarios are the core of the usability test. Their quality makes or breaks the usefulness of the information gathered. Test developers write scenarios, not mere tasks. A scenario “sugars the task by encapsulating it in a hopefully

realistic context that will motivate the test participant” (Molich, 2001, p. 13). Scenarios are usually printed and handed to the evaluator or presented in a text box on the computer screen.

To write scenarios that test performance and usability goals established in Step 3, test developers should consider processes, tasks, and activities that do the following:

- enable performance measurement (for example, time for task completion, accessibility and use of embedded support)
- enable measurement of usability goals
- reflect performers’ environment
- are realistic regarding frequency of tasks; are appropriate for the diversity of performers
- will be performed during production
- have representative degrees of complexity
- affect business performance if not performed correctly
- represent business criticality
- represent volumes accurately
- consider performers outside the organization if appropriate (Dickelman, 2001, p. 6)

Molich (2001) suggests that test developers focus on critical tasks that have serious negative consequences if performed improperly. What tasks are key to the product’s success? “Focus the test on core tasks, rather than on what’s new or fun or easy to test” (p. 13). Test developers also should write some scenarios that reflect complicated but realistic situations. Molich calls these “edge cases.”

Measures. Qualitative Measurement. Once the test scenarios are written, they must be assigned metrics so that the success of the test can be measured and reported. Most of the time, qualitative, subjective information is what test developers are interested in collecting. This formative information will be used in the iterative performance centered design process. A method advanced by Nielsen (1997) is for the observers to collect their observations on post-it notes—one observation per note. He suggests grouping the post-it notes using affinity diagramming to identify trends, hot spots, and gaps. Dumas (2001) discusses using Likert scales to measure qualitative data. He suggests that the end points on the scale be worded such that evaluators can rate a scenario negatively without making them feel as though they are being too harsh. He offers as an example “easy” and “not at all easy” on a scale of 1–7.

Quantitative Measurement. When quantitative measurement is appropriate, for example, when components such as usability attributes are being measured, Nielsen (1997) suggests that the data can be collected using a stopwatch or tic sheets to measure time or count occurrences. Quantitative measures can include time it takes evaluators to complete a task, number of errors, the time it takes evaluators to recover from an error, how often the evaluators consult manuals or help aids, or the number of times the evaluator expressed emotions.

What to Avoid. When writing a test scenario, it is important to avoid using humor and hidden clues in the task description. Hidden clues might provide evaluators with a tip for how to complete the activity, thus damaging the integrity of that scenario. Test evaluators should be able to determine the goal of the scenario, but not be provided with the steps (Molich, 2001). Pearrow (2000) recommends writing a few extra scenarios to use in case one or more scenarios cannot be completed. This is not likely to happen if a dress rehearsal of the test is conducted. Pearrow also recommends shuffling the order of the scenarios so that the evaluator does not begin to anticipate how tasks should be completed.

5. Develop Evaluator Briefing

The purpose of the evaluator briefing is to orient the evaluator to the test process, provide directions, answer their questions, and make them comfortable with the test process. If the evaluator needs to sign a consent form, the evaluator briefing is a good time to do it. Observers and test facilitators can use a checklist to be sure every point is covered each time.

Make sure that the evaluator understands:

- that candid feedback is encouraged
- that it is the website being tested, not his or her skill or speed at navigating
- whether the test will be videotaped, and that only the test team will view it
- to think out loud on completing the tasks

Pearrow (2000) recommends developing an orientation script—“a piece of scripted text that you will read out loud to participants when they arrive for testing” (p. 242). He suggests the following format for an orientation script:

- Introduce test team to evaluator.
- Explain that his or her participation is an important part of improving the website.
- Explain that the site is being tested, not the evaluator.
- Briefly go over how the test will flow, how long it will take, where the observers sit.
- Explain that you will answer any question that does not violate the test's integrity.
- Complete any paperwork.
- Sign any releases.

Pearrow (2000) emphasizes the importance of being consistent with everything said to the evaluators. This preserves the integrity of the test.

Running the Test. Molich (2001) recommends giving the evaluator a few minutes to explore the home page and soliciting their initial impressions. The first actual task should be an easy one to build evaluator confidence. Be prepared to respond in an encouraging, positive way if the evaluator blames him or herself for taking a wrong turn. Pearrow

(2000) suggests that the test moderator “be able to assure the participants that they are doing okay and that other people have made similar mistakes” (p. 245). It is important to keep interactions between the observers and evaluators to a minimum once the briefing is over. Molich (2001) echoes that thought and suggests that observers withhold help until the evaluator gives up on the task. Know in advance about how much time floundering the observer will give evaluators before intervening.

6. Develop Evaluator Debriefing

Debriefing occurs after the evaluator completes the last scenario. It is important that the debriefing go well so that all relevant information from the test is collected and the evaluator leaves in a good frame of mind. Compose a debriefing document and use it to conclude each test. If there are others observing the test with you, get any questions they might have and add them to the list. Keeping in mind the key purpose of the test, go back over any portions of the test that gave the evaluators trouble. According to Molich (2002), the debriefing should be used “to get any final input, to clarify questions, and to put the test participant in a good frame of mind” (p. 19). Dickelman (2001) suggests that the debriefing captures information needed to assess whether or not performance and usability goals were met.

7. Schedule Evaluators

Set up an evaluator schedule so that there is time for the previous evaluator to be debriefed and thanked before the next one arrives. This eliminates the possibility of one evaluator tipping off the next one to how the test will run. When inviting evaluators, provide directions, room number, addresses, email addresses, and if possible a phone number the evaluator can call the day of the test in case he or she is delayed. Alert the evaluators of approximately how much time the test takes. Be sure to send a confirmation message just before test day. It's prudent to line up one or two substitute evaluators in case of last-minute changes.

What to Avoid. Try not to use technical jargon in communications with the testers (Molich, 2001); it might intimidate them. Try not to give too much away when writing a description of the test. Avoid giving wrong or vague directions to the site by testing the directions before sending the letter.

8. Set Up Lab or Evaluation Area

This was discussed under Step 1.

9. Select Observation Team

It is beneficial to have several people participate on the observation team. Pearrow (2000) suggests the following roles of a test crew:

- Test monitor or facilitator: This person does most of the interacting with the evaluators. This person should be very familiar with the test goals, since he or she will be guiding the evaluator and conducting the debriefing. This person also needs to be familiar with principles of facilitating usability tests.
- Data logger: The scribe for the test. The data logger writes notes and records participant responses.
- Timer: If needed, this person measures and records how long it takes the evaluator to complete each scenario.
- Video operator: If the test is recorded, it is best if one person is responsible for turning the camera off and on, changing the tapes, and manipulating the camera.
- Site specialist: This person knows all about the site being tested and is possibly on the site-development team.

Some of these roles could be expanded, combined, or dropped, depending on the circumstances.

What to Avoid. Try not to have too many observers. Be sure that the evaluators do not see the observers.

10. Conduct a Dry Run

Like a theatrical performance, hold a dress rehearsal before the real test. Make sure all electrical and computer systems work and that network connections are functional. Try running through all scenarios with a typical evaluator. Have the dry run early enough so that there is time to correct, repair, or rewrite anything that does not work. Be sure that the test crew participates and performs their assigned roles.

11. Conduct Usability Evaluation

Remind the observation team to stay out of sight of the evaluators. Make sure everything is ready before the first evaluator arrives. Follow the test plan and make adjustments if needed. Molich (2001) suggests the following basic model for performing the test:

- Test moderator/facilitator greets evaluator and completes any necessary consent forms or other paperwork.
- Facilitator asks evaluator what his or her expectations are of the website.
- Facilitator gives the evaluator the written test scenarios one at a time.
- The facilitator interacts with the evaluator, reminding him or her to think aloud or—depending on the methodology—conduct an extensive interview.
- After the evaluator completes the scenarios, the facilitator debriefs the evaluator and collects final thoughts and impressions.
- Facilitator thanks the evaluator and presents compensation, if any.

Molich (2001) also recommends that the observation team keep a list of what to do between tests. These activities could include rewinding or changing tapes, resetting PC desktop, deleting any files or records the previous evaluator

created. Remind the observers of basic lab etiquette. Turn lights off in the observation room, keep loud noises to a minimum, and stay out of sight.

12. Document Test Findings

The design of the test goals, scenarios, and metrics established in steps 3 and 4 drive how the test findings are reported. Dickelman (2001) advises that individuals preparing the report focus on what was actually observed, indicate which goals were accomplished and which were not, make recommendations for improvement and distribute the results.

Molich (2001) has a suggested outline for reporting usability testing results:

- One-page executive summary
- Table of contents
- One-page explanation of methodology
- Test participant profiles
- Test results (5–7 pages)
- Appendix (test scripts, scenarios, annotated screenshots)

Molich suggests that problems be classified according to their potential impact on the success of the site. Categories he suggests include catastrophic, serious, and cosmetic. Include both quantitative data and qualitative data. He urges that positive results be included along with the negative findings. Ideally, there should be one positive finding for each negative finding reported and be specific. Sort and present the information in a way that makes sense to the audience. Include screenshots when needed to clarify a point or problem definition.

Conclusion

Is usability testing worth it? Nielsen (1998) reports that a study of 15 large US commercial sites found that users were successful only 42% of the time when asked to find specific information. In general, a usability test with only five users will usually uncover 80% of the site-level usability problems. So usability testing can contribute to a significant improvement, even if the test is very basic. The forward-thinking human performance technologist would do well to add the fundamentals of developing and facilitating usability tests, and become proficient at reporting results and making recommendations. 🏠

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