

# A Practice-Oriented Enterprise Resources Planning Course Design

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**Abstract** This is a paper in progress. As a key course in business management curriculum, Enterprise Resource Planning (ERP) represents a new managerial thought that integrates organizational models, enterprise norms, management practices and methods. The characteristics and complexities of ERP determines its importance in the curriculum for students in a business school as well as its difficulties in teaching. In this paper, the authors present a summary of years of experience in the design and teaching of ERP course in the School of Economics and Management, Beijing Jiaotong University (BJTU), China. The design of this ERP course involves teachers' guidelines, a question-oriented teaching method, laboratory supports for ERP experiment, group contest with ERP systems.

**Keywords** Course design · Enterprise resources planning (ERP) · System · Curriculum · Teaching method

## 1 Introduction

Since the 1990s, great changes have taken place in global business environment. Companies are now facing more and more keen competitions from domestics and oversea markets. To fit this environment characterized as 'customers, competitions and changes', global business enterprises start a revolution with a major feature of ERP system adoption. Since 2000, more and more Chinese companies have applied ERP systems in the operations and management (Lee et al. 2006). With the wide diffusion of ERP systems in China, the demand for talents with good knowledge in ERP from industries is urgent and large (Liu et al. 2007a).

Aiming to train the students to meet the requirements of the market, a course named "ERP: Theoretical and Practical Issues" was opened for postgraduate students in 2001 in BJTU. As a milestone of ERP teaching in BJTU, ERP course was opened for all undergraduate students in 2002 (Liu et al. 2007a). A series of ERP

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courses including “Principles of ERP”(Compulsory), “ERP Simulation” (Compulsory), “ERP for Business” (Elective) and “ERP: Certificates for Supply Chain Experts” (Elective) were opened for undergraduate students in the School of Economics and Management (SEM) in BJTU in 2003. Since 2004, a yearly contest named “Management Elite: ERP sand table contest” has been held in BJTU. In 2006, the series of ERP courses above were integrated into “ERP” and renamed into “ERP: Theories and Practices”, which becomes the basic course for all majors in SEM of BJTU. This course was nominated as a demonstrative course in Beijing, China in 2009.

In the past years of teaching and learning, the ERP course in BJTU had been frequently reviewed and redesigned before it becomes a demonstrative one. This paper presents the details of the course design of ERP, which is named by the authors as “practice-oriented” design (Wiggins C 2010). Also, it will describes the educational objectives, the teaching and learning processes and evaluation of this course. This paper is organized in the following ways: section II is the related literature about ERP teaching, from which the authors summarized the key differences between the design scheme proposed in this paper and those proposed in existing literature. Section III and IV present the course design, experiment and contest. Section V provides a reflective evaluation of the design, and section VI concludes this paper.

## 2 Design of the ERP Course

The main position of this ERP course in BJTU is to train the students with the knowledge in the processes and methods of an enterprise’s decision making, planning, controlling and business performance evaluating with the supports of an ERP system. In this section, the authors will present the key and difficult points of the course, the content structure of the course and the teaching method of the course.

### 2.1 *Key and Difficult Points of the Course*

The key of ERP is to solve the problems of a company. However, many students do not know the operations of a company. Thus, the first key point is to make the students understand the business environment of a company, that is, to know the operations of a company from the point of view of demand, production, costs, supply and scarcity etc. The second is to make the students understand the characteristics of the operations and management of a company from the point of information, master the methods and processes of a company’s decision making, planning, controlling and evaluating performance, and utilize information technologies to complete the management and balance of various resources of a company.

One of the difficulties of an ERP course is how to provide a better understanding on how an ERP system would help to improve a company’s management for the students, as ERP is embedded with comprehensive management thoughts, models

**Table 1** Structure of the ERP course

Modules	ERP principles	Economic management	Information technologies	Experiment and contest	
Contents	History of ERP Multi-view analysis of ERP	Theory of the firm Business competitions and operations analysis		Sand table simulation of the enterprise Analysis of business models	
	ERP applications and functionalities		Commercial ERP systems and their functionalities	ERP software experiment Individual business process experiment	
	Development and operations of ERP digital firms	Characteristics of ERP digital firms		Configuration of basic data and experiment for major business processes	
		Design and simulation of ERP solutions			
	Companies’ major functions, business processes and characteristics of ERP solutions	Traditional management and its problems		Design of solutions	Grouping and role assignment Design of solutions Draft experiment guideline Discussions on solutions and training
		Design of ERP solutions			
	ERP implementation and application	Theories and technical methods for ERP implementation and operations			Case analysis contest
ERP software architecture and implementation	Design and development of ERP software			Development of ERP software	
Time (h)	8	12	12	32	

and methods. On the other hand, ERP systems are known for their complicatedness in terms of functionalities and processes. How to make the students learn to use the software within a short time is quite difficult.

