4

Representing the user: Notes on the disciplinary rhetoric of human–computer interaction

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> To throw some light on discussions about the "people" and the "popular," one need only *bear in mind that the "people" or the "popular" . . . is first of all one of the things at stake in the struggle between intellectuals*
>
> (Bourdieu, 1990: 150, original emphasis).

4.1 Introduction

The focus in this chapter is somewhat different from that of most of our cocontributors; for rather than pointing to some of the many ways in which action and interaction at the user interface can be construed, described, and analyzed as "social," we propose and explore the value of looking at the matrix of disciplinary relations that not only provide the background to but, we claim, constitute the *very possibility* of the entities "user interface" and, for that matter, "user." In other words, we argue for the importance of analyzing the discourse of human–computer interaction (HCI), with particular reference to its interaction and management of relations with other disciplines. Such a shift of topic has radical consequences: for those phenomena that occupy central positions within the domain of HCI emerge as discursive constructs that are crucial for the discipline's self-assertion and legitimacy. Thus, the question of "social dimensions" of interaction is completely reformulated.

A consideration of many of the early texts in HCI from the late 1970s and early 1980s reveals a number of important features of HCI discourse. Indeed, our argument will be that recent developments in HCI – far from contradicting the discipline's foundations laid in this early period – depend and build upon them. In the space available here, we cannot evidence all our claims fully. Although we take the features of HCI discourse that we identify to be constitutive of the field, we will make our points in relation to a comparatively small number of key texts, which, though, we will analyze in some depth.

The chapter is structured as follows. We begin by briefly indicating the theoretical and methodological underpinnings of our analysis of disciplinary discourse, and noting some of the specific issues that must be addressed in relation to HCI. We then identify and analyze, in turn, a number of themes we see as being of central significance to the discipline: the representation of the user, the user interface as the site of HCI knowledge; the rhetoric of progress, the artful management of disciplinary relations, and the emergence of crisis rhetoric as the early optimism of

HCI has begun to falter in recent years. Finally, we consider some of the implications of, and future directions for, our analysis.

4.2 Analyzing discourse

Our analysis draws implicitly on the perspective on disciplines elaborated by Michel Foucault (e.g., 1970; 1977), and on the work of Michel Callon (e.g., 1986), which, although it does not take the discipline as its unit of analysis, identifies a similar dynamic in the formation and organization of knowledge. We will briefly set out the main parameters of this approach.

Foucault focused on those institutionalized forms of discourse which he characterizes as the human sciences, whose legitimacy rests on their claim to speak some form of truth about, and on behalf of, the human subject. Of fundamental importance is his assertion that the distinctive character of a given discourse, that is the relative unity of the statements that it comprises, does not derive from the objects of study: such objects are the product of discourse, not its foundation. Rather, a discourse actively maps out a terrain of possible and valid statements, sets the boundaries of that terrain and constitutes the legitimate objects of study within it. Just as objects are produced in and through discourse, this process will also involve the definition of those who have rights of access to the discourse. In this way, experts, their professional self-interests and domains of exclusive expertise emerge. In other words, this is a constructivist and supply-driven view of disciplinary formation.[1] The legitimacy of the emerging discipline is tied to the extent to which it succeeds in formulating and asserting a distinctive domain and thereby, in Callon's terms, in constituting itself as the "obligatory passage point" for access to that domain's phenomena. Once this has been achieved, a discipline can speak *its* truth.

In the case of the human sciences, the constitution of a distinctive domain is reflexively tied to claims that the discipline in question, to differing degrees, acts as the representative of a particular constituency. In this respect, a discipline's rhetoric is of great significance: for no matter how well intentioned it may be, compassionate rhetoric – whether it be nineteenth-century criminology's claims to understand the criminal or HCI's advocacy of "user-centred design" – can be seen to serve an important legitimating function.

However, we do not wish to claim that Foucault provides a method that can be unproblematically "applied" to HCI. There are a number of methodological and historical obstacles to such a formulaic aspiration that we can do no more than note in passing. The identification of HCI as a unitary discipline is clearly problematic, for even preliminary analysis reveals a more complex configuration in which, for example, cognitive psychology constitutes both a defining core of an avowedly multidisciplinary field, and a skeptical competitor.[2] The field is fragmented, contested, and dynamic, and this is itself, we shall argue, germane to understanding the

discourse of HCI. HCI has to work and be convincing within a field of competing and highly skeptical interests. For us then, "discipline" is retained not as a definitive label for HCI but as a provisional designation for an unstable process in which the constitution, ordering, and regulation of a domain exists in a mutually supportive relation with the attempt to found a legitimate discourse in which that domain is described.

HCI has to insinuate itself into an existing array of disciplines, notably but not exclusively, computer science and cognitive psychology. This creates a whole series of disciplinary dilemmas for HCI workers: to attain autonomy without losing one's audience, to attain novelty without losing one's legitimacy, and so forth.[3] This active and persistent management of interdisciplinary dilemmas emerges as a central feature of HCI discourse in our analysis.

