

THE EFFICIENCY OF *PROFITPLANNER* BOARD GAME: ACHIEVING THE KEY PEDAGOGICAL OBJECTIVES

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Abstract

The major training fields when applying business game in educational process are communication, leadership and business subjects. It is important to develop skills of managers in order they could manage changes more effectively. The *scientific problem* analyzed: how effective is business simulation method in meeting the key pedagogical objectives and achieving key competences in different interest groups. The *aim* of the article is to assess the efficiency of *ProfitPlanner* board game, valuing if it is equally efficient in different groups with different needs. The research methods: structured multiplex observation, survey, performance data. The groups of achievement criteria were analyzed and tested and during the research were confirmed as reliable. The findings showed that learning as the main objective of business simulation was met and that board game is suitable to achieve the key pedagogical objectives, as provides comparatively realistic business situations and creates favorable learning environment for business decision making.

Keywords: business simulation; strategic management competencies; pedagogical objectives; learning.

Introduction

It is difficult to implement changes in organizations as successful programs depend not only on prepared strategy, but on employees' ability to change. Business simulations are evaluated as effective tools for strategic management training and as alternatives to traditional seminars and training courses. There are different types of simulations, addressing different pedagogical objectives.

The educational aim to develop such abilities as managing changes in organization often is reached using alternative educational methods, that include those that seek to promote "transformative learning" (Mezirow, 1997 in Tan & Frank Ng, 2006), which involves individuals shifting from their existing frames of reference, developing more autonomy and engaging in critical reflection. Transformative education promotes discovery learning by using group projects, learning contracts, role plays, cases studies and simulations (Tan & Frank Ng, 2006). According to Adobor & Daneshfar (2006) simulations are useful for the teaching of integrative courses, and for teaching general management skills, because they require users to make a series of strategic decisions. Business games are evaluated as effective alternatives to traditional seminars and training courses and are widely used in training managers (Faria, 2001; Tompson & Dass, 2000). Especially it is true when adult professionals need to make more risky decisions, as according Iseman (Mitchell, 2006) they learn best by case method, by analogy, metaphor. From other side, inexperienced participants can practice business decision making and later use the abilities of broad understanding of business processes when managing changes in specific organization. Traditional methods of training are applied for basic knowledge and skills development and should be used in step-by-step learning and further more advanced methods for development of manager's and strategists' intelligence are used.

Business simulations give an opportunity to make risky decisions and analyze mistakes in risk-free environment, i.e. help managers to *make decisions in uncertainty* of competitive conduct without any real lose of investments and then learn by trial and error (Bertche *et al.*, 2001, Courtney, 2001; Adobor & Daneshfar, 2006; (Gentry *et al.*, 2007). Beside that, simulations may *enhance the personal development*, as requires use and develop critical and strategic thinking skills (Adobor & Daneshfar, 2006). Simulation is one of active learning models and requires active involvement of participants (Granić & Ćukušić, 2007). So the increased motivation to understand the principles and theories leads to increasing self-efficiency (Tompson & Dass, 2000; Sherrell & Burns, 1982 from Adobor & Daneshfar, 2006; Whitton & Hynes, 2006). Student's motivation, involvement into study process, possibility to solve realistic problems, work in partnership, feel the responsibility for decisions and see the effects of decisions made form the empowering environment (Lipinskienė, 2002), which is formed in case of business simulation and leads to success of achieving pedagogical objectives.

Business simulations can be classified to ones that are closely related to specific business – *custom simulations*, and to generic games that are applicable to most of business types – *evolved simulations* (Mitchell, 2006). There are various technologies used to develop business simulations, but in broad sense it may be separated to *computer based*, where decisions and results of decisions are placed in computer program, and

board games, where business game is performed with pieces that can be moved across a board. The use of IT adds extra value, as more complex decision making processes and more inputs can be processed (Whitton & Hynes, 2006). However, computer games can obscure the logic of causal relationships and isolate participants, depriving them of shared experiences. These weaknesses are eliminated when using board games, as action learning, through hands-on, interpersonal and experiential communication is specific to board games. The major obstacle of board games is that more time is needed to conduct it. There are still many discussions which type of business simulation is more efficient. But the generalization of debates can be made that it depends on aims that should be achieved during the training were business simulation method is used.

