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Evolution of the management games: Towards the massive multiplayer online role playing game?

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Abstract

The paper empirically investigates the "state of the art" of management games (MGs), their present limits and suggesting where the MGs should evolve. The investigation is conducted through taxonomy of the best 110 MGs based on three dimensions (market complexity, flexibility of the model, complexity of the business environment). The aim of the framework is to offer a correct and a complete positioning of the different softwares. Finally, the paper suggests the massive multiplayer online role playing game (MMORPG) as a natural evolution of the MGs, and propose how the basic features of a MMORPG should be implemented to a new management game.

Keywords

Taxonomy, Management Game, Business Game, Massive Multiplayer Online Role Playing Game.

1   Introduction and background

Since '50s the use of management games in the managerial education has gained increasingly more importance. In the last decades the management games (MGs) found major success in the United States where the 97,5% of the AACSB (*Association to Advance Collegiate Schools of Business)* members use them in their bachelor and master degree courses, above all in the marketing and strategic management area. Furthermore as everybody knows, the same happens in the majority of MBA (*Master in Business Administration*) and in many *post-graduate* courses.

Nevertheless many authors assert that it's not still clear what a management game is. There isn't a univocal definition of the term "management game" which is subject to misinterpretations. As a matter of fact the games used for managerial learning are called in many ways: business simulation, business simulator, learning environment, management simulator, multi-person computer simulation, micro worlds, management flight simulator, etc. In a recent paper Lewis and Maylor (2006) summarize very well the chronological evolution of the terms games, business games and simulations.

Maier and Größler (2000) suggest that this uncertainty "is caused by various reasons: different academic backgrounds of the people involved, marketing aspects (some terms sell better than others), and a not reflected adoption of terms originally used with other intended meanings".

According to Elgood (1997), we consider management games both business games and both business simulations. Simulation is "essentially a case study, but with the participants on the inside" (Jones, 1998) but also "means driving a model of a system with suitable inputs and observing the corresponding outputs" (Bratley *et al.*, 1987).

Management games are all the simulations used to support managerial learning through an experience that features competition and rules in the socio-economic environment.

The paper starts from the research aim which is to understand the "state of the art" of MGs, their present limits and suggesting where the MGs should evolve. Subsequently, taxonomy of the MGs based on three dimensions (market complexity, flexibility of the model, complexity of the business environment) is proposed with the aim to offer a correct and a complete positioning of the different softwares. Finally, the present work suggests the massive multiplayer online role playing game (MMORPG) as a natural evolution of the MGs, and proposes how the basic features of a MMORPG should be implemented to a new management game.

2   Research Aim

The market of learning games offers a large number of management games. The simulations have an important place in management education but, as suggested by Fripp (1997), we must fundamentally rethink how they are designed and used in order to ensure they are still valid. A taxonomy is the right instrument to understand where MGs are by making a comparison of them in order to understand differences, main features and characteristics and their advantages and disadvantages.

Maier and Größler (2000) classified MGs using four different dimensions: (1) environment of the application, (2) design element of user interface, (3) model and (4) target groups, goal, and objective. Thavikulwat (2004) proposed its own taxonomy and reported a lot of other classifications available in literature.

Furthermore very little is written about how the management games are evolving. The work of Perotti (2006) is one of the rare examples. Nevertheless, in our opinion, a taxonomy should be used not only to classify different games, but mainly to identify the evolution of the object analysed, the present trends and the evolving paths.

The present work aims to bridge the gaps in literature by:

- proposing an adaptation of the previous taxonomy in order to enhance the comprehension of the strengths and the weaknesses of the different MGs;

- proposing a framework useful for analyzing and understanding the "state of the art" of MGs and their present limits and suggesting where the MGs should evolve.

3   A taxonomy of Management Games

Starting from the taxonomy of Maier and Größler (2000) we selected the 9 more meaningful dimensions used by the authors to characterize the MGs and we added other 9 dimensions: type of computation, use of web technology, interaction between players, functional unit considered, sequential nature of decisions, number of products, number of markets, configurability of the model and customization of the model (highlighted in Table 1). We used the 18 features to classify 110 among the best computerized management games available in literature (mainly in the book of Elgood (1997) and on the World Wide Web). In the table we report all the characteristics, the typology of the feature, the number of softwares which has that feature and percentages.