We claim that the viability of HCI depends on its production and management of new categories in terms of which problems, issues, methods, theories, recommendations, and so forth get formulated. We identify two crucial categories that HCI has constructed: the user and the interface. It is not that users and interfaces lay undiscovered until HCI found them. Rather, HCI discourse actively produces users and interfaces where before there were none, and does this in ways that draw upon and reinforce disciplinary realignments. And users have an added significance in that they form the constituency that HCI claims to represent.

4.3 Representing the user

A pervasive, fundamental and highly visible feature of HCI discourse has been its representation of the user and his or her needs. Such representation constitutes, from our perspective, a valuable topic for analysis; and we argue that the rhetoric of representation is of fundamental importance for the attempt to assert the legitimacy of HCI as a discipline.

The representation of the user can be analytically broken down into three constituent and mutually dependent moments. In the first, the user is created as a new discursive object that is to be HCI's concern; this can be distinguished from, for example, "the operator" as found in ergonomics texts. In the second, HCI tends to construct cognitive representations of the user: that is, the discourse of cognitive psychology is typically conferred privileged access to and understanding of those aspects of "users" which are seen as being of particular relevance to the study of human–computer interaction. In the third, HCI represents the user in the political sense of "representation": as Landauer puts it, people within HCI should be the "advocates of the interests of users" (Landauer, 1987: 2) within the wider enterprise of system design. The last two senses are interrelated in that the legitimacy of political representation rests in part on the extent to which expertise in cognitive representation is accepted.

A notable aspect of the political representation of the user is its liberal, humanist, and antitechnicist rhetoric. The relatively ubiquitous notion of "empowerment" – see for example the subtitle of the CHI '90 conference *Empowering People* – provides a conspicuous example.[4] An even more telling one is provided by "user-centered design," which urges that design not simply take the user into account, but should "start with the needs of the user"; it emphasizes "that the purpose of the system is to serve the user, not to use a specific technology, not to be an elegant piece of programming" (Norman, 1986: 61). It is not insignificant, we suggest, that the implicitly moral assertions about the needs of users are here tied to the chronological place that such considerations should take in the design process. If design *starts* with the needs of users, then HCI will claim a more central place in system design.

The political and disciplinary connotations of representation become especially clear when we consider Shneiderman's (1987) text. The preface is called "Fighting for the user" and a political–war discourse is used throughout the first few pages. After a list all those who are concerned with problems of computer use, we read:

> However, our awareness of the problems and a desire to do well are not sufficient. Designers, managers, and programmers must be willing to step forward and fight for the user. . . . Victory will come to people who take a disciplined, iterative, and empirical approach to the study of human performance in the use of interactive systems. . . . In this way, each designer has the responsibility of making the world a little bit warmer, wiser, safer, and more compassionate. (1987: v–vi)

In various places, Shneiderman's text characterizes users as frustrated, anxious, struggling, and suffering computer shock, terminal terror, and network neurosis. These characterizations of the woes of users are commonplace in creating simultaneously both the user as a fragile beast under threat from technology and a duty for HCI researchers to help rescue them. Booth (1989) adds in the first three pages of his opening chapter that users are not understood, angry, frustrated, insecure, frightened, stressed, not motivated to work well, unsatisfied with their jobs, and prone to absenteeism.

That users are not like designers (or computer scientists or system managers or programmers, etc.) is repeatedly emphasised in HCI texts. Consider Shackel (1985: 265): "the designers are no longer typical or equivalent to users; but the designers may not realise just how unique and therefore how unrepresentative they are."

It is important to recognize the rhetorical functionality of these characterizations of the user for HCI. It is not so much that users *are* angry, frightened, and different from designers, it is more that, for this way of legitimating HCI, they *have to be.* One would have no case for HCI, if – having focused on users – we found them to be happy, content, familiar, and already as warm as Shneiderman wants them to be! As long as HCI takes the (political) representation of the user as part of its justification and remit, the frustrated and slightly exotic user will have to be repeatedly

rediscovered; while the essential difference of (ordinary) users from designers that Shackel identifies underwrites the need for specialized, mediating representations and representatives.

The sense that "user" serves HCI as rhetorical cipher is further reinforced by its relatively abstract and unexplicated quality: for example, there is comparatively little attention given to distinctions between the individual using the computer and the organizational constraints within which such use takes place. But our claim here is not that "real" users are being ignored (see the discussion of Bannon's work): rather that, in whatever form, users are a necessary construct for HCI's legitimacy, in that they form a constituency awaiting adequate representation. In Callon's terms, the construction of users is an essential part of the process by which HCI attempts to become an "obligatory passage point" (Callon, 1986).

4.4 The user interface: The site of HCI knowledge

The user interface[5] is the site of HCI knowledge and practice; for if HCI's legitimacy derives from its claimed knowledge of the cognitive user, the user interface is the object that it aspires to change. As such, it is itself fundamental to HCI's disciplinary aspirations.

