

FEAR and LOATHING on the KEYBOARD

Why we should hate software that's smarter than we are and what to do about it.
by

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This article appeared in [CBT Solutions Magazine](#), November/December 1997.

*It's 1:04 AM and the project plan is due first thing in the morning. The final change - so it seems - has been made and the mouse is heading for File...Save. Alas, I notice that a smattering of tasks are scheduled for the wrong month. There's no rhyme nor reason to which tasks contain the errors, but there they are. I begin to make the changes, one by one. Suddenly, like a thief in the night, a hideous beast appears. He's a foul, wretched creature, obviously bent on keeping me from much need slumber by scaring the wits out of me real-time and leaving an indelible impression on my psyche that escalates to a nightmare. Who is this demon? It's the **Planning Wizard!!***



Now I ask you, of what use is this guy when I'm exhausted and trying to make random changes to my project plan? I mean, how does *he* know what I want to do? I want him to go away, but perhaps not forever. Should I select the box that says "Don't tell me about this again?" If I do, will I ever see the Planning Wizard again? Will I have to use the "Help" file to find out where he lives and how to invite him back? Besides, I thought Wizards wore pointy hats and black robes with sequins.

2:45 AM. Now exactly what was it that I was doing??!

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Jonathan Grudin once proposed the following:

When those who benefit are not those who do the work, then the technology is likely to fail or, at least, be subverted.

Donald Norman explains that technology has deficits and human beings suffer for them. It is our responsibility as designers to ensure that those who must use the technology are not the ones who suffer. **Usability engineering** provides a means to mitigate the pain.

What is Usability Engineering? (I hear you cry...)

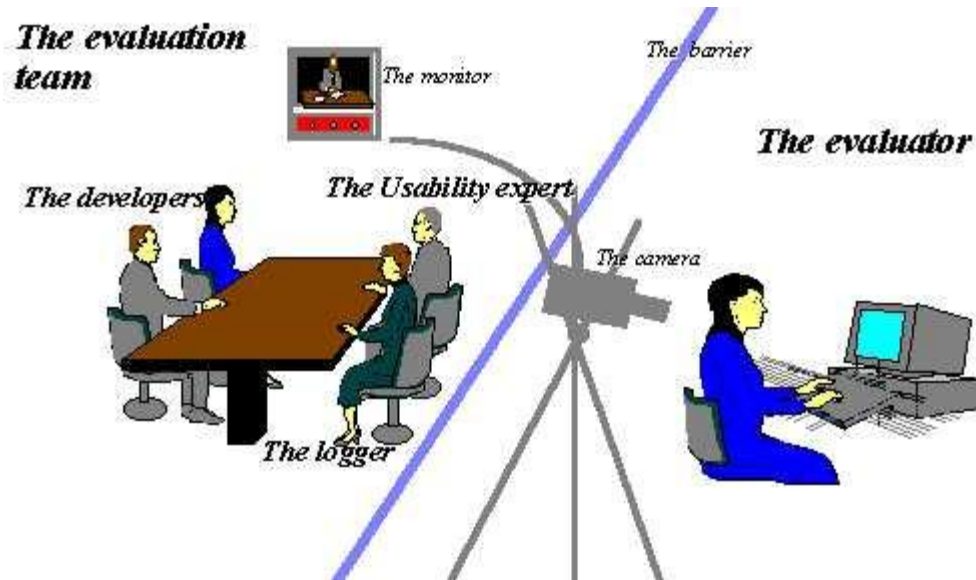
Make a choice: Usability engineering is...

- (a) Asking "end-users" if they like the system after it is designed.
- (b) A process (or set of tools) for designing systems that match human capabilities.
- (c) A focus group conducted after system design and/or development.
- (d) A means by which to determine how much system training needs to be developed.
- (e) A means by which to ensure performance.
- (f) All of the above.
- (g) None of the above.

The correct answer is (b). Usability Engineering is not an after-the-fact activity, nor does it necessarily ensure performance. It is a necessary (but not sufficient) condition for performance. And if you intend to apply Usability Engineering to learning needs assessment, then you've chosen the wrong tool for the wrong purpose and to a useless end. Usability Engineering is best applied as an iterative process, in connection with the design and development phases of systems engineering, to ensure that the end product matches human capabilities. You will also see that business performance (vis-a-vis performance support) can be enabled through Usability Engineering provided that the established usability goals are performance-centered.

