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Research Article

Study on the Teaching System of ERP Sand Table Simulation

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Abstract: The aim of the study is to improve the practical ability of students in management major. Nowadays, the teaching ways of management course are limited into theoretical teaching. However, such teaching ways cannot meet the practical demand of the students in management major since the major demands students should be practical and theoretical. How to improve the practical ability of students in management major has been an emergent problem need to be solved for universities. First, the brief introduction and characteristics of the teaching system of ERP sand table simulation was made. Then the design of the teaching system of ERP sand table simulation was put forward, which included the design of teaching organization, the design of teaching contents and the design of teaching methods. Through the new teaching method, students can improve their practical capability since they can experience the practice of firm's operation.

Keywords: ERP, sand table simulation, teaching system

INTRODUCTION

The current class teaching method of management has emerged many problems since it is very difficult for it to improve the practical capability of students in management major. Since the practical capability of students in management major has been more and more important in current days. How to improve the practical capability of the students in management major has become an important and emergent issue waiting for theory and business circles (Chan-Hsing *et al*., 2005). The teaching system of ERP sand table simulation has been very popular in the teaching of universities in China. Nowadays, there are more than 400 universities are using the teaching system of ERP sand table simulation to teach the students in management major. However, the effect of existing teaching system of ERP sand table simulation is not satisfying because of the design of it all not good. How to design a suitable teaching system of ERP sand table simulation has become an urgent thing for many universities and firms.

The teaching system of ERP Sand Table Simulation is the boutique training course of UFIDA, which applies the teaching method of sand table situation that popular in Harvard University and takes the relevant theories and teaching methods of Management Group Company and similar kinds of firms as lessons. The teaching system of ERP Sand Table Simulation takes manufacturing firms as background, which let each student to place themselves into business practices. Each student stand for their own identities, which refers to financial, logistics, manufacturing and marketing roles, to let them experience the fierce of business competition. In the sand table, the cash flow, product inventory, production facilities, human resources and other business indicators are clear, which appear as dramatic props and be accompanied with operation rules. In practical sand table simulation, all the students were divided into several groups. Each group includes 5 or 6 persons and each group stands for one virtual firm. The members of each group act as one important position in the firm. All the groups compete with each other under the rules to get development (Bing *et al*., 1996). The teaching system of ERP sand table simulation can help students know the common process of business operation through games competition.

The first characteristics of the teaching system of ERP sand table simulation is comprehensiveness. The teaching system of ERP sand table simulation refers to many aspects, such as the strategy, product research, equipment investment and upgrading, the plan of manufacturing capability, the plan of material demand, the plan of financial demand, market and sales, the analysis of financial indicators, team communication and construction and so on. It also integrates the role play, case analysis and expert diagnosing, which let students experience the whole process of firms' operation through analyzing market, making strategies, organizing production, financial settlement and so on Holland and Light (1999). This can help students recognize the limitation of firm's resources, thereby understand the management theory of ERP, comprehend scientific management principles and improve management capability.

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The second characteristic of the teaching system of ERP sand table simulation is practicalness. The teaching system of ERP sand table simulation aims to let students study from participation. The studying process of students closes to the operational situation of firms, which can let students experience the delicacy and cruel of the market competition and undertake the operation and responsibility. During the studying process, students will come across various kinds of typical problems in firm's operation. This demands students to find market opportunities analyze laws and make strategies to operate general management. In the experience of the success and failure of various kinds of decisions, students can study management knowledge, seize management skills and improve their management quality.

The third characteristic is intuitiveness. The teaching system of ERP sand table simulation can open the complex appearance of operation principle and explore the operation nature directly. It also can exhibit enterprise structure and management in the sand table and let students experience and learn the complex and abstract management theory of ERP management directly (Mandal and Gunasekaran, 2002). The intact and lively visual feeling will effectively activate the learning interest of students and strengthen their learning capability. Students will understand more deeply and memorize better of the contents when the course ends.

