

Management Game "Strategic Challenge" and its Development, Improving and Suitability for using in the Education Process

Lucie Jelinkova, Jan Fuka, Radka Knezackova
Institute of Business Economics and Management
Institute of Administrative and Social Sciences
Institute of Economics Sciences
University of Pardubice
Studentska 95, 532 10 Pardubice
CZECH REPUBLIC

lucie.jelinkova@student.upce.cz, jan.fuka@upce.cz, radka.knezackova@upce.cz

Abstract: - The paper deals with the further development and improvement of previously created management game "Strategic challenge". The game simulates real operations in a manufacturing plant by uploading specific model situations in the sphere of production, research and development, quality and control, finance, safety and health protection at work site, environment protection and supply chain.

The aim of this game is to give students possibility to try to solve everyday issues relating to business operation in a risk-free environment. It is one of the active learning methods. It supports development of systems thinking, thereby leads to sharing and developing of knowledge in various fields. These activities are an integral part of knowledge management. Effective knowledge management which uses modern approaches is necessary due to its growing importance in contemporary Czech society. The aim of this paper is verify the suitability of the proposed game in education process by using piloting game. The aim of the piloting research was to determine positive effects on the quality of education.

Key-Words: - decision making, level of knowledge, quality of human capital, simulation management game, systematic thinking

1 Introduction

It is assumed, experience is the basic learning method for a manager, however, no matter how good it is, it is not a perfect tool for his/her development [14]. Vast majority of managers claims that everything they had learned was merely „gaining experience“ and „hard work“. The reason is that they generally lack any experience gained in training courses as a form of managers' training.

Traditional methods in the training of future managers proved to be insufficient in many respects. One of the main shortcomings of traditional training is the fact that students are trained in respective subject-matters in a limited and practical way lacking often a comprehensive overview of business management as a whole. Particularly they do not realize the contexture in respective functional business spheres.

Students lack the necessary space for creativity, they are not actively involved in the training, and knowledge gained in various subject-matters is not interlinked.

Impact of external factors as e.g. growing demands on business practice and dynamics of business environment are of no less importance [4].

Study of printed handouts, documents, books, electronic text files, tutor's lecture and use of blackboard for explanation of lectures can be quoted as traditional training examples.

The approach to training of future managers had to be considerably innovated. New training methods were introduced as a reaction to shortcomings in traditional training and growing demand for business practice [3]. New active training methods offer sufficient space for student's creativity presentation, interlinking their knowledge, enabling to actively involve students, offering support for decision-making [20] and particularly supporting systematic thinking [22]. We refer to problem- and project-oriented training.

Case studies, solution of various situations by means of simulation and management games can be quoted as examples of this innovative method.

Case studies and management games are part of the most important new methods.

A group of methods and approaches based on solution of various situations by means of simulation can be sorted out of large number of methodical tools that contribute to improve the effectiveness of higher education training process.

Simulation is an effective training method. This method focuses on learning in real situation and modelling various aspects of managerial work by means of simulation (starting with work tasks up to business environment) [25]. Simulation requires an active approach from a trainee. Compared to reality the main advantage of simulation is that managers may test certain roles in certain positions without any risk and get the feedback [11]. Their task is to encourage the participants in seeking new and innovative solutions and enhance their need to use knowledge and skills they haven't used before [13]. Terms "games" and "simulation" are often mismatched, however simulation does not mean a game without an element of compatibility. Simulation games whose environment is modelled in written information or computer programs are often called management games [19].

Management games are an appropriate tool for training of future managers. They represent an appropriate set of tasks and case studies simulating operation of a manufacturing plant, administrative body and other institutions on examples in real dynamic operation [18].

2 Theoretical Background of the Management Game

The time after the Second World War is considered as a beginning of the development of current simulation games. It was related to development of mathematical methods in economics, operations research, theory of games and others sciences which created suitable conditions for the creation of management games. All of them helped to support the analytical, quantitative, qualitative, and experimental part of simulative games [7] [24].

