



## Chapter X

# Developing Effective Computer Systems Supporting Knowledge- Intensive Work: Situated Design in a Large Paper Mill

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### EXECUTIVE SUMMARY

*The case to be discussed is a joint project between the university of Zurich and “Swiss Paper,”<sup>1</sup> a large paper mill in Switzerland. The paper mill had recently undergone deep structural changes after an investigation of by of the world’s leading management consulting companies. Our project is mainly concerned with support of energy management by means of computer technology. There were essentially three goals. The first one was to minimize energy consumption while keeping it at a constant level. The second goal was the exploration of a scientific hypothesis, namely that expert behavior cannot be adequately explained in terms of “information processing,” but is more adequately seen as “situated action.” The latter emphasizes the actual organizational and social circumstances. The objective of Situated Design — a particular project*

*methodology that we have been developing in our group at the university over the last few years — is to support “situated action” by means of computer technology, rather than to formalize human expertise. Applying and refining this methodology is the third major goal of the project. In this paper we will discuss our experiences with Situated Design at Swiss Paper. The software industry’s biggest problems are well known — projects arriving late, over budget or not delivering what is needed. We will argue that one of the main problems is a misconception of human cognition and behavior. We claim that this misconception is at the source of the problems of software development in general. We suggest an alternative approach which has grown out of our experience with many projects in the area of “workplace design by means of computer technology.”<sup>2</sup> One of the underlying assumptions that we will discuss in the paper is that the goal of software engineering is support rather than automation. Thus, we do not intend to develop software packages that will take all the design decisions for the software engineer. This position can be contrasted with, e.g., the conviction underlying CASE systems, where the design process and the whole software life cycle can be formalized. All the designer has to do is apply the detailed recipes prescribed by the CASE software. What we have in mind contrasts sharply with this view. It is our belief that an answer to the so-called “software crisis” is to optimally exploit human expertise, not automating it. Furthermore, design involves a lot of communication. The software designer has to listen and observe carefully, in order to better understand the latent user’s needs. The aim of Situated Design is to stimulate the designer’s awareness of the issues involved in the design process, such as the expertise used in daily work. It should encourage the discussion and confrontation of these issues from different perspectives among all members of a project team, designers as well as the people concerned. The goal is not to provide “canned” solutions, but to optimally bring to bear the user’s as well as the designer’s knowledge. The success of the project depends on the human designer’s experience in perceiving related issues which are not optimally exploited. In order to test and refine the methodology of Situated Design we have defined a project with Swiss Paper. The investigation of one of the world’s leading management consulting companies has been the first consequence of a preceding declaratory capital reduction. Though the company’s interest in the project is energy management, our approach will rather emphasize the communication between all workers about energy issues than to understand the energy process itself. Therefore, the objective is to improve or, respectively, to enhance the existing computer infrastructure in a way that the communication process about the energy issue will be improved. Finally, we expect that an improved communication will enhance the paper mill workers’ understanding and mastery of the energy management.*

## BACKGROUND

### The Holding

Swiss Paper specializes in high-quality paper production with a total annual production of 300’000 tons. Swiss Paper is one of two paper mills belonging to the “Swiss Paper Holding”<sup>3</sup> with a total production of 450’000 tons. The second paper mill produces

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