Chapter IV

A Virtual Advisor Utilizing Multi-Agent Software Teams and Contingency Theoretic Coordination Models

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ABSTRACT

Few tools are available for managing distributed educational support processes, from answering “quick” student questions, to degree planning and course scheduling. The dual purpose of our work is to analyze the viability of synthesizing two well-established paradigms (agent-based systems and Information Processing Theory) to create a distributed Web-based support system for a virtual university. Currently, we are developing a smart agent-based resource for advising (SARA) that will serve different departments at multiple universities. This effort allows the investigation of distributed advising systems in a virtual university, along with providing a platform for investigating
utilization of brick-and-mortar research on coordination and control of human employees in a completely virtual world. In this chapter, we present SARA to argue for the benefits derived from integrating agent-based systems development and information-processing theory for creating rapidly customizable Web-based support systems.

INTRODUCTION

Problem Motivation

Our motivation for this chapter comes from two sources: first, to test the viability of distributed system design steps generated from a synthesis of research in Multi-Agent Systems (MASs) and in Organizational Theory (OT); and second, to create a prototype virtual advising system. Our focus is on the design environment and architecture, and not on the details of the individual agents or other components generated.

The growing popularity of distributed education has produced a variety of interesting research in the production and presentation of educational materials. Distributed education consists of much more than simply putting PowerPoint slides on a website and receiving student homework or term papers by e-mail (Dumont, 1996). Optimally, it consists of a dynamic environment in which students and teachers can communicate and both can learn. Teaching in such an environment is at its best when the instructor is viewed as a facilitator for interested, motivated students (Graf, 2002). This fact is especially true for the fastest growing segment of eLearning, the busy adult who has too many demands on his or her time to attend a “traditional” classroom (Symonds, 2001). A viable virtual university also consists of the infrastructure and background coordination tasks necessary to successful educational efforts (Howell & Lassila, 2002). Among these tasks is student advising.

From any perspective, university student advising is an extremely complex and time-consuming process that is made up of many sub-tasks. A recent survey conducted at Texas Tech (Durrett, 2001) showed that 60% of an advisor’s time was spent helping students perform long-term degree planning and current semester scheduling (e.g., course approval). The remaining time was evenly divided among evaluating transcripts; responding to requests for information concerning degree programs, course content, how to apply, kinds of jobs available to graduates; and mentoring students. Human advisors are inundated with “quick questions” to the point that there is often little time remaining for other important duties.

Attempting to automate advising for virtual universities is a risky proposition, given the difficulty of advising in person. The traditional advising process, especially in larger departments, is fraught with miscommunications, misunderstandings and misconceptions. Policies and requirements are dynamic and difficult to maintain.
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