The *scientific problem* analyzed is how effective is business simulation method in meeting the key pedagogical objectives and achieving key competences in different interest groups. *The aim* of the article is to assess the efficiency of *ProfitPlanner* board game, valuing if it is equally efficient in different groups with different needs. Our interest is on evolved business simulations that focus on management of total enterprise. We've developed and tested the main competence achievement criteria, which were grouped into visioning, planning, implementation, team dynamics and learning. Beside that, factor analysis was used to define the most interpretable solution for criteria grouping. In order to test the learning process, performance and learning measures were formed and compared. The methods for evaluations were structured multiplex observation, survey of participants, and data analysis of game performance.

Evaluation of business simulation efficiency

The features of business simulations determine their success in educational process. Beside their academic benefits, motivational and social aspects are important as well. The latter helps to achieve the pedagogical objectives. Therefore simulations as pedagogical tools should meet certain criteria. In scientific researches of business simulation effectiveness such criteria as performance and learning, realism, ease of use, team dynamics, cognitive and emotional group perceptions are pointed as most important.

When creating or choosing the training method for students or employees, the overall aim and the business environment in which learners are expected to make decisions should be stated clearly. As Bertche *et al.* (2001) states simulation is of most value when:

- decisions of many people have to be coordinated;
- high degree of dynamic business complexity exist;
- time and distance may be potential misunderstandings between managers.

The discussions about *reality of simulations* are closely related to their types. According to Bertche *et al.* (2001) successful simulation would be the one that is made for a specific organization, as generic games make it difficult for managers to learn from situations that do not relate to their own business. Mitchell (2006) also points the advantage of custom simulation as it closely tracks the particular company's operations and issues. Though the advantages of evolved simulation are nonetheless important, if managers need to understand "a big picture" (Mitchell, 2006):

- More valuable if the aim is to improve efficiencies across different business units or develop leaders across functions [Iseman];
- More open-minded, as participants are taken outside their usual work decisions;
- Important when the aim is to change the way people run their business or when the aim is to strengthen the ability to manage changes;
- Learning not only from simulation, but from participants as well.

One of the problems when applying custom simulation is that business dynamics limits the application time. Besides, according to Smith (Mitchell, 2006) custom simulations may cause potential problem because of focus on judgment if the game reflects the actual specific business. The concern of participants that "it is not real" is one of distractions in learning process, also discussed in case of evolved simulations (Adobor & Daneshfar, 2006, Nicholson, 1997).

The question of reality is closely related to judgment if the complexity of simulation has any negative effects for simulation performers. Negative effects would be in case if simulation seems complex and difficult to use for students. So the criteria for valuation would be *ease of use* or user-friendliness of physical architecture of simulation (Adobor & Daneshfar, 2006, Houten *et al.*, 2005).

The main objective raised for effective business simulation is to help students to learn the subject and to gain competences in taking strategic business decisions. In this context the valuation of effectiveness of business games may be measured using *performance* indicators and comparing them with *learning*

indicators (Teach & Patel, 2007; Gopinath & Sawyer, 1999). The use of single measure of performance during the simulation may be valued as unfair as during the simulation students may learn concepts first and only later apply the knowledge. Experiential learning is the major objective of the simulation (Gopinath & Sawyer, 1999). So if learning in later periods (years of simulation) occurs, then performance indicators wouldn't be so high, but the course objectives will be met. If single performance measure would be valued, then those who learned by doing most will be unappreciated.

Performance indicators are usually constructed by game authors, but have the same or similar criteria or ratios. They measure the value of business entity in the market, taking into account major financial performance indicators and value the business competitive position as it increases development perspectives in future periods. The most commonly used are measures associated with profitability: cumulative profits, earnings per share, return on equity, gross margin and the like (Teach & Patel, 2007). Performance indicators: credit rating, working capital or cash management, market share, forecasting accuracy. Other value-creating factors measured are: image rating, amount of wealth created, marketing effects, social responsibility, employee human resource policies.

Learning indicators measure the development of business decision making. One of the possible groupings of learning valuation criteria can be made by business functions. Learning experience according Martin & McEvoy (2003) was surveyed addressing the questions as understanding the principles of main business functions (marketing, finance, accounting, strategic thinking, and human resources), and provision of dynamic and challenging learning experience. In case of *ProfitPlanner* simulation three functions were separated: decisions related to marketing, financing and technology development (Railiene & Hopeniene, 2007). Interaction of performance and learning indicators are shown in Figure 1.

