Business simulation as a tool for entrepreneurial learning
The role of business simulation in entrepreneurship education

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Summary

Recently, there is an increasing trend towards use of business simulations in all levels of education in educational institutions. They are using business simulation games as enhancements to the traditional learning environment. Business simulation or business simulation games as a form of experiential learning are focused on improving business decision making skills by using students natural capacity for technology.

Business simulations provide a space in which learning is an outcome of tasks stimulated and executed by the content of the simulation, while the knowledge is developed through the content of the simulation, and skills are developed as a result of playing the simulation game.

While it is commonly accepted that information technology has changed the way how we work, live, learn and entertain, it has been proven that nowaday students' attitudes and aptitudes are framed by an IT and media-rich environment.

This paper presents the results of the survey conducted among the students of third grade of high schools in Croatia. The purpose of the research was to explore levels of digital and entrepreneurial competencies before and after training and competition using business simulation games as a tool. The results showed that the level of students' digital and entrepreneurial competencies cumulatively grown about 10%. Adding to the results the additionally conducted interviews and calculating the impact of increased competencies to the operating business results of their virtual companies, we can say that their competencies have been increased even more (20%)

Key words: *entrepreneurship, education, knowledge, business simulation games*

JEL Classification: L26, I25, D83, O33

Introduction

Supporting and assisting students in developing high level competencies is very challenging. Students are expected to develop a broad range of skills (critical thinking, problem solving and cognitive skills) in order to be prepared to manage effectively at their future work. The economy is changing rapidly generating more and more requirements towards the students in terms of developing an ability to be skilful, flexible and adaptable.

Nevertheless, the conventional methods and tools used for teaching business skills are insufficient to cope with the complexity of contemporary organizations and unpredictable market dynamics (Achtenhagen et al., 1993, Baker & O'Neil, 2002, Lehtinen, 2002, Machuca, 2000). That requires transformation of teaching approaches and educational methods.

New methods of teaching leadership and other practical skills which can meet those new requirements and prepare students to better cope with the complexity of the business world could be implementation of business simulation games into their lectures.

Business simulations as active methods of teaching and learning, can be used in the upper classes of high school, during higher education and in adult education. Value of the implementation of business simulations in the learning process is in developing of two competences for lifelong learning: the entrepreneurial and digital (according to the European Parliament and European Council, 2006).

Business simulation games serve as a realistic representation of the real operations in a virtual environment, and use it to develop managerial skills primarily in corporate decision-making.

Contemporary economic development requires re-orientation and ongoing modification of educational programs, while the learning process is expected to be focused on strengthening the knowledge, skills and attitudes in line with labor market needs.

Business models, competitive dynamics and strategic challenges have a dramatic impact to the organisational success. Sweeping forces in today's business environment are accelerating the pace of change. A deep understanding of market dynamics, organization fundamentals, key challenges and trade-offs, and financial levers are critical for entrepreneurs and managers to succeed in the contemporary businesses.

Business simulations enable managers to experience the competitive dynamics, general trends, business challenges, interdependencies and profitability drivers that are unique to an industry, and therefore, the business simulations are useful method in the development of human resources in support of decision-making in most business organizations.

"Simulation games are one very efficient and practical tool to improve the human integration dimension. This means both integration among different people working in the same business process chain and integration between the human and the IT systems." (Savolainen, 1997, p. 221)

Definition of business simulation

Conventionally, a business organization is "an entity formed for the purpose of carrying on commercial enterprise" (Encyclopaedia Britannica). Thus, with the aim of defining *business simulation game*, *business will be considered* as a synonym of "related to the management of organizations."

Regarding to Carson (1969), "Business games are case studies with feedback and a time dimension added" (p. 39). Although some business simulation games do not provide detailed feedback (such as an evaluation of the player's performance), almost all of them provide results in terms of at least a final score that can be used as the ground for feedback in sense of realisation of simulation objectives.

Very often there is in use the term *management simulator* as a synonym for *business simulator*. Actually, a number of the definitions for business simulations in the literature use the word management as synonymous with business (Maier and Größler, 2000).

