Insights on Telemedicine: To Succeed Is Human

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A few years back, I would occasionally see a poster with an interesting proposition: “To err is human, but to really screw things up requires a computer.” The message offered much-needed comic relief and provided a convenient scapegoat for frustrated computer users who did not feel they deserved all the blame when automation went wrong.

Hardware and software manufacturers probably failed to see humor in the poster’s message. After all, the development of information technology was proudly based on the most advanced concepts known to electrical engineers and programmers. Industry actions tended to reflect an implicit belief that the weak link was the user, not the machine or the operating system. Hence, enormous effort was devoted to training people how to use computers. Relatively few resources were allocated to designing machines in consideration of the natural tendencies of people who used them.

Happily, interest in understanding and meeting users’ needs has surged within the past year, and telemedicine is one of the areas that has benefited most from the new focus on designing information technology for regular people, not engineers. Several recent developments show how far the industry has advanced with the adoption of human factors as a design imperative.

Computerized management of prescription pharmaceutical orders is a good example of the success that can be achieved when user-sensitive information technology is applied to a serious health care problem. Research in the mid-1990s clearly showed that the traditional process of prescribing and dispensing drugs was one of the biggest sources of error in medicine — accounting for tens of thousands of wrongful deaths each year, according to the Institute of Medicine. Several vendors quickly developed computer systems capable of producing dramatic reductions in medication errors, but doctors avoided the early technology for a variety of reasons, such as the inconvenience of going to a desktop computer and taking the time to turn on, boot up, log in, and enter data.

Fortunately, manufacturers began to study first-generation prescription management systems from a typical doctor’s perspective, and they redesigned the interface based on what they learned. The new systems use pocket-sized, wireless “always on” devices that save time for the doctor and link directly to software that checks for errors and cost-effectiveness. Handheld order entry systems are still being improved, but they are well on their way to widespread acceptance because they are convenient and user-friendly. Palmtop platforms will be equally helpful in reducing another area of major waste in health care — the paper trail. User-friendly interfaces will ultimately accelerate the essential adoption of electronic medical records, too.

Telemedicine applications are also starting to incorporate voice recognition technologies that allow health professionals to record clinical information or to control computer-assisted devices without using a keyboard. For example, the verbal observations of an ambulance-based emergency medical technician (EMT) can be instantly transcribed to a medical record that is relayed to doctors in the emergency room where the patient will be delivered. The paramedic can create critical records without taking his or her hands off the patient. Technologies that convert spoken commands into mechanical actions are also being built into robotic surgery equipment, reflecting the way that surgeons have always issued verbal instructions to a surgical nurse rather than requiring doctors to learn an unnatural method for interfacing with the robots that will soon replace some surgical assistants. This application of human factors thinking will likely promote adoption of telepresence surgery, a promising form of telemedicine that allows a surgeon to operate on a patient located many miles away.

Today’s fastest-growing area of telemedicine is probably home health. Its impressive momentum is directly attributable to the development of home-based devices that can be operated independently by an elderly or disabled patient. Human factors research has been particularly impressive in responding to the needs of persons with problems like low visual acuity, impaired hearing, poor memory, or complicated therapeutic regimens. High-contrast monitors with large print, software that vocalizes printed text, amplified speakers located strategically throughout the home, and computer-activated drug dispensing systems are all gaining acceptance because they are designed to meet users’ special needs. In addition, interactive video over a plain old telephone service (POTS) connection allows a homebound patient and a remote caregiver to see each other face-to-face as needed. Telehomecare will grow even faster because engineers are now building the needs of the end-user into the equipment.

Software navigability is also attracting attention. Computer programmers have started replacing non-intuitive icons with meaningful images, using more simulated speech for user instructions, and locating cursor controls within relevant content areas rather than forcing the user to go to a scroll bar on the edge of the screen. For many software writers, distilling...
all relevant information onto one screen is now a basic goal so that users will not have to scroll at all. Further, Section 508 of the Rehabilitation Act of 1998 provides extensive criteria for ensuring that federal agencies’ electronic and information technologies are accessible to people with disabilities. (For detailed, technology-specific criteria, visit http://www.section508.gov.)

The new focus on human factors is also addressing issues like ergonomics (to reduce or eliminate the physical discomfort of using equipment), troubleshooting (so that users can do basic system checks without calling a technician), and reliability of physical connections between devices (so that cabling will not become disconnected when users inevitably jostle equipment). Recent growth in the breadth and depth of attentiveness to end-users will correspondingly accelerate the adoption of information technology throughout healthcare. In particular, concern with human factors will generate even more successes in telemedicine.

About the Author

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