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# Design is our Success – the Importance of Modeling a Virtual Enterprise

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## Abstract

Virtual Enterprise is a multidimensional teaching method based on a business simulation for learning purposes. In a Virtual Enterprise, students execute procedures similar to real-life companies in a virtual market economy. To enable that students can act according to existing business principles, teachers must design this Virtual Enterprise as an economically valid business model. This paper discusses the importance and the process of modeling and introduces several ways of designing a Virtual Enterprise for different learning objectives.

## Introduction

Virtual Enterprise (VE), in Europe also called Practice Enterprise or Practice Firm, is a complex learning and teaching method. It can be defined as a business simulation for learning purposes. There, students learn and act in the spirit of entrepreneurs. Instead of attending classroom lectures on different subjects like accounting, advertising, or management, students operate their own business where they become managers, employees, or even entrepreneurs. They apply business skills and work independently in appointed offices while carrying out all necessary business operations associated with their respective firm (Borgese, 2003; Riebenbauer, Stock & Slepcevic, 2009).

In order to exploit the main benefits of this method, an appropriate learning environment has to be created by teachers and responsible education institutions. By simulating a virtual market economy, procedures similar to those found in real-life companies can be executed according to current business rules and legal restrictions. This close-to-reality learning place enables trading and cooperation between the Virtual Enterprises within the national and international network for Virtual Enterprises. However, this learning concept distinguishes itself from the real world of business as the flow of goods and services as well as the money transactions are not real (Berchtold & Trummer, 2001; Trummer, 2004).

The national and international network for Virtual Enterprises is established, coordinated, and maintained by central offices. They enable regional and transnational business activities by constructing an economic setting with all necessary macro-economic functions. Central offices complete the Virtual Enterprise market and provide commercial services such as bank, chamber of commerce, custom and taxation, post office, telephone, and insurance companies (Europen-Pen International, 2014). During the foundation, a Virtual Enterprise achieves access to the market with all services by inscribing itself in the commercial register. The national central offices administrate

these registers and transfer the data to the international network. The most important international network is called European-Pen International and has a growing number of members. While about 5,200 firms were recorded in 2007, there are already over 7,600 registered Virtual Enterprises in 2014. The main Virtual Enterprise countries are Austria, Slovakia, Germany, Romania, China, and the United States (Riebenbauer, 2007; European-Pen International, 2014).

To summarize, the method Virtual Enterprise can be described as a virtual learning environment which

- simulates an enterprise,
- emphasises business activities and economic procedures,
- acts in a national and international market with an increasing number of participating members in the network,
- employs students, who learn and work within an adequate environment,
- deals with fictitious goods and services as well as fictitious flows of money,
- uses modern communication technologies and IT equipment for real contacts with employees of other Virtual Enterprises (Gramlinger, 2004).

The purpose of this paper is to focus on the importance and the process of modeling a Virtual Enterprise in order to enable self-regulated learning and acting of students. Several ways of designing a Virtual Enterprise for different learning objectives are discussed.

### **Learning and teaching in a Virtual Enterprise**

Business education intends to arouse entrepreneurial spirit and to prepare for self-employment as well as for personal independence in all vocational (and also private) contexts. This means that a person has to be able to solve problems independently according to a given situation in life (Peterssen, 2009). Therefore, education should prepare learners to handle complex problems in a goal-oriented manner, autonomously, and self-responsibly, as well as to acquire professional, social, methodological, and personal competences.

Competence-based learning concepts are derived from the theories of vocational and progressive education of the 19th century. At that time, Dewey and Kilpatrick developed the project method with the learning wheel including the four steps: purposing, planning, executing, and judging (Dewey, 1994). Educational programs must include complex tasks and problems which enable learners to carry out their actions with an increasing degree of autonomy. This aim can only be reached when students find learning opportunities where they can experience complete acting – that means they are able to go through all four steps: purposing, planning, executing, and judging.

Virtual Enterprise as a method offers an innovative environment which can be considered from a learning and a business perspective (Trummer, 2004). Virtual Enterprise is different to any other classroom lesson. On the one hand teachers are responsible for maximizing the learning outcome of the individual student and on the other hand it is their task to take care that students succeed on the market with their Virtual Enterprise. As a result, the classic roles of an instructor in a Virtual Enterprise are the role as a teacher and as an executive manager. However, instructors may not fulfil these roles in the traditional perception. As it is one of the main objectives to promote the students' autonomy, it is neither the task of the instructor to lecture nor to tell the students what to do with

their company. It is not necessary to know answers to all questions, but to inspire ideas, thus helping students to find a solution and initiating reflection as well as discussion of the results. Therefore, in a Virtual Enterprise the teacher is rather seen as a coach, moderator, designer, consultant, mentor, and facilitator (Berchtold & Trummer, 2000). Being a teacher in a Virtual Enterprise is a very challenging job as they are always role models. Only when they get fully engaged and involved with the Virtual Enterprise will the students do so as well.