Top Management Decision Simulation is considered as the first modern management game. It was created by an initiative of the American Management Association in 1957. The game monitors activities of five competing companies, which produce the same product. The companies distribute it in the one market [7]. For the great success of the game, a number of institutions, universities, and companies in the whole world started to deal about it. "Game models were progressively improved to enable the use of continuous variables, the application of stochastic

elements, higher degree of complexity or quazirealistick modelling of conditions in specific sectors or even in companies" [24].

Peter Senge and John Sterman can be included among the main investigators who issues about management games. Peter Senge explored the dynamics of systems in companies by management games [22], John Sterman is creator of the game The Beer distribution game [29] including instructions for its realization [25] and Sterman model of managerial behaviour [26]. In the Czech Republic, there is the issue comprehensively dealt from the 90s of 20th century. In particularly it is solved at University of Economics in Prague by Fotr and Hřůzová [8].

The emergence of computers had great influence to further development of management simulation games. It allowed to increase the complexity of the game, the playing become simpler and completely process of the play become speeder. Transition from the board games to the virtual world approaching reality is considered as a breakthrough point in the development of the simulative approaches [15].

In the literature strategic decision-making games are considered as an effective pedagogical tool leading to exploration of the company's strategic operations [28] [31].

2.1 Definition of Management Game

According to [30] can be define gaming as a situation where participants, operating as a group in responding to a competitive situation, have resources they dispose of according to rules, deal with losses/gains, and make moves on a simultaneous or sequential basis.

The general concept of the game can be according to [17] defined as "a set of activities requiring the implementation of the tasks, playing the assigned rolls and adherence of agreed rules that lead to the achievement of objectives".

The simulation management game can be characterized as a set of structural and dynamic parts which are in interact and lead to achievement of defined objectives [23]. According to [18], simulation of behaviour of economic entities can be understood by the term. It provides simplified reality where players manage the enterprise or its part (activity) in predetermined conditions. Angelides considers the simulation game as a tool for allowing to players monitoring of consequences of their decisions and it give them a possibility to react on the situation in an artificially environment.

The environment simulates the characteristics of real-life situations [2].

According [6], the basic characteristics which are typical for simulation games are:

- simulation games are means of reflection of reality,
- the part of the games are active social communication of participants,
- the major objectives of simulation games are also an evaluation of reality, self-assessment and feedback reflection.

According to [5] it can be said that the managerial simulation games offer the following advantages:

- they allow learning in all fields of management,
- they allow to use a wide range of analytical tools,
- the participants learn to work with others,
- the participant is “forced” to be an active participant during whole the game,
- they allow to gain experiences to the participants of the game without real consequences of their decisions in real life,
- actual time can be shorter in the game (e.g. one year in real life can be represented by one day in the game),
- the feedback is immediate,
- simulations bring excitement to the learning experience,
- the simulations bring to participants the possibility to have the real experience,
- the games give to participants the opportunity of global view on the business.

Playing of simulation management games leads to development of analytical and creative thinking, it causes improvement in communication skills and in teamwork [1].

[10] points out to a relevant benefits for participants that can be realised by playing games coming from business environment. The following points summarise benefits in relation to: the development of analytical and decision making skills; the participants’ personal involvement in on-the-job situations that reflect real life situations; lessons learned through the feedback received from instructor and the participants’ personal reflections; and the time compression and dynamic or uncertain environments which can be incorporated in games.

According to [16] is learning through the game easy thanks to three phases:

1. experience,
2. content,
3. feedback.

The first phase is characterized by collecting of experiences through playing the game, decision making and team interaction. In the second phase, ideas, principles, concepts focusing on business practices are spread. The last phase is essential and it is focuses on individual reflection from the game.

[5] reports, that Business simulation games have many benefits for management training. The business game can be used to serve at least three purposes:

1. To orient and train new employees.
2. To screen current managers or would be managers.
3. For ongoing management training.

3 About the Game “Strategic Challenge”

Traditional methods applied in training of future managers proved insufficient in many respects. That’s why we started to look for new more effective training methods and based on experience gained in other (above all foreign) higher learning institutions and universities management games proved to be an appropriate method.

Management games enable the students to better understand how the enterprise systems work thus enabling them to envision real business environment.