The definition of the interface as a locus of interaction between user and machine is, however, subject to a number of flexibilities. We wish to note two of them. First, HCI disputes the presumed (computer science) view of the user interface as marginal to the functionality of the system. As Norman claims in his advocacy of user-centered design, "from the point of view of the user, the interface *is* the system" (Norman, 1986: 61, emphasis in original), and therefore central to design. Second, the interpretive flexibility of the interface can be put to use in validating the evolution and extension of HCI's domain of expertise. For example, Grudin (1990) points out that the widespread conception of the user interface as the screen (and its design) simply reflects the current state of computer technology in an evolution from punch cards to the distributed and embedded technologies of the future.

In both cases, the interface and its definition are put to use to assert the importance of HCI as a discipline. Grudin's argument is also of interest in that it graphically highlights, through its partial acknowledgment of the converse, the notion of the interface as predating its recognition. For, despite his acknowledgment that it was in a particular period that the term acquired widespread currency, and that the predominant disciplines involved were cognitive psychology and human factors, he explicitly conceptualizes the user interface as existing prior to its formulation in discourse: "Of course, systems have always had user interfaces: how have they evolved, prior to and since attracting attention?" (Grudin, 1990: 262).

The rhetorical effect of such an assertion is that HCI, whose field is interface development, represents a necessary response to a given but hitherto unrecognized

set of design problems, and that their solution has become a matter of some urgency.

The further notable feature of Grudin's argument is a reliance on a notion of technological and theoretical evolution or progress. We now turn to examine this figure of HCI discourse in more detail.

4.5 The legitimating function of rhetorics of progress

HCI crucially depends on some notion of technical, social, or epistemological progress.[6] Pointing out or arguing for the existence of some form of progress is often important either to legitimating the stance taken in a text or for indicating responsibilities or "challenges" that we have which are profoundly "new" (or both). We take as our focus one of HCI's foundational texts: Card, Moran, and Newell's *The Psychology of Human–Computer Interaction* (hereafter *PHCI*), published in 1983, to see some progress rhetoric in action. On the first page, progress ("advances") in cognitive psychology is pointed to: "Recent advances in cognitive psychology and related sciences lead us to the conclusion that knowledge of human cognitive behaviour is sufficiently advanced to enable its application in computer science and other practical domains."

For *PHCI,* these advances are due to theorizing humans as information processors and a whole array of sources are cited to demonstrate the utility of this conception. Having founded the worth of the information processing approach, *PHCI* argues that it is already being applied in areas of practical importance. Eyewitness testimony and the design of intelligence tests are specifically cited. That two areas seemingly far removed from computer science and from each other are the first to be cited is presented as underlining cognitive psychology's claim – not merely to applicability but to generality.

PHCI then goes on to specify the particular relevance of this approach for future work by claiming that "there are already the beginnings of a subfield, for which various names (associating the topic in different ways) have been suggested: user sciences, artificial psycholinguistics, cognitive ergonomics, software psychology, user psychology, and cognitive engineering" (p. 2).

In this way, *PHCI* trades off its novelty with its legitimation in terms of past contributions. *PHCI* will be new and original without being groundless. And it will be justified by precedent without being derivative or merely rehashing its ancestors. Achieving this balance is quite an artful matter rhetorically. It is important to note the use of a notion of progress-not-yet-exhausted in bringing it off. "Our own goal is to help create this wave of application: to help create an applied information-processing psychology" (p. 3).

Here, a personalized ("our") goal is aligned with a "wave." The metaphor of wave is interesting here: it simultaneously situates "us" within a large-scale endeavor while giving an image of force. Again, *PHCI*'s enterprise is presented as

being part of a composite. It is not marginal or idiosyncratic in such a way that a skeptic could readily dismiss it; but its force cannot yet be taken for granted. There is work for *PHCI* to do.

The management of a narrative of progress in relation to cognitive psychology then is crucial to the legitimation of *PHCI*. Narratives of progress also appear in direct discussions of technology and its status within society: "Society is in the midst of transforming itself to use the power of computers throughout its entire fabric – wherever information is used – and that transformation depends critically on the quality of human–computer interaction" (p. 3).

This statement employs a factual report on social change to justify consideration of human–computer interaction. "Society is in the midst of transforming itself." There is no guarding of this claim with "it is often supposed" or "we believe" or some such device. The change in society is presented as just there. It is also further emphasized by employing what Bowers and Iwi (1993) call a "total and uniform" construction of society. Society is not broken down to consider the relation between computers and different social groups, such a conception being entirely consonant with the unexplicated notion of individual "users" that was noted in the previous section. The whole of society is transforming. The emphasis on "its entire fabric" further underlines this.