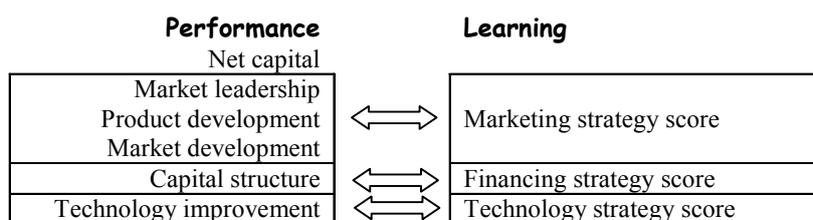


Figure 1. Valuation of performance and learning indicators (*ProfitPlanner* example)

The importance of human behavioral factors over content and tool selection when implementing a learning solution cannot be ignored. The role of *group dynamics* in achieving the learning outcomes also needs to be considered, as does the perceived value of the approach to be taken by the participants (Mitchell & Honore, 2007). The effective use of different type simulations depends on group or individual characteristics, as in one case it can enhance learning possibilities and quality of decisions, in other – restrict. Interaction of group members forms their cognitive and emotional perceptions. In case of cognitive perceptions, group members discuss the content or process of the task and draws assumptions, and if it doesn't lead to personal conflict, it affect performance and learning positively (Adobor & Daneshfar, 2006). In case of emotional perceptions, group members may feel personal disagreement the effect of which would be negative on group performance and learning. As cited in Adobor & Daneshfar (2006) study, teams can stifle creativity, encourage free riding, and conflict; the degree of emotional and task conflict within can affect team performance [Jehn, 1995]; the atmosphere in a team, including the degree of trust and cooperation [Kramer, 1999] and including task and emotional conflict (Adobor & Daneshfar, 2006), can also affect team performance. The conflict as a barrier can be analyzed in the light of personal attitude toward one's goals form simulation, as learning-oriented students will respond better to negative feedback in a simulation game than performance-oriented students (Gentry *et al.*, 2007; Anderson & Lawton, 2007).

Assessment of Efficiency of *ProfitPlanner* Board Game

ProfitPlanner is a company game through witch participants are introduced to the totality of information and control process within an organization. It is *evolved simulation* and may be applied to different business types. This business simulation is visible, i.e. business is performed on specially designed tables where all business functions and cash flows are reflected. Therefore it refers to *board game* type. For wider presentation see Railiene & Hopeniene (2008).

In order to assess the efficiency of *ProfitPlanner* board game in achieving the key pedagogical objectives the structured *multiplex observation* and *survey* was made (there were 40 students, 40 businessmen and 20 teachers surveyed). The information gathered helps to estimate the behavior and reactions of participants into the main researchable issues. Simulation was guided and observation was made by authors of this article. The survey consisted of Likert scale questions ranking from 1 (strongly disagree) to 5 (strongly agree), data were collected at the last session of business game seminars. Participation in survey was voluntary, in total 100 surveys returned, resulting in a 100 percent response rate. The data for performance assessment were taken from simulation results; totally results for 20 groups were calculated.

The valuation was made in three different groups: students as future managers, businessmen as current managers with practical experience and teachers of economic education as trainers in economics and management fields at school.

The practical research starts with valuation of business management subjects thought with *ProfitPlanner* board game. The managerial decisions made during the game are structured according the competences which can be developed. Further the valuation of efficiency of activities and business decisions is made using the framework of *key pedagogical objectives* adapted from Angehrn & Atherton (2001) model. Angehrn & Atherton (2001) derive a framework for assessing training programs, based on the literature on change management models and the skills and competencies necessary to manage change successfully. In our case, this framework was modified for evaluation how successful were students, managers and teachers in developing skills such as being able to learn, able to innovate, able to design and drive organizational simplicity, able to manage ambiguity and be able to manage and thrive on change. In order to evaluate if these competences were achieved, we grouped the criteria into five categories: visioning, planning, implementation and reflection (as learning and team dynamics). The criteria involved in these groups are discussed by Railiene & Hopeniene (2008). *Cronbach's alpha* coefficients calculated for each group of criteria indicates that the items are sufficiently reliable (see Figure 2). For example, in this study the alpha for team dynamics is the highest (0.7601) and for implementation criteria – the lowest (0.6112), but sufficient for exploratory research (Adabor & Daneshfar, 2006).