The fourth characteristic is simulatability. The course of the teaching system of ERP sand table simulation will divide the students participated into four to six groups. The members of each group will act as CEO, CFO, CMO, COO and so on, which confront them into the actual environment presumed (Motwani *et al*., 2002). Each group shall operate a firm with good sales and rich finance owns 100 million Yuan. Through 6 to 8 years, the firm how to keep success and growth is a great challenge for each member of the group while facing the fierce competition of competitors, aging of product and market simplification.

The fifth one is interestingness. The teaching system of ERP sand table simulation increases the funny of learning and makes bored course become vividly. From the process of the game, it can activate the complete enthusiasm of participators and give them the motivation to learn in order to get victory.

The objective of the study is to design a new teaching system of ERP sand table simulation and use the method of experiment for study, which used the students in management major as the experimental subject. In the study, we gave a brief introduction of the teaching system of ERP sand table simulation, which includes the brief introduction of the teaching system and the characteristics of the teaching system, made an analysis of UFIDA's ERP Sand Table Simulation, which is the most popular kind of teaching system of sand table simulation of China (Amin *et al*., 2012) and designed a new teaching system of ERP sand table simulation, includeing the organization design, the content design and the method design of the teaching system of ERP sand table simulation.

MATERIALS

In 2002, UFIDA Company began the cooperation program between schools and enterprises to train students to be practical and it builds ERP experiment center with national universities. Up to now, UFIDA Company has provided training course for more than 300 universities. The effect of the training course is welcomed by teachers and students.

The course of UFIDA's ERP sand table simulation includes sand table aids, course design, teaching subject, ERP sand table simulation software and the instructor of ERP sand table simulation (Summer, 1999).

Sand table aids is the carrier of ERP sand table simulation. It consists of sand table disk, various kinds of bacons, money of various kinds of colors and empty barrels. The course design includes six stages, which are organization and preparation work, the description of basic information, the rules of marketing and firm's operation, the set of initial state, the simulation of firm's competition and the analysis of actual case. The teaching subject is teachers. The role of teachers differs with different stages and guides the process of the course. ERP sand table simulation software is developed by Excel software to take notes, supervise and assess the operation situation of the groups. The instructor of ERP sand table simulation made a simple introduction of the course of ERP sand table simulation, which includes the organization profile, the competition rules and the analysis of the practical simulation of ERP competition.

In the beginning of the course, teachers should complete the ready work and introduce the basic information of the firm to help students set the initial state of the simulation firm. Under the rule of marketing, students enter the competition simulation of firms. The director of marketing invests advertising expense to get orders based on the analysis of productivity provided by the director of operations. Meanwhile, the director of purchasing began to purchase materials. After that, the director of operations began the production. All the expenses are accounted by chief financial officer. The CEO always plays the role of coordination and control the overall operation of

Table 1: The organization and arrangement of teaching process

Teaching stage	Teaching contents	Time allocation
First stage (situation simulation)	The introduction of operation rules	6
	Situation simulation teaching	20
	Problem identification	4
Second stage (Knowledge construction)	Self learning	Self learning in the form of groups under the guidance of professional teachers
	Cooperation and communication	
	Project design	
Third stage Practical confrontation	Practical confrontation	20
	Teacher assessment	6
	Teaching examination	4
	Paper writing and analysis	4

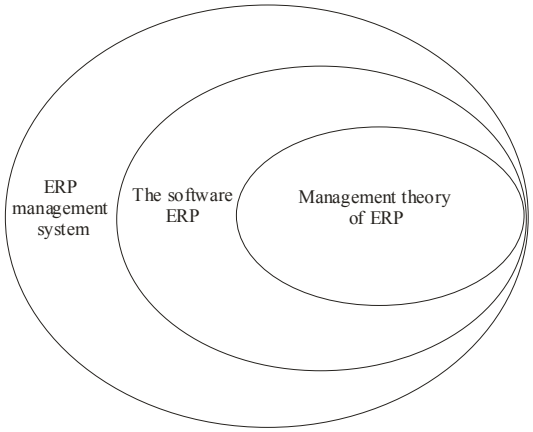

Fig. 1: The concept hierarchy of UFIDA's ERP sand table simulation

the firm. The process of the teaching system of UFIDA's ERP sand table simulation can be seen in Table 1.

