

# Chapter 4

## Situated Service-Oriented Modeling

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### ABSTRACT

*The emergence of e-services benefited the stakeholders due to ease of access to data, information and knowledge sources. Service-based applications have evolved into flexible and adaptable systems capable of coping with changes in user requirements and business processes. The shift from monolithic application silos towards service-oriented approaches is evident in the literature today. The benefits of service-oriented approaches include cost effectiveness, improved inter-operability, reusability, and flexibility. The benefits are not enjoyed without the threat of cognitively overloading managers in their decision making activities. Tools for effective management of information are necessary. Effective and efficient service-oriented applications need to operate within their situational boundaries. As such, decision support type tools require tight integration with the service-based approach. This study proposes an integrated Situated Service-Oriented Model and demonstrates its value via a case study of an e-learning service-based application used over a period of 15 months. Two designs were used; component-based and service-oriented. The significance of this study is in the tangible value of the model proposed and demonstrated by the e-learning case study.*

### 1. INTRODUCTION

In web-based applications, data, information and knowledge sources are easy to access. As a result, more artifacts are retrieved than necessary. Consequently, interoperability, reusability, and

flexibility of application's components are compromised. Service-Oriented Computing (SOC) is a new paradigm for delivering accurate and efficient useful functionality in a cost effective way (Fang & Sing, 2009). It is being adopted by organizations to maximize interoperability, reusability, flexibility and cost efficiency. To that effect, web-based Service-Oriented Application

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components are used to service, the stakeholders within a specific context in general, and customers in particular, by connecting them to the different support staff and mechanisms for addressing their requests. In order to handle customers' requests, knowledge of the particular domain should be acquired, stored, disseminated and managed. An alignment between the domain knowledge and business processes and the underlying information technologies is primary in order to achieve effective interoperability, reusability and flexibility (Nonaka, 1994). This alignment is achieved by adopting the Service Oriented-Approach (SOA).

Considering modern trends towards globalization of the economy, growing challenges of economic relationships, flattening of organizations, growing employee empowerment, increasing demand for faster and accurate response in the competitive environment, explosion of information delivered via the networks and continued growth of e-commerce, e-business, e-government, e-learning and other e-service domains, it is evident that web-based service environments have become complex, unstructured and challenging to manage for decision makers. It is, therefore necessary to include decision support tools in today's new service environments (Shaw, Gardner, & Thomas, 1997). With the continued increase in information-creation and on-demand service of knowledge (knowledge-service) the need for decision support in Service-Oriented-Applications (SOA) is necessary and timely.

Today's businesses are becoming more inter-connected. Consequently, decision support systems (DSS) in organizations need to be expanded and integrated (Vahidov & Kersten, 2004). The traditional isolated "stand-alone" view of DSSs has been criticized and the need for linking the DSS with the business processes have been echoed (Balasubramaniam & Kannan, 2001). This is even more significant for modern decision makers dealing with new e-environments such as enterprise resource planning, supply chain management, customer relationship management

and service-oriented systems management. To that effect, in the context of SOA, DSSs used within the service-oriented framework need to be seamlessly integrated into the organization's information infrastructure to empower the stakeholders by providing them with relevant and timely information, keeping them abreast of the decision making processes, involving them with the required responses to emerging situations, and allowing them to participate in the evolution of the environment.

The main purpose of this paper is to develop a situated service oriented model (SSOM) and demonstrate the efficiency and effectiveness of this approach in the e-learning context. Situating the service oriented model was done by integrating the three layers of service oriented architecture into the kernel of the situated decision support system. The paper focuses on the mapping the e-learning context into a value added service architecture. A learning management system which was developed in-house was used as a virtual service-center for e-learning (SCeL).

## **2. THEORETICAL BACKGROUND**

### **2.1. Service Oriented Modeling**

Business Process Management (BPM), which has evolved from Business Process Engineering, had been an established discipline well before the concept of Service Oriented Architecture (SOA) was introduced. Recently SOA has matured from being an approach where web services were used for faster integration to a method of business process abstraction, where information technology (IT) resources are used to support business activities directly. This creates the potential for SOA to be better aligned with BPM (Madrid & Shaw, 2009).

SOA is not a panacea for organizations that could be employed quickly to deliver immediate business value. SOA is an incremental and itera-

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