Characteristic	Typology	N°	%
Transparency of simulation model	Black-Box	107	97,2 %
	White (o Transparent) Box	3	2,8 %
Type of computation	Manual	0	0,0 %
	Computer	110	100,0 %
Web technology	Yes	25	22,7 %
	No	85	77,3 %
Interaction between players	Present	92	83,6 %
	Absent	18	16,4 %
Generality of model in regard to domain	Specific	47	42,7 %
	General	63	57,3 %
Management domain	Total / Inter-functional	87	79,1 %
	Functional	23	20,9 %
Functional unit considered	Marketing and Sales area	87	79,1 %
	Production Area	62	56,3 %
	Procurement Area	24	21,8 %
	Logistic Area	28	25,5 %
	H&R Area	34	30,9 %
	R&D Area	22	20,0 %
	Financial and Control Area	53	48,2 %
Sequential nature of decisions	Present	103	93,6 %
	Absent	7	6,3 %
Proceeding of time in simulation engine	Batch Processing	100	90,9 %
	Real-time processing	10	9,1 %
Behaviour of the model	Deterministic	59	53,6 %
	Deterministic / Stochastic	51	46,4 %
Type of model's internal relationships	Quantitative	96	87,3 %
	Quantitative and Qualitative	14	12,7 %
Number of players	One	24	21,8 %
	More	86	78,2 %
Number of products	One	18	16,4 %
	More	92	83,6 %
Number of markets	One	72	65,5 %
	More	38	34,5 %
Configurability of the model	Absent	102	92,7 %
	Average	6	5,5 %
	High	2	1,8 %
Customization of the model	Present	2	1,8 %
	Absent	108	98,2 %
Role of the simulation model	Active	23	20,9 %
	Passive	87	79,1 %
Frequency of the decisions	Batch processing	102	92,7 %
	Real processing	7	6,3 %
	Only one time	1	0,9 %

Table 1: Dimensions of the proposed taxonomy.

Afterwards we analyzed all MGs' models using a framework based on three dimensions coming from the intersection of the most significant classification variables:

1. *Market complexity*, considered as the number of products and the number of markets (one or more than one),

2. *Flexibility of the model*, considered as the level of configurability of the model (absent, average or high) and the possibility to customize the model (absent or present)

3. *Complexity of the business environment*, considered as the proceeding of the time in the simulation engine (real-time or batch processing) and the number of players (one or more than one).

N° of markets	More	11	27
	One	7	65
		One	More
		N° of Product	

Table 2: Market Complexity.

Configurability of the model	High	0	2
	Average	6	0
	Absent	102	0
		Absent	Present
		Customization of the model	

Table 3: Flexibility of the model.

Proceeding of time in simulation engine	Real-time	9	1
	Bath Processing	15	85
		One	More
		Number of user	

Table 4: Complexity of the business environment.

We found that most management games have serious limits in terms of the two characteristics, flexibility of the model and complexity of the business environment, which reduce their *realism*. Participants need some realism and want the experience to be worth the effort and a great learning experience, as well as a pleasurable one (Sauaia, 2006).

As a matter fact, the majority of MGs (see Table 2) offer a simulation game in very complex (and consequently realistic) markets with high number of products and/or high number of customers. Nevertheless with regard to flexibility of the model, 92,7% of the MGs (see Table 3) have a rigid model constrained by fixed parameters, which reduces its adaptability to a real business environment. Finally we find that 99% of these softwares (Table 4) have a big limitation in the level of complexity of the business environment defined as real-time processing and high number of players.

Literature has widely recognized the importance of the realism to learning in simulation tools. The realism so is one of the principal objective of the development of the simulations (Rausch, 1994). The realism is fundamental for an effectively learning validation of the simulation's games. Without it the users could have low interest and limit participation. If the students consider not realistic the simulation, they think their conclusion or their results not relevant for the comprehension of the real world (Sutcliffe, 2002).