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The Big Picture



Notice:

- The evaluator is an "end-user," also called a *performer*. A range of evaluator experience - with technology and business content knowledge - must be represented. *Do not use experts exclusively!*
- The team members - especially the developers - are isolated from the evaluator. In the best of all worlds they are in separate rooms.
- The evaluator is working through a script or scenario that has been developed to allow measurement of the usability goals.
- The evaluation is being recorded (audio and video).
- The team is watching on the monitor, real time.
- The logger is noting significant events and recording the time the events occur. The resulting log is very valuable when the video tapes are reviewed.

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- **The Twelve Steps:**

1. Determine Test Site
2. Select Evaluators
3. Document Usability Goals
4. Develop Scenarios
5. Develop Briefing
6. Develop Debriefing
7. Schedule Evaluators
8. Set Up Lab
9. Select Observation Team
10. Conduct Dry Run
11. Conduct Evaluation
12. Document Usability Test Findings

What Can Be Evaluated?

Usability Engineering typically measures a system's user interface (UI) with respect to a set of attributes such as ease of learning, ease of use, affordance, usefulness, and satisfaction. These days *performers* (not "end-users") interact with the UI through familiar elements such as windows, dialogues, menus, icons, buttons, hypertext links, voice response, and the occasional profanity. Usability goals the designer's targets regarding how the UI is expected to meet human capabilities - and possibly performance needs. Usability Engineering can help to improve UIs, evaluate alternative designs or products, ensure / increase performance, and ensure system acceptance by those who do the work. When the Usability Engineering is applied to performance-centered design, our systems are better able to meet business goals through human performance.

Why Conduct Usability Evaluations?

There are many reasons, including:

1. system development is expensive; supporting a bad UI is even *more* expensive;
2. performers will reject or work around systems that do not meet their needs;
3. design teams need to discover performer problems with the UI to provide remedies;
4. the best designers are not representative of the performers; development teams need to understand performer perspectives, experiences, and capabilities;

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5. Usability Engineering is an inexpensive way to improve systems before they are implemented, to improve existing systems, and to choose usable systems;
6. business users do not have a lot of time to spend learning how to use a system;
7. businesses cannot train fast enough to keep pace with attrition and changing business rules;
8. performers prefer usable systems with fewer features to a system with gratuitous and overwhelming features which they have to work hard at figuring out; and
9. performers often use systems in ways developers did not expect, and if designers find this out, they can build these features into a new system.

When And How Is Usability Evaluation Conducted?

Evaluation can be done at any point in the development or implementation of a system, and in a variety of settings. There are the four primary rules:

1. keep usability goals in mind when designing the test;
2. make the test as similar to the performer's work environment as possible (using simulated or actual work tasks);
3. have performers do the testing (include representatives from all performer groups, although it is not necessary to have many); and
4. accept results. *If goals are not met, then the application is not usable and requires redesign.*

Where Is Usability Engineering Performed?

Tests can be performed in a real work setting or in a usability lab (a studio equipped with video cameras to record performer interactions with the system). A usability filters out all other work activities so performers can focus on tasks that the system was designed to support and that they perform on the job. Conduct on-site tests - and videotape them - when it is not possible or practical to use a lab, or when it is desirable to test the system under the most realistic working conditions. A number of developers can observe testing in the lab because evaluators and observers are in different rooms. A smaller team may be more appropriate for on-site testing.

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Recording test sessions on videotape is helpful for refreshing memories and demonstrating to management why changes to the interface are necessary.

If performed after a system has been implemented, Usability Engineering can help identify areas of the UI where additional support may be needed. So-called *extrinsic* or *external performance support* opportunities are identified in this manner. The general rule, however, is that Usability Engineering should be planned and executed early in the development cycle and applied iteratively as a process for continuous improvement until goals are met. According to the Gartner Group, development costs increase dramatically as function of how late in the development lifecycle Usability Engineering is applied.

What Happens After Usability Evaluation?

Development teams must *apply* results to the UI (what a concept!). Applying results is the purpose and payoff of Usability Evaluation. A round of testing is estimated to increase product usability by 30% if UI changes are made. Such an increase can save maintenance costs and improve productivity *enough to save the entire development cost over the useful life of the product*. It can also avert disasters, such as delivering a system that is rejected by performers even though it met *functional* specifications.