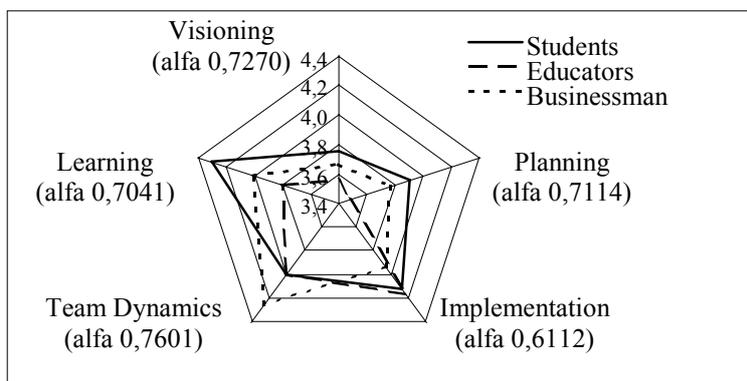


Figure 2. Achievement of competences by different participant groups

It should be noted that students had highest achievement in visioning, planning and learning. As students are in learning process, they showed the highest ability to learn and to accept new knowledge and changes in their decision making. Businessmen had the highest abilities to work in teams, to communicate, negotiate. In case of implementation educators were the most accurate to use diagnosis tools and implement their strategies. It could be stated that from learning perspective students would be the target group for using simulation as pedagogical tool. For businessmen the most value is given in light of interaction management, negotiation, self confidence and decision making skills improvement. Educators as already having knowledge in using business decision making methodologies see the most value from simulation as practical implementation of them.

When looking to separate competence valuation, the highest achievements would be in case of interaction management skills (including team and coalition building) (mean 4.59, highest valuation with response of *strongly agree* 64.7%), interpersonal and listening skills (4.29, highest valuation 47.1%), communication/presentation skills (4.39, highest valuation 47.9%) (see Table 1). These skills were equally valued by all groups, with no significant statistical difference. All other competences were valued starting from 3.41 to 4.18 mean. Participants agreed that simulation was challenging, allowed to demonstrate the strategic thinking and problem solving ability. They also felt strongly that simulation provided reliable

environment for taking risky decisions (mean 3.59), allowed to implement new ideas (3.65) and performed realistic business situations (3.71). That shows the high efficiency of simulation as all competences researched had higher than average values.

The proposed typology of criteria cover variety of achievement variables and there are no theoretically or empirically supported categorization of them as subject of investigation. Therefore the *factor analysis* with varimax rotation was used to identify the main dimensions in achievement criteria using empirical data from survey. Using the Kaiser criterion (extracting factors with eigenvalue = 1), 7 factors turned out to offer the most interpretable solution, accounting for 88,49% of the variance (see Table 1).

Table 1. Rotated factor matrix for achievement criteria

Factors	Criteria	Factor loading	% of Variance	Crombach alfa	Mean	Std. Deviation	Highest valuation (5), %
1	Information search	0,9094	17,87	0,8566	3,41	0,7952	11,8
	Use of information for decision making	0,8359			3,65	0,9315	23,5
	Proactive orientation and planning	0,5508			3,75	0,7746	11,8
	Change management	0,7999			3,65	0,7019	5,9
	Ability to use formal and informal networks	0,6697			3,35	0,6063	41,2
2	Ability to use diagnosis tools	0,8752	14,49	0,8901	4,00	0,8660	35,3
	Decision making	0,8148			3,88	0,8575	23,5
	Communication/presentation skills	0,5343			4,39	0,7717	47,9
	Negotiation skills	0,7982			4,06	0,8269	35,3
3	Investment planning	0,8371	13,96	0,825	3,31	0,6183	46,2
	Time planning	0,8886			4,12	0,7812	35,3
	Interpersonal and listening skills	0,7210			4,29	0,7717	47,1
4	Knowledge of operational systems	0,5606	13,73	0,82	4,18	0,8090	41,2
	Knowledge of finance management	0,6658			3,59	0,7952	5,9
	Interaction management skills (including team and coalition building)	0,7996			4,59	0,6183	64,7
	Reflection and learning skills	0,8711			4,06	0,8269	35,3
5	Knowledge of marketing management methodologies	0,5610	12,48	0,83	3,76	0,8314	17,6
	Ability to value new market potential	0,7558			3,53	1,0073	23,5
	Ability to value new product potential	0,9362			3,71	0,7717	17,6
6	Achievement orientation	0,7566	8,96	0,57	4,06	0,6587	23,5
	Learning from other participants' experience	0,7160			4,00	0,7071	23,5
7	Knowledge of strategic management methodologies	0,7370	7,00	na	3,76	0,8314	23,5

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.

