

Chapter 12

The Semiotics of Usage-Centred Design

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Abstract

User interface design is a complex activity, which makes it difficult to control and master. A well-designed user interface can be seen as one where designers have correctly mapped the application domain onto the solution domain. This mapping, or bridge, may be helped or hindered by the design methodology and the success of any software engineering methodology depending on how good a bridge it provides between the application domain and the solution domain. A good match between the requirements and the implementation reduces the risk of having to make costly and major changes to the user interface at a late stage in development. Usage-centred design (UsCD) has been a very successful user interface design methodology. Although successful, there is no underlying theory as to *why* this should be the case. This chapter uses semiotics to provide a better understanding of the models and the process of UsCD.

12.1 Introduction

It is generally accepted that user interface design is a challenging and often poorly understood activity [19, 22]. The success of UsCD has been well documented in a number of software projects [4, 13, 27, 33, 35] and is seen by some authors as a methodology that can aid user interface design on agile software development projects [10, 27]. UsCD is a design methodology that

produces a user interface from several derivations of successive abstract models [11]. Constantine talks of the advantage of modelling at the abstract level as providing the user interface designer with more “creative leverage” than a design process that moves to the concrete level very early on [11]. Another important aspect that sets UsCD apart from other design methodologies is the focus on *usage*, i.e. user tasks. We believe that evaluating UsCD from a semiotic perspective can give new insights into the design process and the user interface, which results from that process. This chapter also considers how UsCD relates to Stamper’s semiotic ladder as another

way of revealing how our knowledge of the world (both physical and spiritual) is constituted, and how our awareness of the process is reflected in the dynamics of various semiotic systems or directions [25].

This chapter begins with a brief overview of UsCD in section 2. We then introduce the concepts and definitions of semiotics that are to be applied in section 3. In section 4, we justify the use of semiotics and also discuss the semiotics of each of the UsCD models and highlight the interesting observations. At this point, in section 5, we turn our attention to the semiotic ladder suggested by Stamper and show how the models of UsCD relate to this framework – discussing each level in turn. At the end of section 5, another brief discussion of important points is presented, and finally we conclude in section 6.

12.2 Model Driven Design

According to Arias *et al.*:

Models are the externalisations that (1) create a record of our mental efforts, one that is “outside us” rather than vaguely in memory, and (2) represent artefacts that can talk back to us and form the basis for critique and negotiations [5].

These models are the externalisations, or descriptions, of processes in the domain [2]. As in object-oriented design, we will investigate the models of UsCD with respect to two domains that require modelling – the *application domain* and the *solution domain*, adopting Bruegge and Dutoit’s [7] definition of these two domains. The application domain represents all aspects of the user’s problem and the solution domain is the space containing all possible implementations.

Turning our attention to user interfaces, Biddle, Constantine, and Noble propose models as ideal tools for answering questions like: