Mapping the "Human" Side of Computing: An Author Co-citation analysis of the Interrelationships Between Ergonomics, Human-Computer Interaction and Human Factors Research

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Introduction

Ergonomics, Human-Computer Interaction, and Human Factors all focus on some aspect of the interaction between human and machine — including computer-based information systems. The degree of interrelationship among these three research areas is not clear.

From one perspective, Ergonomics and Human Factors appear to be the same, or closely related topics of concern. The International Ergonomics Association (www.iea.cc) defines ergonomics as: "Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance" and lists a number of human factors and ergonomics organizations as association members. Also, the Human Factors and Ergonomics Society of America, which began as the Human Factors Society, publishes both *Human Factors* and *Ergonomics in Design.*

On the other hand, Licht et al., in a detailed content analysis of user-derived definitions of Human Factors, Ergonomics, and Human Factors Engineering, report that "definitions of *human factors* include a broader range of classification categories and domains of inclusion; definitions of *human factors engineering* place an overwhelming emphasis on design as the medium to effect change on an end-system; and definitions of *ergonomics* emphasize the study of humans at work as an important characteristic" (Licht et al. ND). In its "Curricula on HCI," ACM SIGCHI states that "Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them. "

Contents

In the present study we use author co-citation analysis and three domain visualization tools, cluster analysis, multidimensional scaling, and PFNets, to explore the interrelationships between these three research fields. We map 60 authors—selected primarily by being highly cited in core Ergonomics, HF, and/or HCI journals (with additions made on the basis of recommendations from field experts).

Preliminary results suggest that

1. Unlike the view of the IEA, ergonomics (or at least ergonomics authors) is treated as an almost entirely separate field from authors working in human factors or HCI.
2. The literature of HF and HCI is more integrated, but there are still distinct subsets of authors representing different research areas.
3. PFNet analysis of raw co-citation counts identifies several key authors who serve as focal points for HF and HCI research and bridges between different specialties.

References

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