Table 1 shows the criteria groups of seven factors. All criteria were used for analysis as there were no loadings lower than 0.5, although the factor *Knowledge of operational systems* is pretty close (0.5606). Looking for patterns of similarity between the criteria that load for each factor, part of relationships seem logical: *information search and use* (F1) including search and use of information, proactive orientation, change management and ability to use formal and informal networks; *decision making* (F2) including use of diagnosis tools, communication and negotiation skills; *planning* (F3) including investment and time planning, *marketing knowledge* (F5) including marketing management methodologies, valuation of market and product potential. The criteria loaded under 4th, 6th and 7th factor are difficult to interpret as they cover few fields and would be expected to form other factor groups as *learning skills, knowledge of operational and strategic management and coalition building*.

The results provided in Table 1 indicate that the main criteria in first factor group would be *Information search* (item weight 0,9094) and *Use of information for decision making* (0,8359), in second factor group *Ability to use diagnosis tools* (0.8752) and *decision making* (0.8148), third factor group - *time* (0,8886) and *investment* (0,8371) *planning*, fifth factor group – ability to *value new products* (0,9362) and

market (0,7558) potential. From other factor groups the most important criteria would be reflection and learning skills and interaction management skills, including team and coalition building (0,7996).

Valuation of performance results was made according the cumulative score, valuing the performance at the end of last round, assigning 1st-4th places (see Figure 3). Performance valuation included such measures as net capital (representing impact of cumulative profits), leadership in markets, product and market development, technology development. In order to compare performance and learning results, additional annual strategy scores were calculated corresponding to marketing, financing and technology development decisions. Comparison of final results (from performance score) and annual decisions in the main business functional fields allows to draw conclusions on the main pedagogical objective – learning. There may be few conclusions drawn from these results. First, comparing the data from groups’ performance, it is most evident that leadership in early stages helps to keep higher performance results through all the game. Second, groups with highest results at the end took fair though risky decisions. Third, worst performance doesn’t mean that group members have learned the least. Further the latter conclusion is explained in more detail.