This excerpt also employs a device similar to some others we have seen in earlier excerpts. We are "in the midst" of change. Earlier we saw "already the beginnings" of new disciplines. These devices present a version of historical change that combines a form of determinism but with a reinforced obligation for those aware of history to do the work of specifying the details. This account of history does rhetorical work in offering a narrative in which we are invited to see ourselves and our responsibilities. And it does so in ways consistent with how the "advances" in cognitive psychology are depicted and utilized. Processes which already exist "out there" justify "us" (they are not mere fictions!) but a (partially) open future gives us both latitude and responsibility.

Now consider the following excerpt, the first of a list of four "current interface deficiencies" told in the form of "mini-horror stories."

> In one text-editing system, typing the word *edit* while in command mode would cause the system to select everything, delete everything, and then insert the letter t (this last making it impossible to use the system Undo command to recover the deleted text because only the last command could be undone). (pp. 5–6)

We have found the telling of such "horror stories" to be a prevalent feature of many early texts in HCI, and they exemplify the identification of a set of problems awaiting attention that we suggested was crucial to the assertion of the need for a new discipline. However, their use rhetorically is not unproblematic. The stories must be seen to have a general upshot (the world needs HCI) and not a particular one (the designers of this particular system were poor). In addition, they must be told in such a way as to not contradict any progress story that might be used elsewhere. It would be strange if the text used technical progress to justify the importance of HCI and then gave enough examples for us no longer to believe in technical progress! They must be told in such a way as to lead to the desired conclusion (a new discipline is needed) rather than to be taken in any other way (better software development methods would have avoided this). Finally, they must be told in a way that manages and mitigates potential accusations of blame. They must not be taken so as to offend and hence repel those whose support the teller wants to count on, for example, computer scientists. As such, just like pictures without a caption, the stories *do not* speak for themselves – indeed, anything but!

These are severe discursive dilemmas. *PHCI* manages them through again utilizing the hybrid picture – which we have seen emerge already – of progress-plus-responsibility with the interface as the site for study: "Yet, when one looks at the teletype interfaces of yesterday, it is clear that substantial progress has been made. . . . But despite considerable advancements, the systems we have are often ragged and in places are sufficiently poor to cripple whole ranges of use" (pp. 6–7).

In this excerpt the notion of progress appears again. This time we suggest that it is involved with managing and mitigating a reading of *PHCI* which the skeptical reader might happen upon. The reader is assured of progress so the "mini-horror stories" should not be taken as denying it. Furthermore, a general point is made about a general category – "the systems we have." They are often ragged and crippling. With this generalization, we are instructed to read the stories as indexing a general conclusion and not a specific accusation of blame to the designers of the systems in question.

We want to emphasize how a certain nuanced notion of progress does rhetorical work in *PHCI*. Specifically, we suggest that progress legitimates the novelty of *PHCI* (and hence HCI itself) without marginalizing it, while setting up a network of roles and responsibilities for readers and researchers which they are invited to fill.[7] All this is done in a way that attempts to manage the likely responses from skeptical readers who might happen upon *PHCI*. This includes dealing with some delicate dilemmas that arise whenever a text is inserting itself between other disciplines. The deftness with which *PHCI* manages the disciplines of cognitive psychology and computer science is the subject of the next section.

4.6 Disciplinary relations

Much of the foregoing excerpts from *PHCI* – on analysis – have been shown to legitimate cognitive psychology or information–processing psychology through narratives of progress. Cognitive psychology is central to *PHCI*'s HCI and emphasizing its progress is one way to manage those skeptical of cognitive psychology's worth. However, this is not the end of affairs. For one thing, there may be those

within cognitive psychology who are skeptical of this application. Consider the following.

> As with all applied science, this can only be done by working within some specific domain of application. For us, this domain is the human–computer interface. The application is no offhand choice for us, nor is it dictated solely by its extrinsic importance. There is nothing that drives fundamental theory better than a good applied problem, and the cognitive engineering of the human–computer interface has all the makings of such a problem, both substantively and methodologically. (p. 3)

Again, *PHCI* is at pains to point out how its approach is at one with the common practice of "all applied science." As before, *PHCI* gains its strength through precedent. This involves constructing an object of study: "the human–computer interface." However, it is important to note how *PHCI* emphasizes the nonarbitrary nature of the interface (i.e., a real, practical problem is being addressed), while saying that it is not just its practical importance that motivates the choice. If *PHCI* was only motivated by practical matters, this would be enough to marginalize it within psychology and cognitive science. Studying the interface can, as it is sometimes put in HCI texts, "drive fundamental theory." In this way, *PHCI* constitutes its endeavors as both and equally of theoretical and practical weight. Thus, skeptical psychologists are offered the opportunity to participate in a field where their theoretical vanguardism will be undiminished while contributing to any aspect of a practical problem that affects the whole of society.

Of course, there may still be skeptics from computer science, skeptics who are still prepared to read *PHCI*'s litany of horror stories as a veiled accusation. First, the authors of *PHCI* offer the statement that in addition to the arguments about the potential ubiquity of computing in society, "we have personal disciplinary commitments to computer science as well as to psychology" (p. 3) to attend directly to this skepticism of their orientation. In addition, *PHCI* gives an *explanation* of why there might be "all [those] little ways" through which poor designs let us down. This explanation does further work in managing possible readings of the text as being implicitly accusatory.

