Chapter 10

Business Process Simulation in Academia

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ABSTRACT

In light of the proliferation of information technology in every area of society/business, its adoption by academia seems like a natural extension of this trend. What the authors find, however, is that few examples exist of the use of Business Process Management to improve processes in academia. This chapter presents simulations as a necessary mechanism for understanding and overseeing organizations as they undergo a continuous process of change. Enterprises, their organization, business processes, and supporting information technology must be understood as socio-technical systems that consist of people (human actors) and technical subsystems and their complicated relationships. In designing, redesigning, and improving such systems, modeling and simulation methods are not only relevant, but essential.

INTRODUCTION

Service organizations are typically structured according to the work division principle, by means of which groups of specialized workers are created, along with managers to supervise them. Nowadays, however, processes are increasingly complicated, with a greater number of tasks to be performed resulting in more complex management. This, along with the changes taking place in corporate settings (more demanding clients, the need for increased competitiveness and market innovation) means that a rigid organizational structure is not the best option for today’s companies, which must be organized around their processes. Reengineering is the process for effecting these changes.

One of the disciplines that has emerged to address this problem is Business Process Reen-
Muthu, Whitman and Cheraghi (2006) expose that “reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service and speed” (pp. 8). A decisive element in this process of change is the creative use of information technology.

The use of information technology should be extended to Academia. There are several online applications that allow students to resolve many bureaucratic issues without having to waste time waiting in line. Furthermore, there are several applications, like Moodle, which increase professors’ capacities to work with their classes. In contrast, it is hard to find examples of the use of BPM to improve processes in Academia. The use of BPM in private and public companies shows that it is a powerful tool to aid in tactical decisions in an organization. As such, Academia should also take advantage of this tool.

This chapter presents simulations as a necessary mechanism for understanding and overseeing organizations as they undergo a continuous process of change. Business Process Simulation (BPS) is an important tool within BPR. Business process simulation is a powerful tool for process analysis and improvement. Enterprises, their organization, business processes, and supporting ICT must be understood as socio-technical systems that consist of people (human actors) and technical subsystems and their complicated relationships. In designing, redesigning, and improving such systems, modeling and simulation methods are not only relevant, but essential (Barjis, 2010).

**BUSINESS PROCESS SIMULATION**

One of the main challenges is to create simulation models that accurately reflect the real-world process of interest. Moreover, we do not want to use simulation only to address strategic questions, but also for tactical and even operational decision making. Simulations can be used to predict performance under various circumstances, e.g., different business process reengineering alternatives can be compared with the current situation. The value of such predictions stands or falls with the quality of the simulation model.

Business process simulation involves developing an accurate simulation model which reflects the behavior of a process, including the data and resource perspectives, and then performing simulation experiments to better understand the effects of running that process. There are several steps involved in simulating a business processes. First, the business process is mapped onto a process model, possibly supplemented with process documentation facilities. Then, the sub processes and activities are identified. The control flow definition is created by identifying the entities that flow through the system and describing the connectors that link the different parts of the process. Lastly, the resources are identified and assigned to those activities where they are needed. The process model should be verified to ensure that the model does not contain errors. Before a business process can be simulated, the performance characteristics, such as throughput time and resource utilization, need to be considered. For statistically valid simulation results, a simulation run should consist of multiple sub runs, and each of these sub runs should have a sufficient run time. During the simulation, the simulation clock advances. The simulation tool may show an animated picture of the process flow or real-time fluctuations in the key performance measures. When the simulation is finished, the simulation results can be analyzed. To draw useful and correct conclusions from these results, statistical input and output data analysis is performed (Wynn, Dumas, & Fidge, 2007).

Business process simulation is regarded as an invaluable tool for process modeling due to its ability to perform quantitative modeling (e.g., cost-benefit analysis and feasibility of alternative designs) as well as stochastic modeling (e.g., external factors and sensitivity analysis). Simulation
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