ERPsim – A Simulation Game for Teaching SAP ERP

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ABSTRACT

Higher education teaching is more and more expected to ensure students' fitness for work immediately after their final degree. To do so, researchers at HEC Montréal, a Canadian top business school, developed the simulation game ERPsim to improve the handling of the SAP ERP system and the execution of managerial tasks. As a special feature, ERPsim fosters methodological management competences. The team work experience under real business conditions adds to students' social competences and students also learn to make decisions under time constraints. ERPsim is also capable of blended learning approaches. In this paper, we want to present key features of ERPsim and we want to analyze its usefulness in teaching business management in higher education.

Keywords: ERPsim, SAP ERP, simulation game, teaching approaches.

INTRODUCTION

Today, global labor markets expect management students to have knowledge in ERP software and its handling. Consequently, ERP education is a virtually indispensable element of higher education in business administration both in graduate and undergraduate curricula. Due to the ongoing computerization, it is unlikely for this process to change. As a result, demand for knowledge in ERP software and its handling is not only restricted to business management and to related fields such as business information technology and computer sciences, but it increasingly comprises new fields of application, e.g. hospital management. Regardless of specific fields of application, competences in handling of basic ERP modules and especially profound knowledge of business processes and their integration are high in demand (IFAC 2009).

This development is a perfect example of changing labor market requirements which leave employees confronted with a growing number of increasingly complex tasks. Consequently, higher education teaching must adapt to changing skill requirements. While modern higher education teaching generally focuses on the introduction of more student-centered learning methods in order to provide the required comprehensive set of competences, these concepts have already proven exceptionally successful in achieving positive learning outcomes in the area of software handling. This is why teacher-centered 'click-along-courses' have been replaced with concepts that aim at teaching participants to work independently and as a team. This approach is more suitable to simulate realistic future working conditions which oftentimes require problem-solving in a trial and error process on one's own (Postholm, 2007).

Modern teaching methods accordingly prefer a hands-on mentoring (Entwistle, 2009) following the credo as little help as possible, as much help as necessary. To achieve optimum learning success, certain limitations have to be taken into account. Experience has shown that students with little or no ERP knowledge need all their attention to implement the system, so that they are unable to understand the logic of the underlying business at the same time. This is particularly true if non-business students with restricted or no specific management knowledge participate in class. ERPsim uses continuous-time simulation to generate new market information and related demand for decisions. Therefore, it is imperative to let students gain insight into underlying basic business processes before starting the game. Thus creating approximately identical levels of knowledge is also a basic requirement for good teamwork among the students.

THE STRUCTURE OF ERPSIM

Participating in the innovative teaching concept ERPsim presents significant content challenges. ERPsim was developed by researchers at HEC Montréal and simulates all areas of strategic and operative management decision-making under real-world conditions (Léger 2009, HEC Montréal 2011). In this simulation game students have to play the role of an operating profit maximizing entrepreneur. The immediate profit effects of their management decisions are indicated after each simulation round. This leads to continuous learning by doing and to careful adjustments in decision making. With profit maximizing as the only objective in the game, students' decision performance can be clearly measured. To increase their learning motivation incentives can be given to the best performing game players. For the simulation game two different types of companies are implemented in ERPsim: The first one is a commercial company for beverages and the second one is a manufacturing company for muesli products.

Usually the simulation game is performed with competing groups of four to six students. Each group runs its own company. Hence, the number of groups determines the degree of competition in the market. Students have to operate in a dynamic and changing environment generat-

ed by continuous-time simulation. They have to cope quickly with selected tasks concerning procurement processes, material planning, pricing, and sales order management as well as with corresponding reporting and analysis tools. All these transactions are necessary to execute a full make-to-stock-process of a discrete manufacturing company as shown in figure 1.

Figure 1: Make-to-stock-process
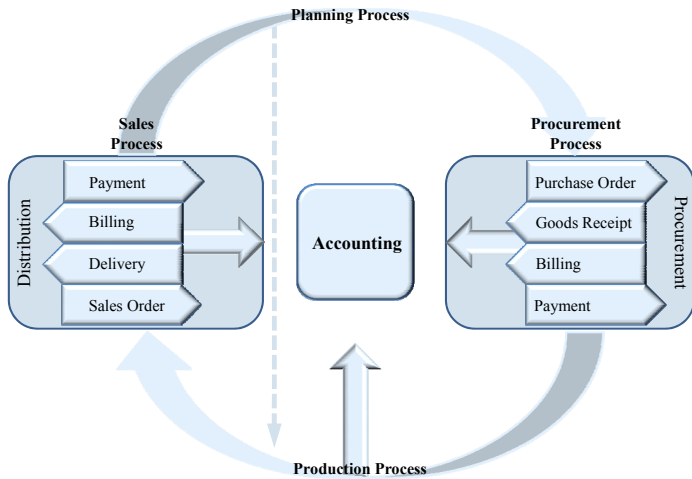
Students execute managerial functions using the SAP ERP system which gives them an idea of all the advantages such a system provides, e.g. process integration or current reports. Thus, students are given the opportunity to gain hands-on experience in ERP and business management at the same time.