> Interaction with computers is just emerging as a human activity. Prior styles of interaction between people and machines . . . are all extremely lean: there is a limited range of tasks to be accomplished and a narrow range of means (wheels, levers, and knobs) for accomplishing them. The notion of an operator of a machine arose out of this context. But the user is not an operator. He does not operate the computer, he communicates with it to accomplish a task. Thus we are creating a new arena of human action: communication with machines rather than operation of machines. What the nature of this area is like we hardly yet know. We must expect the first systems that explore the arena to be fragmentary and uneven. (p. 7)

This emphasis on the novelty of interaction with computers is at one with the management of progressivist rhetorics that we already have noted. HCI is a new

area that we have a responsibility to study and, as it's new, our work cannot be reduced to what has gone before. However, here we also see a new relation between humans and machines being used to explain (or is it excuse?) early "fragmentary and uneven" systems prone to failures of the sort told in the horror stories. This gives *PHCI* a latitude in managing the apportionment of blame: designers are not to blame in any direct way as we are dealing with "a new arena of human action," which "we hardly yet know." Along the way, this argument constructs a further object for study in HCI – the user: "the user is not an operator." In contrast with the operator, the user performs a task by interacting with the machine in a much more intimate and cognitively sophisticated sense than the operator of, say, a motor car or factory machinery could be said to do. In this way, HCI can mark itself as distinct from traditional ergonomics. The extent of its success can be read in the decline of the use of the term "operator" and the correlative rise of "the user" in the literature; and in the extent to which claims for the importance of ergonomics have to acknowledge, and move within, the "discursive high ground" that has been marked out by cognitive psychology (see, e.g., Booth, 1989).

Having managed a possible reading of *PHCI* as blaming computer science, the text turns to indicating the advantages to that discipline of participating in HCI. We read:

> It is our strong belief that the psychological phenomena surrounding computer systems should be part of computer science. Thus, we see this book not just as a book in applied psychology, but as a book in computer science as well. When university curriculum committees draw up a list of what "every computer scientist should know to call himself a computer scientist," we think models of the human user have a place alongside models of compilers and language interpreters. (p. 16)

Not only is *PHCI* proposing an addition to computer science, it is suggesting a refashioning of the very identity of computer scientists! New kinds of computer scientist should come into existence, knowledgeable in the ways of HCI. Furthermore, the disciplinary asymmetry of the claim that computer scientists should learn cognitive psychology is striking. *PHCI* does not contain the converse claim that cognitive psychologists should learn computer science.

In summary, our argument is that in early HCI discourse, texts have recourse to cognitive psychology as the source of representations of the user. We have seen how Card et al. (1983) bring off the importance, indeed priority, of cognitive psychology to HCI and how this required the artful management of some possible skeptical responses both from within cognitive psychology and without.

4.7 Crisis rhetoric and the second wave

In the very late 1980s and through to the time of writing, we detect a number of developments in HCI discourse. While the themes we identified in Card et al.'s

(1983) book are still very much in evidence, there is also a loss of confidence manifest in a number of sources. For example, a panel discussion at the CHI '91 Conference was called "HCI Theory on Trial."

To study this faltering optimism further, let us examine Diaper and Addison's (1992) report on a panel session called "HCI: The Search for Solutions." The report notes a series of problems that HCI has confronted: concerning its basic nature, its application to system development, and concerning the marketing of HCI and educating others in it. All these are presented as being in crisis. The authors suggest that:

> What is required is a general and integrated approach to HCI's problems that: agree what HCI should be; what HCI can do; how HCI can do it; and how HCI can be allowed to do it. Proposals that fail to address all four of these are likely to continue to doom HCI to being ineffective and for systems that include computers to continue to be inflicted on individuals, organisations and society that do little to enhance the quality of life, if not actually making the world a less attractive place for us all. (p. 493)

In several respects, we can characterize this as crisis rhetoric. The progress that HCI once promised has been thwarted. We are now already in a situation where we are "doomed," as individual users or as HCI researchers. It is worth noting how this crisis rhetoric depends on earlier promises of progress – one would not be convinced of the pertinence of these current troubles for HCI, if one had not been earlier convinced of its promise – and also on several of the elements of "first wave" HCI discourse: the hapless user inflicted with technology for instance.

In part, the solutions offered in the panel that Diaper and Addison report on involve reconstructing HCI itself but the reorientations are modest: some consist in a re-invigoration of the ergonomic tradition within HCI, some a heightened emphasis on "interaction" over "interface" as the "I" of HCI, some the necessity of an agreed vocabulary. Whereas crisis rhetoric has the effect of commending urgent reflection on us all, the foundations and disciplinary legitimacy of HCI are not questioned.

