

Chapter 4.25

Teaching Operations Management with Enterprise Software

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ABSTRACT

Enterprise systems technology is used to enhance the teaching of operations management through development and operation of a virtual manufacturing enterprise. An ongoing, real-time simulation is conducted in which operations management issues in the fictitious factory must be addressed on a daily basis. The virtual manufacturing enterprise is integrated into an operations management course to facilitate understanding of the dynamic and interrelated nature of operations planning and control in a complex manufacturing environment. Enterprise software supports the primary learning objective of understanding how operations management decisions affect customer service, capacity, inventory, and costs.

INTRODUCTION

This chapter presents an approach to teaching operations management (OM) with enterprise systems technology. The approach described here is based on the premise that the topics taught in operations management courses are dynamic and interrelated. Therefore, the teaching and learning of operations management should address not only the content of each specific topic, but also the dynamic interrelationships among the topics.

The integration of OM topics is extremely difficult to accomplish in a traditional classroom setting. There are several excellent OM textbooks available in the market, and they generally provide information needed to study the content of OM topics such as aggregate sales and operations planning, master production scheduling, material planning and control, capacity planning and control, and production activity control. However,

textbooks are a static medium that cannot capture the dynamic interrelationships between and among the topics. The topics in an OM textbook must necessarily be presented in sequential fashion organized by chapter or unit, and conventional testing typically focuses on the content (issues, concepts, tools, techniques) related to each topic. True insights into the connections among the topics are extremely difficult or impossible to glean from even the best textbooks.

As an example of the interrelationship of operations management issues, consider the topics of aggregate planning and production activity control. Aggregate sales and operations planning deals with the company's overall strategy for meeting anticipated demand of broadly-defined product families over a planning horizon of 12-18 months. Production activity control, on the other hand, deals with day-to-day (or hour-to-hour) scheduling and sequencing issues for internal shop orders to make component parts or assemblies needed for specific products. The two topics are at extreme ends of the continuum and are invariably covered in completely different sections of the typical OM text, but they are in fact highly interrelated. While we might be tempted to seek sophisticated algorithms and models to help with complex scheduling issues that occur on a daily basis, it may be that our day-to-day scheduling issues are the result of poor overall planning at the product family level.

The previous argument suggests that conventional classroom lectures, textbook readings, and end-of-chapter exercises are *necessary* but *not sufficient* to gain insights needed to understand operations management. This chapter describes an ongoing project in which the desired synergy is addressed by the introduction and use of enterprise-wide system (ES) technology in the operations management classroom.

The objectives of this chapter are to raise the level of awareness regarding the need for active learning approaches to operations management, to describe in detail an approach to teaching OM

with enterprise technology, and to discuss lessons learned that may be of benefit to other scholars and teachers interested in this approach.

BACKGROUND

The practice and teaching of operations management has been impacted significantly by advancements in information technology (Manetti, 2001; Rondeau & Litteral, 2001). The development of material requirements planning (MRP) systems in the 1970's revolutionized thinking about how to manage materials in a manufacturing environment. This provided an alternative to economic lot size models that assumed that demand for all inventory items was independent, and it promoted more of a systems perspective to materials management. This was followed by manufacturing resource planning (MRPII) systems that provided additional functionality related to capacity planning, limited financial analysis, and "what-if" planning. More recent enterprise resource planning (ERP) systems aim to link together the various functional areas of operations, accounting, finance, customer relationship management, and human resources. ERP systems can be enhanced with advanced planning system (APS) modules for obtaining near-optimal scheduling, manufacturing execution system (MES) modules for shop floor control, and/or supply chain management (SCM) modules designed to integrate planning and execution with suppliers and customers.

A key aspect of this evolution is integration. Organizations have made significant investments in hardware, software, and training to install, maintain, and use enterprise-wide systems designed to better integrate their activities (Hitt, Wu, & Zhou, 2002; Mabert, Soni, & Venkataramanan, 2000). It is logical to assume that collegiate schools of business would also value, and seek to achieve, higher levels of integration in the topics taught in the curriculum (Cannon, Klein, Koste, & Magal, 2004; LaForge & Busing, 2000).

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