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From the Editor in Chief

FROM TECHNOLOGY TO THE HUMAN USER

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When thinking of users, it is possible to look at them from a variety of perspectives. One essential way of considering users within the human–technology environment involves technical concepts. In this manner, we define what users should be able to do with a particular technical system. As such, there are tasks to accomplish and goals to reach by means of some technology, and therefore specific operations must be carried out in order to reach those goals or fulfill those tasks. For example, if someone wishes to buy boots from an eShop, it is necessary to get onto the Internet, find the eShop, find the boots, load them into a virtual shopping cart, and follow the process to check out. Savvy online shoppers can do this quite effortlessly.

This example provides a perspective on human–technology that can be called technical. This view simply defines what it is that people need to do technically to successfully accomplish whatever it is that they want to do. Within this perspective, people are considered a subsystem of a particular technical system—actually, one of several subsystems that work together to accomplish an intended goal. And, like all of the subsystems, the human element needs to be seriously considered in planning how the technology will work, thus making it a necessary component of human–technology interaction. This represents a traditional perspective on the role of humans in the design of technology: If the interaction does not operate smoothly, no one will be able to reach the goal with that particular technology, and so the technology is useless. Therefore, a focus on the technical aspects of design is emphasized.

However, recent developments in technology design, and in particular design for online services, have raised the discussion about extending or rethinking the traditional view on human–technology interaction. People cannot—and should not—be viewed only as extensions of machines, or as simply one more element in a complex technological system. Thus, significant and fundamental changes are required in the theory language that provides an alternative to the technology-based analysis.

First, research has demonstrated clearly the reality that people cannot possibly do everything. The human mind is simply not capable of every potential process, and so machines can assist in many areas. However, even though the human can, generally speaking, succeed at a wide variety of functions, the success level of any given individual for any particular task is quite variable. For example, the interaction models that are commonly used are just too difficult

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for some people. As a result, some individuals find themselves excluded from the possibilities offered by certain technologies because they do not know how to access them to reach their desired goals. In some cases, it might be as simple as not knowing which buttons to push. In other cases, the individual is unaware of the potential offered by a particular technology system to help him/her achieve a goal or receive a service, or is misinformed about or unwilling to invest the time needed to understand the process. These and similar situations result in the challenge of the "under user": By ignorance, inability, or choice, these people do not access available technologies to achieve their goals or to manage their everyday processes. So within the technology design process, merely thinking through goals, tasks, and operations, and the subsystems to accomplish them, does not help with the final use environment. Ultimately, for adequate technology use, designers and engineers need to penetrate the psychological reasons for under use.

Yet, as noted above, the solution is not a matter of simply providing the user the capability to access the technology. Fundamentally, it is a matter of whether the people really *want* to use these new technologies and services, and this want draws on their preferences and likings. People need to like the technology or service (Norman, 2004). Because underlying emotional rationales affect people's decisions regarding their behavior—in this case, the use of a particular technology—the concepts and processes of traditional technical usability are not practical in solving the under use challenge.

Thus, while the technological perspective on human–technology interaction is necessary, it is not sufficient. The designer or engineer certainly must contemplate the various technological problems and how the various subsystems interact, but this approach overlooks the multitude of human dimensions within the human–technology interaction that have direct impact on the creation and usability of the technical dimensions. What is essential in solving this use and usability challenge is a more advanced and human-oriented approach to human–technology interaction and technology design. Quite simply, it means human–technology interaction begins with the conceiving, analyzing, and designing of technology through the lens of human research.

Fortunately, this new way of thinking about the human role in human–technology interaction is becoming more common. One typical example of the human-based interaction analysis idea is that of worth-based design (Cockton, 2004). In this approach to product design, the primary emphasis rests on the impact of interaction outcomes. ICT design decisions are based on the intended or desirable practical value for the user, from the user's perspective. In this case, *worth* does not refer to a moral value, but rather to the additional value the technology brings to the users who know about and want to use it. Cockton's approach illustrates the new thinking on interaction, and draws on a deeper-than-intuitive understanding of the human psyche as the essential element in human–technology interaction. Yet there is much to do in integrating this thinking within the technological design sector.

