



A Context-Based Organization Modeling for E-Learning Initiatives

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ABSTRACT

This paper investigates the design of an architectural model suitable for the development of a specific electronic learning (e-learning) paradigm. This model is derived from a series of organization modeling activities capitalizing on knowledge development and transfer among organizational members. Specifically, we describe our architectural initiatives in terms of the limitations of current technologies, but from the reality of organizational goals. Thereby, the paper presents our interpretation of the essential contexts in applying information technology (IT) to support the argument that it is important to involve organizational concerns to develop e-learning initiatives.

1 INTRODUCTION

In the emerging knowledge economy [OECD 1996], there have been many terms to describe the use of technology for learning. E-learning [Rosenberg 2001] has been interpreted as the use of Internet technologies to deliver a broad array of solutions that enhance learning and knowledge sharing, which go beyond the traditional paradigms of training to include the delivery of information and tools that improve performance. In fact, the 'e' in e-learning should render additional connotations other than the usual electronic context. First, 'e' is for experience in the sense that e-learning should change the character of the experience of learning through offering the options of time-shifting, place-shifting, granularization, simulation and community support. Second, 'e' is for extension in the sense that e-learning should emphasize the ongoing process of learning instead of an event-based activity, which could hardly linger with the learners throughout their later careers. Moreover, 'e' is for expansion in the sense that e-learning should offer access to an unlimited number of topics, beyond the limitations of the classroom, for audience-in-the-large who are interested to participate. It has been our experience that the easy part of implementing e-learning is the technology. The tough part is to invent and innovate the organizational context to create new models of experiences for knowledge sharing with the technology. The interesting part is how to blend the well-known classroom learning and e-learning in appropriate and supercharged ways. On conceiving the strategic foundation to accommodate the development of e-learning among organization members, we find the notion of learning organization [Garvin 1993; Levine 2001; Senge 1990], quite compatible for our purpose. According to Senge [1990], a learning organization is "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together." Thereby, with e-learning, we are not just introducing new technology for learning; instead, we are introducing a new way to think about learning. People learn in many ways – through access to well-designed information, by using performance-enhancing tools, through peculiar experience, and from one another. In order to leverage the potential of e-learning technology for sustained, beneficial change for

an organization, we need a sound architectural model to develop the organizational environment that encourages learning as a valuable activity.

2 MODELING ORGANIZATION FOR E-LEARNING

The primary purpose of organization modeling is to propose a suitable organizational architecture, which fits the targeted e-learning context, and thereby makes organizational design disciplined [Morabito, Sack and Bhate 1999; De Hoog, et al 1994]. The central idea behind our approach is that an organization can be sufficiently understood and integrated as a set of behavioral specifications. Each specification represents a view designed to characterize the organization premised on some set of core concepts known generally as the organizational constructs, such as people, structure, process and technology. The proposed architecture typically incorporates an overall schema produced by applying information modeling ideas to an organization's various constructs, each of which should have its own meta-model typically represented in the form of an object constrained by its specific contextual business rules stipulating its behavioral properties. In an organizational context, each instance of a behavior is usually specified in a contract, providing a dynamic aspect to modeling objects of interest. Basically, we maintain that organizations can be described in a relatively stable fashion with a constant set of core organizational constructs. Still many other management notions are advanced every day, such as e-learning, which represent variations of existing constructs. So, we call these variations the *derived* constructs. Together, the core and the derived constructs comprise the individual domains of an organization, and such an *organizational domain* is a distinct but integral part of an organization's overall architecture.

3 INNOVATING ARCHITECTURAL COMPONENTS FOR E-LEARNING

We believe the creation of an organizational model for e-learning is an important ongoing process of architecting a learning organization. Particularly, we are interested in expressing the inter-relationship among the relevant architectural components. Put it simply, we conceive the architecture of an e-learning organization to be composed of the following components: the Information System (IS), the Individual Learning (IL), the Organizational Learning (OL), the Intellectual Property Management (IPM), and the Knowledge Management (KM).

- *The IS-component.* This component operates on the information system (IS) paradigm [King 1996] of identifying relevant data, acquiring it, and incorporating it into storage devices designed to make it readily available to users in the form of explicit knowledge (routine reports and responses to inquiries). Principally, IS directly relates to managing data and information rather than knowledge and learning. But the IS infrastructure, including the application programs which transform data into more valuable information relating to particular decisions, or activities in the organization, is of fundamental importance to implementing any of the other architectural components in a learning organization. It is also considered as part of the *structural capital* of the organization.

