

Chapter II

A Methodology for Situated Analysis and Design

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ABSTRACT

This chapter presents a new high level methodology for the analysis and design of information systems specifically to support routine action at the operational level of organizations. The authors argue that traditional methods fail to adequately address the unique requirements of support for routine operational action. The main innovation of the methodology is the use of an action-centred approach derived from recent work on the nature of purposeful human action, and as such, emphasises both the information requirements for action and the dependence of action upon appropriately structured environments. A brief case study illustrates how using the methodology can sensitize the analyst to opportunities to increase human efficiency and effectiveness through lighter weight information systems.

INTRODUCTION

Situated analysis and design focuses on providing information in support of routine action at the operational level in organizations. It is the outcome of applying the situational theory of action to the analysis and design of information systems (Johnston, Waller, & Milton, 2005; Milton, Johnston,

Lederman, & Waller, 2005; Waller, Johnston, & Milton, 2006). A high level methodology for situated analysis and design was developed in a 3 year funded research project employing iterative theory development and testing by means of two system development case studies (Johnston et al., 2005; Waller et al., 2006) and one comparative experiment (Waller, Johnston, & Milton, 2008).

The methodology was designed specifically to address the problem of high failure rates and poor user acceptance of traditionally designed information systems at the operational level. We have argued in a previous publication that the heart of this problem lies in the implicit theory of action which informs information systems design. The traditional information systems analysis and design approach, manifested in methodologies such as SSADM (British Standards Institution, 1994), is informed by a deliberative theory of goal-directed action. The deliberative theory posits that an actor creates a mental model of the state of the world and that action invariably results from reasoning about this mental model. The traditional information system then supplies information about the state of the world to inform the actor's mental model (Johnston & Milton, 2002).

In other disciplines, there has been a move towards a situational theory of action, the idea that actors respond directly to structures in the environment in order to act appropriately. For example, work undertaken in artificial intelligence (Agre, 1997), situated cognition (Clancey, 1997; Lave & Wenger, 1991), animal behavior (Hendriks-Jansen, 1996), ecological psychology (Gibson, 1979; Heft, 2001), and situated action (Suchman, 1987) is based on this alternative theory of action.

The situated approach to systems design supplies the actor with information about action that enables routine action rather than deliberative action. Rather than attempting to represent the real world, the situated system informs actors when to do something and what to do without there being need for recourse to a representation of the state of the world; the information is located 'in' the world and can be observed directly. The purpose of this chapter is to provide a brief overview of the principles, concepts, and methods of situated information systems analysis and design. The approach is illustrated with a brief description of one of the system development cases conducted during its development.

BACKGROUND

Traditionally designed information systems are computerised models of the work system (Weber, 1997). While they provide support for managerial work such as decision making, accounting, planning, and standards production, they often do not effectively support routine operational activity, particularly in time-constrained routine environments. Estimates of failure rates are as high as 50% (Fortune and Peters, 2005). Analyses of why IS projects fail tend to focus on technical factors, such as the performance of the system, and organisational factors, such as the quality of project management, communication, management support, and user acceptance (Bostrom & Heinen, 1977; Ciborra & Schneider, 1992; Cannon, 1994; Gowan & Mathieu, 1996; Checkland & Holwell, 1998; Glass, 1998). In previous work (Johnston and Milton, 2002; Johnston et al., 2005), we have suggested a more fundamental reason for the failure of IS systems, specifically those designed to support real-time operations of the organisation. We have suggested that the problem lies with a misconceptualization of how the IS can best support these operations.

Whereas traditional systems analysis and design approaches aim to design a computerised model of the organization's work systems and processes, the situated systems methodology aims to identify ways that the environment of action can be restructured to enable new operational routines and to identify minimal informational cues that will enable actors to fluidly execute these new routines. With this aim in mind, the methodology proposes a radically different approach to analysing existing operational action systems, negotiating change, and designing new action systems that can be effectively routinized.

The key innovation of the new methodology is its use of an action-centred approach to information systems analysis and design. On the analysis side, this means resolving existing routinized action systems into a hierarchy of dependent actions and goals on the one hand, and on the other hand,

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