Book Review: Display and Interface Design: Subtle Science, Exact Art
Gavan Lintern

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What is This?
Designing Displays for Older Adults

By Richard Pak & Anne McLaughlin  
2011, 197 pages, $76.95  
Boca Raton, FL: CRC Press, Taylor & Francis Group  
ISBN 978-1-4398-0139-0

– Reviewed by Randa L. Shehab

This book is a useful resource for usability design practitioners seeking to expand their perspective to include consideration of older adults in the design of consumer products. The authors approach design with the goal of developing adaptive interfaces that make products accessible to a wider range of users, including older adults. Rather than focusing on the stereotype of adults resisting or even fearing use of technology, the authors look at the fundamental motivations that encourage older adults to use technology or discourage them from doing so.

The book provides a clear path for the reader by first introducing the issues of technology use, then providing an overview of functional performance changes associated with aging, and concluding with case studies that walk the reader through the process of age-inclusive design for several technology-driven interfaces. Each chapter includes familiar examples born of everyday experiences, such as the importance of auditory cues to set an alarm clock and need for hand dexterity to use a computer mouse. The chapters also contain figures that bring to life the impacts of aging. In particular, the examples of variations in visual abilities experienced by older adults leave no doubt as to the challenges of aging vision.

A key feature is the authors’ approach to usability as a systems problem. Rather than conforming to the linear structure of the book, they divert the reader with “possible interactions to consider,” emphasizing a systems perspective to design that looks for unintended consequences in design decisions. They illustrate this approach with a discussion of the design flaws in the now-infamous Florida ballots for the 2000 presidential election.

Another key feature of the book is the personalization of the design process by developing age-relevant user personas. Case studies present fictional representations of actual users with detailed descriptions of user capabilities and limitations as well as motivations, attitudes, and expected behaviors. Three distinct personas are used in the case studies; Marilyn, Don, and Paul each have different goals for the use of technology, including receiving mobile e-mail pictures of grandchildren, recording television programs while away from home, and easy and accurate use of a home medical device. These personas drive the usability evaluations presented through scenario and task analyses.

The value of this book lies in the examples used to illustrate the various topics. The examples are familiar and comfortable to a broad range of readers, and the case studies put the concepts into practice. Although the target audience is the usability design engineer, the book could also serve as a complementary resource for classroom discussions on human–computer interaction. Readers of all backgrounds will find this book a useful resource for accomplishing the goals of universal design.

Randa Shehab is a professor of industrial and systems engineering at the University of Oklahoma. Her research expertise is in the domain of human performance assessment for special populations, including aging adults, shuttle astronauts, and amputees. She is active in engineering education research that focuses on the parity and success of underrepresented students.

Display and Interface Design: Subtle Science, Exact Art

By Kevin B. Bennett & John M. Flach  
2011, 463 pages, $99.95 (hardcover)  
Boca Raton, FL: CRC Press, Taylor & Francis Group  
ISBN 978-1-4200-6438-4

– Reviewed by Gavan Lintern

Bennett and Flach offer an outstanding treatment of display and interface design, which stands out partly because it sits within an area of thinking in design and behavioral science that, until now, has been fragmented and superficial. This book constitutes such a significant development in the area of display and interface design that it deserves to become the preferred text for graduate courses on this topic.

Bennett and Flach present the full package: a strong theoretical foundation, a comprehensive strategy of analysis, and a detailed strategy for representational design. To illustrate the intricacies in application of their
design strategy, Bennett and Flach offer design tutorials on process control, aircraft control, mobile phones, and command and control. However, their strategy can be generalized to any complex, interactive work domain.

There are three parts to the conceptual framework underlying their design strategy: the work domain, the interface, and the cognitive capabilities of the worker. The centerpiece of their strategy is the proposal that interface design must take a triadic perspective. They show us the limitations of thinking solely in terms of how people process information within a work situation (or its related display). The operator-display interface must also reflect constraints of the work situation so that important or meaningful aspects of work problems become salient in the representation. Bennett and Flach characterize their conceptual framework as a triadic approach, which they contrast with common dyadic approaches that emphasize only the relationship between the interface and the cognitive capabilities of the worker or, alternatively, only between the interface and the physical properties of the work domain.

With regard to analysis, Bennett and Flach emphasize the need for systematic analysis of both the structure of the work domain and the cognitive capabilities of the worker. They turn to cognitive work analysis (CWA), specifically, the abstraction-decomposition space of work domain analysis and the decision ladder of work task analysis. They contrast work domains largely constrained by physical laws with those largely constrained by intentions or purpose. They argue for a different emphasis within CWA for these two different types of work domains, with the abstraction-decomposition space taking the lead role for domains largely constrained by physical laws, and the decision ladder taking the lead role for those largely constrained by intentions or purpose.

Bennett and Flach’s comprehensive approach to representational design deals with contrasting ideas of proximity compatibility versus object configurality, arguing that the empirical evaluations of proximity compatibility provide data more consistent with the concept of object configurality. They build on semantic mapping as support for a strategy of layering information from different levels of abstraction and different levels of detail and employ a nuanced use of object forms in the development of interfaces. Reliance on object configurality dovetails well with the desire to represent meaning versus information. Bennett and Flach emphasize that these object representations must be configured so that experienced and skilled workers can readily infer the meaning of patterns represented at the interface for action on the work domain.

Bennett and Flach bring clarity and order to concepts and ideas that are easy to get mixed up – for example, analogy and metaphor. What is the distinction? Is the distinction meaningful? When might one prefer analogy to metaphor? What are the complexities in using either in the development of a representational form? These questions get crisp, straightforward answers.

I cannot remember the last time I was so enthusiastic about a book. Am I being overly enthusiastic? This is an area that has troubled me throughout my professional career of 30+ years. We in human factors and, more recently, in cognitive engineering have not done a good job of linking foundational theory to analysis and then following through with a strong conceptualization that connects the analysis to the design. Nor is that done well in allied fields; for example, human–computer interaction and systems engineering. I have read many books on this topic over the years, generally finding something of value but never the systematic and comprehensive treatment that will transition interface design from an art form into a discipline. In this book, I have found what I have been looking for.

Gavan Lintern has a PhD in engineering psychology (University of Illinois, 1978). He is an HFES Fellow with more than 30 years of experience in human factors. Retired from General Dynamics in 2009, he now lives in Melbourne, Australia. Gavan works part-time as an industry consultant, otherwise filling in his time as minder of the home pets and general home roustabout. He has written two books: The Foundations and Pragmatics of Cognitive Work Analysis (April 2009) and Joker One: A Tutorial in Cognitive Work Analysis (2013).