Baldissin, De Toni, and Nonino (2007) states, "Management games are all the simulations used to support managerial learning through an experience that features competition and rules in the socio-economic environment" (p. 10). Ruohomaki (1995) suggests that simulation and simulation game can be distinguished as follows:

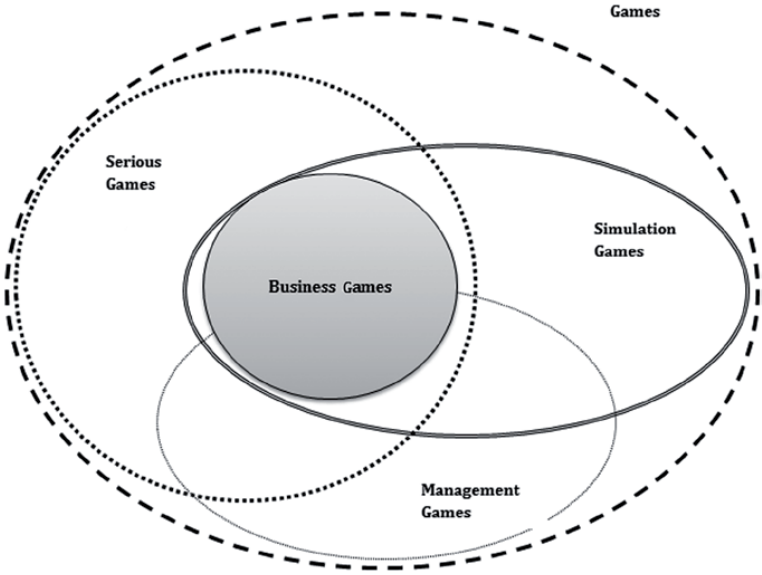
- A simulation is a working representation of reality; it may be an abstracted, simplified or accelerated model of a process. It purports to have a relevant behavioural similarity to the original system.
- A simulation game combines the features of a game (competition, cooperation, rules, participants, roles) with those of a simulation (incorporation of critical features of reality). A game is a simulation game if its rules refer to an empirical model of reality. (pp. 13-14)

Pasin and Giroux, (2011), define business simulation games as a representation of the real situation using simplified simulation model imitating some business situations or processes. According to Eilon (1963) business simulation games have a threefold purpose:

- they can be used as training tools (in which players must face the consequences of their decisions),
- they provide an overall view of corporate strategic functions, and
- they can simulate market trends in order to improve a player's capacity to face changes.

A graphical representation of the set of games and its subsets is shown in Figure 1

Figure 1. A graphical representation of the set of games and its subsets.



Source: Greco, Baldissin, & Nonino, (2013), p.648

Eilon (1963) was the first classifying business simulation gamess in terms of their design characteristics as:

- total enterprise or functional,
- interacting or noninteracting,
- computer or noncomputer

and according to their expected use:

- as a part of a general management training program,
- for selling new techniques or procedures, or
- for conducting research (e.g., on the behavior of systems, on the decision-making processes of individuals, or on the interaction of individuals within a team).

In order to identify simulation learning objectives, Gentry & Burns (1981) suggest using Bloom's taxonomy. The six levels of learning identified by Bloom (1959) are: basic knowledge, comprehension, application, analysis, objective synthesis, and objective evaluation. Gentry & Burns stated that *"the level of learning taught should be determined very early. If, in fact, the purpose of the course is to provide an awareness of the general topic area, then methodologies aimed at higher levels of learning may be counter-productive"* (1981, p49).

The major desired outcomes typically can be sorted into three categories; learning, attitude and behaviour (Faria, 2001, Hsu, 1989, Knotts & Keys, 1997):

Literature review

The history of business simulation games began in China in the year 3000 BC where they have been used as board and war games. Wolfe (1993) dates the modern business simulation game to year 1956 when the first widely known business simulation game, under the name *Top Management Decision Simulation,* was developed (Meier et al., 1969). That game was the first practical and successful business simulation. From that time, as Kibbee has reported, the number of business simulation games grew rapidly, and, already in year 1961, it was estimated that there were existing over 100 business games and that over 30,000 managers have played at least one business game (Kibbee et al., 1961).

