

Human-computer interaction (HCI) is an area of research and practice that emerged in the early 1980s, initially as a specialty area in computer science embracing cognitive science and human factors engineering. See section "Exceptions" in the copyright terms below. Figure 2. 15: Through the past three decades, a series of theoretical paradigms emerged to address the expanding ambitions of HCI research, design, and product development. Successive theories both challenged and enriched prior conception of people and interaction. All of these theories are still relevant and still in use today in HCI. The sequence of theories and eras is of course somewhat idealized. People still work on GOMS models; indeed, all of the major models, theories and frameworks that ever were employed in HCI are still in current use. Indeed, they continue to develop as the context of the field develops. GOMS today is more a niche model than a paradigm for HCI, but has recently been applied in research on smart phone designs and human-robot interactions. The challenge of integrating, or at least better coordinating descriptive and explanatory science goals with prescriptive and constructive design goals is abiding in HCI. There are at least three ongoing directions -- traditional application of ever-broader and deeper basic theories, development of local, sometimes domain dependent proto-theories within particular design domains, and the use of design rationale as a mediating level of description between basic science and design practice.

2.6 Implications of HCI for science, practice, and epistemology

One of the most significant achievements of HCI is its evolving model of the integration of research and practice. Initially this model was articulated as a reciprocal relation between cognitive science and cognitive engineering. Later, it ambitiously incorporated a diverse science foundation, notably social and organizational psychology, Activity Theory, distributed cognition, and sociology, and a ethnographic approaches human activity, including the activities of design and technology development and appropriation. Currently, the model is incorporating design practices and research across a broad spectrum, for example, theorizing user experience and ecological sustainability. In these developments, HCI provides a blueprint for a mutual relation between science and practice that is unprecedented. Although HCI was always talked about as a design science or as pursuing guidance for designers, this was construed at first as a boundary, with HCI research and design as separate contributing areas of professional expertise. Throughout the 1990s, however, HCI directly assimilated, and eventually itself spawned, a series of design communities. At first, this was a merely ecumenical acceptance of methods and techniques laying those of beyond those of science and engineering. But this outreach impulse coincided with substantial advances in user interface technologies that shifted much of the potential proprietary value of user interfaces into graphical design and much richer ontologies of user experience.

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Somewhat ironically, designers were welcomed into the HCI community just in time to help remake it as a design discipline. A large part of this transformation was the creation of design disciplines and issues that did not exist before. For example, user experience design and interaction design were not imported into HCI, but rather were among the first exports from HCI to the design world. Similarly, analysis of the productive tensions between creativity and rationale in design required a design field like HCI in which it is essential that

designs have an internal logic, and can be systematically evaluated and maintained, yet at the same time provoke new experiences and insights. Design is currently the facet of HCI in most rapid flux. It seems likely that more new design proto-disciplines will emerge from HCI during the next decade. No one can accuse HCI of resting on laurels. Conceptions of how underlying science informs and is informed by the worlds of practice and activity have evolved continually in HCI since its inception. Throughout the development of HCI, paradigm-changing scientific and epistemological revisions were deliberately embraced by a field that was, by any measure, succeeding intellectually and practically. The result has been an increasingly fragmented and complex field that has continued to succeed even more. This example contradicts the Kuhnian view of how intellectual projects develop through paradigms that are eventually overthrown. The continuing success of the HCI community in moving its meta-project forward thus has profound implications, not only for human-centered informatics, but for epistemology.

2.7 Pointers: How to learn more In these "pointers" I have listed general background references to the discussion above, specific references to points made in the text, and reference to other chapters in the Encyclopedia of Human-Computer Interaction (Interaction-Design.org). Contemporary users want more from a system than merely "ease of use". See section "Exceptions" in the copyright terms below. See section "Exceptions" in the copyright terms below. Figure 2.5 A-B: Two visualizations of the variety of disciplinary knowledge and skills involved in contemporary design of human-computer interactions. Indeed, the principle that HCI is a community of communities is now a point of definition codified, for example, in the organization of major HCI conferences and journals. The integrating element across HCI communities continues to be a close linkage of critical analysis of usability, broadly understood, with development of novel technology and applications. This is the defining identity commitment of the HCI community. It has allowed HCI to successfully cultivate respect for the diversity of skills and concepts that underlie innovative technology development, and to regularly transcend disciplinary obstacles. In the early 1980s, HCI was a small and focused specialty area. It was a cabal trying to establish what was then a heretical view of computing. Today, HCI is a vast and multifaceted community, bound by the evolving concept of usability, and the integrating commitment to value human activity and experience as the primary driver in technology.

2.3 Beyond the desktop Given the contemporary shape of HCI, it is important to remember that its origins are personal productivity interactions bound to the desktop, such as word processing and spreadsheets. Indeed, one of the biggest design ideas of the early 1980s was the so-called messy desk metaphor, popularized by the Apple Macintosh: Files and folders were displayed as icons that could be, and were scattered around the display surface. The messy desktop was a perfect incubator for the developing paradigm of graphical user interfaces. Perhaps it wasn't quite as easy to learn and easy to use as claimed, but people everywhere were soon double clicking, dragging windows and icons around their displays, and losing track of things on their desktop interfaces just as they did on their physical desktops. It was surely a stark contrast to the immediately prior teletype metaphor of Unix, in which all interactions were accomplished by typing commands. The early Macintosh desktop metaphor: Icons scattered on the desktop depict documents and functions, which can be selected and accessed (as System Disk in the example) Author/Copyright holder: Unknown (pending investigation). Copyright terms and licence : Unknown (pending investigation). See section "Exceptions" in the copyright

terms below .See section "Exceptions" in the copyright terms below. Figure 2.2: The Model Human Processor was an early cognitive engineering model intended to help developers apply principles from cognitive psychology. This was facilitated by analogous developments in engineering and design areas adjacent to HCI, and in fact often overlapping HCI, notably human factors engineering and documentation development. Human factors had developed empirical and task-analytic techniques for evaluating human-system interactions in domains such as aviation and manufacturing, and was moving to address interactive system contexts in which human operators regularly exerted greater problem-solving discretion. Documentation development was moving beyond its traditional role of producing systematic technical descriptions toward a cognitive approach incorporating theories of writing, reading, and media, with empirical user testing. Documents and other information needed to be usable also. Minimalist information emphasized supporting goal-directed activity in a domain. Instead of topic hierarchies and structured practice, it emphasized succinct support for self-directed action and for r

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