

HCI Journal

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An Abstract of a Paper Submitted to Nova Southeastern University
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The central concept of human-computer interaction (HCI) is usability, usefulness, and ease of use. The field of HCI has the goal of producing interactive software that can be used effectively, efficiently, safely, and with satisfaction. During a four-week period in September and October of 1999, the following journal of HCI related observations was created. These observations focused on the usability, usefulness, ease of use, and satisfaction of the author's computer interactions during that period. Journal entries were presented in the order in which they occurred during the four-week period. Following the journal, the paper concluded with a summary of the observations made along with references to the relevant HCI literature that supported these observations. HCI topics discussed were Web site usability, consistent response times, error messages, obviousness and learnability, search results, and interaction devices.

HCI Journal

The central concept of human-computer interaction (HCI) is usability, usefulness, and ease of use (Hartson, 1998, November). The field of HCI has the goal of producing interactive software that can be used effectively, efficiently, safely, and with satisfaction. During a four-week period in September and October of 1999, the following journal of HCI related observations was created. These observations focused on the usability, usefulness, ease of use, and satisfaction of my computer interactions during that period.

In the following pages, these HCI observations are recorded as journal entries. The eight entries are presented in the order in which they occurred. Following the journal, the paper concludes with a summary of the observations made along with references to the relevant HCI literature that support these observations. HCI topics discussed are Web site usability, consistent response times, error messages, obviousness and learnability, search results, and interaction devices.

HCI Observations

Journal Entry 1

One of the first tasks I undertook after beginning this HCI journal was to renew my membership in the Association for Computing Machinery (ACM) and to add the SIGCHI special interest group (SIG) to next year's membership. After accessing the ACM home page on the Internet, I quickly located three links that would allow me to join the organization (ACM, 1999). The first link was located in a menu that ran across the top of the page. Five links were included in this menu: home, feedback, join, go

shopping, and search. However, the link to join did not work and continued to produce errors on multiple attempts. The link to go shopping also was not functional.

Frustrated, I located two additional links in another menu that ran down the right hand side of the page. These links were clearly marked to allow the user to join either the ACM or one of the ACM SIGs. My frustration continued to increase when both of these new links produced error pages that said the requested page could not be displayed. After spending another 30 minutes trying numerous other defective membership links, I gave up and decided to mail in the ACM renewal form that I had received from the post office.

In spite of the fact that the ACM Web site was well laid out with clearly labeled text links on both the top and sides of the page, I would rate its usability as extremely low. Simply, I was unable to accomplish the task that was my primary reason for using the site. While trying to locate and use the site's many nonfunctional links, I became frustrated and as a result less effective, efficient, and satisfied. I expected more from the ACM Web site.

Journal Entry 2

In contrast to the negative experience of the ACM Web site, I found the NetZero.net site to be satisfying and easy to use (NetZero, 1999). My purpose for going to the site was to subscribe to NetZero's free Internet connection service and to download the company's user interface for my Windows 98 computer. I enrolled in the free service by following a clearly documented three-step process.

The first step was to download the NetZero application using either FTP or HTTP. The HTTP option proved useful since I was behind a firewall and would have been unable to connect using FTP. Next, I installed NetZero and the application

automatically dialed and logged my computer into the NetZero site. The last step of the process was to complete the new user enrollment process. Data entry during the enrollment process was kept to a minimum by the site's use of a combination of pop-up menus, scrolling, and form fillin. NetZero's Web page designers took advantage of the fact that scrolling lists and combo boxes reduce a user's data-entry burdens and related errors (Shneiderman, 1998).

In addition to NetZero's simple and error-free enrollment process, the installation program's behind the scenes sophistication made Windows 98 configuration and connection to the Internet almost transparent to the user. The program automatically configured Windows dial-up networking and allowed me to easily choose the best local telephone connection based upon my current location. My experience with similar installation programs employed by other major Internet service providers (e.g. Netcom, MSN, Prodigy, AOL, and Ameritech) made me appreciate the trouble free nature of the NetZero configuration process.

Journal Entry 3

After the positive experience with the NetZero.net site reported in the previous journal entry, I was surprised by the site's slow response when I logged in today to find out the specifics of my free access account. Like most people, I had established expectations based on my experience of the time required to complete a given task (Shneiderman, 1998). The site's slow response on this occasion made me both concerned (that something was wrong) and frustrated.

Journal Entry 4

This entry describes the negative experience I had upgrading my online banking from Microsoft Money 5.0 to Microsoft Money 2000. The recent acquisition of First Chicago - NBD by Bank One and related changes in company's online systems required the bank's online credit card users to upgrade to the new version of Money to be able to download credit card balances and line item detail. The first step of the process went smooth, and I was able to download and view my credit card account statement within 45 minutes of beginning the upgrade process. However, the new version of Money was unable to communicate and transfer checking account balances. The only error message given was "Unable to communicate with Bank One."

