Design Science

Understanding people: extensions of human–computer interaction

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Science and design are often seen as being at opposite ends of an academic discipline spectrum. Indeed, this is often the case. However, there are several fields that connect these two ends of the spectrum together. Human–computer interaction (HCI) is one such field, being described as the bridge between science and design. HCI involves research into the design, development and use of computer technology that focuses on the interfaces between humans and technology. From the outset, usability – creating software that people will want to use, will be able to use and will find effective/satisfying to use – took a central role in HCI. In fact, there was a drive in the early days to create designs to ensure that people would not need to think too hard about the interface and how it worked. In other words, it needed to be easy to use. Since then, HCI has expanded and is now a multidisciplinary community encompassing a wide range of concepts that still include usability.

Observing how people interact with interfaces today, it becomes clear that people need more from an application or system than mere 'ease of use'. In essence, people are not only interacting *with* technology; they are interacting through technology to achieve their goals. From an HCI perspective, we need to design modern interfaces to ensure that they afford appropriate and responsible interactions. For example, it is well known that people often say and do things in cyberspace that they would not normally say or do in face-to-face interactions. They may also place trust in strangers (including nonhuman entities, such as artificial intelligence (AI) bots) in ways that they would be far less likely to do through direct, in-person encounters. In fact, many people feel more uninhibited online, which can have both positive and negative consequences. Nonetheless, we need to start understanding what it is about the design of these virtual spaces that affords these feelings and sometimes unwise behaviours.

When we design our physical environments, lessons are drawn from many fields to plan and design environments that appropriately affect, and are affected by, human behaviour (fair, sustainable, safe etc.). As such, the physical environment can facilitate and influence certain behaviours and motivations. For example, in an inviting space with comfortable surroundings, perceived security and privacy can encourage certain feelings of safeguarding and avoiding harm. The questions are, then: "How can we intentionally design these qualities into our online spaces?

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How can we create interfaces that foster well-being and agency, cultivate trust, embody inclusivity and fairness and encourage thoughtful reflection and critique rather than inappropriate and/or impulsive behaviour?"

This thematic collection aims to reflect the richness of answering these questions. It draws from diverse disciplines – computer science, psychology, sociology, philosophy, design and ethics, among others – to stimulate and showcase HCI design, development and research. The papers demonstrate that science and design are far from being opposites and can function as complementary modes of inquiry and creativity when navigating the complexities of contemporary technology. Together, the themes explored in this issue weave a coherent narrative focused on enhancing design and technology experiences through a human-centred approach. Central to this is the emphasis on user needs, particularly the careful consideration of users' skills, perspectives, preferences and context in the development of tools, technologies and environments. Technology-enhanced design and prototyping, using virtual reality, mixed reality and AI tools, alongside strategies to optimize usability, fidelity and effectiveness, enables more efficient, creative and user-responsive design solutions. Underpinning these approaches are cognitive and perceptual factors, which demonstrate how user abilities, perception and interactions directly influence outcomes in technology use and design quality. Finally, we need to develop ethical and responsible technology, by ensuring that human oversight and values are integrated into the design, to promote fairness, trustworthiness and safety. In summary, the learnings you will encounter through these papers align to offer us the opportunities to enhance design and technology experiences and practices with approaches that are not only human-centred but also feasible, novel, cognitively aware, ethically aligned and strategically optimized for meaningful impact.

As digital technologies become increasingly pervasive, the need to align science and design practices is even more critical. It is not enough to ask what technologies can do for us; we must also ask what *they should* do for us. Indeed, technology and their interfaces are seldom neutral: they shape human action and must be ethically designed with a responsibility toward individuals, communities and the world we live in. This thematic collection showcases the vitality of this symbiosis – from AI ethics to empathic design, from social connectedness to sustainable interfaces – reminding us that technology's future depends not only on functionality but also on how responsibly it is conceived and integrated into human lives. As researchers and designers, we are called to ensure that tomorrow's technologies are not merely usable but also trustworthy, empathetic, responsible, safe and sustainable, expanding HCI's role as the discipline where science and design co-create a more humane digital world.

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