Team approach including application of relevant software substantially increase the level and effectiveness of pedagogical process, getting all students involved, increasing the students’ interest in solving respective issues presented in a form of decision-making process relating to principal business activities. Furthermore, participants enhance their interest in team competitions and are motivated to achieve the best results.

Management games can be easily modified also for partial business activities involving also suppliers and clients; they can be also implemented for task solution in the field of innovations, strategic and project management, etc.

Given the above facts manager game “Strategic challenge” have been established. This management game was first published in [12].

This general concept can be applied to any type of business; however, it is important to be adapted to the type of business, area of business and further conditions relating to a specific business. The game must be tailor-made for a specific company or plant. The aim of the game is to provide current managers of specific departments or newly coming managers with possibility to try to solve a specific issue “in a rough way” that has been solved within the

company in the past or to solve a brand new issue or situation that has not occurred yet, however, the company considers it a possible threat. The managers are supposed to develop a strategy leading to improvement of any indicator or keeping the status quo in an unfavourable situation demonstrating "a way out" for an issue outlined in a specific model situation.

Playing this game manager has the possibility to fully realize the impact of respective decisions and steps not only on themselves but also on other managers and the whole company. They should also realize the mutual dependence and cohesion of their decisions and entire departments.

The training of management skills shall bring a series of benefits to the company, particularly the increase in potential of present and newly coming managers, development of their abilities and skills. First of all, managers shall acquire valuable experience in "practice, real situations and issues"; however, they will not necessarily face real impact of their decision on company performance by paying for their faults e.g. loss of profit.

Respective steps made during the game are as follows:

1. Participants distribute their roles in the team (one director and managers of individual departments of the company (production, research and development, lean, quality and control, finance, health and safety and the environment, supply chain).
2. They study the enclosed documents each familiarizing with his/her role in the team, model situation, rules of the game and all input documents. Players have 20 minutes to study documents.
3. If there is anything not clear players may ask "the coach" (trainer).
4. Players start to play, managers jointly solve model situation, and general manager is just monitoring them. After the first round lasting for 20 minutes the players get a 10-minute feedback from the general manager. General Manager shall distribute his/her time limit (10 minutes) so that he/she is able to provide all players with sufficient feedback. He/she carefully records his assessment from each round whereas he/she his assessment is entirely subjective and observes recommended assessment principles. Each player is also allowed to make self-assessment in each round (there are not recommendations defined for assessment, the assessment is done in an

absolutely free and spontaneous way being entirely managed by players), eventually a player may discuss the assessment with general manager. Players pass all rounds in the afore-mentioned way. There are 2 rounds.

5. In the framework of each round, players communicate with each other trying to fully identify themselves with their role and reach the best possible results not only for himself/herself but first of all to solve together the specific model situation as fast and as good as possible.
6. "The trainer" evaluates the game, provides feedback to all players and especially to the player having the role of general manager, the trainer observes the recommended assessment principles.
7. Players are subsequently informed where they did a mistake, eventually what they could have done better.
8. All game players may provide the trainer with feedback. At the same time they may present their proposals and recommendations as how to manage and play the game, add and specify documents, etc..

The input quality of human capital is an important factor in the effectiveness of management game. The following table (Table 1) shows the comparison of level of input knowledge and motivation.

Table 1: Comparison of level of entry knowledge and motivation

Level of motivation	sufficient	The game does not provide enough quality experience Loss motivation is threatened	Objectives can be achieved
	insufficient	Objectives can not be achieved	Poor quality of experience was obtained Experiences are not reflected
		insufficient	sufficient
Level of entry knowledge			

Source: [24]

The Tab. 1 shows, that management game can be maximally effective when sufficient level of input knowledge and motivation exists. The level of quality of input human capital is in Strategic challenge accurately determined. In the context of teaching at universities, this game is addressed

primarily for students of the master's degree in economics. So it is for the students who have graduated a bachelor's degree focused on business economics and management. Within the corporate practice, at least one-year experience in a management position or achieved universities study in economics and management is required. The players have to reach the level of input knowledge about the function of the company, its economics and management so that they will be able to solve all tasks in the game. After that, the game is maximally effective and brings benefits for them. The motivation for playing and the support during the play is no less important component for ensuring the effectiveness of the game. The support during the play and motivation is ensured by a trainer. The trainer is a teacher in an academic environment and a director or a member from top management in business practice. Learning objectives are set for the development of human capital. They are met by various activities. The following table (Table 2) summary defines learning objectives and actions for their fulfillment.