In round 1 of the game, ERPsim sets an initial market demand. Thereby this demand depends on the geographical region, e.g. north, south and west and the number of located customers. Through pricing and determination of a marketing strategy, students have to establish their company on this market to maximize their profits.

DISTINCTIVE FEATURES OF ERPSIM

All students' decisions have to be converted into the underlying SAP ERP system and have to be continuously adapted to the newly simulated market conditions in each round of the game. The simulation of e.g. market prices and volumes allows an immediate feedback based on the consequences of students' acting. To make the game a little easier to play, some rather administrative business functions are automated by ERPsim giving the students the opportunity to focus their actions on the core processes. The following figure gives a short overview of the automated process steps:

Figure 2: Overview of the automated process steps

Procurement process

Sales process
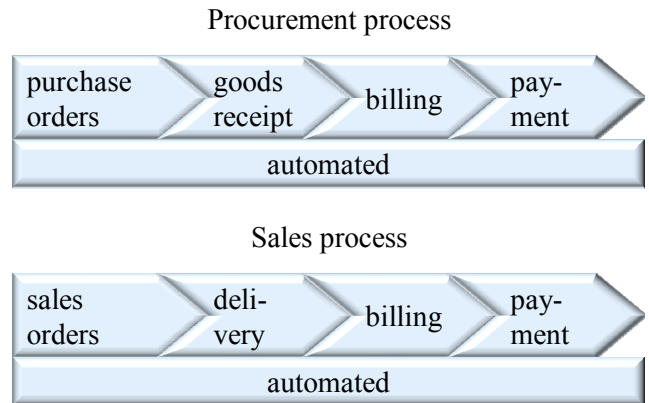
Nevertheless, students have to fulfill a number of complex tasks and convert them into the SAP ERP system, for instance:

- change price list,
- change bill of material,
- advertising,
- forecasting,
- run material resource plan,
- convert purchase orders,
- release production,
- evaluate reports about sales orders, market reports, financial statements, production reports, cost and inventory reports.

To simplify the solicited input for the students, the ERPsim system offers specially customized transactions such as advanced marketing management or production confirmation management. These transactions enable students to plan all marketing disbursement on a single clearly arranged screen or to convert all planned orders into production orders in one step. The following figure shows the customized marketing transaction named ZADS for the manufactured products and the possible regions:

Figure 3: Transaction ZADS – marketing expense plan

However, students may experience the complexity of a standard SAP ERP system as a burden. To solve this problem, the simulation game offers a special "light" version of the ERP system as shown in figure 4. This version only includes the relevant transactions necessary for the students to fulfill their tasks in the game. Thus, students can focus their action on decision-making instead of searching for the right transaction codes within a fully expanded SAP ERP transaction menu.

Figure 4: Reduced tree structure of the SAP ERP system
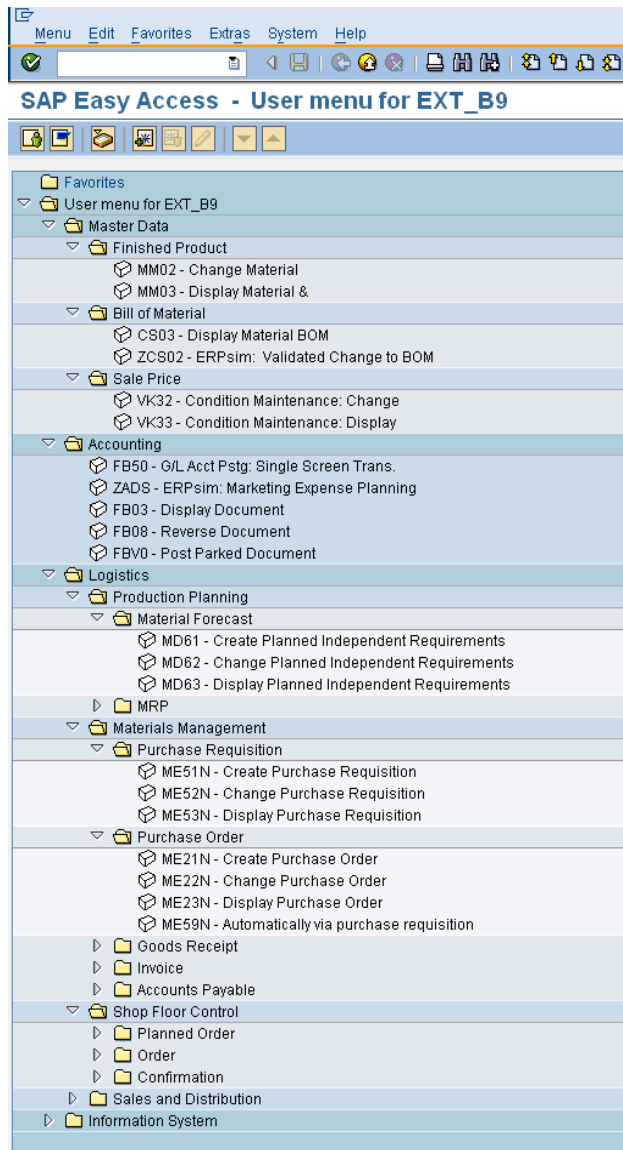
The game's successively rising complexity is another feature of ERPsim to avoid students' failure through excessive demand. The initial tasks are intended to maximize the net operating result by distributing a pre-set amount of products. Subsequently, the number of tasks rises constantly. Students have to perform tasks of purchasing such as material requirements planning and or-