An alternative response is to focus on the constitution of HCI itself. This is evident in a number of different forms, which we cannot detail here;[8] but a common theme is the adoption of a critical stance toward first-wave HCI that is often reminiscent of the first wave's orientation to design! In the first wave, design was problematized for not taking account of the user. Now, HCI is problematized for not taking account of design.

We find many of these themes well developed in a chapter by Bannon (1991) called "From human factors to human actors: The role of psychology and human–computer interaction studies in system design" (henceforth FHF). Just as *PHCI* compressed many of HCI's foundational moves in a single text, so does FHF with respect to what we shall tentatively call "second-wave HCI."

FHF seeks legitimacy through very similar tropes as did *PHCI*. It invokes notions of progress or advancement. It points out that past achievements, though real, are partial. In short, FHF performs similar interdisciplinary footwork to *PHCI*. The difference is, however, that it is now HCI and applied psychology themselves that are accorded this treatment. Consider:

> Although psychology, particularly as represented by the field of human factors . . . or ergonomics, has had a long tradition of contributing to computer systems design and implementation, it has often neglected vitally important issues such as the underlying values of people involved and their motivation in the work setting. (p. 25)

Psychology and psychologically informed approaches to human factors and ergonomics are characterized as "contributing" yet incomplete in "vitally important" ways. Similarly, HCI itself has grown and progressed but has failed to be relevant to design:

> Over the last decade the area of human–computer interaction has grown enormously, both within academic research environments and corporate research laboratories. . . . Despite the legitimate advances that have been made . . . , there has been serious criticism of the field for its lack of relevance to practitioners in system design. (p. 33)

These remarks are worth comparing with our discussion of progress rhetorics in *PHCI* where the "legitimate advances" had been made by designers and technologists who had progressed from "the teletype interfaces of yesteryear" and so forth, yet they were unable to systematize the results of their trial-and-error explorations, their common sense, and their intuitions into a well-founded applied science.

This rhetoric is continued in the excerpt below where FHF situates itself in relation to human factors research and begins to reformulate the nature of persons as actors: for although traditional human factors work "has produced many improvements to existing technological systems," its view of the person has been a limited and reductive one (pp. 27–28). Bannon goes on to discuss and question the term "user":

> Another term ubiquitous in articles about the HCI field that deserves scrutiny is that of users. . . . The focus of the system design or HCI research group is biased towards the technology; the view of people is often simply as "users" of this piece of technology and "naive users" at that. This can lead to problems. People may not know the technology, but they are not naive as to their work; rather it is the system designers who are "work naive." . . . [There] is a danger in thinking of people as nothing but users. In fact, it is often the case that computer users need to make some modifications to the system in various ways, tailoring the system before it is truly usable. . . . So in a very real sense users are designers as well. Focusing on people simply as users can also blind us to the fact that the user's view of the technology we are developing may be very different from that of the designer's view. . . . It is the ability to understand the user perspective, to be able to see a problem from other than the system viewpoint, to

be able to empathize and work with the users of the intended system that marks the good design team. (pp. 28–29)

This excerpt involves a number of subtle reformulations of the notion of user. First, the notion of naive users is objected to as this can obscure the knowledge that users have of their work practices. Second, a reductive conception of user is objected to as this hides suppler user–designer relations that can exist. However, a disparity of user from designer and user from system is still employed here and the necessity of understanding users for good design is asserted again here much as in first wave HCI discourse. Thus, this passage from FHF can be seen to work with a modified conception of user. It does, however, still employ this category and puts it to use in similar ways to the HCI, which the text is critical of. In this way, FHF situates itself still within HCI yet in a (self-)critical orientation to it. This enables FHF to be read as a sympathetic criticism concerned to improve – and not overthrow – HCI. FHF, then, manages the sensibilities of a possible skeptical HCI reader much as *PHCI* had to manage the sensibilities of a possible skeptical computer science reader. In our terms, it deploys the moral and political priority of "representing of the user" in order to problematize and reorder representation in disciplinary terms; and to achieve this, it evokes an ontologically given user prior to representation.[9]

FHF goes on to argue that the differences between designer and user views are to be solved no longer through representing the user through cognitive psychology but by involving *users themselves.* Cognitive psychology is here dethroned and a number of other disciplines are invited to contribute to studies of the entire design and work context. Thus, FHF reconstitutes HCI by reformulating users and reordering the disciplines and HCI's relation to them. In so doing, it nevertheless avails itself of many of the tropes of first-wave HCI discourse (e.g., a notion of "attenuated" progress) as well as many of its constituents (e.g., a notion of "user"). FHF, in many respects, gains its legitimacy through an interdisciplinary critique much like *PHCI* did, only this time it is "first-wave" texts like *PHCI* that form the object of the critique. In a sense, then, FHF has an ironic dependence on texts like *PHCI.* Much as first-wave HCI discourse has to reinvent the hapless user whose cognitions are not understood by designers, so second-wave HCI discourse has a dependence on the hapless user whose working practice, motivations, values, or whatever are not understood by first-wave HCI.

