

Improving Our Direction: A Study in Human Factors Engineering

Have you ever walked up to a door and not known whether to push or pull to open it? If the design of the door were self-evident, making it very clear how to open it, would this improve your ability to pass through more quickly? Would it increase your performance? Human Factors Engineering (HFE) can come into play during the design of something as simple as a door. In much the same way, HFE can improve or hinder the performance of computer systems. The primary goal of this half art, half science discipline is to increase user productivity.

What is HFE?

Designing a system with maximum performance requires a thorough understanding of the user. HFE seeks this by making use of research in the areas of cognitive psychology, sensory processing, physiology, neurology, and age. Good HFE ensures the following: reduced work time, fewer errors, reduced training, positive user acceptance, and increased user satisfaction.

DST Innovis' HFE efforts involved industry experts, including consultants from Human Factors International, a company that specializes in user-centered software design for clients including Barnes & Noble, Federal Express, Dow Jones Interactive, and MCI. Using HFE, these industry experts worked with us to develop TechConnect, CyberCSR, and Compass.

Order Entry Meets HFE

Most everyone at DST Innovis has seen a demonstration of Compass, which is the GUI (graphical user interface) version of Order Entry. Before design began on Compass, human factors studies were conducted on Intelecable Order Entry to determine what Compass needed to accentuate. This process involved task analytic interviews with Intelecable CSRs (customer service representatives) in six locations worldwide, as well as observation of these CSRs on the job.

The studies showed that CSRs using Order Entry tended to view the following information 60 percent of the time: financial history, service history, and the customer's services. This finding, among others, led to the following proposed changes:

- make frequently used customer information immediately available
- make core customer information always visible
- limit the navigation for the CSRs.

As a result of this initial study of Order Entry, when a CSR now opens a customer's account, the financial history, service history, and the customer's services display on an overview screen in Compass. In addition, the customer's contact information, comments, and warning information are always visible. This consolidation eliminated several actions and keystrokes. In fact, this screen alone answers many questions without requiring additional navigation.

Thinking Things Through

When DST Innovis began migrating Order Entry to Compass, one requirement towered above all others: Compass must perform as well as or better than its predecessor. One customer made this abundantly clear: for each second trimmed from the average processing transaction, they save \$32,000 annually. Shaving 10 seconds from each call saves the customer \$320,000 annually.

The real dilemma, however, wasn't processing time—it was "user think time." In other words, even though a CSR was on the phone for an average of four and a half minutes, average machine processing time was only four seconds. Optimizing that "think time" was the biggest issue.

Phase 2

After the testing with the “original” Order Entry, as well as studying the elements that needed to be added and changed, we created a prototype of the software. From there we conducted “low fidelity” usability testing to validate the design. Low fidelity testing encompassed design printouts and proposed screen prototypes. Users simulated operating the application using the printouts, then answered questions about the tasks.

When these steps were complete, we created an iterative design and conducted “high fidelity” usability testing with an alpha version of the software. This human factors process created a user interface that was much easier to navigate and comprehend than the old interface.

Phase 3

Recent testing in Kansas City compared the existing DDP/SQL and Intelecable versions of Order Entry with Compass. Five CSRs of varying experience (1.5 to 8 years) participated. The lab consisted of a test room with a PC workstation and monitoring cameras and microphone, as well as a one-way mirror with an observation room on the other side. Testing took approximately 2.5 hours for each participant.

The Process

Testing consisted of an initial interview to gather work experience and background information, then a brief introduction to Compass. Participants were presented with simulated phone calls with different scenarios, during which they used Compass to answer the questions.

For example, one call was “I lost my bill and I need to find out how much I owe this month.” The five participants had to locate the customer’s current balance from the overview screen.

When the scenarios were complete, participants were asked to complete a written evaluation survey.

Results

The results confirmed the learnability and efficiency of the Compass user interface architecture, as well as future design plans. The CSRs were able to complete scenarios with minimal prompting and minimal training.

The process also revealed several areas of Compass screens that can be improved with minor adjustments—mostly cosmetic.

Compass was deemed easy to learn and intuitive. Overall, CSRs were pleased with the layout and design, and they felt they would be comfortable working with Compass.