There exists quite extensive literature exploring learning in a simulated environment. Many studies are questioning the validity of the business simulations for education purposes (Greenlaw and Wyman, 1973, Wolfe, 1985). Thorngate and Carroll (1987) found that luck or success in playing the simulation game correlated with the number of players, in defining a winner, as well as the structure of the contest have no significant difference regarding the chances that the best person would win. In the report they have implicated that learning and performance are not related. Keys and Wolfe (1990), claim that simulations are internally valid for a strategic management course, while Wolfe and Roberts (1993) state that business simulation games have external validity in predicting future career success of players.

Watson (1981) states that business simulation games have been used in business schools since 1957. A survey conducted in 1962 reported that 71.1% of 107 schools included into survey, were using simulation games in at least one course (Dale and Klasson 1962). Faria (1987) reported that

95% of schools used at least one business simulation game in their program during the 1985-1986 academic year.

Faria and Schumacher (1984) surveyed a business simulations usage in management training programs. Other authors have examined business game usage in selected courses (Williams, 1987; Hegarty, 1976; and Summers and Boyd, 1985).

The number of studies report about increasing popularity of business simulations.Over a 20 years ago, it has been estimated that more than 5,000 U.S. companies use business simulations in corporate training and development programs (Faria, 1989). Joldersma & Guerts (1998) have indicated that use of business simulations is also widespread in Europe. Thus it can be assumed that the use of business simulations by universities and business schools is based on the on the belief that they can contribute in achieving of learning objectives (Gentry & Burns, 1981).

Clear learning objectives are crucial for introduction of business simulation games into learning environment. An extensive number of studies has been published trying to determine whether business simulations are effective at helping students achieve learning objectives (Greenlaw & Wyman, 1973; Keys, 1976; Gentry, McBain & Burns, 1979, Wolfe, 1985; Miles, Biggs & Schubert, 1986, Gartner, 1993Malik & Howard, 1996, Anderson & Lawton, 1997).

Whiteley and Faria (1989) indicate that business simulation games can be effective in improving quantitative skills of players, while their contribution in improving the acquisition of theoretical knowledge is questionable. In terms of pedagogical value, business simulations may significantly contribute to the development of decision making and interpersonal communication skills (Wellington and Faria, 1991).

Since their introduction, the main objective of using business simulation games was to be a learning tool. In a management training, entrepreneurial learning and decision-making courses the business simulation game is an element of course structure (Ricciardi et al., 1957). Over the years, *"the use of games and simulations in economics has become well established, with a well-developed body of literature to support their use in the teaching environment"* (Sutcliffe, 2002, p. 2). In that sense, business simulations may be considered to be effective at improving business skills (Greco & Murgia, 2007; Rachman-Moore & Kennet, 2006). Some authors argue that evaluation methodologies lack a scientific rigor, and that it is difficult to demonstrate that learning occurred through simulation (Gosen and Washbush, 2004, Anderson & Lawton, 2009).

A number of studies have reported about benefits of using simulation games for educational purposes (Aldrich, 2004, Kafai, 2006, Lainema & Nurmi, 2006). Thus, business simulation games provide multiple benefits, such as:

- motivation for learning (Garris, Ahlers, & Driskell, 2002),
- complex approaches to learning processes and outcomes (Sterman, 2001),
- student engagement (Kiili & Lainema, 2008),
- active-learning techniques (Oblinger, 2004).

Considering their advantages, business simulation games can serve as an innovative pedagogical approach to teaching business concepts (Aldrich, 2004; Prensky, 2001).

Learning and business simulations

Action learning *"aims to enhance the capacities of students in everyday situations to investigate, understand and if they wish, to change those situations in an ongoing fashion with a minimum of external help"* (Morgan and Ramirez, 1983, p9).

Therefore learning is empowering people to act in a rational way and to develop critical thinking skills helping them to solve real problems and taking a purposeful and logical actions (Brookfield, 1995).

Business simulation games are providing a structured risk-free environment for learning complex problems. Shubik (1975), states that most business simulation games in a professional context could be categorised in terms of teaching, training, operations and entertainment. *"Games used to replicate and teach models and processes that employ the use of a human in a particular role, actual or simulated are called simulation games"* (Shubik, 1975).

There are a number of learning layers in business simulation games. Players can learn from the contextual information contained in the dynamics of the game, from the process of playing the game, and as well, as from analysing the risks, benefits, costs, outcomes and rewards resulting from decision making. Simulations are considered to be more realistic than alternative learning methods (e.g. Nel *et al.,* 1996).

