Book Review

Design Knowing and Learning: Cognition in Design Education
C. Eastman, M. McCracken, W. Newstetter (eds.),
Elsevier, Oxford (2001) 318 pp., £60, ISBN 008
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To start a development of a 'science of learning'
seems an almost impossible mission. Nevertheless,
by presenting this book the editors showed the
courage to undertake this difficult expedition. They
brought people together from different design
fields who are seriously involved in design edu-
cation. In my review I want to focus on the ques-
tion of whether this courage has been rewarded by
the joint contributions of the authors involved.

Let me start by saying that the book is a valuable
and significant contribution to design research in
general. For everyone who wants to get a fairly
complete overview on what happened in recent
years in empirical design thinking research, the
book is a must-read. Almost every area relevant
to design cognition has been covered, from purely
behavioural aspects such as mental representations,
the role of prior knowledge and visual reasoning,
to general design processes and strategies. But it
offers more than cognitive aspects alone. I am very
happy with the attention paid to evaluating the
research methods applied in this area as can be
found in the chapters by Craig (chapter 1), Cross
(chapter 5) and Bucciarelli (chapter 13). Especially
the first chapter by Craig contributes to the matu-
ration of the design research field by giving a rather
critical view on many current design studies. Much
of his criticisms can be applied to a number of con-
tributions in this book.

But, what about the development of *design learn-
ing strategies* and *design pedagogy*? Unfortunately,
that seems to be not the real focus of the book.
Most chapters hardly contribute to a better view
on this pedagogy and learning strategies in design
education. In that way the book reflects the editors'
disappointing experiences in earlier efforts to find
authors for a special issue of *Design Studies* on
design learning. The two main problems they
encountered were the lack of rigorous evaluations
of innovative classroom interventions, and the lack
of clarity in determining the gains in student per-
formance on the basis of the learning method
applied.

I miss an overall introduction to the topic of design
learning. Although there are differences between
designing and other disciplines, the way students
acquire knowledge and practical skills is quite
common among most disciplines. For that reason
we can learn from learning theories and research
data already developed in other disciplines such as
educational and cognitive psychology. I disagree
with Oxman's statement in Chapter 12 that
'…there presently exists a lack of educational
theories of learning which function as an under-
pinning of design education.' A lot of (rigorous)
research has been done on knowledge acquisition
and transfer, on the importance of different knowl-
edge types (declarative, procedural, meta-
cognitive), on information processing and on skill
learning; but also on the effectiveness of
teaching/learning methods. All these findings can
contribute to the development of design pedagogy.

That is not to say that in the book there are no references made to these findings. For example, Goel's description of the importance of Type 1 knowledge (domain-related and technical) and Type 2 knowledge (managing the process of design) has strong relations with well-known learning theories; the same holds for the theoretical view of Newstetter and McCracken on prior knowledge in design learning. But again, in their empirical research and conclusions a translation of these data in terms of consequences for design education is missing.

Regarding the issue of design pedagogy it seems quite obvious that more research is needed in the classroom. But I know from my own experiences that it is indeed very difficult to derive rigorous data from classroom experiments and observations. As a consequence of the many variables involved, there is too much noise obscuring the data. But here also we can learn from the research in other disciplines in order to develop our own research methods on design learning.

The editors see the book as an 'initial step' towards the development of a science of design learning. Even if we limit ourselves to the development of design learning strategies, the initiative taken by the editors certainly deserves a sequel.

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