Chapter V
Requirements Elicitation Technique Selection:
A Theory–Based Contingency Model

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ABSTRACT

Requirements elicitation has been recognized as a critical stage in system development projects, yet current models prescribing particular elicitation techniques are still limited in their development and application. This research reviews efforts aimed at addressing this issue, and synthesizes a common structure consisting of project contingencies, elicitation techniques, logic of fit, and a success construct, arguing for the need to more comprehensively study and organize each. As a first step in this research, models drawn from organizational literature are used to categorize project contingencies into dimensions dealing with their impact on the uncertainty and equivocality of the overall development project.

INTRODUCTION

Information requirements determination (IRD) has long been considered a critical stage in system development projects (Browne and Ramesh, 2002). The need for advancing our understanding in this area can be argued from four different perspectives. First, requirements determination is conducted early in the systems development lifecycle, and outcomes of this phase have a

strong impact on project quality and outcomes. In addition, strong empirical evidence highlights the negative effects requirements uncertainty (Nidumolu, 1995) or requirements risk (Wallace, et al., 2004) have on development project performance. Third, issues related to requirements determination consistently top rankings of software development risks as perceived by project managers (Schmidt, et al., 2001). Finally, lack of understanding about users´ needs and expectations results in the failure of a significant proportion of development projects (Hickey and Davis, 2003). In summary, any improvement in the process of eliciting and understanding requirements holds significant promise for the improvement of development activities (Browne and Rogich, 2001).

Despite the importance for development success, and the significant amount of research studying the relative effectiveness of different elicitation techniques, the literature has yet to converge on a framework prescribing the most effective use of specific techniques in varying situations; although several have been proposed (Davis, 1982; Maiden and Rugg, 1996; Hickey and Davis, 2004; Tsumaki and Tamai, 2005). More than twenty years ago, Valusek and Fryback (1985) stated "*... we should soon be able to prescribe a strategy and tool for managing through the IRD portion of these problems...*" yet progress in this regard has been scant. While significant research has been conducted on the performance effects of specific elicitation techniques, we are no closer to prescription than before.

This work seeks to establish the foundations of a research program into the selection of requirements elicitation techniques. It does so by building on the contingency structure proposed by Hickey and Davis (2004), by providing the underlying logic, grounded on the information processing model proposed by Daft and Lengel (1986), for the increased effectiveness resulting from appropriately matching[2] elicitation techniques to project situations. The task for which

the system is developed, users, stakeholders, and analysts, are characterized as sources of uncertainty and equivocality, and elicitation techniques as mechanisms with the capacity to reduce and resolve same. This framework offers a more detailed perspective by moving away from overall project levels of uncertainty and equivocality, and into the task, users and analysts, each with their own particular issues, as separate sources, potentially requiring different techniques for successful elicitation performance.

Literature Review

Most models of the IRD process distinguish between three different groups of activities: *elicitation, specification*, and *validation* (Browne and Ramesh, 2002). In the elicitation phase, functional requirements for the proposed system are obtained from all relevant users of the new application as well as interested stakeholders. This information can be obtained in a variety of ways and the selection of the most appropriate one, given project characteristics, is the main interest herein.

Elicited requirements form the input to the specification stage, in which a variety of modeling and representational techniques are employed to formalize and document said requirements, including process logic, data structure, and system behavior. These representations are then used in verifying that obtained requirements are correct, involving the selection of a validation or assurance strategy (Naumann, et al., 1980). The final output of IRD is a set of system diagrams, agreed upon by all involved parties, which can then be implemented into a new application. Although generally depicted as proceeding in a linear fashion, these activities are highly iterative in nature. Of the three phases, requirements elicitation is the most time and resource intensive one (Hickey and Davis, 2004).

Past research on IRD can be grouped into two different categories: that related to a specific technique or method, and that modeling

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