Artificial Intelligence for Engineering Design, Analysis and Manufacturing (2007), *21*, 201–202. Printed in the USA.

DOI: 10.1017/S0890060407000224

GUEST EDITORIAL

Support for design teams

MARY LOU MAHER[1] AND RENATE FRUCHTER[2]

[1]Key Centre for Design Computing and Cognition, University of Sydney, Sydney, Australia
[2]Project Based Learning Laboratory, Department of Civil and Environmental Engineering, Stanford University, Stanford, California, USA

This Special Issue of *AI EDAM* on support for design teams is inspired by needs seen in the growing global workplace environment, recent developments in collaborative virtual environments, and the ability to model traditionally informal knowledge and processes. These developments and current research have the potential to transform the practice of design by allowing seamless transitions between physically and virtually present teams, single and multiple discipline models, local and global collaboration, and personal and shared knowledge. We have not achieved seamless transitions in practice, and the diversity of the papers in this Special Issue show that the problem is complex. As networked communications become more capable and common, the research reported in this Special Issue becomes more relevant to engineering design professionals.

The articles in this issue fall into two major categories: studying and understanding collaborative processes and the knowledge generated during the design process, and virtual environments that support teams in design meetings. The topics related to studying and understanding collaborative processes and knowledge include: characteristics that lead to successful distributed team design in small and medium enterprises (SMEs), principles for educating architects and engineers to work together, models for capturing tacit knowledge in design teams, providing support for capturing the benefits of design review meetings, and an ontology for design knowledge and processes. The topics related to virtual environments include the role of agents in supporting collaborative design in three-dimensional (3-D) virtual worlds, and the access to corporate memory in an interactive room environment.

Understanding collaborative processes and the knowledge generated during a design process is essential for progressing the development of artificial intelligence and/or information technology support for design teams. Thomson, Stone, and Ion use a case study approach to improve our understanding of how SMEs are successfully working in a distributed environment today. In their article, Martin, Fruchter, Cavallin, and Heylighen provide a model for education that encourages students from different disciplines to understand the language and concerns of each other while working on a specific project. Flanagan, Eckert, and Clarkson present the "sign-posting" model to capture the tacit knowledge gained through extensive experience and making it available to all members of the design team. The article by Huet, Culley, McMahon, and Fortin proposes a template generalized from several case studies to capture knowledge during a design review meeting. Gero and Kannengiesser present a situated function–behavior–structure model that expresses the changes in the team's structure that emerges from their interactions.

The development of virtual environments to support design teams is limited by our understanding of the knowledge needs and the interaction needs of the design team. The article by Maher, Rosenman, and Merrick focuses on how software agents can assist in managing the information and relationships in a 3-D object model of a building design for design meetings that take place in a 3-D virtual world. Fruchter, Saxena, Breidenthal, and Demian demonstrate the benefit of linking a broad range of information sources to interactive environments that make it easier for a colocated team to interact with each other and the information during team meetings.

This area of research is in its engineering phase: new models are proposed and implemented after studying the perceived needs of design teams. This is reflected in the types of articles we see in this Special Issue. The proposed models typically stand on their own and are difficult to evaluate. Although previous research exists in this area, the role of previous research is to provide a better understanding of the perceived needs of design teams, rather than to provide a starting point for further development and evaluation of the new and previously proposed models. As this field matures we will see more commonality among the models and the potential to define performance metrics that allow us to compare the different approaches.

Reprint requests to: Mary Lou Maher, Key Centre for Design Computing and Cognition, Building GO4, University of Sydney, Sydney, NSW 2006, Australia. E-mail: mary@arch.usyd.edu.au

Mary Lou Maher is a Professor of design computing at the University of Sydney. She is currently on leave at the NSF

in the United States, developing a funding emphasis on creativity and information technology. She received her PhD from Carnegie-Mellon University. Dr. Maher's research interests span different areas of design computing, specifically designing and collaborating in virtual environments, representation of design knowledge, design cognition, and the role and impact of new technologies on designers' cognition and design behavior.

Renate Fruchter is the Founding Director of the Project Based Learning Laboratory, Lecturer in the Department of Civil and Environmental Engineering, and Senior Research Engineer Thrust Leader of Collaboration Technologies at the Center for Integrated Facilities Engineering at Stanford University, which she joined in 1990. She received her engineering Diploma from the Institute for Civil Engineering in Bucharest, Romania (1981) and MSc (1986) and PhD (1990) from Technion–Israel Institute of Technology. Dr. Fruchter leads a research group that develops collaboration technologies for cross-disciplinary, geographically distributed team work, and e-Learning. Her interests focus on research and development and deployment of collaboration technologies that include team building, synchronous and asynchronous knowledge capture, sharing and reuse, and mobile solutions for global teamwork and e-Learning. In addition, her research group studies the impact of technology on learning, team dynamics, and assessment. She is the leader and developer of the Computer Integrated Architecture/Engineering/Construction Global Teamwork course launched in 1993 at Stanford, which engages universities from Europe, Asia, and the United States.