The learning supported by business simulation games could be broadly divided into three categories;

- learning as a result of tasks stimulated by the content of the simulation games,
- knowledge developed through the content of the simulation game,
- skills arising as a result of playing the game.

Business simulations vs traditional teaching methods

Gilgeous and D'Cruz (1996) compare the use of games with traditional teaching methods. Briefly the comparisons were as follows:

- ***The lecture.*** Games are used to support rather than replace lectures.
- ***The case study.*** A case study is usually a snapshot of a real company's situation at a given moment in time,. A game can also represent a snapshot of a hypothetical company controlled by the designer. The advantage of a game is that the game can be repeated or restarted with new ideas, whereas a case study can only really be used once.
- ***The role play.*** Games provide much more personal interaction than role plays. Role plays are limited by the fact that individuals are presuming roles of which they have very little experience, but the positions presumed in games are very real.

Attributes of Games as Learning Environments

Business simulation games have many attributes of effective learning environments because they include elements of urgency, complexity, learning by trial-and-error and scoring points. They also support active learning, experiential learning, problem - based learning and provide immediate feedback.

Business simulation games also offer advantages in terms of motivation. *"Games inspire players to seek out data and information in order to be successful rather than starting with facts and figures and then figuring out how they may be relevant"* (Rickard and Oblinger, 2004).

Table 2 below highlights some principles of good pedagogy and parallels in a simulation environment.

Table 2. Some principles of good pedagogy and parallels in a game environment

Principles	Description	Application in Sinmulations
Individualization	Learning is tailored to the needs of the individual	Simulation games adapt to the level of the individual
Feedback	Immediate and contextual feedback improves learning and reduces uncertainty	Simulation games provide immediate and contextualized feedback
Active learning	Learning should engage the learner in active discovery and construction of new knowledge	Simulation games provide an active environment which leads to discovery
Motivation	Students are motivated when presented with meaningful and rewarding activities	Simulation games engage users for hours of engagement in pursuit of a goal
Social	Learning is a social and participatory process	Simulation games can be played with others (e.g., multiplayer games) or involve communities of users interested in the same game
Scaffolding	Learners are gradually challenged with greater levels of difficulty in a progression that allows them to be successful in incremental steps	Simulation games are built with multiple levels; players cannot move to a higher level until competence is displayed at the current level
Transfer	Learners develop the ability to transfer learning from one situation to another	Simulation games allow users to transfer information from an existing context to a novel one
Assessment	Individuals have the opportunity to assess their own learning and/or compare it to that of others	Simulation games allow users to evaluate their skill and compare themselves to others

Source: Oblinger, (2004), p. 14

Business simulation games are a performance-based environment.*"Learning through performance requires active discovery, analysis, interpretation, problem-solving, memory and physical activity which results in the sort of extensive cognitive processing that deeply ro o t s learning in a well - developed neural network"* (Foreman, 2003).

Research on the level of digital and entrepreneurial competences among vocational school students conducted under the *Competitive Youth* project

The project Competitive Youth was developed between Hotel and Tourism Industry School from Opatija, Croatia, Private Grammar School and Economic School Katarina Zrinski from Zagreb, Croatia and Cesim Ltd. From Helsinki, Finland under the IPA fund (Instrument for Pre-Accession) in 2012.

The general aim of the project was to pilot new educational tools which in term could be used for modernization of curriculums of vocational schools in the field of tourism and economy in order to enable the students to develop the adequate level of digital and entrepreneurial skills. This would promote them as competitive individuals on the labour market according to Croatian and European, educational, touristic and development strategies and all this in order to contribute to the development of Croatia as an ecologically, socially and economically sustainable state.

Specific objective of the project, among others, was to raise the level of digital and entrepreneurial competences among vocational school students. In order to measure and do this, a research on digital and entrepreneurial competences with students from 5 schools had been conducted. After the research, students from the test groups participated in the training for business simulation games and entered the "Piece of Cake" competition. Upon the end of the competition, the post analysis of digital and entrepreneurial competences was conducted upon use of this new, innovative teaching/training tool.

Since the research was conducted as a part of the project and since there were neither enough funds nor time to conduct a big scale research, it was adapted for the needs of this project. This is why the results should be taken as indices which point the direction for the development of the new curriculums.