The only management game with high complexity of the business environment is a web-based game called IndustryPlayer®; unfortunately the flexibility of its model is scarce. Nevertheless the example of IndustryPlayer® and other business games like Perfectcompetition® allow us to identify the new evolutive path of MGs.

In these games we find a Virtual World where a high number of players meet and play in real-time obtaining a good realism in terms of business environment. For instance Perfect competition have two economies, with a day step of 15 and 60 minutes, so the time haven't a real flow, but is like a batch processing system. In Industry player the step time is every 2 minutes, so more real.

These two games follow the major trend in the game industry overall, which is the push toward increasing realism in virtual game world (Moore *et al.*, 2007). This feature can be found in the so called 'MMORPGs' (*Massively Multi-Player Online Role Playing Game*).

4   Towards the Massively Multi-Player Online Role Playing Game

The analysis of the MGs suggests that MMORPGs (*Massively Multi-Player Online Role Playing Game*) are the right way to overcome the limits in the *realism* of the management games. A MMORPG, more simply a *virtual world*, is an internet-based game that can be accessed by large number of players at the same time. Players choose a physical self, an avatar, and then spend their time running about in the game world, chatting with others, undertaking various tasks, purchasing, producing, and consuming goods, and generally leading a more or less full, rich, and detailed life there" (Castronova, 2002). MMORPGs are the most common type of MMOGs (Massive Multiplayer Online Games) which represent the 97,6% of their market share (Woodcock, 2006).

The MMORPGs allow the implementation of a real-time MGs and a high number of competitors. As the number of competitors increases, the markets would become 'more perfect' and sales levels would even out amongst competitors (no one would have a competitive advantage) (Wellington and Faria, 2006).

At first sight the main differences from a traditional online management game and this new family concern the massive number of players and the real-time interaction between them, but the fundamental aspect is that MMORPGs logic gives to a game the right *level of complexity*.

The problem of the right complexity has been faced since the beginning of the MGs' implementation. For instance Bellman *et al.* (1957) reported that one of the question to built a MG was "How detailed and how realistic should the model be?". At the same time The Carniege Tech Management Game, instead of making a dozen decisions every quarter, asked to the players to record between 100 and 300 decisions for every month of simulated play (Cohen and Rhenman, 1961) rising the game complexity.

The complexity of the game is a crucial point for the learning. If a game is too simple the players are boring, if is too complex the player doesn't understand it. Thus it's very important to give the correct level of difficulty of the game to the correct level of the players. So, what's the correct level of complexity? To answer to this question we have to think that different players need different games; so we have three ways:

1. Make a management game focused on a specific target of users.
2. Make a general management game, where anybody can play and where the competencies of the players can be on a middle level. This is the way of strategic or competitive games.
3. Make a game that start simple (to help the player to understand how the simulation works) and increase the difficulty along the time.

This third way is the most interesting, because everybody could play starting with the right difficult. But this is not feasible with a batch processing game and with a limited number of

users. The logic of the MMORPG (real processing time and massive number of players) can help the MGs to overcome this critical aspect.

Houten and Jacobs (2004) presented architecture for distributed simulation games, "with its human and simulated players". But in our opinion, the design of a management game based on MMORPG logic should start from a deep analysis of their main characteristics. In order to bridge the gap among a management game and a MMORPG and to suggest a possible evolutionary future scenario for the management games, we analyzed the 16 most widespread MMORPG used by about 90% of players all over the world (Woodcock, 2006). We find the 10 main feature of a MMORPG and we hypothesized how to apply them to a new management game, as summarized in Table 2.

