Chapter 2

Novel Concepts in Digital Design

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ABSTRACT

New media and methodologies are being employed in changing the conceptual understanding of what digital design is and may become. New experience is beginning to emerge in relation to novel key design concepts, computational methods, and digital technologies in the use of, and interaction with, digital media in design. The chapter describes an experimental program, the objective of which was to identify and map novel design concepts and relevant methodologies of digital design. In making the survey, analysis, and the categorization of relevant concepts and emerging precedents in this field, the authors made an attempt to formulize a theoretical basis for the conceptual mapping of this field. The conceptual mapping of this field is termed DDNET: Digital Design Network. The DDNET is a semantic system divided into the following conceptual levels: Key-concepts, sub-concepts, computational models and techniques, and precedent level. As a first step in this research, the authors made a survey of emerging knowledge from both praxis and theoretical resources, and then formulated and presented proposed set of design models, concepts, relevant methodologies, and precedents. Next, the authors mapped a network representation around leading key-concepts. The final step was to accommodate and apply this representation as a new basis for a pedagogical experiment in teaching digital design. The research has been conducted in Experimental Digital Design Studio in the Faculty of Architecture and Town Planning at the Technion, Israel.

INTRODUCTION

The evolution of digital design as a unique field of design knowledge, supported by new technologies, and producing unique understanding of designs is a phenomenon that is rapidly crystallizing in this decade. Our assumption is that the very nature of design is radically changing today. If the new media is indeed the common thread - there is the need first, to pioneer a new understanding of the nature of designing in relation to digital design media. Furthermore, if the very nature of design is radically changing, how then can we accommodate...
and recognize emerging theories of design? And how we accommodate these as a basis for a new didactics and pedagogy?

Among the significance of digital design for the design theoretical community is the way that this form of highly mediated design is beginning to evolve unique conceptual content. A new understanding of digital design as a unique set of design phenomena demands a theoretical and methodological formulation of the symbiosis between the product of design and the way it is now conceived, generated and modeled in digital media. The clarification and meanings of conceptual relationships between models, concepts, systems, and their applications in precedents, appears to provide advantages in the formulation of novel bodies of knowledge concepts and techniques. Having created a body of novel precedents in emerging practices, new methods and processes of mediated design have reached the point of maturity in conception and practice that now demands a broad and general theoretical formulation.

THE EMERGENCE OF NEW DISCOURSE

Early attempts to deal with digital design as an important theoretical threshold in architecture were realized by various theoreticians (Oxman, 2006). Folding in Architecture, the special issue of the journal *AD* (Lynn, 1993) created an influential body of early theoretical sources and had an important impact in determining the constituents of an incipient digital design theory. Early contributions by Lynn (1999) provided introductions to potential philosophical sources, to studies of technological innovations, to descriptions of experimental projects, and to identity of their relevance in the formulation of a theory of the digital in design. This combination of diverse theoretical, philosophical, methodological, technical and professional sources has characterized the discourse of digital architectural design in its first decade. In parallel, emerging technologies began to influence central issues in design theory. From the mid 1990’s digital architectural design became engaged with the exploration of complex geometries (Rashid and Couture, 2002), with so called, ‘free forms’ (Pottmann, 2010) as well as with related materialization processes of fabrication and manufacturing technologies (Schodek et al., 2005; Sass and Oxman, 2006). Recently, Digital Culture in Architecture - an introduction for the design profession examines the influence of digital culture on architecture (Picon, 2010) and in a recent AD book, the New Structuralism is proposed as a new theory of structuring in architecture as part of a new material practice (Oxman and Oxman, 2010).

Furthermore, the formulation and publication of a theoretical discourse, novel precedents have been associated with practice gained theory. Among such significant monographs on digital theoretical practice are UN-Studio, van Berkel and Bos (1999), Rashid and Couture (2002), Oosterhuis (2002), Zaero-Polo and Moussavi (2003), and Spuybroek (2004) each of which is a significant theoretical work promoting digital design as a unique set of processes. Furthermore, there was a growing impact of innovative experimentation in design and construction. In architecture, the Bilbao Guggenheim by Frank Gehry (1992-1997) was the most prominent catalyst of theorizing new formal directions and postulating new design methods (Lindsey, 2002). Other formative works that helped to generate theoretical discourse include the Greater London Authority Headquarters, (2002) and the Swiss RE building (2004) designed by Foster & Partners and Arup Associates etc. Recently works such as the Cagliari Contemporary Arts Centre in Cagliari designed by Zaha Hadid Architects (2007), the Skipper Library by Formtexx (2010) and works completed by Gramazio & Kohler (2008) are proposed as part of the New Structuralism (Oxman and Oxman, 2010).

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