Table 2: Educational Goals and Game Activities to Strategic Challenge

Learning objectives of the game	Activities that lead to the fulfillment of them
Creating, strengthening and development of:	Suggestions from students
- innovative approaches	
- active thinking	Involvement in the solution of the model situation
- ability to flexibly react to changing conditions and situations	Improving the quality of decision based on previous feedback
- communication	Communication within the team presentation and defines of their own proposals of solution, argumentation
- ability to organization to work in teams	Planning, allocating of powers and responsibilities, coordination of activities, leadership of team
- ability to work in teams	Distribution of tasks, all activities in order to solve the model situation, communication, mutually accountable cooperation
- ability to assign tasks	Defining tasks, allocation of tasks, taking owner the work
- ability to stimulate	Evaluation of the work of each individual participant, award of achievements
- ability to act and negotiate	Negotiations between players
- ability to acquire and process information	Searching of information, their sorting and evaluating, analysis, optimization, situation assessment, decision making
- ability to make decisions	Determinatives of objectives, analysis, evaluation, decision-making

Source: completed and adjusted by [24]

Filling of the educational objectives of the game and evaluation of its effectiveness in the educational process can be expressed by the indicators and methods which are used in other management games. The methodology for evaluating the effectiveness of management game Manahra (which is mentioned in [24]) can be a good example. This method will be used as a basis for evaluating the effectiveness of management game Strategic challenge.

4 Experience Gained in Testing Operation – Pilotage

4.1 Goals and Methodology of Testing Operation

The test sample (pre-research, testing operation) represents a top of project stage in every research verifying expedience and adequacy of suggested process (research strategy) before own investigation. Sometimes it is also branded a “dress rehearsal” of own research or a type of orientation research (general orientation). However, in this case the pre-research had a far more goal-oriented character (verification of research strategy) representing in fact last opportunity to retrieve any errors [9].

The aims of this pilot study were:

- the verification of usability and clarity of the proposed technique (game),
- the verification of the organizational demands of the game (the readiness of players and trainers),
- the clarification of targets of the game.

Following principles were required during the sample selection for pre-research of management game [21]:

- the same characteristic for selection as for own research (from the basic file, however elements from both selections can not be identical);
- we recommend to avoid any contact between elements from pre-research and research file (taking into consideration the risk of negative impacts due to information transfer);
- a sample need not fulfil rules for selection from basic file (accidentally, stratification);
- testing solution alternatives and selection of the best alternatives on a smaller sample

(more effective, less demanding organizationally, less expensive).

Test sample was created by students attending bachelor and master study programs:

Bachelor study program – 2nd year – subject-matter Management – No. of students: 22.

Magister study – 2nd year – subject-matter Management games – No. of students: 71.

Testing operation was performed in two-round coordination of the game Strategic challenge – “board” version.

Differentiation of items (e.g. test items), respect for mutual links, standards for application on a larger sample, removal of less contributing items, etc. represent an obvious prerequisite for pre-research oriented to elaboration of newly created (so far not verified) research technique [27].

The pilot projects took place in January 2014.

It was necessary prepare materials for the game before starting of the pilot project. It took about eight hours. It included preparation and printing of documents for students, measurement of duration of the game and its adaptation for time possibilities of the subjects Management games, time for preparation for teaching and possible questions.

The pilot phase took about 90 minutes for the subject Management game and 50 minutes for the subject Management (it was shorter version).

At first, students got organizational documents and materials for the game. After that, students studied materials and divided their roles in the game. In the next step, they started play the game which had two rounds. The evaluation of players followed after the end of each round. At the end of the game, discussion and comments of students to the play were following.