The design of the teaching system of FUIDA's ERP sand table simulation ensured the relationship between teachers and students which are focused on students. Such kind of course can help train students' capability of problem identification, problem analysis and problem solving. However, as a new kind of teaching method, the perfect of teaching process is a long and gradual process which needs us to think over continuously. As a kind of business training course, the training time may be limited into several days. Thus, it exist the following deficiencies. First, it is lack of the content of ERP principles. Second, the operation contents and assessment system need to be improved. Third, the course exist problems in the information management and information processing.

According to the problems related above, this part will focused on giving some solutions to them. First, adds the contents of ERP principles. The concept hierarchy of ERP includes ERP management system, the software of ERP and the management theory of ERP (Fig. 1). From the concept, we can know that ERP is a kind of management standards and management theory. Moreover, ERP is build on the basis of information technology which integrates enterprise management theory, business process, basic data, human and material resources, software, thus, ERP is a kind of resource management system of firms.

Second, make up and improve the deficiency of the course. The course can consult the really operation environment of firms to improve the marketing principles and operational rules, which can increase the authenticity of the simulation.

Third, develop and apply the subsystem of the sand table's Excel operating system. Since Excel software owns very strong capability to process and analyze data, it has a very strong assist function for improving the course of sand table simulation (Welti, 1999). The development and application of Excel subsystem is the foundation of ERP sand table simulation. It can reduce the blindness of students' operation in some extent since it is used to solve practical problems. Thus, develop and apply the subsystem of the sand table's Excel operating system can help make up the deficiency of the course of ERP sand table simulation.

DESIGN METHODS

The design of the teaching organization: Since the teaching system of ERP sand table simulation owns the characteristics of inter disciplinary and interdisciplinary, traditional teaching organization does not meet the demand of the new kind of teaching system. This part will design the teaching system in the aspects of the organization of teachers, the organization of students and the organization of the teaching process.

First is the organization of teachers. The traditional teaching model that one teacher corresponds to one course of one class cannot meet the demand of the teaching system of ERP sand table simulation (Stephens, 2000). This demands new teaching model. Professional teaching groups should be established which composes of professional teachers (Fig. 2). Only in this way can the teaching system of ERP sand table simulation get the satisfying teaching effects.

Second is the organization of students. Use the class as a unit to teach is the common used teaching organization model, which also cannot suit the teaching system of ERP sand table simulation since it may appear absence phenomenon of role play in teaching process. For instance, students of marketing major do not understand financial management and students of financial management do not understand marketing. The whole teaching process is difficult to realize

