

Creating an Elegant, Intuitive, User Interface

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Abstract

This paper describes our experiences doing usability testing of the user interface (UI) and online documentation for Magellan ServiceMonitor (TM). Rather than waiting for a finished user interface to document, we undertook our efforts right up front in the product development process. We based the usability test on Sophie Kohn Kaminsky's "Do-It-Yourself Usability Test" (see "Test Early, Test Often" in the SIGDOC Conference Proceedings, Ottawa, October, 1992). This paper shows our testing methodology, the benefits we have seen, and implications for the profession of technical writing.

Introducing Magellan ServiceMonitor

Designed and developed by Bell-Northern Research, Magellan ServiceMonitor was the first prototype of a PC-based network management product for data communications service providers and their customers.

Our goal was to produce an elegant, intuitive user interface for tasks of value to potential customers. Consequently, the design process was iterative and very user-centered. Both the user interface and the documentation were viewed by us as the interface to the product, and as such had to work together. We felt that the user interface should be as self-explanatory as possible, requiring minimal documentation.

Information Development Methodology

In order to help achieve our goal, the technical writer became a member of the development team as soon as the system description and first user interface sketches were available. We intended to deliver all user documentation for the product exclusively online.

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We created the online documentation (help) in Microsoft Word for Windows, and used the WinHelp authoring tool, which provided basic hypertext and indexing functionality.

To do the testing, we adapted a "do-it-yourself" documentation formative usability test created by my colleague, Sophie Kohn Kaminsky. The kit includes a pre-test questionnaire, the testing template, and a post-test feedback form. According to Ms Kohn Kaminsky, "Formative usability testing involves asking people to use a portion of the information and give feedback, turning the feedback into improvements to the document, then asking someone else to try it again. Formative usability testing is not gathering authoritative empirical data for or against any broad principle in information design. Nor is it an exhaustive test of all aspects of an information package to rate its level of quality.¹" As such, we found that formative usability testing is very appropriate to a prototyping design process. With prototyping, we have the opportunity to make successive refinements to documentation as refinements to the product are also being made.

However, we made a significant change in the test itself by shifting its focus from documentation usability to product usability. The test basically required the subject to install the product, following directions in a "read-me" file, then to browse the online documentation to get familiar with the product, and then to perform a number of typical tasks with the product.

We made sure to emphasize to the subject that he or she was helping us to test the user interface, and that we were not testing his or her knowledge or abilities.

The pre-test questionnaire gave us information about the subject's background and experience level, which we took into consideration when interpreting the test results.

The post-test questionnaire gave the subject the opportunity to provide subjective comments about the product and online help.

1. Sophie Kohn Kaminsky, *Formative Usability Testing*, Northern Telecom internal document, 1992

The pre-test questionnaire, test, and the post-test questionnaire are included at the end of this paper.

As recommended by Ms Kohn Kaminsky, the testing required three people: the test subject, a guide to direct the subject and answer questions, and a recorder to take detailed notes of the subject's actions, comments, questions, and any assistance given.

Because we were testing quite a number of subjects and making refinements to the product periodically as we went along, we decided that we would produce a memo after each test indicating the usability issues found. We felt that this would be much more useful than an elaborate report at the end of testing. A sample memo is included at the end of this paper.

We discussed possible causes and solutions to the problems after each usability test with members of the development team. Causes ranged from the subject's background, to the user interface, to the online documentation.

The development team was very interested in the usability testing results. They took the results seriously and viewed usability problems as real indications of areas where the user interface needed improvements.

Based on the accumulated and triangulated evidence, we implemented and further tested fixes until we arrived at an interface that is attractive, professional, and easy to use.

The following factors give an idea of the level of effort involved:

- design and prototyping of a market trial version of the product took the team of three software developers a little more than four months to complete
- as a third-party extension to an existing, commercially available network management system, the product consisted of two relatively complex windows/dialogs and two relatively simple windows/dialogs
- we conducted two rounds of usability testing, the first with Nortel internal staff, and the second with market trial customers prior to the trial (10 subjects in total)
- each test lasted about one and a half hours

We fixed obvious minor problems after each test, and did two major re-designs based on convergence of evidence.

Judging by customer responses during the market trial, we were well on the way to achieving our goal. At the conclusion of the market trial, one group of trial users formally reported that they were "very satisfied," found the product "very easy to use," and "would like to work with it in the future."

Benefits

By producing and testing the user interface along with its online documentation, we realized a number of significant benefits.