There were not any serious remarks raised concerning organization of testing operation. It was necessary to explain and follow all rules of the game and continuity check the implementation of steps in

Internal environment	Strengths	Weaknesses
	<ul style="list-style-type: none"> • effective form of training managers and students at universities • suitable instrument for preparing of future managers and training of present managers • integration of theory and practice • active involvement of players • high degree of realism of the game (environment, input conditions) • risk free environment 	<ul style="list-style-type: none"> • simplified calculation of output and input indicators • significant number of these indicators • limited ability to compete comprehensive educational tools • relatively high demand on “coach” who is driving more teams which playing the game at the same time
External environment	Opportunities	Threats
	<ul style="list-style-type: none"> • possibilities for improvement of computer support • configuration, variability of input conditions and variability during the game • utilization for managers in enterprises 	<ul style="list-style-type: none"> • competitive access • complexity of the game for participants • existence of more sophisticated games

each round.

4.2 Results of Testing Operation

Testing operation generated the first empiric data (preparation of categorization and scheme for processing of statistics), whereas the results shall not be included in own data collection (due to possible changes adopted after pre-research as a reaction to its results).

A written assessment of pre-research results is a part of this research project the implementation of which was subject to continuous opponency followed by adoption of corrective measures in respective processes.

The pilot study provided valuable comments and opinions of students on the game. Students who participated in the pilot study had no experiences with the management games.

Based on the pilot study it can be said, the game was interesting variegation of the subjects. Students called it as amusing point. It enabled to them easily understanding of the topic and students were involved in the teaching. The teamwork was evaluated by students also positively.

Students also could express their negative reactions and possibilities for improvements of the game. They defined as weaknesses e.g.: indication of the operation of business in video form, streamlining of materials, detailed description of departments and roles, cancellation or introduction of some departments of the company etc.

Students also provided some suggestions for the new model situations: e.g. real situation in supplier-customer relations, coming on the market with a new product, financial crisis of enterprise and so on.

5 Conclusion

The introduction of manager games and similar approaches deepened the active involvement of the participants. They are not "just" listeners and passive recipients of information as in the case of a series of so-called traditional methods of education, but they themselves must invent solutions, make a decision and apply it, but also be able to defend their decisions against others.

The game brings other expected benefits, e.g. it can be result of highlighting of strengths points, suppression of weaknesses, elimination of threats and use of opportunities (see SWOT analysis represented in Table 3).

Table 3: SWOT analysis of management game "Strategic challenge" focused on developing of human capital

Source: own processing, 2014

The results of the pilot project revealed the expected conclusions about the suitability use the games in education. Students identified the game as entertaining form of learning that enables them to acquaint themselves with problems from real life of business. During the game they were "dragged" in to the action and they can try to solve real business situations in "risk-free" environment.

Some comments made during the pilot project from students were in appropriate form incorporated in to the game.

Management games proved to be an appropriate instrument for training of future managers and an effective teaching method.

Based on experience gained in the test operation – i.e. in testing operation of the „board“ game version Strategic challenge we decided to focus on qualitative improvement of this game, create and develop software support and set forth prerequisites for its successful implementation in the management study programs organized at Faculty of Economics and Administration, University of Pardubice.

References:

- [1] Amanet.org [online]. 2014 [cit. 2014-06-15]. Available at: <http://www.amanet.org>.
- [2] Angelides, M. C. A methodology for specific, total enterprise, role-playing, intelligent gaming-simulation environment development. *Decision Support Systems*, 1999, Vol. 2, No. 25, pp. 89-108.
- [3] Armstrong M. *How to become an even better manager: a complete inventory of proven techniques and essential skills*. Prague: Ekopress. 2004.
- [4] Drucker, P. F. *Management Challenges for the 21st Century*. Transl. P. Medek. Prague: Management Press. 2000.
- [5] Faria, A. J. and Dickson, J.R. Simulation Gaming for Sales Management Training. *Journal of Management Development*, 1994, Vol. 13 No. 1, pp. 47-59.
- [6] Forssén-Nyberga, M. and Hakamaki, J. Development of the production using participative simulation games: two case studies. *International Journal of Production*, 1998, p. 169-178.
- [7] Fotr, J. *Case studies of managerial decision making and management games*. Ed. 1. Prague: University of Economics. 1996. ISBN 80-707-9559-X.
- [8] Fotr, J. and Hřůzová, H., et al. *Case studies of managerial decision making and management games*. Prague: University of Economics. 1999. ISBN 80-7079-559-X.
- [9] Gavora P. *Introduction to Educational Research*. Brno: Paido. 2010. ISBN 978-80-7315-185-0.
- [10] Greene, J. and Sisson, R. *Dynamic Management Decision Games*, Chapman & Hall, London. 1962.
- [11] Hesková M. *Simulation games that improve the quality of teaching management and marketing*. [online]. 2005. [quot. 2014-03-16]. Available from: www.vse.cz/; http://www.vse.cz/zpravodaj/2005_1/15.htm.
- [12] Horčíčka, A. and Jelínková, L. *Increasing of the efficiency of human resources management by introducing games. Trends in business*. Plzeň: University of West Bohemia. 2013. ISSN: 1805-0603.
- [13] Hradecký P. Use of simulations for education. In *Proceedings from the scientific seminar with international participation, "Active forms of teaching methods using simulation games in*