The key point in human-focused human–technology design is actually quite simple: Technology should exist not for itself, but rather for improving elements of human life. Therefore, the correct perspective toward technology and human–technology interaction would not be that humans are simply one more subsystem within a complex environment, but that human beings are diverse, multiskilled, multiexperienced, multimotivated creatures who can and do make explicit choices in the process of living. For technologies to serve their purpose in the vast opportunities of human life, they must be conceived, designed, and implemented based on the scientific analysis of human living and being.

This current issue of *Human Technology: An Interdisciplinary Journal of Humans in ICT Environments* draws together papers from researchers who have explored the human component of human–technology interaction. Whether the research focused on the purpose for and use of technology, or a rethinking of how one approaches studies on the human–technology interaction, these papers represent the essential perspective of the multidimensional human being in the use of technology or technology research.

User-centered, iterative technology research is the basis of the paper by **Jaime Sánchez**, whose research group designed and tested a variety of games designed to educate legally blind children in a Chilean school. Significant in this research is that every technical element of the software programs was researched and based on the students' mental model of stimuli processing, which is quite distinct from sighted children. Through iterative design and with ongoing feedback and input from the blind users, the researchers were able to map sounds and tactile feedback, which facilitated game designs to assist the blind students in achieving skills in mathematics, problem-solving, and object location and maneuvering within a virtual environment. Evaluative testing demonstrated that educational software for legally blind children designed for their particular ways of understanding the world around them can facilitate specific learning goals.

The increase in technology-supported activities raises the concern about how people view and rely on agent support while completing challenging tasks. **Shenghua Liu, Sacha Helfenstein** and **Ari Wahlstedt** explore some social-psychological aspects of agent communication with the user, with the goal of learning how algorithmically intelligent agents can also be more socially skillful in communicating with the user. Such research involves understanding the elements of trust, persuasion, and likability. Their results indicate in that human–agent interaction can be both productive and enjoyable with more communicatively skilled agents, but that the interaction must always confirm that the human remains autonomous during the task.

Ezejiofo Patrick Udeh investigated how various elements of two well-established initial acceptance models, the technology acceptance model and the diffusion of innovation theory, affect current and future use of free wireless fidelity hot spots. Issues such as relative advantage, ease of use, trust in technological systems, personal motivations toward innovation, and facilitating conditions can impact not only a user's openness to implementing a technology but also long-term use intentions. This study clearly supports the emphasis on the human psychological dispositions toward technology use as foundational in plans to enhance or expand free Wi-Fi access.

While it is easy to understand that social and human needs affect what technologies are conceived and developed, **Raul Pertierra** emphasizes in his paper how technology and its uses shape and are shaped by the cultural practices of, in this case, the Philippines. Cultural traditions and practices influence how a technology is absorbed into and used in daily life, reflecting and embodying issues related to social interaction, religion and beliefs regarding death and the supernatural, popular culture, and politics, to name a few. In this paper, the focus is on mobile phone use, yet clearly demonstrates that while a technology may be the same throughout the world, the social and communicative implications of that same technology can be quite diverse.

Turning from application to research, the paper by **John Karn, Joseph J. Ninan**, and **Marian Gheorghe** explores the human elements within the technology design process. Specifically, these authors followed seven project teams and their clients to observe and investigate whether agile methodologies for technology development, such as extreme programming, really do facilitate enhanced communication, decreased gaps in expectation, and improve client satisfaction during the design process. They conclude that, as with most human interaction, results will vary, depending on the communicative skill and interactive attitudes of the individuals involved.

Finally, **Antti Salov**aara underscores an emphasis on human creativity and adaptability in his discussion of technology design and the process of user appropriation. He explores a variety of approaches and research perspectives regarding how and why technologies are appropriated into alternative uses, but suggests that the social sciences approach, particularly ecological psychology and a focus on cognitive processes, can advance the discussion and understanding of the various human elements at play in not only the actual appropriation of technologies, but in creating and designing technologies to facilitate users in applying whole or partial elements of technology systems into processes not initially envisioned by the designers.

Taken as a whole, this issue of *Human Technology* provides clear demonstration of the advocated human-centered approach toward technology design, application, and research as it applies to the human role in human–technology interaction. The findings and discussions advance our understanding of the multifaceted and complex role humans play in technological advances created for the benefit of society.

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