**INTRODUCTION**

Human-Computer Interaction (HCI) in the 21st century needs to look very different from its 20th-century origins. Computers are becoming ubiquitous; they are disappearing into everyday objects. They are becoming wearable. They are able to communicate with each other autonomously, and they are becoming self-adaptive. Even with something as ubiquitous as the mobile phone, we see a system that actively searches out a stronger signal and autonomously switches transmitters. Predictive techniques allow phones to adapt (e.g., anticipate long telephone numbers). These changes in technologies require us to change our view of what HCI is.

The typical view of how people interact with computers has been based primarily on a cognitive psychological analysis (Norman & Draper, 1986) of a single user using a single computer. This view sees the user as outside the computer. People have to translate their intentions into the language of the computer and interpret the computer’s response in terms of how successful they were in achieving their aims. This view of HCI leads to the famous gulfs of execution (the difficulty of translating human intentions into computer speak) and evaluation (trying to interpret the computer’s response).

With the ubiquity of information appliances (Norman, 1999) or information artefacts (Benyon et al. 1999), the single-person, single-computer view of HCI becomes inadequate. We need to design for people surrounded by information artefacts. People no longer are simply interacting with a computer; they are interacting with people using various combinations of computers and media. As computing devices become increasingly pervasive, adaptive, embedded in other systems, and able to communicate autonomously, the human moves from outside to inside an information space. In the near future, the standard graphical user interface will disappear for many applications, the desktop will disappear, and the keyboard and mouse will disappear. Information artefacts will be embedded both in the physical environment and carried or worn by people as they move through that environment.

This change in the nature of computing demands a change in the way we view HCI. We want to move people from outside a computer, looking in to the world of information, to seeing people as inside information space. When we think of having a meeting or having a meal, we do not see people as outside these activities. People are involved in the activity. They are engaged in the interactions. In an analogous fashion, we need to see people as inside the activities of information creation and exchange, as inside information space.

**BACKGROUND**

The notion that we can see people as existing in and navigating through an information space (or multiple information spaces) has been suggested as an alternative conceptualization of HCI (Benyon & Höök, 1997). Looking at HCI in this way means looking at HCI design as the creation of information spaces (Benyon, 1998). Information architects design information spaces. Navigation of information space is not a metaphor for HCI. It is a paradigm shift that changes the way that we look at HCI. The conception has influenced and been influenced by new approaches to systems design (McCall & Benyon, 2002), usability (Benyon, 2001), and information gathering (Macaulay et al., 2000).

The key concepts have developed over the years through experiences of developing databases and other information systems and through studying the difficulties and contradictions in traditional HCI. Within the literature, the closest ideas are those of writers on distributed cognition (Hutchins, 1995). A related set of ideas can be found in notions of resources that aid action (Wright et al., 2000). In both of these, we see the recognition that cognition simply
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