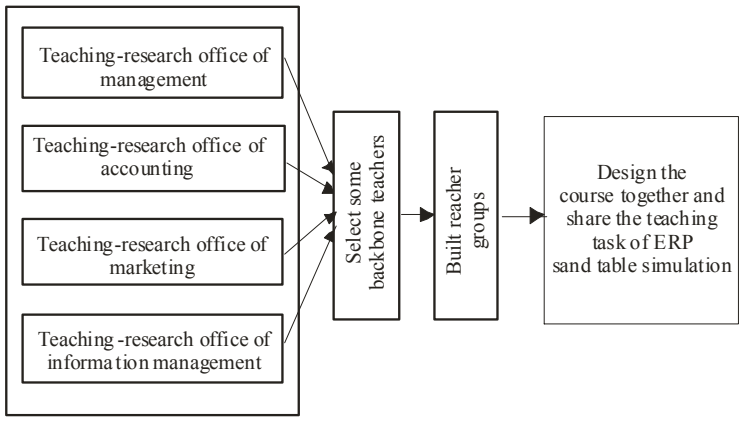

Fig. 2: The design of teaching organization

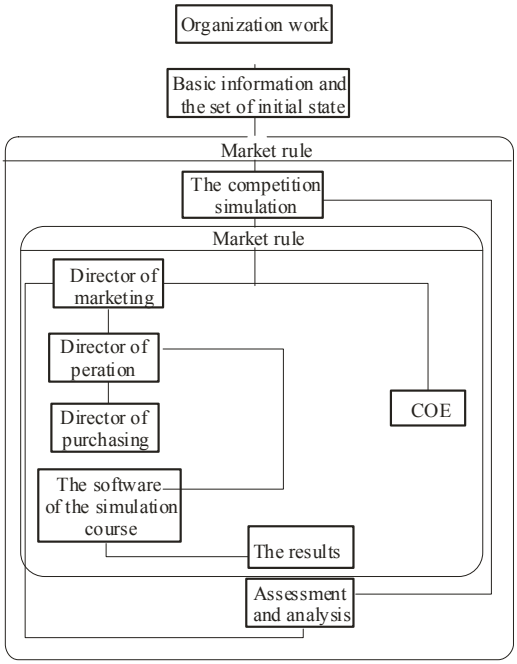

Fig. 3: The organization process of UFIDA's ERP sand table simulation

predicted effect. Thus, this study suggests that mix the students of different majors into the same group. In this way, each learning group owns a relatively complete knowledge structure (Savitskie, 2003). It can also simulate firm's behavior to provide different kinds of role resources to give organization safeguards for self and cooperative learning.

The constitution of each group is implemented by students' professional background and firm's positions establishment (Wen-Hsien *et al*., 2011). This can not only make each students understand the whole operation and work process of firms, but also can deepen students' professional knowledge and skills under the environment which linked to their professional knowledge. In this way, it can integrate the learning of professional knowledge and relative knowledge, the training of professional skills and basic skills.

Third is the organization of the teaching process. The centralized teaching method is too simple for the teaching system of ERP sand table simulation, which is not good for students to understand learned knowledge. Thus, it cannot play the full role of ERP sand table simulation. This study suggests that using the method of stage teaching to make students have enough time to sort out and conclude the knowledge they learned under the premise that they understand the teaching process of ERP sand table simulation completely (Bernhard, 1997). The stage teaching process can be divided into three stages, which are situation simulation stage, knowledge reconstruction stage and practical confrontation stage. The details can be seen in Fig. 3.

The first stage should be arranged in the beginning of the fourth semester of university students. Students in this stage have mastered lots of professional knowledge, however, the knowledge structure are random and loose. Through the first stage of situation simulation teaching can help students make the learned knowledge systematic and combine the loose knowledge effectively. This is not only good for the usage of former knowledge, but also can be good for absorbing of new knowledge, which are better for the system construction of whole knowledge.

The second stage of learning is a relatively loose and long stage. Through the situation simulation, teacher's assessment, problem identification of the first stage, makes students enter into the second stage of learning with questions. In second stage, it mainly use the method of group cooperative learning under the

guidance of teachers, which can train students' team spirit and the sense of responsibility. The sense of responsibility is the soul of cooperative learning. First, each student should be responsible for the group tasks (Donald, 1996). In the process of searching and integrating learning resources, it can train students' service awareness for group work and make them expand learning resources actively. Second, each student should be responsible for other members of their group. Through assigning tasks rationally, it can give each student an opportunity to practice their learning capability. Each member of the same group must cooperate with each other and communicate with each other. Students in this stage can change their role in turn in order to let each student get the experience of whole decision making and then can help each student feel the importance of decision making in firm's operations. Applying the method of group learning can promote the fusion of students with different majors. It can help them complement each other's advantages and learn from each other and then improve their capability to explore knowledge and self learning.