Conducting the Test

To prepare a test plan for the usability evaluation:

- select an appropriate test site;
- select and schedule users to be the test evaluators;
- obtain and install hardware/software to be evaluated at the test site;
- establish system connectivity (if appropriate);
- prepare testing materials (test scenarios, usability goals, debriefing questions);
- pre-train users, if necessary; and
- conduct a dry run of the test to ensure all software works as intended, everyone understands their roles, and the testing materials are usable.

The test....

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On the day of the test, be sure to tell the evaluators that their expert input is valued and will be taken seriously. Let them know that they are not being evaluated, rather the system is being evaluated against a set of usability goals. *Don not reveal the goals.*

Although adhering to the test plan is important to obtain meaningful results, often the experiences of the first evaluator(s) will show a need to modify the test plan to achieve overall test goals, so be flexible. The dry run will mitigate - but not necessarily eliminate - the need to modify the test plan once the evaluation has begun.

All members of the observation team should take notes and discuss test results at the end of each day's sessions. Look for trends. Are most of the evaluators having the same problems with the user interface? Suggestions for improvement are often discussed with the evaluator after the test.

Debriefing, which is conducted after the evaluator has completed the test, often provides valuable feedback on the usability of the user interface that was not observed during the test.

At the end of the session....

Review usability goals, evaluation notes, and the evaluation videotapes. Record recommendations for improving the user interface. The usability consultant produces a report of all recommendations, but it is a good idea to discuss results and recommended changes while they are fresh in everyone's mind. In practice, most suggestions for improvement are identified during the evaluation and from observing as few as three evaluators.

It's Not Rocket Science...

But it is science. As a dear friend often reminds me, "*The Process is the Gift.*" For those who are more process-oriented than the above remarks can satisfy, I've included the following "Pocket Guide to the Twelve Steps of Usability Engineering:"

Step 1

Determine Test Site

Deliverable: Commitment for a suitable location to conduct the usability test

- Select a usability lab or identify a location suitable for a usability test.
- Consider connectivity, set up and testing.
- Consider evaluator travel and parking.

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- Get commitments for space and equipment for the times you intend to conduct the lab plus some time before and after.

Step 2

Select Evaluators

Deliverable: Commitment by suitable evaluators to participate in the usability test

- Determine an appropriate number of evaluators.
- Determine the levels of evaluator necessary for the test.
- Consider evaluator travel, parking, and other needs.

Step 3

Document Usability Goals

Deliverable: Set of measurable usability goals

- Determine measurement criteria to evaluate usability.
- Determine attributes of concern.
- Determine the measurements of concern.
- Document goals.

Step 4

Develop Scenarios

Deliverable: Set of usability test scenarios

Consider processes, tasks, and activities which:

- enable measurement of usability goals;
- reflect the performers' environment;
- are realistic with respect to frequency;
- are appropriate for the diversity of performers;
- will be performed in production;
- have representative degrees of complexity;

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- impact business performance if not performed correctly;
- represent business criticality;
- accurately represent volumes; and
- considers performers outside of your organization if appropriate.

Step 5

Develop Evaluator Briefing

Deliverable: Briefing document and plan for delivering the briefing

The briefing is designed to orient evaluators to:

- what they will do;
- what will be done with the results.
- the sequence of events;
- understand that the *product* is being tested, not them;
- that the test is being filmed;
- advance training;
- how to get help;
- how to proceed through the scenarios;
- pencil and paper for making notes;
- *verbalize* their thoughts;
- taking breaks as they would on the job.

Step 6

Develop Evaluator Debriefing

Deliverable: Debriefing document and a plan for delivering the debriefing

The debriefing is designed to capture information critical to determining whether or not the usability goals are met. It should capture attributes like:

- visual clarity;

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- consistency;
- compatibility;
- informative feedback;
- explicitness;
- flexibility and control;
- error prevention and control;
- ease of use;
- intuitiveness of labels and messages;;
- layout of elements;
- ease of learning;
- likes /dislikes;
- affordance;
- use of specific system features; and
- use of color.

Step 7

Schedule Evaluators

Deliverables: Evaluator schedule, memo to evaluators, and commitments from evaluators

- Create a schedule based on evaluators arriving 1 - 1.5 hours apart.
- Base time per evaluator on anticipated scenario time x 1.5, plus 30 minutes total for brief & debrief.
- Determine schedule for evaluation based on lab availability, product readiness, availability of evaluators.
- Send invitation to each evaluator
- Confirm changes to schedule.