- Czech and foreign schools*". Jindřichův Hradec: University of Economics. 2002.
- [14] Hroník F. *Development and training of employees..* Prague: Grada. 2007.
- [15] Hwang, H. B. *A Modern simulation course for business students.* Interfaces, 2001, No. 31, Vol. 3, p. 66–75.
- [16] Keys, J.B. and Biggs, W.D. A review of business games, *Guide to Business Gaming and Experiential Learning*, Nichols/GP, East Brunswick, NJ, 1990, pp. 48-73.
- [17] Kirk, J. J. *Trainers Use of Games: Some Preliminary Explorations.* Simulation and Gaming, 1997, No. 28, Vol. 1, pp. 88-97.
- [18] Kršáková, Z. *Management games.* Bratislava: EKONÓM. 2005, 83 s. ISBN 80-225-1957-X
- [19] Kubalka D. *Simulation Managerial Game.* In Proceedings of the 4th Annual International Conference IMEA, 2004. Pardubice: University of Pardubice, 187-194.
- [20] Nöllke M, Tomek G. *Decision making: how to make correct and quick decisions.* Prague: Grada. 2003. ISBN 80-247-0411-0.
- [21] Pelikán J. *Fundamentals of empirical research of pedagogical phenomena.* Prague: Karolinum. 1998.
- [22] Senge, P. M. *The fifth discipline: the art and practice of the learning organization.* New York: Doubleday/Currency. 2006, 445 p. ISBN 0385517823.
- [23] Siegel, G. B. *Gaming Simulation in the Teaching of Public Personnel Administration.* Public Personnel Management. 1977.
- [24] Smutný, P. *Simulation games as a tool for improving the quality of human capital.* Brno, 2007. Dissertation thesis. Masaryk University in Brno, Faculty of Economics and Administration.
- [25] Sterman, J. D. (1998), *Instructions for Running the Production-Distribution Game "The Beer Game"*. Cambridge: Massachusetts Institute of Technology, edition 1998.
- [26] Sterman, J. D. *Modeling Managerial Behavior: Misperceptions of Feedback in a Dynamic Decision Making Experiment.* In Management Science, 1989, Vol. 35, No. 3, p. 321-339, March 1989.
- [27] Surynek A, Komárková R, Kašparová E. *Methods of sociological and social psychological research.* 1999. Prague: University of Economics.
- [28] Walters, B.A. and Coalter, T.M. *Simulation games in business policy courses: is there value for students?*, *Journal of Education for Business*, 1997, Vol. 72 No. 3, pp. 170-175.
- [29] Web.mit.edu [online]. 2014 [cit. 2014-09-01]. Available at: <http://web.mit.edu/jsterman/www/SDG/beergame.html>.
- [30] Yalabik, B. and Howard, M. and Roden, S. *The innovation game: lessons in strategy and managing operations.* International Journal of Operations & Production Management, 2012, Vol. 32 No. 12, pp. 1441-1459.
- [31] Zantow, K., Knowlton, D.S. and Sharp, D.C. "More than fun and games: reconsidering the virtues of strategic management simulations", *Academy of Management Learning and Education*, 2005, Vol. 4 No. 4, pp. 451-8.