Telephone calls placed to Bank One technical support were of no help. The technicians were unfamiliar with the new version of Money and stated that Bank One did not support it at this time. A subsequent call to Microsoft produced similar results. After many hours of trial and error, the problem was located late the next day. The communication error referenced so vaguely by Money turned out to be a configuration incompatibility between Money 2000 and the proxy server software that I use to connect to the Internet. After reconfiguring the proxy server, a process that took about five seconds, Money was able to successfully communicate with Bank One and download the checking account balance.

Error messages are critical to the usability of a system for two reasons (Nielson, 1993). First, they occur in situations when the user is in trouble and needs help. Second, they present an opportunity to help the user work through a problem and understand the system better. In my case, if Microsoft had followed the four simple rules of error messages (Shneiderman, 1982), the problem would have been corrected in minutes

instead of hours. Shneiderman states in his second rule for writing error messages that they should be precise rather than vague or general. For example, instead of saying, "Unable to communicate with Bank One" the message would have been more effective if it had said "Unable to connect to Internet to communicate with Bank One."

Journal Entry 5

My experience as a new user attempting to become familiar with the EndNote bibliography application is described in this entry. EndNote is a Windows application that works together with Microsoft Word to create bibliographies in one simple step. The program proved more difficult to master than originally thought. I expected program functionality to be similar to Word and therefore intuitive (i.e. obvious) ("Obviousness", 1999).

This was far from the case since the task of creating and inserting APA style references into Microsoft Word documents was far from the normal functionality of Microsoft Word and not in the experience of the average Microsoft Word user - including myself. Once I worked through the uniqueness of the task and a sizable portion of the user's manual, the program began to make logical sense, and I became adept at creating and inserting references. Based upon my experience, I would rate the program as having average learnability. Learnability is the effectiveness, efficiency, and satisfaction with which a user is able to achieve a competent level of performance with a product, having already completed those tasks once previously (Jordan, 1998).

Journal Entry 6

Today I attended the demonstration of a Web-based electronic document management system that my company is evaluating for possible purchase. The application, Meta-DM, while labeled "Web-based" by the developer, is in reality a client/server application with a hastily developed Web-based user interface. The product's most obvious deficiency was in the area of search results.

The results returned by a search engine should provide users with enough information to know whether to follow a link or not (Spool, Scalon, Schroeder, Synder, & DeAngelo, 1999). Meta-DM did not. The product's search results consisted of a list of filenames without any type of description. In addition, the results were sorted in alphabetical order, and the product did not provide the option of using a relevance algorithm for organization. When asked about the shortcomings, the sales representative replied that Meta-DM's search results could be customized to return anything we wanted. His response was not reassuring.

Journal Entry 7

During the past few weeks, one of my work assignments was to add Dell personal computers to the list of approved MIS standards for the corporation. Part of this process was the evaluation of a variety of interaction devices available from Dell on both its desktop and laptop computer systems. As Shneiderman points out, the increased concern for human factors has led to hundreds of new devices (Shneiderman, 1998). The original corporate desktop standard was the IBM PL desktop with a two-button mouse and a 17-inch CRT monitor. The laptop standard was an IBM ThinkPad with a TrackPoint pointing device and a 13-inch LCD display.

The Dell Direct business model, which eliminates the "middleman" and reduces the total cost of ownership, enabled me to both reduce the cost per PC and to upgrade the interaction devices provided with each system. For example, the new MIS standard Dell Optiplex desktop includes a 19-inch monitor and a Microsoft Intellimouse Pro wheel mouse. Initial response to both devices was very favorable. Comments focused on the increased readability of the larger display as well as the comfort provided by the advanced mouse design. The new MIS standard laptop configuration also offers interaction device improvements. The Dell Inspiron 7500 replaces the somewhat unfriendly TrackPoint mouse with a user configurable touchpad. In addition, the 15-inch LCD display is significantly larger than IBM's and provides a viewing area equivalent to a 17-inch CRT monitor. Initial user response to these changes was also favorable.

Journal Entry 8

A recent experience provides one example of how interface usability might affect a user's decision to switch from one application to another. For the past six months, I have been a regular user of FreeDrive.com. FreeDrive is a free Internet-based file storage service that allows users to store up to 25 megabytes of information on the Internet. The service is useful for both backing up critical files and for transferring large files between work and home. Although the Web-based user interface provided by FreeDrive is simple, initially it was unfamiliar and currently lacks the drag and drop file manipulation functionality provided by Microsoft Windows 95, 98, and NT.

