

# COGNITIVE ERGONOMICS: A DEFINITION

Cognitive Ergonomics, a term synonymous with Cognitive Engineering, concerns the design, structure, and operation of the interface between the human end user or operator of a system and a system's states and processes. This approach assumes that the way people see, hear, pay attention, think, remember (and forget), and make decisions has direct implications for the design of the artifacts and environments that they use. If the features of their physical surroundings reflect and support their natural cognitive tendencies, then at least users should make fewer errors when using such systems. At most, their performance and productivity could receive a positive boost.

If we apply a narrow definition of this term, the following would constitute some relevant examples:

- TV or DVD player remote control — button placement, orientation, size, shape, texture, and color
- Computer software menu — the number, color, arrangement, modes of access, and hierarchical nesting of the screens in an online help system
- Design and layout for the buttons, knobs, and dials on a car stereo
- Warning labels on consumer products — color, configuration, size, and placement

Consider the design of an alarm clock. Since people naturally think of hours and minutes in hierarchical relationship to one another, when setting an alarm, people might expect to set the hour before the minute.

However, if we define Cognitive Ergonomics more broadly, the following also illustrate its application:

- The configuration of equipment and furniture in a hospital operating room to maximize team performance and minimize errors of perception, attention and judgment
- The design of a commercial jet's cockpit to correspond to the crew's natural tendencies in perception, memory, and decision making
- The creation of an office environment to minimize distractions and maximize productivity and performance
- The arrangement of a classroom to maximize information exchange, knowledge creation, and acquisition
- The space layout and design, traffic paths, common areas, signage and other display areas within a library, to maximize orienting and use by naïve and experienced users

Specifically, the design of a team room would offer tools and components to accommodate individual and group perception, communication, coordination, and problem solving. If such environments reflect and support the processes that contribute to group comprehension and consensus building, they will ensure superior performance compared to environments that interfere with these principles.

Cognitive Ergonomics applies findings from more basic sciences such as cognitive science and cognitive psychology to the design of products, systems, artifacts, and environments for people. If the design of these items reflects the knowledge structures, skills, abilities, and natural behavioral tendencies of their users, then more efficient system performance can be expected.

In applying Cognitive Ergonomics more broadly to the design of furniture, work tools, and office environments, we hope to design workplaces that constitute extensions of the minds of their occupants. Literally, we want people's inner worlds to resonate with their physical environments, creating a positive effect that we have termed cognitive resonance.