Five vocational schools participated in the research with 116 students. A two part questionnaire regarding digital and entrepreneurial competences was developed. The results of the preanalysis indicated the following:

The highest percentage of the correct answers in the survey on digital competencies was 54%, while the lowest was 25% of the correctly answered questions. Regarding entrepreneurial competences, the highest percentage of the correct answers was 61% while the lowest was only 7,14%. When all the results were summed up, it was evident that the level of the mentioned skill was not satisfactory and to amend this there was a need for a more systematic approach.

Following the survey, training for students as the introduction to the "Piece of Cake" competition was held. The purpose of this training was to introduce the simulation games to the students and show the benefits of this interactive tool and to instruct them on how to use the user interface.

Altogether 63 students from the 5 mentioned schools were trained. Immediately upon the training session, the students entered the pilot competition "Piece of Cake". The competition was very successful which was concluded upon the log in statistics of the students that can be found on the user interface, their feedback to the professors/trainers during classes and especially their results and success in the game. They were generally eager to play the game and very much involved in it during, almost the entire process because the computer game is a tool they are fond

of and they learn easily while playing. The ranking list was made according to the key indicators: share of profits in own universe, % and cumulative profit. The winning team was from Opatija.

Upon the end of the competition a post - analysis was conducted. Due to the end of the school year that coincided with the end of the competition, it was challenging to get all the same students to participate in the survey so there were 97 of them who filled in the questionnaire. The first part of the questionnaire was completely the same, 7 questions for measuring the level of digital competences and 7 for measuring entrepreneurial competences. Nevertheless, some new questions were added to the questionnaire since the professors detected the need include a set of questions regarding economic content which was most practiced while playing the simulation game, but at the same time general enough so they could be answered even without playing the game. Results related to the same 14 questions were analysed separately from the results of the 7 added questions. This first part indicated an increase of 10% in digital and entrepreneurial competences. But, when the results from the 7 added questions were taken into consideration, as well as the results of conducting business in virtual teams, they indices that there has come to an increase of around 20% in the mentioned competences after involvement of the new educational tool.

Education conducted for a managerial team from a telecom corporation in business simulation games

The training *Simulation of Strategy and International Business Management* was part of an educational programme for 9 members of middle management of a Croatian telecom company. It was designed to test their competences after having finished the theoretical part of the educational programme through a mini, tailor made, MBA course. The participants were divided into three teams (3x3) and they rotated in their internal positions in order to experience all managerial and organizational aspects of running this type of business

The training was carefully set up in order to balance the participants who came with different set of skills and background and ensure reaching the goal of the training: capacity building that can be implemented in their organization and that will enable them to respond better to the managerial challenges in the dynamic surroundings.

Main results of the training were the following:

- Increase in understanding of functional areas of business with the participants as well as application of previously acquired knowledge and skills in a challenging and motivating way
- Participants further developed their managerial potential and made a step forward towards taking over strategic managerial positions in their firm in the future
- Participants acquired new managerial and business competencies. Participants synthesized knowledge and practical skills and this developed a critical eye and creative approach to business.

Overall, the trainers detected potential for directing certain participants towards strategic managerial positions, especially among the winning team members after the gamification training. This training revealed the potential that should be further incited and developed and it has allowed us an insight in the mechanism of effect of the business simulation games in managerial education and capacity building.

Conclusions

Our experience with business simulation games through academic and corporate trainings as well as research conducted emphasised the following advantages of using business simulations in learning processes:

- users consider simulations as stimulating and enjoyable, a clear prerequisite of learning.
- simulations enable demonstration and development of teamworking skills.
- simulations provide a risk-free environment at both individual and organisational level
- when used in classrooms, simulations add a valuable type of learning activity which contrasts with and complements other methods such as case studies or lectures.
- provide experiential learning and *hands-on* approach
- allow experimentation with new strategies without the risk of irreversible consequences for the company, very important in corporate trainings
- provide rapid and clear feedback about the consequences of players decisions
- enable the development of teamwork skills
- stimulate interest and motivation of the users
- encourage problem-solving skills, creativity and critical thinking,
- are efficient and fun

As one student stated after using the simulation game: “The theory provides a theoretical framework and simualtions allow its’ practical use.”

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