Chapter XVII
Interactive Tables: Requirements, Design Recommendations, and Implementation

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ABSTRACT

Interactive tables are becoming increasingly popular. In this chapter, we describe a collaborative tabletop environment that is designed for brainstorming meetings. After describing the user requirements, we demonstrate different possible solutions for both the display and the tracking implementation, and summarize related work. Finally, we conclude with a more detailed description of the Shared Design Space. Using a digital pen, participants can annotate not only virtual paper, but also real printouts. By integrating both forms of physical and digital paper, we combine virtual and real drawings, three-dimensional models, and digital data in a single information space. We discuss the unique way that we have integrated these devices and how they can be used efficiently during a design process.

INTRODUCTION AND MOTIVATION

An interactive table combines the benefits of a traditional table with all the functionalities of a digital computer, including the combination of both real and virtual paper. Although interactive tabletop environments are becoming increasingly popular, there are few applications which fully show their potential. One area where they could be expected to be very useful is in supporting creative collaboration. In the creative process, people often use real paper and sketching tables to capture their ideas, so digital tabletop setups could provide an ideal interface for supporting computer-based collaboration. Blinn (1990) postulates that the creative process occurs in two-phases: first

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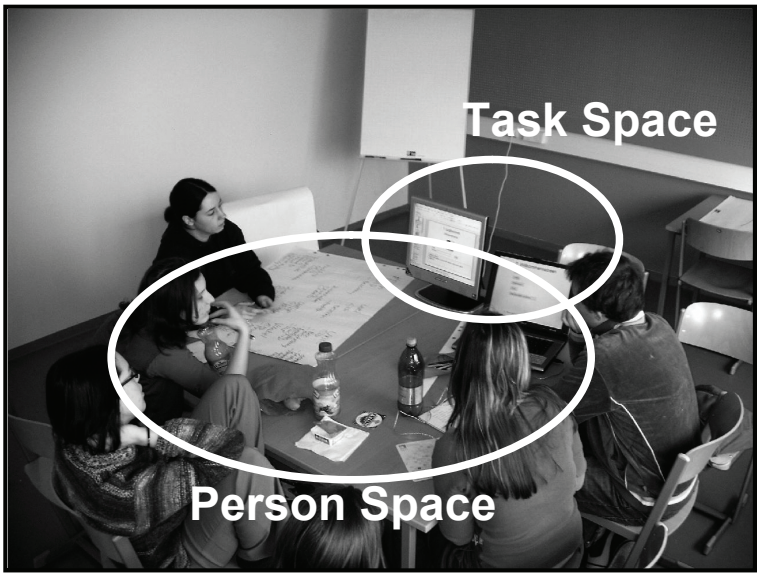
Figure 1. Separation of person space and task space



moving from chaos to order and second from ideation to implementation. Most computer-based design tools are primarily focused on the second phase and there is limited support for digital tools where people can play with ideas in a free form manner. In this chapter we describe an interactive digital table which supports the first phase, moving from chaos to order.

Introducing a computer into a face-to-face meeting changes the group dynamic. In general, users focus more on their own device and pay less attention to the coparticipants. Buxton (1992) uses the terminologies *person space* and *task space* to describe the spaces used for communication and for working on a task (Figure 1). Computers in face to face collaboration often cause an artificial separation between the person space and task space.

In this chapter, we describe how to use a digital tabletop system for enhancing face-to-face collaboration. Interactive tables combine the physical and social affordance of a traditional table with the advantages of digital technology (Morris, 2006). Enhanced with virtual elements, a tabletop setup becomes an ideal input and output device around which people can share a wide range of verbal and nonverbal cues to collaborative effectively. The digital data, projected onto the table, can be stored, moved, re-arranged, and manipulated in an intuitive way.

In contrast to vertical displays, such as interactive SmartBoards,[1] horizontal displays have several advantages: in a meeting with a vertical display, the participants usually have a single leader who stands in front of the display and controls most of the session. The horizontal display, however, facilitates a discussion where all participants interact in the same way without any leadership (Morris, 2006).

It is very challenging to develop an interactive table which can be used under different conditions and there are a lot of requirements and constraints that have to be considered. These requirements and the proposed solutions are often diverging. Summarizing, the key questions of this chapter are:

- What are the (most important) requirements for designing an interactive table?

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