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Cognitive Task Analysis

Cognitive task analysis (CTA) is a type of **Task analysis** aimed at understanding tasks that require a lot of cognitive activity from the user, such as decision-making, problem-solving, memory, attention and judgement.

The cognitive task analysis methods analyze and represent the cognitive activities users utilize to perform certain tasks. Some of the steps of a cognitive task analysis are: the mapping of the task, identifying the critical decision points, clustering, linking, and prioritizing them, and characterizing the strategies used (Klein, G. A. (1993). Naturalistic decision making: Implications for design. Wright Patterson AFB, OH: Crew Systems Ergonomics Information Analysis Center.). There is a collection of methods available for conducting a cognitive task analysis. Applied Cognitive Task Analysis (ACTA), the Critical Decision Method (CDM), Skill-Based CTA Framework, Task-Knowledge Structures (TKS) and the Cognitive Function Model (CFM) are a few examples.

Cognitive task analysis has been used to examine:

- Performance differences between novices and experts
- Mental workload associated with complex controls and displays
- Decision-making of experts
- The development and evolution of mental models.
- Information requirements for command and control systems
- Troubleshooting, fault isolation, and diagnostic procedures

Related Links **Detailed description**

Crandall, B., Klein, G., Hoffman, R. R. (2006). **Working Minds: A Practitioner's Guide to Cognitive Task Analysis**. MIT Press. "This is an important book for the engineering of complex systems and information technology systems."

Klein, G. (1998). Sources of power: How people make decisions. Cambridge, MA: MIT Press. Gary Klein is a leading figure in cognitive task analysis.

> This book describes how experts solve problems, often under great stress. He notes that rational analysis where the costs and benefits are considered logically is not the primary approach by experts under difficult conditions.

Luczak, H. (1997). Task analysis. In Salvendy, G. The Handbook of Human Factors and Ergnomonics. New York, NY: Wiley. 340-416.

> Luczak list a variety of cognitive task analysis methods including; decision ladders, GOMS, verbal protocol analysis, and concept mapping.

Richard E. Clark, David F. Feldon, Jeroen van Merriënboer, Kenneth A. Yates, and Sean Early (2007). **Cognitive Task Analysis**. In: handbook of research on educational communications and technology. Routledge.

> This chapter presents an overview of the current state of CTA in research and practice.

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