dering of products. In case of the manufacturing company they also have to run the production process.

The number of tasks to execute also depends on the extent of students' knowledge. In the basic version of this game all required master data e.g. of products or suppliers are given, so that students only have to manage the full make-to-cash-cycle of a discrete manufacturing company. As an add-on students also have the possibility to implement SAP ERP in their company on their own. These individual company profiles require implementation of all necessary master data and configuration of the organizational elements in SAP ERP as well. To do so, students complete the necessary general ledger transactions for pre-game, including initial capitalization and acquisitions on their own. The instructor is able to adapt the complexity factor of the game to the students' knowledge by deciding which transactions should be automated. Hence, the degree of complexity can be increased during the course. The extended version of the muesli game for instance offers students the possibility to distinguish their products from competitor products by changing the muesli mixture. Due to these possible adjustments according to the players' state of knowledge, the ERPsim game is eligible both for unacquainted SAP users and for advanced learners as well.

BENEFITS OF ERPSIM FOR STRENGTHENING THE MANAGERIAL ACCOUNTING KEY COMPETENCES

With the currently tight situation on labor markets, exclusive expertise in business administration is no longer sufficient for getting adequate jobs. In fact, companies arrogate both methodological and social competences from their job candidates as key competences. Therefore right decision-making under time pressure and immediate realization are key success factors (Hodgkinson, Healy 2008).

ERPsim offers a new approach to develop these competences. Besides the main ambition of this game, strengthening knowledge and handling of an ERP system, further skills like methodological and social competences are promoted.

Good teamwork is not only a success factor in this game but it is also a prerequisite for the individual student's future career. Therefore, teamwork plays an important role in ERPsim. Before the game can begin, the team has to make strategic decisions. This demands intense group communication among the students. Learning how to resolve emerging conflicts and how to communicate one's own opinion are at the heart of this teamwork experience.

The simulation game is played in multiple quarters. After each quarter, business ratios show the evolution of the students' companies (cf. figure 5). Furthermore, students

have to analyze the balance sheets and the profit and loss statements of their companies. Under these conditions, students can reflect their own business decisions and they can analyze the development of the competing companies. As a result, students get to understand the effects of their own actions.

Figure 5: Example for a quarterly report

Financial Statements - Q8

Team	Cumulative Net Income	Total sales	Gross Margin (%)	Net Margin (%)	ROA (%)	D/E (%)
A	(560,022.41)	81,750.96	-339.445	-685.035	383.235	-73.906
B	(481,002.77)	417,931.40	-47.463	-115.091	164.504	-39.211
C	(563,298.18)	0.00	0.000	0.000	826.170	-87.896
D	(559,999.38)	66,000.00	-419.851	-848.484	875.247	-88.575
E	(1,231,014.44)	1,234,267.24	-79.009	-102.167	199.088	-49.771

To improve the corporate strategy, it is important to analyze these business ratios and to point out developments of underlying decisions. Based on these new pieces of information enhanced business decisions in the next quarter are made. They also serve as a basis for the strengthening of a corporate strategy. Using the SAP business warehouse module is another possibility to analyze the obtained data. This system provides a wider opportunity to control previous business decisions. By adapting business decisions based on the analyses of these reports and the underlying processes students' methodological competences are advanced highly.

CONCLUSION

The presented simulation game ERPsim offers a new way of teaching SAP ERP systems which can also be used for blended learning scenarios. It strengthens the students' necessary action-oriented competences in business management like expertise, methodological competences and also promotes their social competences. Furthermore, students do not have to learn how to use the full application of an ERP system by stultifying click along any longer, instead they have the opportunity to learn the handling playfully. Therefore, ERPsim gives students the ability to use acquired knowledge in a specific problem situation and to get acquainted with an ERP system at the same time.

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