Students also have two roles in a Virtual Enterprise. First they are learners and then they become employees, too. Students are integrated in the phases purposing, planning, executing, and judging with both functions. As learners, they go through this process to achieve their fixed personal learning targets and to maximize their individual learning progress. As employees, they accomplish the four steps to maximize the success of a Virtual Enterprise. Because of their rising autonomy, they thereby take over more and more management tasks (Berchtold & Trummer, 2000).

Students execute a variety of business functions in an adequate Virtual Enterprise office. As employees they choose a position in a process or department in which they want to work and learn. Typical divisions are comparable to those found in real enterprises e.g. management, administration, accounting, human resources, purchasing, sales, and marketing. Students appear as buyers and sellers on the national and international market and handle any sort of business which is required for their particular Virtual Enterprise. For this purpose, it is necessary that they use new technologies like websites, e-commerce tools, web conference software, and podcasts. In order to be successful, students have to understand strategic, structural, and operational matters. At the beginning of the term, they compile a mission statement and write a business plan from which they derive objectives as well as action plans for several departments. Monthly reports and annual statements are composed to control the business activities. After implementing their action plans, they analyze the results and reflect upon their actions and learning outcomes. It is very important that the learners' autonomy grows step by step during the course. At the end of the Virtual Enterprise time, students complete their assessment sheets and portfolio (Riebenbauer, Stock & Slepcevic, 2009).

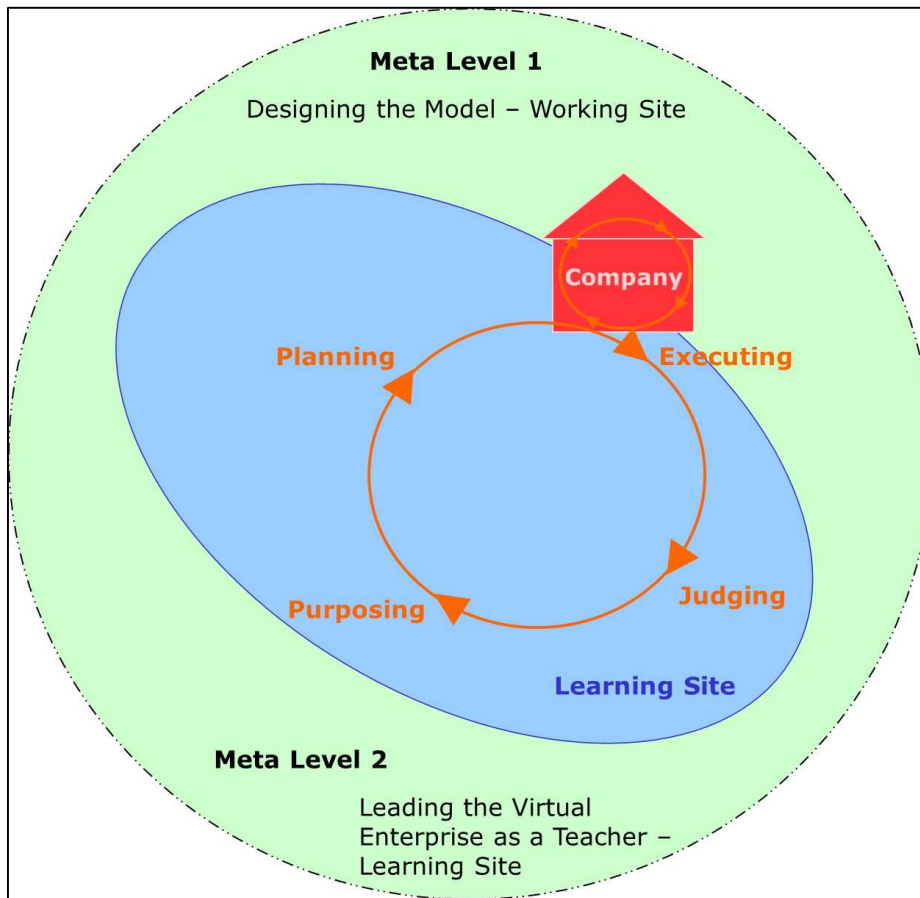
### **Modeling a Virtual Enterprise**

The didactical challenge with the complex method Virtual Enterprise is to offer the students a simulated enterprise where they can learn in and on the model. This business model does not originate by itself, it must be created and advanced actively by the teacher. In this context it is important to always focus on the learning and on the working site (Stock & Riebenbauer, 2013).