The third stage should arrange in the end of the fourth semester. In this semester, students have learned many professional courses. Moreover, through the learning of the first and second stage, students have already owns ordering and systematic knowledge and are ready for the practical confrontation of ERP simulation. Thus, the third stage can be finished in one week through practical training. In the process of learning, first, there should be simulation notes. Each member of the group takes notes of operation results and emerging problems in turn according to their roles. Second, submit the final report of sand table simulation when the simulation finishes (Charleston, 1992). The main contents of the final report are the feeling and existing problems of students. Finally, each group should submit a paper, which demands each group to make an analysis of the operational result of its firms and strengthens and weaknesses of their competitors, moreover, they should raise the solving measures.

The design of teaching contents: The current ERP sand table begins from the manufacturing of the firm and simulates the economic work of the firm. It focuses on the analysis and management of manufacturing process. The main modules include theoretical basis, basic concept, sales management, manufacturing plan, material demand plan, capability demand plan, purchase management, stock management, JIT management, financial management, assets management, cost management, equipment management, quality management, human resource management, supply chain management, customer resource management and so on Chang *et al*. (2012). Although these modules almost run through all the manufacturing and operation activities of the firm, it also needs further improvement.

First is to monitor each link by adding control table. As a firm, from the beginning of getting orders from market to the financial summary of the year-end, it will go through market development, product research, loan application, loan payment, material order, production, marketing, equipment purchase. In the operation of these activities, it cannot escape some mistakes. Thus, it is necessary to make some control of these activities, especially market development, product research and loan, which affect bidding qualification, manufacturing qualification and financial condition individually. Thus, it should add some control table to supervise each link of the firm's operation, such as statistical table of market development and financial condition.

Second is to strengthen the supervision by setting audit post. A perfect market system should have effective regulator except for market main body. A perfect market main body should also have internal regulator, which can reduce exchange cost effectively. The most effective way to solve above problem is to set audit position. For the course of ERP sand table simulation, it can add a auditor of group members to solve supervision problems.

Third is to improve the link of invite tenders. The current rule of invite tenders is that the marketing director brings capital to invite tenders of all market modules. If one group loses one market, it does not have the chance to make up. Thus, this study suggests that each time only invite tender of one market module. In this way, firms also have chance to make up if it lose one market module.

Fourth is to perfect the performance evaluation system. The formula of the current ERP performance evaluation system is that the mark of operation = ownership interest×(1+development potential÷100). The development potential of the firm consists of the rank of market position, product research, ISO qualification, product stock and so on. The assessment considers the future development of the firm. However, there is some shortage of the assessment. For instance, there are some differences among product research, market development and ISO certification since they invest differently.

The design of teaching method: The current ERP sand table simulation use manual way to implement (Chen and Wang, 2010). Fist, students get orders through participating franchisee according to their market prediction. Second, students simulate various kinds of operations of firms. In the process, teachers take charge of all kinds of work and undertake different roles in different stages. All the works are done by hand. However, there are many problems in practice, such as the chaos of ERP sand table simulation, time shortage,

the incapacity of information processing. Thus, this study suggests that the ERP sand table simulation should be electron zed. The way to realize electronization should develop and perfect the ERP software, which includes the perfection of course software and develop course software based on B/S structure.

Nowadays, the ERP software usage has become one of the most important things in the course of ERP sand table simulation. The usage of ERP software also makes a good foundation for students to use ERP software when they graduated. However, the current use of ERP software is only focused on financial software, which makes students get difficulties to understand the organization structure and the relations of different departments. Thus, this study suggests that the ERP software system should add ERP software of manufacturing management system and ERP supply chain system. This can help students understand deeply of organization operation and learn better of ERP software.

CONCLUSION

The economic development and environment change raises a new demand for management teaching. This study introduces a new teaching method of ERP sand table simulation to train students to be practical. First, the paper made a brief introduction of the new teaching method and its characteristics. And then this study designed the teaching system of ERP sand table simulation, which includes the design of teaching organization, the design of teaching contents and the design of teaching methods. The new teaching method can help students experience the practice of firm's operation in management course, which can help students understand how to make decisions in practical firm's operation. On one hand, the new teaching method can improve the theoretical capability of students. On the other hand, the new teaching method can improve the practical ability of students.

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