

## Chapter 5.10

# The Impact of Missing Skills on Learning and Project Performance

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### ABSTRACT

To improve the performance of software projects, a number of practices are encouraged that serve to control certain risks in the development process, including the risk of limited competences related to the application domain and system development process. A potential mediating variable between this lack of skill and project performance is the ability of an organization to acquire the essential domain knowledge and technology skills through learning, specifically organizational technology

learning. However, the same lack of knowledge that hinders good project performance may also inhibit learning since a base of knowledge is essential in developing new skills and retaining lessons learned. This study examines the relationship between information system personnel skills and domain knowledge, organizational technology learning, and software project performance with a sample of professional software developers. Indications are that the relationship between information systems (IS) personnel skills and project performance is partially mediated by organizational technology learning.

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## INTRODUCTION

The importance of technical and business skills and knowledge for information systems personnel has been advocated in the IS literature for decades (Cheney & Lyons, 1980; Jiang, Klein, Van Slyke, & Cheney, 2003). In spite of the recognized importance, empirical investigations that examine IS project performance focus too much on the tools rather than employee competence (Rose, Pedersen, Hosbond & Kraemmergaard, 2007). Partly, this is due to an inability to model this lack of skill such that a link becomes evident (Byrd & Turner, 2001). Why should empirical studies contradict experience? Possibly the relationships in an organization where IS personnel skills are applied have too many complexities to be modeled accurately. Could there be a mediating variable between IS personnel skills and IS project performance that further explains how to overcome this essential lack? Perhaps the intervention of certain learning abilities is essential in the ability to apply competences to new projects.

Researchers have observed that activities during information system development and implementation offer an opportunity for organizational technology learning, or the ability and practice of bringing new skills and knowledge into the organization related to IS development and the application of IS tools to business domains (Ko, Kirsch, & King, 2005; Stein & Vandenbosch, 1996). For a successful IS implementation, skills must be brought to bear from the application domain and technical domains, which can best happen when the organization encourages the learning of newer skills and knowledge, and has practices to incorporate these newly acquired assets into current and future projects. In short, organizational technology learning is a critical factor for predicting final IS project performance, and a base of knowledge and skills in the IS project team are a necessary condition for organizational technology learning to occur. This suggests that organizational technology learning is a mediator between IS skills and

knowledge and the performance of the IS project. Unfortunately, no empirical study has attempted to validate this reasoning.

The focus of this study is, therefore, to examine the relationship from IS staff development skills and domain knowledge to project performance with organizational technology learning as a mediator. A positive result of this study will provide additional insights on IS skill research and provide an alternative explanation to the unsolved IS skills puzzle of Byrd and Turner (2001). From a survey sample of 212 Institute of Electrical and Electronics Engineers Computer Society members, the results indicate that the lack of system development skills and knowledge in the application domain have a direct negative impact on organizational technology learning and project performance. Furthermore, organizational technology learning has a significant positive impact on final project performance, showing that the impact of IS personnel skill levels on project performance is partially mediated by organizational technology learning.

## HYPOTHESIS DEVELOPMENT

Broad categories of critical IS personnel skills are identified, including (1) technical specialties/technology management skills and (2) business domain knowledge and skills (Jiang et al., 2003). Unfortunately, given decades of emphasis, these IS skills were still not linked to IS project performance (Byrd & Turner, 2001). This may be due to the lack of an intervening variable similar to an established relationship between IS staff competency and firm performance where learning is a mediator (Tippins & Sohi, 2003). This study investigates the possibility of a variation on learning as a mediating variable in the project context between IS personnel knowledge and skills and IS project success.

This research considers learning from the perspective of general technology skills acquired by the firm in the project context (Coopridge &

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