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People: the way I see it: Interaction design is still an art form. ergonomics is real engineering

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The practice of HCI is mainly still an art form. The practice of Ergonomics is a rigorous engineering field. Okay, so I oversimplified in order to get your attention, but listen up: There is a lot of truth in that simplification.

The discipline that calls itself "Human-Computer Interaction," or HCI, has two major components: research and practice. The research component is done in universities and research divisions of companies. The practice comes from all those interface and interaction designers out there making real products and Web sites. The research side is a combination of science and engineering, with the major emphasis being on novel applications and means of interacting with machines. I love this stuff, but will have nothing more to say about it here. It is the practice that bothers me. The practice of HCI seems primarily to be an art form and skill, which explains why it is often so bad.

The discipline that calls itself "Human Factors" in the United States and "Ergonomics" elsewhere in the world is a real, true engineering discipline, with established methods and procedures. It is what HCI ought to be. Mind you, Human Factors & Ergonomics (henceforth, HFE) has its problems as well. Practitioners tend not to be designers, so they are good at specifying the design requirements, but not at constructing the actual layouts and appearances of the resulting devices and control panels and displays.

I have been reading a number of textbooks, both in HCI and in HFE. Originally, I thought the two would be similar, for, to my deluded mind, the practice of HCI is simply a subset of Human Factors that focuses on computers and their applications. Hence, the methodology would be similar.

Not according to the textbooks. Alas, textbook writers in HCI are woefully ignorant of the many solid, fundamental techniques discussed in textbooks of HFE. In a recent <*interactions*> article, I criticized "Human-Centered Design" for many failures [1]. In particular, I suggested that although the layout and design of each screen was well-done, there was little support for the activity to be performed. Now that I have examined the texts, I see why.

For example, here are two powerful classes of tools that are common in HFE and rare or non-existent in HCI: "link analysis" and "task analysis." Task analysis is often mentioned within HCI, but not in great detail. The HFE textbook in front of me devotes two lengthy chapters to the topic, with 11 different techniques. Another important HFE concept is "situation awareness," critical not just for safety-related tasks (where it is essential) but even for the problem of remembering one's place after an interruption, a critical problem in HCI design. Or consider "human error"—not just the definition (although even this is seldom well-addressed in HCI texts), but the appropriate classification and treatment. All these topics are essential if we wish to design applications and services that meet real needs, that handle sequences of actions, offer supportive error management, and enable recovery after interruption.

HFE is a well-established field, with a history of deep, insightful analysis and the development of useful tools that make equipment easier to use, more effective, safer, and more able to accomplish our underlying needs. Because I was originally educated in these methods, I just took for granted that everyone in HCI knew them, and were simply adapting these well-known methods to the special cases of computers. How wrong I was.

University and industrial researchers are indeed often knowledgeable about these techniques, but usually only for those whose training is from industrial engineering, ergonomics, or engineering psychology: Computer scientists and graphic artists seem woefully ignorant. Instead of a rigorous, systematic body of knowledge and methods, HCI practitioners seem to know a hodgepodge of techniques, such as conceptual analysis, scenarios, personas, and card sorting, all useful, but none capable of structuring sequences of operations, of dealing with problems of human error, of interruption, and of complex task sequencing, especially in the face of errors and distractions. These issues are at the heart of human factors and ergonomics.

HFE has a body of methods and techniques that are of critical value to practitioners of HCI. But HCI also has skills and talents that would greatly improve the practice of HFE. HFE needs more design skills and, especially, a better appreciation of the role of aesthetics. Both disciplines, HCI and HFE, need better understanding of business and marketing, of the business constraints of cost, time, and the installed base, and of creating products that not only fulfill the formal, technical requirements, but that attract willing, eager customers.

But this magazine is intended for those who work within HCI, and so to us I say: Shame on us. But special shame to those of us who teach and train the practitioners of HCI. We really can't blame those who practice HCI for the deficiencies of their education.

References

1. Norman, D. A. (2005). Human-Centered Design Considered Harmful. <*interactions*>, 12(4), 14-19.

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