Chapter 31

An Analysis of Design Communication with and Without Computer Mediation

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31.1 Introduction

With recent developments in CAD and communication technologies, the way we visualise and communicate design representations is changing. A matter of great interest to architects, practitioners and researchers alike, is how computer technology might affect the way they think and work. The concern is not about the notion of 'support' alone, but about ensuring that computers do not disrupt the design process and collaborative activity already going on (Bannon and Schmidt, 1991). Designing new collaborative tools will then have to be guided by a better understanding of how collaborative work is accomplished and by understanding what resources the collaborators use and what hindrances they encounter in their work (Finholt et al., 1990).

Designing, as a more abstract notion, is different from having a business meeting using video conferencing. In design it is more important to 'see' what is being discussed rather than 'watch' the other person(s) involved in the discussion. In other words the data being conveyed might be of more importance than the method with which it is communicated (see Kvan, 1994). Similarly, we believe that by using text instead of audio as a medium for verbal communication, verbal representations can then be recorded alongside graphical representations for later retrieval and use. In this paper we present the results of a study on collaborative design in three different environments: face-to-face (FTF), computer-mediated using video conferencing (CMCD-a), and computer-mediated using 'talk by typing' (CMCD-b). The underlying aim is to establish a clearer notion of the collaborative needs of architects using computer-mediation. In turn this has the potential for assisting developers when designing new collaborative tools and for assisting designers when selecting an environment for a collaborative session.
31.2 Computer-mediated Collaborative Design

In order to compare computer-mediated collaborative design (CMCD) and face-to-face (FTF) collaborative sessions between architects, we first need to look at how architects collaborate in FTF environments, the media they employ and the communication channels they utilize in order to convey design representations to their partner(s). When working FTF, architects have been observed to hold certain preferences for the way they organise their design and creative environments, and what 'traditional' tools they choose to use, whether designing alone or collaborating with colleagues (Carter, 1993). Some architects might prefer to work with thick pencils scribbling 2D sketches on butter paper (Gross, 1994; Kvan, 1994). Others might sketch as well as start working with 3D volumetry. Sometimes they hastily proceed to build 3D massing models, made of polystyrene or cardboard (Visser, 1993). This enables them to acquire an enriched 'experience' of the space they are working with and makes it easier to communicate their 'idea' to other parties involved in the design. However, the continuous development of computer and telecommunication technologies, has seen architects increasingly using these mediums for communication as well as work. Hence architecture as a profession is becoming dependent on computers not only in ways of documenting designs, but also in the form of representing and communicating design ideas between various parties, from colleagues to clients and to the general public. Research into communication channels used in CMCD environments has shown that there is little agreement on whether audio and video channels are essential in such ventures as well as what constituted the appropriate channels (Maziloglou et al.; 1996, Olson et al.; 1997; Vera et al., 1998). A popular view held by some researchers is that adding audio, video and graphics is somehow expected to make the medium more 'real' (Sudweeks and Rafaeli, 1995). According to Greenberg et al. (1992), some researchers maintain that tele-presence is an the alternative to FTF collaboration, where distributed participants in a collaborative venture are given the feeling that they are present in the same meeting room. Whether or not seeing one's partner has an effect on performance seems to be highly dependent on the type of task performed (Olson et al., 1997). On the other hand, Vera et al (1998) observed a slight decrease in low-level design as opposed to high-level design in text-based compared to audio and video computer-mediated experiments.

31.3 The Study

In our study we investigate collaborative communication in a design session with two architects. We use a method similar to a protocol analysis in which we collect and transcribe the utterances of the designers during the design session and analyse the design communication protocol using a coding scheme. Protocol studies on design activity date back to that of Eastman (1970), where he studied architects in the late 1960s. The protocol analysis method continues to be an accepted way to study design, although most of the studies look at single designers (Akin, 1986; Goldschmidt, 1991). Recently, the conventional, single-subject, method of protocol