Chapter IX
Advancing End User Development Through Metadesign

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ABSTRACT

End-user development means the active participation of end users in the software development process. In this perspective, tasks that are traditionally performed by professional software developers at design time are transferred to end users at use time. This creates a new challenge for software engineers: designing software systems that can be evolved by end users. Metadesign, a new design paradigm discussed in this chapter, is regarded as a possible answer to this challenge. In this line, we have developed a metadesign methodology, called Software Shaping Workshop methodology, that supports user work

practice and allows experts in a domain to personalize and evolve their own software environments. We illustrate the Software Shaping Workshop methodology and describe its application to a project in the medical domain. The work proposes a new perspective on system personalization, distinguishing between customization and tailoring of software environments. The software environments are customized by the design team to the work context, culture, experience, and skills of the user communities; they are also tailorable by end users at runtime in order to adapt them to the specific work situation and users' preferences and habits. The aim is to provide the physicians with software environments that are easy to use and adequate for their tasks, capable to improve their work practice and determine an increase in their productivity and performance.

INTRODUCTION

The increasing diffusion of the World Wide Web as the platform for a wide variety of applications creates many expectations about the possibilities offered by these interactive tools, but also raises many challenges about their effective design. In this chapter, we focus on Web applications that support professional people in their work practice. Such professional people are a particular class of end users; that is, they are not expert in computer science, nor willing to be (Cypher, 1993), but they are forced, by the evolution of the organizations in which they work and by the progress of information technology, to use computers and, increasingly often, to perform programming activities (Folmer, van Welie, & Bosch, 2005). In this chapter, by "end users," we denote these professionals and not end users in a wider meaning.

Nowadays, end users evolve from passive consumers of computer tools to a more active role of information and software artifacts producers (Fischer, 2002). This is also highlighted by the Shneiderman's (2002) claim: "the old computing was about what computers could do; the new computing is about what users can do" (p. 2).

The interaction dimension creates new challenges for system specification, design, and implementation. It is well known that "using the system changes the users, and as they change they will use the system in new ways" (Nielsen, 1993, p. 78).

These new uses of the system make the working environment and organization evolve, and force the designers to adapt the system to the evolved user, organization, and environment (Bourguin, Derycke, & Tarby, 2001). Moreover current techniques for software specification and design, such as UML, are very useful for software engineers, but they are often alien to users' experience, language, and background. A communication gap arises between application designers and users, which leads to design of software applications that are not usable (Folmer et al., 2005). To overcome these problems, software development life cycles that foresee participatory design (Schuler & Namioka, 1993) and open-ended design (Hartson & Hix, 1993) are invoked. The diversity of end users also calls for general, adaptive systems (Folmer et al., 2005). The temptation is to develop very general systems, thus falling in the Turing Tar Pit, in which "*everything is possible but nothing of interest is easy*" (Perlis, 1982, p. 10).

Actually, what software engineers should design are systems that can be used by end users in a dependable and easy way. Hence, the opposite temptation arises of creating specialized tools, focused on the activity of a well specified user, or a well specified and restricted community of users tied by similar practices or similar interests, working in a restricted context. Fischer (2006) warns about the perils of this tendency: beware of the inverse Turing Tar Pit, in which overspecialized tools permit only trivial and isolated

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