CHARACTERISTICS	MMORPGs	Management Games
Persistent	The world is always available and world events happen continually. The game is independent if the player is or not online.	The market evolves, the competitors change and the products are sold also if the player isn't online.
Scarcity	The player must spend real resources like money and time to obtain product and service in the virtual world.	The real resources that a player spends are time and competencies.
Specialization	The players make decision for the evolution of their avatar, and they give him particular abilities.	The evolution of the players must be on one business area at a time.
Market	The players can bargain, sell and buy their object of the game, in a specific place or anywhere.	The commercial transactions are the engine of the game.
Property right	The system recognizes the user that has the propriety of one object.	The system has a memory of all the activities of the player to recognize their abilities and competencies.
Levelling	The players develop their abilities, and in the mean time the game become harder and complex.	The player manages different aspect of a firm, starting from the more simple operations to more complex and strategic.
Farming	It's an activity that a player makes many times. This bad feature gives a great advantage to the user that stay on the game for many hours.	A new player must repeat some simple activities to learn the management of the operational levers, but more the complex growth, farming must be delete.
Player versus player (Pvp)	Player versus Player, they represent the possibly interaction from the players.	The player's firm produces products in the same market of other players, or has a human chief.
Player versus environment (Pve)	Player versus environment, they represent all the possibility the interaction between player and game.	A market where the only competitors are computer, or have a computer chief.
Gild	A group of players that gather each other to play together.	A group of players become partner in a firm or in a supply chain.
Graphic	Many games have a special 3D user interface, but also a good web-interface is important.	On web with many pictures that describe the firm and the business area.

Table 5 – Application of MMOPRGs' characteristics to MGs.

The application of MMORPGs' logic to MGs suggest to implement a game with a virtual environment, supported by a graphic interface, where a user must start as a simple employer can become a manager, a CEO or a president of a company. So the player can manage different aspects of a firm, both managerial and both entrepreneurial, starting from the more simple operations to more complex and strategic. In the game the market evolves, the competitors change and the products are sold also if the player isn't online, so the real resources that a player spends are its time and competencies.

As a matter of fact the most important characteristic of a MMORPG is the persistence (Perotti, 2006), and this is one of the first difference from the most business simulation that are played from a fixed number of periods or a fixed period of time. Furthermore the players could demonstrate their expertise to the others by amassing profits, market share or stock price over time. Other authors consider that the workshop in the management game is the most important educational aspect: simulations give cognition, games give emotion, workshop give social engagement, and combination of the three fields thus provide a mechanism to support all four aspects of the Kolb learning cycle (Kyvsgaard 2006).

A MMORPG management game (MMORPG MG) could have all these three characteristics thanks, for instance, to the concept of Gild; a group of players can become partner in a firm or in a supply chain, and to the use of bargaining. Furthermore this is supported by an interaction with an augmented and challenging reality, so the player actively searches for solutions to problems (Gee, 2003; Prensky, 2001). This is coherent with the four defining features of virtual worlds suggested by Delwiche (2006): interactivity, physicality, persistence and safety.

Another fundamental aspect of the management games is the debriefing. The debrief is very important in helping people to reflect on what they have experienced, in enabling them to share and debate experience, feelings and views and, finally, in helping them to construct their experience into understanding which can be re-applied. A good debrief is vital if one seeks to avoid the so-called 'video arcade syndrome' (Lane, 1995). The MMORPG MG can perform the debriefing session by using a chat room or other more advanced technologies such as teleconferencing and videoconferencing, as suggested by Bernard (2006) connecting the simulation game and the real life situation(s) the simulation game refers to (Peters and Vissers, 2004).

5   Conclusions

The massive multiplayer online role playing games are a natural evolution of the MGs, and their main features can be implemented in the new management games. If only one or two years ago this prospect would have been only a fascinating hypothesis, actually can be reality. As a matter of fact IBM has recently announced that they will promote a management games called Innov8, "designed to help tech managers better understand the roles of businesspeople, and vice versa, players go into a virtual business unit to test their hand at ventures such as redesigning a call center, opening a brokerage account, or processing an insurance claim" (McConnon, 2007).

In our opinion this should be only the first step towards the appearance of new management games based on MMORPGs' logic and that will enclose their main features described in this paper. This will give more realism of the game and will allow setting automatically the right level of game complexity to each player/user, enhancing the learning benefits of the MGs.

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