Of course, FHF's is only one way to attempt to establish a legitimized yet critical orientation to first-wave HCI while still operating within HCI. But a recurrent theme within new-wave HCI is a shift of orientation with respect to design. HCI's disciplinary relations with(in) this enterprise are becoming an explicit focus of concern. Of particular interest here are question about the place of HCI within design, and the communication of HCI knowledge to designers. In a sense the very

constitution of HCI discourse creates the possibility for this shift in discourse, for the first wave founded HCI as simultaneously *both* a discrete discipline, *and* as one that could contribute to the building of computer systems that already fall within the discourses of other disciplines.

Let us briefly note an interesting discursive manifestation of this shift: that is, the suggestive extension and transformation of some of HCI's key terms. "Usability" has been increasingly employed to describe the adequacy of information that is passed from HCI practitioners to designers. For example, Forrester and Reason (1990: 283) compare (ironically) the complexity of the material given to designers by HCI with the principles that it is supposed to be promoting. Young describes one of the criteria for assessing his simulation models as "usability: are the models practical for the designers who are the intended users?" (Young, 1990: 1056). The designation of designer as user here is further echoed by Carroll, who describes the goal of artifact analysis as attempting to "make it more feasible to take the important objects of HCI practice seriously and thereby to empower designers" (Carroll, 1990: 1057). We can note here that while the objects of "empowerment" are now designers, the term continues to serve an explicit disciplinary function within this displaced context:[10] HCI still has a duty to empower and, hence, a reason to be.

It is also worth asking what empowerment across disciplinary boundaries could mean, especially when we consider the rationalistic stance that much of HCI takes toward the design process: that is, it insists that explicating the principles underlying design will improve design. This takes many forms, from Carroll's own attempts to assess an artifact in terms of the reasonableness of its implicit "claims," to the suggestion that if a rationale cannot be given, then the software cannot be said to have been designed at all (Edmonds, 1989: 52). The stated aim of the design rationale framework is instructive here; it attempts to "help designers reason about design and produce an output which can help others to understand why design is the way it is" (MacLean, Bellotti, and Young, 1990: 207). Helping designers is inflected with disciplinary connotations. A normative and regulative sense is apparent: good design *is* design with rationale.

Let us stress that the "second wave" is highly varied and fragmented in comparison with early HCI. But what unites the divergence is a certain rhetorical dependence on first-wave HCI; for texts can gain legitimacy by analyzing its failings and contrasting themselves with it; and most situate their contributions still within HCI or are taken as such.

The multiplicity of second-wave formulations of HCI should not surprise us. We have argued that HCI was born in attempts to resolve the tension between a range of disciplines. We have suggested that this involves the management of a multiplicity of discursive dilemmas as the claims of different disciplines are invoked, managed, and played off against one another. Skepticism of the foundations of HCI could come, then, from any of a multiplicity of sources. Our analysis of first-wave

HCI – we hope – displays just how provisional and tenuous such discursive strategies can be. On this view, the current multiplicity of approaches is only to be expected. In a sense, it is foreshadowed in the very constitution of HCI.

4.8 Conclusion

We have argued that HCI discourse – and the phenomena, objects, problems, and issues that are formulated within it – can be fruitfully read against the matrix of dynamic and contested disciplinary relations within which it is situated. By analyzing a number of central and recurrent themes within this discourse, we have attempted to show how the domain of HCI is discursively constructed, and how this construction is rhetorically and functionally crucial both for disciplinary legitimacy and identity; that conceptions of technical and theoretical progress, and correlatively of crisis, form an indispensable part of the rhetorical structure of HCI; and that disciplinary relations have to be continually and artfully managed. In short we argue that, in an important sense, this discourse is constitutive of the discipline of HCI. This, it seems to us, provides for an enhanced understanding of both the content of HCI and of its development. Our suggestion is not only that this constitutive rhetoric has been vital for HCI's formation and emergence, but also that the increasingly heterogeneous nature of the field in the "second wave" can be seen in part as a response to the disciplinary tensions that have been integral to the foundations of HCI discourse and hence are immanent within HCI. This view suggests that the debate, disillusion, and dispersal of much HCI today will continue as long as HCI respects the disciplines and institutional settings into which it inserts itself. To go beyond this condition may require a reappraisal of not only the various academic disciplines but the very necessity of constituting disciplines in the first place.[11]

A point of some interest concerns the response of cognitive psychology and computer science to HCI's attempts to found a discipline and demarcate a distinctive domain; for as we have noted, HCI texts have to address themselves to, and attempt to manage a skeptical readership. Our conjecture is that, to the extent that the user interface appears to have a more prominent place within software engineering texts than hitherto – for example, the most recent edition of Sommerville (1992) devotes an entire chapter to it – that the moral rhetoric associated with the user has been successful. However, the very fact that such issues can be accommodated within competing discourses puts into question the extent to which HCI has managed to establish itself as an "obligatory passage point" in relation to knowledge of the phenomena that it has attempted to define as its own.