Because we created online documentation early in the design process, we were able to improve the user interface itself. This happened in three ways:

- the need for complex or convoluted documentation was interpreted as an indication of design problems in the user interface
- any vital information buried in the documentation was incorporated into the user interface instead, making the user interface self-explanatory
- the clarity and effectiveness of text and graphic items on the user interface were improved

Consequently, as an unexpected bonus, many usability issues were caught and corrected even before testing.

Another major benefit of doing online documentation and usability testing early in the design process was that it provided a reality check to ensure that the design was truly user-centered. As one of the developers said "The inclusion of online help is really a first. We believe that doing the online help incrementally will improve our attention to usability as part of our design."

We found an incredible and unexpected variety in the ways our test subjects went about trying to use the product. In addition, the testing pointed out very clearly the problem areas that all subjects encountered, in spite of their different approaches.

Further testing with a suitable number of subjects verified that the re-design had solved the problems.

We found that this approach of capitalizing on the synergy between the user interface and the online documentation reduced, if not entirely eliminated, the need for training. Our usability subjects were asked to browse the online documentation and then perform a number of tasks, without any training whatsoever. (For more complex products, this type of testing may point out areas where training is needed.)

An added benefit was that having clear, useful online documentation available with the prototype was a good marketing tool. An early prototype complete with full and accurate online information was shown at CeBIT, an international trade show. A later version was shown at an international Nortel users' group meeting. Well designed online information produces confidence that the same level of care has been taken with the software design.

At the end of the four months, when the product was ready for market trial (at four sites), the development manager reported on our progress: "The inclusion of online help as an upfront task has helped us make a more friendly product and impressed our customers in Europe. Special thanks ... for the initiative of tighter working between development and documentation. It has been very positive! .. The concurrent development of software and online documentation with usability testing is a great way to build a product."

Changing Roles

From our experiences with ServiceMonitor, we can see that the role of technical writers is changing, and changing rapidly. Furthermore, our experiences are not unique. It seems that others in the industry are experiencing similar changes in the role of technical writers, especially regarding involvement in user interface design.

For example, similar experiences at Intel were reported recently in the article "Producing Usable Desktop Conferencing Software."¹

Also, Daniel Dresner posted the following comments to the InfoDesign@uva.nl conversation:

"... the natural development of the role of technical writers is the increased involvement in design of the user interface. ... I am currently involved with the British Computer Society drafting a role specification for technical writing..."

Preparing for New Roles

How do we prepare for these new roles? What do we need to know? What do we need to learn?

In fact, technical writers already have a lot of skills that can be directly applied to user interface design, such as:

- attention to user tasks
- assessing meaningfulness, appropriateness, and persuasiveness of text elements
- assessing consistency of text elements
- testing the usability of documentation (hardcopy documentation as well as online help and online documentation)

As we have seen with our experiences on the ServiceMonitor team, these existing skills can be expanded easily to include:

- assessing meaningfulness, appropriateness, and persuasiveness of graphic elements
- assessing consistency of graphic elements
- testing the usability of the user interface

In addition, in order to become more valuable members of a user interface design team, we should become familiar with the following:

- user interface design principles (see, for example, *Designing Visual Interfaces* by Kevin Mullet and Darrel Sano)
- graphic design principles (see, for example, *A Primer of Visual Literacy* by Donis A. Dondis, and the journal *Step-By-Step Graphics*)
- software design methodologies (see, for example, *Structured Analysis and System Specification* by Tom DeMarco)
- prototyping methodologies and tools (see, for example, "Prototyping for Tiny Fingers" by Marc Rettig, in *Communications of the ACM*, April, 1994/ Vol 37, No. 4)

Another good resource is the the World Wide Web site for the interaction design community (<http://www.io.tudelft.nl/www/uiworld/intro.html>) . The site, "Resources in Interaction Design" is a "comprehensive listing of useful information for designers involved in the development of GUIs, information kiosks, CD-ROMs, Interactive TV, consumer electronic products and games."

Conclusion

In learning new skills, we must always remember the major value of technical writers: technical writers stand in for users and ask the key questions "What is this tool good for anyway?" "Why?" and "How?"

As the development manager cautioned us, "It's really important for the technical writer to be a member of the team and understand the operational context for the product. But the writer must be careful not to adopt the developers' point of view. The technical writer must remain a visible and vocal representative of the user."

