
The purpose of this handbook is to aid researchers and practitioners in the development and evaluation of cognitive tasks and systems. The editor does not view cognitive task design (CTD) as a new discipline; rather, he sees it as a means to bring together different theories and methodologies that share a common goal – design that is focused not only on how objects are used, but also on how this use changes the way they are perceived. As a result, the book is organized into three parts: 10 chapters are dedicated to theoretical aspects of CTD, 12 chapters discuss design methods that support cognitive tasks, and 9 chapters describe CTD applications. The variety of themes reviewed in each part does, indeed, provide the reader with a comprehensive look at CTD.

The first chapter in the book, written by the editor, provides an introduction to CTD: what CTD is (and what it is not) and why it is important to use CTD in human factors work. It is argued here that when a new artifact is introduced, users will usually adapt to it after a transition period, possibly by tailoring the system or the task to meet their goals. These behaviors may change the nature of the artifact’s use, possibly rendering invalid the criteria that were used to design it. The design methodology should anticipate and account for these changes. The editor does not claim that CTD is the optimal design methodology, but that it offers a necessary first step – a new perspective on task design.

Hierarchical task analysis is the second chapter on theories. In a structure similar to that of many subsequent chapters, the text describes the purpose of this technique and when it may be applied, how it is carried out, and finally examples and caveats are discussed. Chapter 3 presents functional analysis, focusing on three observation techniques used as its basis: natural history, staged world observations, and abstract lab experiments. Chapter 4 lays the theoretical foundations for course-of-action analysis, in which operator activities in real-work situations are investigated, along with course-of-action-centered design. The authors of Chapter 5 make the case for considering social context – operators’ relationships and communications among themselves and with remote agents – in cognitive work analysis and design. On a related topic, Chapter 6 discusses the use of groupware to enhance team collaboration. Chapters 7 and 8 describe different aspects of adaptive systems design. Chapter 9 is a case study of approach-to-landing task analysis. The goal of the closing theoretical article, Chapter 10, is to help designers in anticipating design pitfalls.

The chapters dealing with methods describe different cognitive task analysis and design techniques; frequently, the authors employ case studies to explain how to apply these tools and to highlight key implementation concepts. Some chapters present general CTD techniques, such as the Applied Cognitive Work Analysis method described in Chapter 16. Others focus on task design and analysis for specific systems, such as Chapters 12 and 13 (process control), Chapter 18 (aviation technologies), and Chapter 19 (groupware). A third group of articles examines special aspects of CTD. For example, Chapter 14 looks at design and evaluation of open problem-solving environments such as educational software; Chapter 15 considers task design when access to the user group is infeasible; and Chapter 21 provides guidelines for system automation.
The final section of the book, dedicated to field studies, is similar to the methods section in that most of its chapters describe a framework for CTD and then demonstrate its application to one or more real-world problems. However, here the emphasis is usually on the case studies. For example, in Chapter 27, the Applied Cognitive Work Analysis technique (described in Chapter 16) is applied to two decision-making systems. Additional domains in which CTD has been utilized are covered in this section, such as track maintenance train operations (Chapter 25), space shuttle operations (Chapter 29), and a narrative learning environment for children (Chapter 24). As in the methods section, several articles examine specific aspects of CTD, such as Chapter 28, which deals with design of operating procedures, and Chapter 30, which discusses management of system malfunctions by users (specifically, pilots).

This handbook covers many topics in cognitive task design, including decision support, theories on artifact use, shared mental models, situation awareness, open-ended problems, function allocation, and more. Furthermore, the authors’ varied background and experience provides for a diverse outlook on these topics – from the most theoretical to the most practical, from space shuttle trajectory planning to children’s storytelling. As such, the book should prove to be a useful reference on CTD. It may have been helpful to group chapters by work domain (e.g., aviation) or topic (e.g., groupware), rather than into theories, methods and field studies, since most chapters dealt with all three of these themes. However, this minor drawback should not diminish from the importance of this handbook as a review of the state-of-the-art in cognitive task design.