Chapter 11

Integrating the Semiotic into UML via Enhancing and Cross-Validating Use Case with an Enriched Domain Model

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ABSTRACT

Use case models are representation of the way in which users of the system interact with it. The UML specification driven approach to system development enable the use case model to be continuously refined and cross-validated from a number of system viewpoints. However, little has been done for validating the model against the organisational and workgroup setting in which the system will reside. This article aims to address this gap by the use of techniques derived from organisational semiotics for validating use case models against a wider aspect of organisational culture and meaning making at the organisational, workgroup and actor level of abstraction. Such approach will enhance the system development by providing “goodness of fit” between system model and organisational values and beliefs.

INTRODUCTION

The UML (Unified Modelling language) has become the preferred modelling notation of choice within industrial and commercial settings in which Object Oriented methods of software construction predominate. The strength of UML lies in its ability to offer systems developers a series of core modelling notations that enable a system specification as supplied by a system stakeholder and as initially expressed as a so-called use case to be continuously refined and cross-validated from a number of differing viewpoints. These differing

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viewpoints are generated through the use of a number of specific notations and core modelling techniques such as class-diagrams, state-diagrams and collaboration diagrams. However, here the focus will be on use case modelling.

Previous work within the Organisational Semiotic community has attempted to highlight the need to address ‘soft’ issues within traditional systems analysis and design (Liu, 2000). However, the notations used (such as MEASUR) do not appear to have been widely adopted outside the research community or by industry and commerce. Industrial practitioners do recognize the need to address wider issues but thus far, UML offers little explicit support for the modelling of such activities. This article seeks to address this gap by suggesting ways in which semiotic analysis activities can be incorporated within a UML driven development process.

It is felt that the ‘specification driven’ approach that lies as the heart of the UML approach in fact may be somewhat limited in its vision with respect to validating the system against the rich organisational and workgroup setting within which the system will ultimately reside. Whilst Vidgen (2003) claims for example that “the UML notation can be used to model business and organisational requirements from a conceptual perspective” it is nevertheless clear that this perspective is driven primarily from an actor’s viewpoint and this is necessarily a limited frame of reference. It is believed that core notations and viewpoints such as use case should also be validated against wider and perhaps more elusive and subtle aspects of organisational culture than have been considered hitherto. This is not to say that use case itself and the stakeholder-analyst discourse from which it has been derived does not of course already implicitly encapsulate certain elements of wider organisational culture as viewed from the perspective of an individual stakeholder. Rather, it is to acknowledge that the importance of matching a system to organisational needs, beliefs and values and in particular acts of signification (i.e. ‘meaning-making’) is so important as to justify proposing the direct integration of a semiotic viewpoint into UML.

Further, it is believed that to be cost-effective and industrial credible that the semiotic should be integrated into an early enough stage so as to be useful and cost effective for developers i.e. to support the contextualisation of use case diagrams through enhanced semantics. The UML does not in fact prescribe the methods used to generate use case, merely the notation that is to be used. We propose to enhance use case by semantically enriching the domain model, within which use case resides, through the use of a number of specific techniques derived from the field organisational semiotics. Further, this will also offer a means by which use-case elements can be validated against certain features of this enhanced domain model. The aim is to fully articulate and visualise a richer set of acts of ‘meaning-making’ operating within organisations at the enterprise, workgroup and user-system levels of abstraction so as to enable developers and actors to view the system model within a wider frame of reference than is perhaps usual. By seeking to encapsulate and cross-reference use-case with a ‘wider view’ of an enterprise in this manner it is hoped to achieve an optimal ‘goodness of fit’ between the system and organisational values, beliefs, needs etc. Figure 1 offers a schematic view of the approach and show the connection between the semiotic, the organisation from an organisational cultural perspective and use-case.

**A BRIEF REVIEW OF USE CASE FUNDAMENTALS**

One possible starting point for modelling requirements with UML is the use case model. Use case model captures the proposed functionality of a new system from an external point of view According to Jacobson & Chrirsterson, Jonsson & Overgaard (1992), “A use case is a special sequence
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