1. "Producing Usable Desktop Conferencing Software" *Technical Communication, Journal of the Society for Technical Communication*, November, 1994

Sample Memo

RE: usability test top 3's

Here is my view of the top three usability issues from the each of the tests of May 3/94.

Subject 1

1. interpreted red dot on icon as meaning "critical"
2. trouble moving icon from NewPorts submap to Europe submap
3. trouble with installation instructions

Subject 2

1. could not find how to start monitoring the status of ports
2. trouble with installation instructions
3. could not find the "Report on Performance" window

Subject 3

1. trouble moving icon from NewPorts submap to Europe submap
2. could not find the "Report on Performance" window
3. trouble with installation instructions

Subject 4

1. asked for clarification of one of the installation instructions

Conclusions

1. The trouble moving icons to another submap is due to unfamiliarity with the network management tool. No changes required, as this knowledge is assumed as a prerequisite.
2. The installation instructions need to be re-written more clearly.
3. The trouble finding "Report on Performance" is probably due to the fact that the ServiceMonitor menu items are buried under the Monitor menu. The subjects often went to other menus looking for ServiceMonitor applications. Recommend making ServiceMonitor applications more visible at the top level.
4. The question to start monitoring status is a trick question. Unfortunately, it is not obvious in the user

interface that as soon as you log on, you automatically start monitoring status. Could we add a message to the logon confirmation to the effect that ports on server xx (the selected server) are now being monitored?

5. Our four subjects were all speaking English as a second language. None of them complained that the help was too verbose (as a previous subject did). We can continue to write in complete sentences, but re-format slightly to improve the scanability of the help.

Pre-test Questionnaire

1 Which category does your current job fit into?

- | | |
|---|---|
| <input type="checkbox"/> executive or manager | <input type="checkbox"/> administrative staff |
| <input type="checkbox"/> engineer | <input type="checkbox"/> specialist (Area_____) |
| <input type="checkbox"/> technologist | <input type="checkbox"/> other (Specify_____) |

2 Which activity best describes the work you do? You can check more than one.

- | | |
|---|--|
| <input type="checkbox"/> management | <input type="checkbox"/> administration |
| <input type="checkbox"/> development | <input type="checkbox"/> testing |
| <input type="checkbox"/> customer service | <input type="checkbox"/> software verification |
| <input type="checkbox"/> training | <input type="checkbox"/> other (Specify_____) |

3 How long have you worked in this field?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Less than
1 year | 1-3
years | 4-7
years | 8-15
years | More than
15 years |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

4 How long have you been using Magellan NMS?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Never | Less than
1 week | 1-3
month | 4-12
months | more than
12 months |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

5 How long have you been using the network amanagement tool?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Never | Less than
1 week | 1-3
month | 4-12
months | more than
12 months |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

6 What do you think about information products (Manuals, Cards, Help)?

- ☐ I like using most information products
- ☐ I don't like to use most information products
- ☐ I have no opinion
- ☐ Other (Please specify_____)

ServiceMonitor Usability Test

Subject:

Monitor:

Date:

Task	Observation	Help given
Follow the instructions in the ReadMe file on the installation diskette to install the platform and Magellan ServiceMonitor.		
Can you tell me how to access the online Help for ServiceMonitor?		
Perform the following tasks. If necessary, use the online Help for assistance.		
Start monitoring the status of all the VPN ports.		
What is the purpose of the NewPorts submap?		
Move the new port called Test0019 from the NewPort submap to the Europe submap.		
What is the status of the Tokyo port in the Japan sub-map (normal, critical, etc.)?		
At what time of day does maximum utilization of Test0019 occur?		

ServiceMonitor Usability Test

Task	Observation	Help given
Change the histogram to a line graph.		
When does maximum throughput received occur on the port Test0019?		
Print the graph		
Plot the utilization received for a port in Europe on April 21, 1994.		
Stop monitoring the status of ports and exit ServiceMonitor. Did you notice any change in the status of the ports?		
Select a new ServiceMonitor Server to log in to.		

Post-test Questionnaire

1. What was your first impression of the presentation of the online Help?
2. How readable is the online Help?
3. How accurate do you find the information?
4. Rate the completeness of the online Help.
5. How easy is it to find your way around in the online Help?
6. How useful does the Help seem to you?
7. What are the two best things about the online Help?
8. What are the two worst things about the online Help?
7. What are the two best things about ServiceMonitor?
8. What are the two worst things about ServiceMonitor?
11. Do you have any other comments about the online Help or today's test?