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Step 8

Set Up Usability Lab or Evaluation Area

Deliverables: Evaluation area, completely tested and ready for the evaluation

Consider the following:

- connectivity requirements;
- software functionality (that it behaves as in the workplace);
- simulated work environment and sufficient privacy to conduct an evaluation; and
- ability to observe without disturbing the evaluator or invalidating the test.

Step 9

Select Observation Team

Deliverables: Commitments from an appropriate number and type of people to serve as usability test observers

Consider the following:

- representatives from business, technical, and management roles;
- not too many;
- keep them out of view of the evaluators;
- roles and responsibilities; and
- need to observe.

Step 10

Conduct Dry Run

Deliverables: Final versions of Briefing, Scenarios, Debriefing, and Roles / Responsibilities

The Dry Run must:

- be run as an actual usability evaluation;
- objectively evaluate if the *test* is workable;
- ensure that all connectivity, hardware, and software functions as expected;
- ensure that briefing accomplishes objectives;
- ensure that scenarios are easy to follow;

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- ensure that debriefing questions make sense; and
- be viewed as an opportunity to make changes to all materials, roles, and responsibilities.

The Dry Run is a usability test of the usability test!

Step 11

Conduct Usability Evaluation

Deliverables: Video tapes, logger sheets, and observer comments

- Provide a waiting area for evaluators away from observation team.
- Try to stay on schedule, but if this is not possible set expectations for next evaluator.
- Brief evaluator in a relaxed, friendly manner. Stick to prepared briefing.
- Observers must not be heard by evaluators.
- Stay focused on usability goals and record what you see.
- Debrief evaluator in a relaxed, friendly manner. Stick to prepared questions.
- Do not share the usability goals with evaluators.
- Do not lead evaluators.

Step 12

Document Usability Test Findings

Deliverables: Documentation of test results and recommendations for improvement

- Document what was observed, not speculation.
- Determine which usability goals were met and which were not met.
- For goals that were not met, recommend changes to make the application usable.
- Distribute findings to all stakeholders.

It's apparent that the designers of our friend the Planning Wizard omitted Usability Engineering to some extent. At the very least, they didn't invite my peer group to be evaluators. How do I know? I conducted an informal poll about the Planning Wizard. Here are the results:

(All questions are answered on a scale of 1 through 6.)

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1. Generally, how do you find your encounters with the Planning Wizard? Answer: 2
1=not at all useful, 6=very useful
2. How would you classify what the Planning Wizard told you about how to make changes to your project plans? Answer: 3
1 = difficult or confusing, 6=logical or easy
3. How would you describe your feelings when the Planning Wizard appears? Answer: 2
1=I'd prefer a sharp stick in the eye, 6=happy to see the little fellow
4. In general, how would you rate the Planning Wizard as a performance support element?
Answer: 3
1 = terrible, 6 = excellent
5. What did you like most about the Planning Wizard?
can dismiss him - and check the box that says you never want to see him again.
The moustache.
Reminds me of the Monopoly guy.
He actually helped me to make changes to a bunch of tasks at the same time...once.
6. What did you like least about the Planning Wizard?
cutesy.
Intrusive.
What he suggested didn't apply to what I was trying to do.
He kept coming back!!!
He scared me.
The moustache.
7. What are your suggestions for improving the materials?
Lose the Wizard (...just keep the messages).

In the last analysis, the Planning Wizard causes pain; Usability Engineering provides a means to mitigate the pain. It is my hope that your development methods will improve and your performers will benefit from these simple but powerful principles and steps. In the words of Donald A. Norman, *"Now you are on your own. If you are a designer, help fight the battle for usability. If you are a user, then join your voice with those who cry for usable products. Write to manufacturers. Boycott unusable designs. Support good design by purchasing them, even if it means going out of your way, even if it means spending a bit more. And voice your concerns to the stores that carry the products; manufacturers listen to their customers...."*

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So much for software. Next time we'll talk about freeing the latch that allows the spare tire bracket on my Sport Utility Vehicle to swing freely away from the tailgate- if only I had three hands. That is yet another story.

Acknowledgement

The usability evaluation methodology described above evolved from my experience as a Human Factors Engineer with Aetna, Inc. Many thanks to Christine Neligon, Nancy Conlan, Donna Way, Tom Furey, and Mike Berstene for their commitment to defending human attributes in the age of the computer - and for the privilege of working with and learning from them during my years with Aetna.

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