After seeing a banner ad for X-Drive.com, I decided to try the service and see how it compared to FreeDrive. After downloading, installing, and using X-Drive, I was impressed by two significant improvements of its interface. First, the Web interface

enabled file manipulation that was intuitive and easy to understand. The menu buttons that ran across the top of the display were a combination of icons and descriptive text. They were immediately available and did not require the user to go to another Web page to perform all file manipulation functions.

Second, and most significant, the X-Drive application integrated itself into Windows Explorer. Along with the original C, D, and E physical drives, X-Drive created an additional X virtual drive. File manipulation using the X drive was identical to the other drives. The only noticeable difference was the increased time to complete a file move/copy caused by slower Internet transfer rates. X-Drive's tight integration with Windows Explorer made the decision to switch an easy one.

Summary

The HCI observations given above focused on the usability, usefulness, easy of use, and satisfaction of my computer interactions during a four-week period in September and October of 1999. In the following sections, these observations are summarized with respect to relevant HCI topic areas and supportive literature. Topics include Web site usability, consistent response times, error messages, obviousness and learnability, search results, and interaction devices.

Web Site Usability

The usability of a Web site such as ACM.org or NetZero.net depends on what users are trying to accomplish (Spool et al., 1999). Users may be surfing, doing research, buying products, and downloading software. In Journal Entry 1, I was attempting to buy a

product (i.e. ACM membership). In this regard, the site failed miserably due to its non-functional subscription links. However, in other aspects the site was very usable.

For example, many of the site's links explicitly described the content of the page they linked (e.g. "Change your username and password - account required"). Descriptive text links are vital to a Web site's usability (Spool et al., 1999). I found it easy to locate the appropriate page and to change my ACM password using this link. Another area in which the site's usability was high was the Digital Library search interface. The search page was simple, straightforward, and produced results in a clear and easily understood format.

In contrast, my observations in Journal Entry 2 described why NetZero's site usability was high. Unlike the ACM, NetZero provided a simple and error-free enrollment experience. I was able to accomplish my goal quickly and easily and move on to other things. The more a Web site helps the user find the information they are looking for and accomplish the task they are trying to accomplish, the more usable it is (Spool et al., 1999).

Consistent Response Times

While the NetZero site excelled in Web site usability one day, it failed miserably in consistent response the next. Users expect consistent interface response times. In the example given in the second journal entry, NetZero users expected and did not receive consistent site response. Slow, unexpected response times lead to concern and then frustration among users (Shneiderman, 1998).

Error Messages

Journal Entry 4 provided an example of the criticality of error messages to the usability of a system. Error messages, when properly written, are able to help a user work through a problem while assisting the user to better understand the system (Nielson, 1993). In my example with Microsoft Money 2000, a clearly written error message would have saved many hours of frustration.

Obviousness and Learnability

The fifth and eighth journal entries commented on interface obviousness (or intuitiveness). In the EndNote example, the function to be performed was outside the experience of the average Microsoft Word user. As a result, EndNote had a difficult time creating an intuitive interface for a task that was not obvious ("Obviousness", 1999). In contrast, Journal Entry 8 described X-Drive's ability to integrate itself so tightly with Windows Explorer that its interface became inherently obvious.

While the EndNote user interface was far from obvious to the new user, its learnability was average or better. After working through a task the first time, I was able to competently perform the task in the future. This fits well with Jordan's definition of the learnability of new applications (Jordan, 1998).

Search Results

The usability of search results was discussed in Journal Entry 6. Users often have trouble using and interpreting search results for four reasons (Spool et al., 1999). First, search results are not organized in a way that is helpful to users. Second, the information provided by a search is not enough to determine if a link is worth following. Third, search results include redundant information. Fourth, search results contain useless information.

The search results from Meta-DM's search engine provided little help to users in interpreting results. Search results included only a list of files sorted in alphabetical order. Presented with this type of results list, the Meta-DM user must resort to trying all the links or just guessing.

Interaction Devices

My experience in Journal Entry 7 specifying new personal computer standards at work demonstrated how improvements are continually being made by computer manufacturers in the area of interaction devices. My company's users will soon benefit from ergonomic pointing devices and larger graphic displays. As Shneiderman pointed out, these new devices are the result of increased concern for human factors (Shneiderman, 1998). They are also the result of lower prices.

Conclusion

The journal entries and the summary of HCI observations related above provided examples of both the positive and negative effects of human-computer interaction on my daily life. As the field of HCI grows closer to its goal of producing interactive software that can be used effectively, efficiently, safely, and with satisfaction, my quality of life will improve significantly.

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