- *The IL-component.* The individual learning (IL) [Kim 1993] component focuses on cultivating *human capital* [Becker 1993] of the organization. It serves to provide training and education for individuals through the institution of workshops, apprenticeship programs and the establishment of informal mentoring programs. Typically, an IL component provides free use of the IS infrastructure to access both structured and unstructured material in order to pursue an explicit educational path for online self-learning.
- *The OL-component.* The organizational learning (OL) component focuses on cultivating the *social capital* [Probst and Buchel 1997] of the organization. It is characterized by the use of communities of practice approaches, leading to the formation of collaborative groups composed of professionals who share experiences, knowledge and best practices for the purpose of collective growth. The conceptual basis is that social capital, in the form of various group and organizational competencies and capacities, can be developed, refined, and enhanced to enable the organization to adapt to changing circumstances, through such processes as teamwork, empowerment, case management or development-centered career paths.
- *The IPM-component.* This component deals with the issue of intellectual property management (IPM) [Stewart 1997; Sveiby 1997] underlying the activities that are involved in leveraging existing codified knowledge assets in the form of patents, brands, copyrights, research reports and other explicit intellectual property of the organization. The conceptual basis for this component is that such codified knowledge assets may be thought of as the realized human and social capital in the form of *intellectual capital*.
- *The KM-component.* The knowledge management (KM) component focuses on the acquisition, explication, and communication of mission-specific professional expertise that is largely tacit in nature to organizational participants in a manner that is focused, relevant and timely [King 1996; van der Spek and De Hoog 1995]. The conceptual basis is that an organization's *knowledge capital* in the form of tacit knowledge can, in part, be made explicit, and leveraged through the operation of KM-related processes and systems developed for knowledge sharing.

More precisely, we could express the inter-relationships of the various components within an e-learning organization as follows:

<Organizational Architecture> ::= <Structural Capital> +
 <Human Capital> +
 <Social Capital> + <Intellectual Capital > +
 <Knowledge Capital>

In any organization, the specification of a domain is often done through an information-modeling construct. In our discussion, we call this construct a *molecule*, a term borrowed from elementary chemistry. The process of building a molecule for a given organizational domain involves taking the knowledge areas from the specific domain and connecting them together in a particular manner. Using the idea of an organizational molecule, we might further refine the individual architectural components as:

<Structure Capital> ::= Molecule <IS-component>
 <Human Capital> ::= Molecules {<IL-component>, <IS-component>}
 <Social Capital> ::= Molecules {<OL-component>, <IS-component>}
 <Intellectual Capital> ::= Molecules {<IPM-component>, <IS-component>}
 <Knowledge Capital> ::= Molecules {<KM-component>, <IS-component>}

4 CONCLUSION – CONTEXTUAL CHALLENGES IN E-LEARNING

For each of the architectural components in the overall organizational model, we have to conceive the appropriate e-learning services to support its mission. There are generally three important contexts:

automating, informing, and knowledging, worthy of our attention. In the past decade, we have witnessed the organization's continuous move from a principle of automation to one of integrative processes. While automation involves the removal of the individual from a process, the principle of *informating* [Zuboff 1988] suggests a form of process abstraction and integration between the individual and the computer system. Basically, informating makes people more productive through their use of, and process integration with IT. It serves to increase the capacity of people to understand the entire value-adding learning process. On the other hand, the idea of *knowledging* [Savage 1990], refers to individual and organizational learning, and is characterized by the active involvement of the individual with his or her work. Knowledging includes a dynamic interaction between the explicit and the tacit forms of knowledge. Each successive organizational progression from automating to informating to knowledging, as required in today's knowledge organization, requires higher levels of process abstraction and a broad range of process integration and alignment. Therefore, the creation of a specific e-learning model must be situated in a context of adaptability. This organizational concern is always a big challenge for today's information systems architects. We need the cooperation of the organizational architect, a new figure responsible for designing structures across organizational boundaries, engineering processes into strategic capabilities, developing individual competencies into a learning organization, aligning information technology with organizational imperatives, and integrating the disparate pieces that constitute the organization.

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