Usability and the Web

Since the publication of seminal texts such as *The Psychology of Human-Computer Interaction,* User-Centered System Design, and *Designing the User Interface,* usability methodologies have become established components of successful development strategies. The underlying concept of designing for usability is straightforward: empirically study users and their objectives; provide functionality and interfaces that support those goals; and test how the design fits intended usage. In practice, methods for gathering and using this data have taken years to develop, and experts are still refining them to be more effective and less costly to implement. (For an overview of advances, see the *Handbook of Human-Computer Interaction*; for recent developments, consult the proceedings of the annual ACM Conference on Human Factors in Computing Systems.)

Usability design strategies for the Web, however, are in their infancy. Generic guidelines and “design tips” filled the void early on, but as Web sites have become a backbone of business and information exchange, the need for usability techniques specifically crafted for the Web — and robust technologies that support the usability design process — has become critical. The large number of submissions for this issue of *IEEE Internet Computing* indicate that researchers and practitioners recognize the need for Web-specific usability techniques. The articles in this issue address current problems and generation-after-next challenges to developing scalable tools that support usability design for an exponentially growing World Wide Web.

**Unique Challenges**

In software design, we typically expect a particular version of a product to remain essentially unchanged until the release of the next version or update. In Web design, we expect content to be dynamic and fresh, and we expect the interface design to easily accommodate frequent change. In addition, the anticipated user population of a Web site is often diverse, unpredictable, and international. In “ Achieving Universal Usability by Designing for Change,” Gary Perlman presents a case study in which the need for dynamically adaptable elements was particularly acute. The methodology used to create a platform- and language-independent full-text retrieval system illustrates how site designers can build global, usable, accessible interfaces for domains in which change is the expectation rather than the exception.

In contrast to the significant expertise needed to implement a software product, creating a basic Web site requires minimal technical expertise. Just as desktop publishing applications made it easy for almost
anyone to produce a graphical document, Web editing tools now enable nonprofessional designers to produce and manage Web sites. The resulting interface designs can drive visitors away, however, if they do not allow users to easily achieve their goals. In “Improving Web Site Design,” Melody Y. Ivory and Marti A. Hearst address the need to assist non-designers in creating usable designs. The authors explore an automated approach to evaluating sites’ adherence to empirically validated design principles.

One advantage Web site design has over software design is the availability of significantly more usage data to drive design decisions. Unlike software developers, Web site owners can routinely track users’ behaviors. However, making use of the vast amount of server log data from large, evolving Web sites presents several challenges. In “Improving Web Usability Through Visualization,” Ed H. Chi describes how information visualization can harness the power of this data by modeling usage patterns. He shows how predictive models of user behavior can help site designers pinpoint potential problem areas where information might be hard to find.

Finally, some Web design goals overlap with conventional usability goals, like designing functionality to optimize support for the natural way users think and make decisions. Too often Web design guidelines are created without the valuable input available from cognitive and social science. In “How Web Site Decision Technology Affects Consumers,” Juli Jedetski, Leonard Adelman, and Cedric Yeo illustrate how Web site designers can use testing methodologies drawn from behavioral psychology paradigms to optimize user experiences and site effectiveness.

What’s Missing?
This issue’s articles represent valuable contributions to a topic ripe for advanced research and development. Significant challenges remain, of course. For example, Web usability experts must adapt traditional inquiry techniques to a domain in which users communicate little about their personas except through the links they follow. In the realm of layout and functionality, designers and researchers need to clarify design guidelines for varying site purposes, validating them with sound empirical methods and honing them with input from cognitive and social science research. To respond to innovations in display technology, we are also challenged to create usable designs that scale to mobile devices of varying size and resolution. The articles in this issue show that we can and will effectively address the Internet’s unique usability challenges.

Christine M. Neuwirth is professor of English and human-computer interaction at Carnegie Mellon University. She holds a PhD in rhetoric from Carnegie Mellon University. Her computer science research interests are primarily in human-computer interaction and computer support for cooperative work.

Susan Harkness Regli is a senior member of the engineering staff at Lockheed Martin Advanced Technology Laboratories. She received a PhD in rhetoric from Carnegie Mellon University, where she was a member of the Human-Computer Interaction Institute.

Readers can contact Neuwirth at cmn@andrew.cmu.edu and Regli at shregli@acm.org.