Embodied Actions in Time and Place: The Cooperative Design of a Multimedia, Educational Computer Game

TONI ROBERTSON
School of Computing Sciences, University of Technology, Sydney, P.O. Box 123, Broadway, NSW 2007, Australia
E-mail: tonir@soc.s.uts.edu.au

(Received 27 November 1995; in final form 23 October 1996)

Abstract. This paper reports a field study of the design of a multimedia, educational software product, from the early articulations about the kind of product to be made, to the production of the prototype used for capital raising. The designers were members of a small distributed company who used computer systems and communication technology, as well as highly developed communication skills and procedures, to enable them to work together over distance. The focus of the paper is the work people did to create and maintain the cooperative design process within a specific organisational framework and in relation to the design of an actual product. The basic conclusion is that the cooperative design of the product was enabled and achieved by the work the designers did communicating with each other. Any future selection of additional CSCW technology by the company will be determined by its contribution to the communicative resources of the designers.

Key words: Cooperative design, distributed design, CSCW, embodied action, small company, women designers, personal communication skills

1. Introduction

People have been finding ways to work together for as long as they have been doing anything that could meaningfully be called work. The work of designing is no exception. Likewise, people who are normally geographically separated, have been finding ways to work together over distance for as long as cooperation between geographically separated people has been considered to be, for whatever reason, a good thing. For designers of CSCW systems the work their systems will support is, in a very important sense, always already being done. Their systems will certainly change how that work is done in the future, but they will never be used in a workplace that has not already been shaped by existing work and social practices, and existing technologies. This is why empirical studies of various kinds of cooperative work have become increasingly important within CSCW research; particularly to those concerned that the systems they design contribute positively to the work practices of the people who use them (for a critique of these studies and their role in the design of CSCW systems see Plowman et al., 1995).
This paper reports a field study of the cooperative design of a multimedia, educational software product. The designers were the members of a small distributed company. They used computer systems and communication technology, as well as highly developed communication skills and procedures, to enable them to work together even though they were geographically separated most of the time. The study concentrated on the part of the process of design that spanned the first articulations about what sort of multimedia educational software product it might be, through to the production of an early prototype that could be used to raise capital for the building of the product. This is the end of an industry-recognised phase in the design and development of these kinds of products.

Cooperative systems to support various practices of design have been a major focus of CSCW research. Twidale et al. (1993) argued that design is illustrative of one of the major problems of developing CSCW systems, in that while it is clear that most designing involves collaboration, "our understanding of its nature as a cooperative process is limited" (p. 93). Empirical studies of various instances of the design process have already made valuable contributions to building that understanding.* But to date, longitudinal studies of non-experimental design projects are rare and the coverage of the range of design activities remains sparse. Research effort appears to have been concentrated on a few limited areas of design where most, if not all, of the work studied is computer-based. These areas include software design done by small teams in large organisations, artificial tasks in quasi-naturalistic environments that have been set up within research environments to test experimental systems, and studies of researchers designing cooperative systems to use as research tools. Within this context, the focus of this study is unique. The company involved is very small and the designers are professionals doing their normal work, over its actual time frame within their usual work environment. While the product being designed will find its material expression as a piece of software, a great deal of non-computer based work was involved in its making.

The first part of this paper establishes the organisational and marketplace context for the company's work. The body of the paper focuses on the unfolding, through time and across space, of a specific cooperative design process within a distributed workplace. It is not a description of the design itself, nor of the development of the creative content of the product. My interest lies not so much in what people were designing but how they were doing it. Suchman (1994, p. 20) argued for the centrality of the support of articulation work to the 'successful workings of technology production and use'. And Schmidt and Bannon (1992, p. 20) regard the problem of 'how to support the ongoing dynamic articulation of distributed activities and the corporate management of the mechanisms of interaction them-

* See for just some examples, Twidale et al. (1993), for a study of cooperative software design; Bucciarelli (1994) and Minneman (1991), for studies of cooperative engineering design; Scrivener et al. (1993); Gidney and Robertson (1993); Tang (1989); Minneman and Bly (1991); Tang and Minneman (1991) and Bly (1988), for studies of cooperative design that utilise drawing; Olson et al. (1993) for tool supported design; Harrison and Minneman(1994), and other papers from The Delft Protocols Workshop for uses of protocol analysis in empirical studies of industrial designers.