

Information Interaction Beyond HCI

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INTRODUCTION

HCI might well be poised to break out of its mould, as defined by its first half-century history, and to redefine itself in another mould that is at once more abstract and wider in scope. In the process, it would redefine its very name, HCI becoming a subset of the larger field of information interaction (II). This potential transformation is what is described here.

At this point in our technological era, we are in the process of symbolically modeling all aspects of reality such that our interactions with those aspects of the world around us that are most important are more digitally mediated. We are beginning to inhabit information environments and to interact ever more with artifacts, events, and processes that are pure information. This is the world of II, and what this means for HCI is what is examined here.

The presentation has a largely abstract character to it. Indeed, it seeks to reframe our discussion of the phenomenon of interaction under study in such a way as to go beyond the pitfalls of concrete problems usually associated with the field. By stepping back from the usual issues of concern and from the usual way of categorizing the elements of the field (Helander et al., 2000; Jacko & Sears, 2003), the goal is to contextualize HCI within a broader, necessarily philosophical plane of concern in order to look at it afresh and thereby see where it might be headed. The direction proposed is decidedly more englobing, more abstract, and, hence, more theoretical in its analysis.

BACKGROUND

HCI is a field that grew out of the expansion of computing beyond the early context of usage by technically inclined specialists, who were quite eager to access the potential of computing and did not mind the learning curve involved. The scope of HCI continues to expand, as computing becomes ever

more pervasive and novice users expect to use computing artifacts without fuss, to put it bluntly. Thus, the goal of HCI is to ease usage while preserving the power of the artifact, effecting whatever compromises are possible in order to achieve a workable solution. That this goal is difficult not only to achieve but even to have accepted is well illustrated by Carroll's (1990, 1998) proposal for minimalism and by Norman's (1998) proposal for information appliances, building on the notion initially proposed by Raskin (see Norman).

So we continue to indulge in situations where complex system requirements are specified and HCI expertise is brought in to do what it may to perhaps ameliorate the situation somewhat. Attempts to break out of this design context (as through the various means presented in section II of the Handbook of HCI [Helander et al., 2000]) certainly point the way but may only succeed when computing itself is seen to disappear (in the spirit of Weiser and Brown's [1997] ubiquitous computing and Norman's [1998] "invisible" computer) into the larger context of human activity structures. Thus, how we view cognitive tasks is central to HCI past, present, and future, and needs to be considered in a high-level framework, as described next.

The most basic question of HCI is what the interaction is between. The three elements generally involved in the answer are the person (user), the system (computer and its interface), and the task (goal). An answer with more guts or more ambition would do away with the middle element and pursue analysis purely in terms of person and task. Doing away with the interface itself is, after all, the ultimate in the quest of transparency that drives all HCI design.

A computer system, represented to the person by its interface, is an artifact that mediates some specific process (i.e., supports the interfacing between person and task such that the person can realize the task). The person does not care about the interface (it is just a tool) but does care a great deal about the

task. Transparency in HCI means forgetting about the interface.

Ubiquitous computing (Weiser & Brown, 1997) shares that same goal of transparency, although with a focus on having computers embedded everywhere within the environment. Here, the attention is not on computing itself (even if it is pervasive) but on accomplishing a task (i.e., interacting with the environment and more specifically with the information present in the environment).

A good example of transparency from a more familiar domain (Duchastel, 1996) is the steering wheel in a car. The steering wheel is the interface between oneself and the road (I never think about the steering wheel, but I observe the bends in the road). The steering wheel disappears, as an ideal interface should, and all that is left is the road and me (the task and the person).

A second aspect of the new HCI concerns interaction modalities and their concrete elements. Just as command modalities gave way to the WIMP paradigm of contemporary interfaces (Pew, 2003), the latter will give way to yet more natural interfaces involving speech and immersive technologies in the VR realm (see the following). The driver of this shift, beyond the developing feasibility of these technologies, is the HCI goal of adapting to humans through use of natural environmental settings (i.e., another facet of the transparency goal). The day when my interface will be an earpiece, lapel button, and ring (the button for sensory input of various kinds and for projection; the ring as a gestural device) may not be far off. Screens and wraparound glasses will be specialty devices, and keyboards and mice will be endangered species.

These evolutions (of process and gear) will make the person see computing as interfacing, with current gear long forgotten and the computer, while ubiquitous, nevertheless invisible. The disappearing computer will not leave great empty spaces, however. There will be agents to interact with (discussed later) and novel forms of interaction, discussed here.

The new landscapes include application areas such as communication, education, entertainment, and so forth (Shneiderman, 2003). They all involve interaction with information but also add to the mix the social aspect of interaction, thus creating a new and more complex cognitive context of action. The backdrop for HCI has changed suddenly, and the

cognitive context has evolved to a sociocognitive one, as illustrated by the current interest in CSCW, itself only part of the new landscape.

The notion of interface can be reexamined (Carroll, 2003; Shneiderman, 2003). In a very broad definition (Duchastel, 1996), an interface can be considered as the locus of interaction between person and environment; more specifically, the information environment within which the person is inserted. In these general terms, interfaces can be viewed as abstract cognitive artifacts that constrain or direct the interaction between a person and that person's environment. In the end, the task itself is an interface, one that connects actor to goal through a structured process. Even the most archaic software is the concrete embodiment of a task structure. Thus, on the one hand, HCI deals with the person-information relation and is concerned with the design of information products; and on the other hand, it deals with the person-task relation and here is concerned with the guidance of process. It is the interplay between these two facets (product and process) that creates the richness of HCI as an applied field of the social sciences.

IMPLICATIONS FOR HCI

The constant novelty factor that we experience with technology generally and with computing in particular sets us up for fully using our intelligence to adapt. Not only do the tools (interfaces) change but so do the tasks and activities themselves, as witnessed, for instance, by the arrival of Web browsing and many other Web tasks. In this respect, then, HCI is faced with a losing battle with mounting diversity and complexity, and can only purport to alleviate some of the strain involved with these needs for humans to adapt. What has happened to HCI as the process of adapting computers to humans? HCI must find ways to assist human adaptation with general means, such as only gradually increasing the complexity of an artifact, forcing stability in contexts that may prove otherwise unmanageable, increasing monitoring of the user, and just-in-time learning support. All of these means are merely illustrative of a style of HCI design effort of which we likely will see more and more in response to computing complexity.

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