



Editors' Introduction to the Special Issue on Innovations in Cognitive Engineering and Decision Making, Part II

Ann M. Bisantz

University at Buffalo

Ellen J. Bass

University of Virginia

Jennifer J. Ockerman

Johns Hopkins University Applied Physics Laboratory

THIS IS THE SECOND HALF OF A SPECIAL ISSUE TITLED "INNOVATIONS IN COGNITIVE ENGINEERING and Decision Making" (CEDM). The two-part issue was designed to focus on cutting-edge CEDM-related research and practice and demonstrates the breadth of issues presented at recent Human Factors and Ergonomics Society annual meetings. The articles chosen for this issue represent a diverse set of topics ranging from display design to sociotechnical concerns, including social networking and etiquette.

In "Impact of Functional and Schematic Overview Displays on Console Operators' Situation Awareness," Anand Tharanathan, Peter Bullemer, Jason Laberge, Dal Vernon Rising, and Richard Mclain explore the impact of using qualitative, graphical component state indicators in an overview display for hydrocarbon processing plant operators. This new format display is compared with the traditional schematic display that uses numerical indicators of component states. A controlled study with experienced plant operators was conducted, and results show that the qualitative, graphical component state indicators were clearly better at supporting the operators' Levels 1 and 2 situation awareness of component states. The use of cognitive engineering methods to redesign a primary monitoring interface showed performance improvements compared with the traditional monitoring interface, allowing another industry to take advantage of performance gains.

ADDRESS CORRESPONDENCE TO: Ann M. Bisantz, University at Buffalo, SUNY, Industrial Engineering, 438 Bell Hall, Amherst, NY 14260-2050, bisantz@buffalo.edu.

Journal of Cognitive Engineering and Decision Making, Volume 6, Number 2, June 2012, pp. 139-140.
DOI: 10.1177/1555343412440687. © 2012 Human Factors and Ergonomics Society. All rights reserved.

“Evaluation of an Ecological Interface Design for Military Command and Control,” by Daniel Hall, Lawrence Shattuck, and Kevin Bennett, provides an evaluation of a military command-and-control interface that was designed with the use of cognitive systems engineering and ecological design principles. The evaluation was completed within a synthetic environment with realistic tactical scenarios and compared the ecologically designed interface with the existing interface. The results demonstrate the superiority of the ecological interface in supporting the effective completion of command-and-control tasks, ease of learning, and ease of use.

In the third article, “Designing for Social Engagement in Online Social Networks Using Communities-of-Practice Theory and Cognitive Work Analysis: A Case Study,” Adam Euerby and Catherine Burns address a sociotechnical issue related to enhancing sociability in the design of social networking and social web tools with the goal of improving engagement of communities of users. They present a domain-community model that introduces a new conceptual framework to cognitive engineering, communities of practice, and integrates this framework with work domain analysis. A case study of a development leadership community is used to highlight how the integrated framework can influence the design of an online social environment to support both social engagement and performance (domain effectiveness).

Finally, the last two articles address issues related to politeness and performance. Christopher Miller, Peggy Wu, and Tammy Ott present two experiments that address the effects of degree of politeness on compliance and attitudes toward requests and directions in a team setting in their article, titled “Politeness in Teams: Implications for Directive Compliance Behavior and Associated Attitudes.” The three levels of politeness directives varied in the wording: polite (e.g., “Could you please let me know . . . ?”), rude (e.g., “Quit what you’re doing and tell me . . . !”), and nominal (e.g., “Provide me with . . .”). For both novices and experts, increased politeness and familiarity with the team member providing the requests and directions significantly enhanced attitudes. Interestingly, compliance rates increased for novices but decreased for experts with increased politeness. This research highlights the importance of politeness perception in team performance and the potential influence of training and work culture.

Michael Dorneich, Patricia May Ververs, Santosh Mathan, Stephen Whitlow, and Caroline Hayes also address politeness in their article, “Considering Etiquette in the Design of an Adaptive System,” but with a focus on the design of adaptive automation that embeds social conventions for the appropriateness of interrupting users’ tasks. When deciding whether to interrupt the user, a wearable adaptive system classified the users’ cognitive state via brain and heart sensors and then considered message priority, user workload, and system state. The authors found that when users were overloaded, primary task performance was improved by managing interruptions, whereas situation awareness on secondary tasks suffered.