Figure 1 illustrates a model for learning and working in a Virtual Enterprise which was developed at the University of Graz in order to procure essential connection of the method Virtual Enterprise (Berchtold & Stock, 2005). In the center of this model is the cycle as a core element for the learning site. It shows that students are required to plan, execute, judge, and purpose their learning process and work on their own. The house symbolizes the company of the particular Virtual Enterprise, where all students do their day-to-day business. The outer meta levels represent an additional perspective for teachers with their theoretical background know-how. Meta level 1 demonstrates the business model, how the simulation is designed in a realistic way in order to enable goal-orientated working and learning. Meta level 2 shows the pedagogical background for leading a

Virtual Enterprise as a teacher. It contains the several roles of a teacher, different methods, and pedagogical tasks.

Figure 1. Model for Learning and Working in a Virtual Enterprise (Berthold & Stock, 2005).



For business teachers it is a major challenge to design an adequate learning environment where students can act independently as employees or managers while carrying out the tasks associated with their respective business. However, a realistic modeling is a precondition for a successful Virtual Enterprise which is based on a deep understanding of the connection of business elements and procedures as well as learning concepts and pedagogical tools.

### Virtual Enterprise as a business simulation

The Virtual Enterprise exists only for learning about business strategies, organizational structure, and market processes within this simulation. A special facet of the teacher's responsibility is the design of the simulation itself. Students can experience, scrutinize, and reflect upon business principles, economic systems, and market conditions only with a valid and realistic modeling of the Virtual Enterprise. This needs a complete, harmonious, and concrete model of a real enterprise. It is the task of a teacher as a designer to provide a framework and to take care of the general conditions so that learners can set goals, plan, execute, and judge the required actions in an increasingly autonomous way (Stock & Riebenbauer, 2013).

On the one hand, the virtual economy has to be designed to enable a national and international trading between the Virtual Enterprises. The central offices coordinate the network and allocate market facilities. On the other hand, every individual Virtual Enterprise needs to be simulated by the teacher. The following procedure has to be considered when forming a model to build the working site of a Virtual Enterprise.

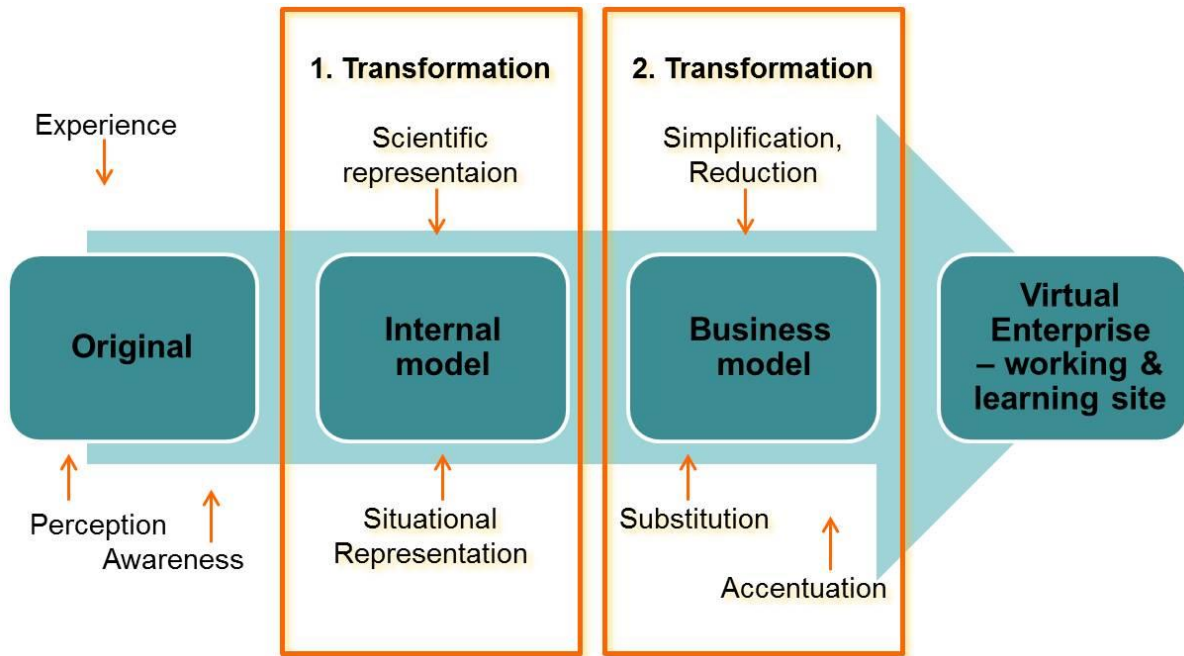
A model always depicts the illustration of the original rather than presenting the reality or actuality (Tramm & Gramlinger, 2006). This means that the original already is based on subjective perceptions, knowledge, and experience of the modeler and thus is a subjective cognitive representation of the object of experience 'business' in the minds of the model designers (Tramm, 1996). Based on the original, the modeler constructs a first internal model of the company. This model is reviewed and adjusted by reference to scientific and situational representations of the company. Scientific representation may, for example, include relevant theories and models of business studies, economics, and sociology. The situational representation, however, refers to the consideration of individual cases (casuistry) of economic practice. The result of this first transformation is a practically oriented, science-based picture of a company (Reetz, 1986).