### 2.2 The Content Structure

Based on the position and objective of this course, the design of content structure is proposed according to four combinations: combination of the theories and practices, combination of economic management and information technologies, combination of business processes and economic models, combination of software experiment and contest. The structure of this ERP course is presented in Table 1.

### **2.3 *The Teaching Method***

In this course, the emphasis is to train the students with creativities and capabilities in practices. Thus a “guided by teacher and question-oriented” teaching method is adopted. The teachers first mainly introduce core knowledge units of the whole course and guide the students proactively learn the elective knowledge units. Through this way, students could rapidly master the basic principles and methods in economics, thoughts and methods in management, application solutions of information technologies, all of which are embedded in ERP. Secondary, the teachers provide the problems to be solved and decompose these problems into tasks. Students could explore different methods to complete the tasked assigned and get different results in learning. By examining the variance of the experiment results among the students, they could “find something by individual research”, and this is proved to be an effective way to improve their creativities and capabilities in practices. In the teaching process, teachers use many video lectures and real cases, which provide strong supports for the students to conduct experiment and contest later. As a featured point of the teaching method, teachers apply a “push” strategy to encourage the students to learn. This push strategy allows students to “construct” what they want to learn in the scenarios defined by the teachers. For example, students can set up roles in the sand table experiment with ERP software and simulate the real situations of a firm. Through the success or failure in this process, teachers encourage students review the related theories and examine the reasons of either success or failure, from which students could get a deeper understanding.

## **3 Experiment and Contest**

Four types of experimental activities have been developed by the authors in this ERP course. These experiments are to help students to meet the actual requirements of real business.

### **a. Sand table simulation**

This is the first practical activity after teaching the ERP theories. Students in a class have been grouped into eight groups in maximum. Six to eight members form a group and simulate as a firm. Students play different roles in the firm and complete the assigned tasks. In sand table simulation, students learn through practice. A company’s resources, operations and management activities are moved to a sand table in a classroom, through which students can approach to a real company and understand how companies use ERP systems in their operations as well as the results. Sand table simulation is very suitable for training students with their capabilities in how to discover and solve problems. In each school year, 420 students join in this sand table simulation.

#### b. ERP software simulation

This is the second practical teaching activity. In this section, a simulated ERP system was developed and maintained by a team from BJTU. The aim of this laboratory section is to help students better understand the characteristics of a company's operations and that of an ERP-enabled digital firm. Based on the experience in industries, the authors designed the contents for ERP software simulation with three stages. In the first stage, students are trained with the exercise of system initialization, in which digital firm models are set up. Students can get an understanding on the organization and control of digital firms. In the second stage, a series of business processes training are carried out. The experiment covers the whole cycle of the fulfilment of an order. In the last stage, the financial and accounting module of an ERP system is used. Students analyze the activities of a company's operations and get financial reports from the system.

#### c. Commercial ERP experiment

BJTU received a sponsorship from an ERP vendor, who provides supportive licenses of their ERP system for the ERP course. With this commercial ERP system, the design and implementation for a company's business solution can be achieved. All data and business processes are originated from a real company. In this section, the authors have designed seven experiments which covers the design and implementation of main functionalities of an ERP system. In this experiment, students are encouraged to solve the assigned problems, all of which are from ERP adoption in a company. They are required to finish the tasks of theoretical analysis, solution design and the writing of experiment guideline by groups. Also they are required to conduct discussions and presentations in class, in which they can learn from each other and improve their capabilities in learning, teamwork and training.

#### d. ERP contest

This ERP contest is the most attractive section for the whole course. Over 800 students join the contest annually since 2005. The contest extends the contents of the ERP course and becomes one of the most important contests in BJTU. In the contest, students play different roles in a company and experience the business activities of various positions in the company. They are challenged to solve the problems that a company has met in operations and management. Students form groups and each group forms a company to participate in the contest. They are learning in experiments and complete the tasks of a company's business activities, from which a company develops. This contest provides an opportunity for the students to experience the real business world. In the meanwhile, students learn and practically apply the methods and knowledge like "demand and supply", "production functions", "financial analysis" and "scarcity of resource" etc. during the course of the contest.

## 4 Conclusions

To sum up, the authors believe that the teaching of ERP should aim to train the students with active learning, exploratory spirits and capabilities. In the teaching process, a design method of “target setting and module decomposition” is suggested to adopt to formulate a multi-dimensional knowledge structure with the contents of economics, management and information technologies. Secondly, a teaching method of “guided by teachers and question-oriented” is applied. Teachers focus on core units of the ERP course and guide the students to acquire other knowledge units in which they have interests. Thirdly, a learning method of “learn and practice” is adopted by the students, with the supports from the lab. Last but not least, teaching with practices is a critical feature of ERP course. Without the support of practices, this course will lose its foundation with which it can survive. Thus, the authors suggest universities cooperate with industries and set up ERP research center and practice base. From cooperation, fruitful teaching and learning resources will be developed.

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