Design Computing and Cognition ’10

John S. Gero
Editor

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Preface

Design research has two strands exemplified by the terms science of design and design as science. Both are commonly referred to as design science. The former studies designing scientifically and the latter treats designing as a science. The ways that designing can be studied scientifically include both computational modeling and cognitive modeling. Many computational models of designing are not founded directly on results of cognitive studies. They are founded on conjectures about designing using concepts from artificial intelligence with its focus on ways of representation and on processes that support simulation and generation. Artificial intelligence continues to provide an environmentally rich paradigm within which design research based on computational constructions can be carried out. Increasingly design cognition research, founded on concepts from cognitive science. It provides tools and methods to study human designers in both laboratory and practice settings. It is beginning to allow us to test the claims being made about designing whether carried out individually or in teams and to study the effects of the introduction of novel technologies into the acts of designing.

Just as design cognition is starting to provide evidence-based support for computational studies, so cognitive neuroscience is starting to provide support for cognitive acts in designing.

Design thinking, the label given to the unique acts of designing, has become as paradigmatic view that has transcended the discipline of design and is now widely used in business and elsewhere. As a consequence there is an increasing interest in design research and government agencies are gradually increasing funding of design research, and increasing numbers of engineering schools are revising their curricula to emphasize design. This is because of the realization that design is part of the wealth creation of a nation and needs to be better understood and taught. The continuing globalization of industry and trade has required nations to re-examine where their core contributions lie if not in production efficiency. Design is a precursor to manufacturing for physical objects and is the precursor to implementation for virtual objects. At the same time, the need for sustainable

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development is requiring design of new products and processes, and feeding a movement towards design innovations and inventions.

This conference series aims at providing a bridge between the fields of design computing and design cognition. The confluence of these two fields continues to provide the foundation for further advances in each of them.

The papers in this volume are from the *Fourth International Conference on Design Computing and Cognition (DCC'10)* held at the University of Stuttgart, Germany. They represent the state-of-the-art of research and development in design computing and design cognition. They are of particular interest to researchers, developers and users of advanced computation in design and those who need to gain a better understanding of designing.

In these proceedings the papers are grouped under the following nine headings, describing both advances in theory and application and demonstrating the depth and breadth of design computing and design cognition:

Design Cognition
Framework Models in Design
Design Creativity
Lines, Planes, Shape and Space in Design
Decision-Making Processes in Design
Knowledge and Learning in Design
Using Design Cognition
Collaborative/Collective Design
Design Generation

There were 125 full paper submissions to the conference of which 38 were accepted. Each paper was extensively reviewed by three reviewers drawn from the international panel of 115 active reviwers listed on the next pages. The reviewers' recommendations were then assessed before the final decision on each paper was taken. Thanks go to them, for the quality of these papers depends on their efforts.

Mercedes Paulini worked to turn the variegated submissions into the conference format to produce a unified volume, special thanks go to her.

July 2010

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