The second transformation in the context of the modeling process consists of three steps: In the first phase operational reality is simplified. Operational complexity and variety are reduced by excluding irrelevant aspects of reality. From a system theory point of view, this approach requires a reduction of the subsystems and their mutual relationships. Examples of subsystems in the Virtual Enterprise are the departments in relation to the overall business or workplaces in relation to the departments. In the second phase, the substitution, a physical, or just symbolic representation of the model takes place. For example, the Virtual Enterprise is usually physically represented by an open-plan office. In contrast, any production facilities or warehouses are usually represented only symbolically. In the third phase, an accentuation of certain features of the business model takes place. This accentuation is done by highlighting and dispensing certain features, for example in the formation of operational processes (Reetz, 1986). The result of the second transformation is a model of the Virtual Enterprise as a business. It is compared to the original, consciously changed, and turns into a learning location with special (educational) character (Reetz, 1977).

Figure 2 is based upon the research on model construction for learning enterprises by Reetz (1986) and demonstrates the process of modeling the business site of a Virtual Enterprise.



Figure 2. Process of modeling a Virtual Enterprise (Reetz, 1986; Moser, 2013).



Virtual Enterprise as a working and learning site must not lose the economic purpose or lead to a distorted image of reality. It is the task of the teacher to offer challenging, but not trivial, learning opportunities for the individual learner. Based on these experiences, students are then able to analyze economic interconnections and business processes as well as to reflect upon the impact on one's own actions and learning results.

### Methods for Modeling a Virtual Enterprise

There is no one and only method for modeling the Virtual Enterprise. Rather are, among other things, the purpose of the business, professional experience, and contacts with industry as well as the teachers' preferences and tendencies determining what tools and methods are used for the modeling. Some of them will be briefly introduced here (Riebenbauer & Stock, 2007):

**Partner company – cooperation with real enterprises:** This is the classic form of data modeling. A real company is a model for the simulation of the Virtual Enterprise. Simplifications and adaptations need to be made for a coherent Virtual Enterprise model. The partner company concept presupposes a good and lasting connection with the real company.

**Business model:** The business model is an attempt to analyze several core areas of a company and to illustrate production and operational systems. Working with business models is usually very complex.

**Key figures of relevant industry or business line:** The great difficulty to be able to plan adequate expenses according to achieved sales can be overcome by the use of such key figures. In connection with the granting of credits, banks as well as insurance companies and chambers regularly calculate key figures for internal use. These key figures can be used for modeling a Virtual Enterprise. Working with key figures is a practical method and the construction of an economically consistent model can be made considerably easier with them.

**Business plan:** The business plan is an extremely helpful tool in supporting the simulation work or modeling. The business plan, with its structure, provides a guideline for all core areas which are taken into account in the modeling of a company, whether in founding or during the continuing operation of it.

In addition to collaborating with a partner company, the combined use of business plans and key figures is a practical method for modeling a Virtual Enterprise. First, the structure of the business plan constitutes the basis and then the key figures are considered to complete the realistic data modeling. The goal of all efforts related to the modeling of the Virtual Enterprise is that it should provide a comprehensively coherent model of a learning framework that allows learners to identify what connections between their actions and the consequential – but often occurring far apart in time – results exist (Berchtold & Stock, 2005). The Virtual Enterprise therefore provides a good and practical preparation for professional life by working in and on a realistic business simulation.

## **Conclusion**

Virtual Enterprise as a business simulation is a complex and innovative teaching method. For business teachers it is a major challenge to design an adequate learning environment where students can link existing knowledge with new practical experiences, experience working attitudes, and as a consequence acquire key business competences. A realistic respectively economic valid modeling of a Virtual Enterprise is a precondition that learners can scrutinize, discuss, and reflect upon business processes, market conditions, and economic relationships. The actual design of this business simulation is critical for the learning success of the method Virtual Enterprise. Requirements for an appropriate design were discussed based on the three levels of a Virtual Enterprise: business site, learning site, and meta-perspective. Additionally, different forms for modeling were introduced in this paper. Whereas besides the cooperation with a real partner company, the combination of business plan and key figures of the relevant industry or business line turns out to be especially useful for this central task of the teacher.

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