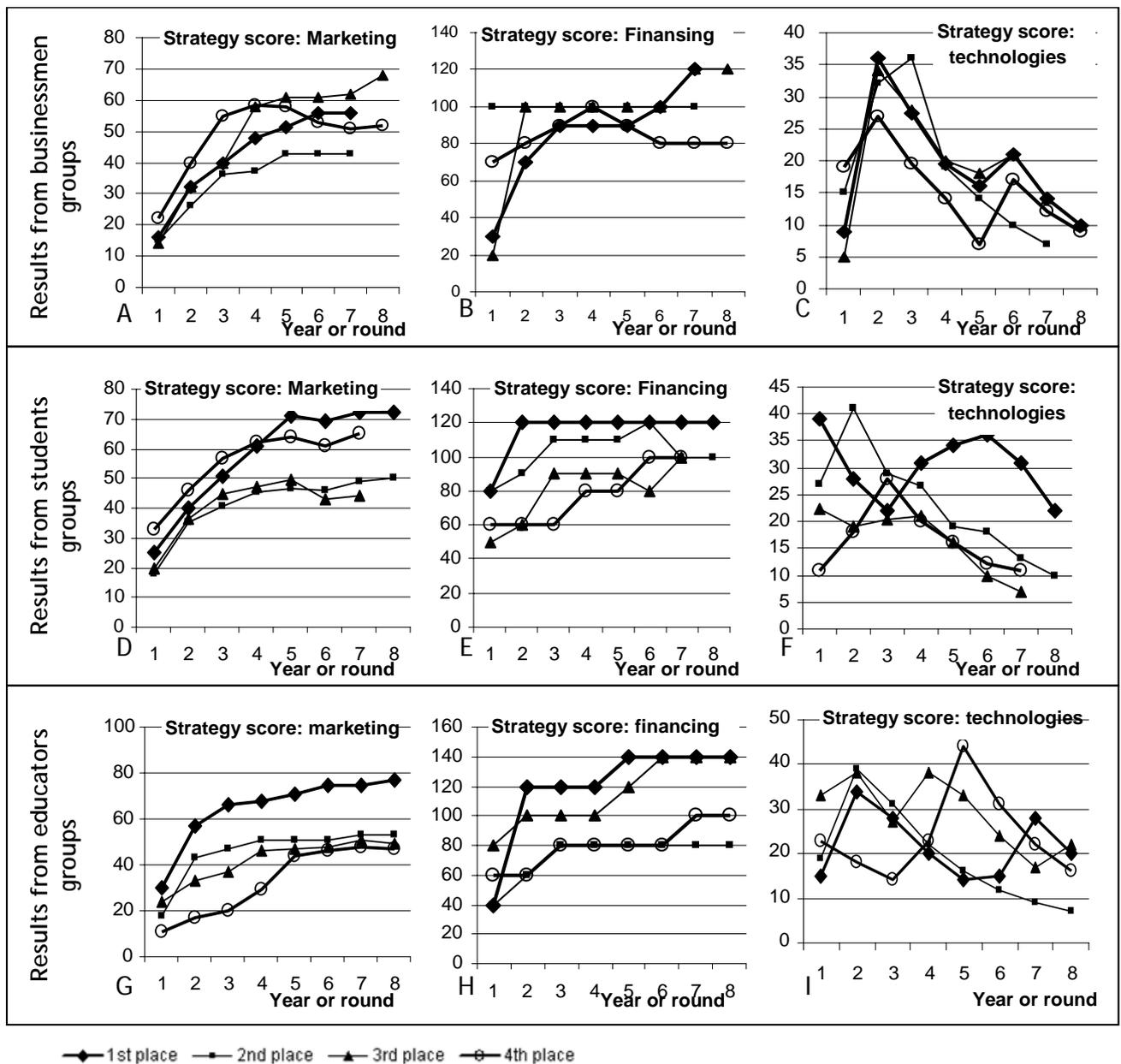


Figure 3. Comparison of performance and learning indicators in different groups based on ProfitPlanner results

Strategic decisions from businessmen groups comparing performance score and annual decisions show that first and last groups took similar marketing and technology development decisions so their learning process was nearly equal (Figure 3, graph A and C). Riskiness of financial decisions till fifth year was high and rising equally, but later more risky decisions by leading group resulted in better performance, though learning from others experience by last group wasn't so obvious (Figure 3, graph B). So in spite of different performance results at the last round, groups of businessmen were able to develop and use their visioning, planning and implementation skills at the very first rounds (years), so learning process during the business game was short.

Decisions of students' groups with highest and lowest performance scores were similar in marketing, they planned and invested timely into products and markets (it is worth mention, that medium score groups performed worse, see Figure 3, graph D), so learning was from first rounds (years). However learning in financing and technology development fields for last groups occurred later, that resulted in worst performance at the end of game (Figure 3, graph E, F). Purposeful financing decisions were started from 6th year and technology development – only from 3rd. So learning process was too long, but the target to learn was achieved. Learning skills as shown in Figure 2 indicate similar results.

Marketing decisions of educators with highest and lowest performance scores show that worst performing group learned only starting from fifth year (Figure 3, graph G). It was the major obstacle as markets and products were not timely developed, but development from fifth year show the learning outcome. Financing strategy score indicates that learning of last groups was late, fair financing decisions were taken starting from seventh year (Figure 3, graph H). Late learning appears in technology development decisions, as investments were started to make in fifth year (Figure 3, graph I). Such results allow to formulate the conclusion, that some educators were not flexible enough to adapt to changing business conditions and used only tools which they know. Learning skills as shown in Figure 2 indicate these results, too.

Conclusions

The research findings can be summarized as follows. First, from the analysis of scientific literature the main criteria for evaluation of achievement of key pedagogical objectives and improvement of business management competence were formed: reality of simulation, ease of use, performance and learning, group dynamics. Second, the groups of achievement criteria used for research were confirmed as reliable. Third, research methodology used for explaining learning process with comparison of performance and learning measures was confirmed as suitable. The findings showed that learning as the main objective of business simulation was met and learning process took six rounds (years) in general. Fourth, the research provided evidence that board game is suitable to achieve the key pedagogical objectives, as provides comparatively realistic business situations and creates favorable learning environment for business decision making.

Research findings should be applied for improving the use, explanation and presentation of *ProfitPlanner* simulation in order to strengthen the ability to achieve such competences as visioning and planning, especially concept formation skills, strategic management skills, ability to use different diagnosis tools, information search and analysis skills.

Limitations of research: research was made only on board game example, hence further researches should be made with computer-based simulations; conclusions for different groups are applicable only to research sample.

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