Finally let us consider the rhetorical and disciplinary status of our own arguments. For although our gaze has been securely fixed upon HCI, it has been implicit in our argument that the processes described have, at least, some degree of general applicability for understanding the formation and interaction of

disciplines.[12] It might be assumed that an admission of generality amounted to an undermining of our own argument: for clearly our own text could be analyzed in terms of *its* use of tropes, *its* management of discursive dilemmas, and the matrix of disciplinary relations within which *it* moves. In our view, such a recognition – that is, the recognition of reflexivity – serves rather as an affirmation of the processes that we have attempted to articulate. For the suggestion that reflexivity leads to the negation of our argument relies on a mistaken assumption that this text is separate from what it describes.

By contrast, we assert the value of considering this text as an instance of the very phenomenon being described. In the first place, our shift of focus onto the discourse of HCI is itself an overtly disciplinary one, whose claim to novelty rests on an implicit comparison with work within HCI and an assertion of the relevance of work in different fields, such as the sociology of scientific knowledge. Moreover, the volume of which this chapter forms a part is itself a phenomenon consistent with our formulation of the "second wave," in which the dynamic and shifting field of disciplinary relations accommodates a wider plurality of more ostensibly critical approaches, which are nonetheless tied to foundational aspects of first-wave HCI. As such, our chapter should not be construed as species of metalevel criticism, but as part of this same matrix of disciplinary relations, and as displaying the same rhetorical dependence on features of HCI discourse that we have identified in recent work of others. However, while we assert that criticism is not our intention, we recognize that, as Latour has argued, since the deconstruction of others' work is a standard strategy for discrediting positions within science, it is not surprising that analyses such as ours are read in that light (Latour, 1987). Accordingly, and bearing in mind the book this chapter appears in, perhaps there is no escape from our text being read as itself a piece of second-wave HCI no matter what we mere authors would wish.

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Notes

1. "Constructivist" is used in a general sense here, and not as a label for a particular methodology or theory within the social sciences. Neither Callon nor Foucault can be easily designated as constructivist in the latter sense.
2. "Problems" such as these can, of course, be profitably turned into topics and sources of substantive insight in themselves. E.g., the disjunction between programmatic claims for multidisciplinarity and the practical agendas set by cognitive psychology is itself a characteristic

feature of HCI, and one with considerable significance for putative contributions from other disciplines (see Cooper, 1991).

3. Cf. Ashmore, Mulkay, and Pinch's (1989) discussion of the founding of "medical economics."
4. Sometimes this liberal rhetoric coexists, somewhat uneasily, with an emphasis on productivity: e.g., Dertouzos's keynote address to the CHI '90 conference asked "let us then ask what we should do in tomorrow's user interfaces to increase productivity and empower people, as the theme of this conference charges" (Dertouzos, 1990: 1).
5. In another paper (Bowers and Rodden, 1993), one of us has proposed that the notion of interface (as designating some site where two separated objects are to be interrelated) can be made an empirical topic for study rather than taken as a theoretical resource for HCI. That is, just what is separated from what and just how the interrelations are made are issues to be studied in a relevant field setting, not taken as matters requiring an a priori, conceptual decision. Bowers and Rodden report a study from this perspective. The current chapter's discourse analytical approach is a complimentary alternative. Both strategies take "the interface" not as some entity with a fixed location and definition but as something whose sense and place are produced through practical activities of various sorts (the discursive practices of HCI in the current case, the practices by which a computer network is managed and used in the case of Bowers and Rodden's field study).
6. Cf. Woolgar (1985) on the rhetoric of progress within AI.
7. On the textual construction of responsible subject positions, see McHoul (1986); and on the role that this plays in "performing community," see Cooper and Woolgar (1994).
8. See, e.g., Carroll (1989), Suchman (1987), Whiteside and Wixon (1987).
9. Cf. Woolgar and Pawluch (1983) on "ontological gerrymandering."
10. It might further be argued that "designer" has come to occupy a familiar discursive position within recent HCI, i.e., crucial to disciplinary claims, yet relatively unexplicated as a category: e.g., it does not map easily onto job descriptions within IT or computer science.
11. The authors are divided over the practical feasibility or desirability of such an overcoming of the disciplines. One of us is eager to see the end of cognitive psychology, computer science, and the rest and the beginnings of "postdisciplinary research." The other is not so sure.
12. Bauman (1992) suggests that self-justificatory rhetoric is more important to those disciplines, such as the social sciences, which have to work continually at the definition and preservation of their boundary with respect to lay discourse: a problem, e.g., more for sociology than for physics. Our argument implies that *boundaries* with other disciplines are equally important. Beyond this, our response to Bauman would be that, in the first place, the differential specificity of disciplines is a matter for empirical investigation; and, second, that construing disciplines such as physics as not engaged in self-justification may rely on an unduly restricted conception of the nature of scientific work.

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