

# 40 YEARS OF BRAZILIAN S&G - ANALYSIS AND PERSPECTIVES

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## ABSTRACT

*After globalization, business managers were required to take decisions faster and without mistakes. More and more managers are asked to quickly understand the environment and establish some scenarios for the problems presented. There are evidences that S&G allows Business Administration students to have contact with this kind of situation quickly. Many Brazilian researchers are publishing about this theme and the number of researchers about it is increasing in Brazil. This article aims to demonstrate the growing number of studies on S & G published by Brazilian researchers and throws a question: is it enough that we are able to create a Brazilian Association of Games and Simulations.*

## INTRODUCTION

It has been witnessed a revolution in the process of creating value since the late 20th century that can be attributed, in part, to the confluence of globalization and technological advances occurred in the transition from an industrial economy to an economy based on information. This context involves a great complexity, instability and uncertainty. Thus, the management changes became one of the main challenges to design and explore the new business' world. The development of new organizational forms require that Graduated Business Schools play strategically with its teaching, research and extension in order to reduce the gap between academy and the business world.

This perspective raises the need in using new teaching techniques that aim, from one hand, to facilitate the work of the teacher, who should be seen as a facilitator, and, in the other hand, to achieve the students' commitment with the teaching-learning process. According to Kolb (1984), these are aspects of the Experiential Learning Theory. Studies related to Experiential Learning (Wolfe & Keys, 1997) have established a link between it and business simulations/business games, known worldwide as Simulation & Gaming – S&G.

The main subject of this work is to present a methodology called, in Brazil, by some authors, as Company Games (Suaia, 1995), Business Games (Barçante, 2007) or Business Simulation (Bernard & Kopittke, 1990). It has been deserved relevance in Brazilian academic and business scenario for decades. The objective evidence which justifies this claim is the growing

number of results obtained from experiments on S&G presented at scientific theses and dissertations defended and articles published in journals ranked by CAPES, Coordination for the Improvement of Higher Education Staff (Rosas & Suaia, 2006), in addition to being used as a training and learning tool (Pretto & Almeida, 2007).

The use of S&G is already consolidated at the international level (Faria, Hutchinson & Wellington, 2009) and has grown in recent years in Brazil (Barçante et al, 2011; Neves & Lopes, 2008; Pretto & Almeida, 2007) both in the academic and business environment. The prediction of Rosas & Suaia (2006) has been achieved today: the MBA of the most important business schools of Brazil have adopted disciplines, in their programs, called Business Games, Business Simulations, Corporate Games, and they are well evaluated by students. It should be noted that the use of S&G is dependent on the quality of the model used, the way of implementation and facilitators' capacity (teachers or instructors). There is a preview about a descriptive analysis using S&G in academy, and it means that if it increases significantly in Brazil, consequently it will be necessary to have good professionals trained on it.

Although S&G in Brazil have been introduced in the 1970s, only in the 1990s it began to be studied in a more comprehensive way by the Academy, as well as some interest was demonstrated by business environment as an effective and efficient methodology (Rosas & Suaia, 2006). This work shows that nowadays some Brazilian universities have researchers' teams who study S&G, mainly in Business Administration and Production Engineering undergraduate courses. The search is based on Bibliometrics, which is the study area that uses mathematical and statistical methods to investigate and quantify the processes of written communication (PAO, 1989) or include all studies that attempt to quantify the processes of written communication (Pritchard, 1969). Also according to Tagüe-Sutckiffe (1992), it is the study of the quantitative aspects of production, dissemination and use of information logged. The Bibliometrics develops standards and mathematical models to measure these processes, using their results to prepare forecasts and support decision-making.

Some techniques of bibliometrics will be applied, such as:

- Identification of trends and growth of knowledge in one area;
- Publishing trends forecasting;

- Dispersion analysis of scientific literature;
- Productivity analysis of individual authors and organizations;
- Evaluation of statistical aspects of language, words and phrases;
- Measuring the growth of certain areas and the emergence of new themes.

It is important to point that Cronin & McKim (1996) make evident that the Web is becoming an increasingly and important way of communication for science and academy, by which it is logical that the quantitative studies also extend to this environment. Hopefully, in the end of work, four basic bibliometric questions could be answered (Porter et al, 2002; Watts & Porter, 2007):

- Who are the Brazilian authors who publish more about S&G?
- What are the specific topics addressed by them?
- Where are the results published?
- When were the results published?

### S&G IN BRAZIL

The Simulation and Gaming – S&G, have experienced a major global expansion over the past 40 years and is a consolidated subject (Bragge, Thavikulwat & Töyli, 2010). Since the seventies, international and national associations of S&G have arisen, especially in Europe, North America and Japan. Recently, the Asian continent has adopted the theme. The S&G associations have spread throughout the world, except for Latin America and Africa.

In Brazil, S&G has also experienced growth. Although there isn't a Brazilian S&G Association, the publications on the theme are spread in various congresses of engineering, administration, accounting, education, and others, besides the fact that some Brazilian scholars contribute consistently and significantly to disseminate S&G (Lopes, 2001; Barçante, 2007; Miyashita, 1997; Saaia, 1995; Bernard & Kopittke, 1990).

According to Lopes & Lacerda (2004), education for management at the Academy must update their didactic-pedagogical resources in order to provide experiences with greater significance for the student and be closer to the reality of professional performance. It is noteworthy, in this scenario, the flexibility introduced in the simulated activity allowing modeling paradigms rupture in the classroom

- student indifference, absenteeism, lack of interest
- providing a creative assignment in the classroom.

In the study developed by Rosas & Saaia (2006), it was found that the major factor encouraging the use of S&G is the students' demand, while the lack of trained facilitators to provide training may become the biggest limitation. These data are confirmed in other researches and make aware of the need to integrate national efforts among researchers in partnership with the Ministry of Education and other institutions committed to the quality of higher education in Brazil.

After some studies, through a descriptive nature research, Neves & Lopes (2008) described the conditions for the use of Company Games at Business Administration Universities in São Paulo – Brazil. They had, as main results of the study, in a universe of 138 respondents, 48% of the Universities using Company Games regularly in their courses and only three Universities do not intend to use the Games in the future. In addition, 95% of the Universities using the tool are satisfied with the results. Other interesting results were found and show there is a high degree of satisfaction with Company Games purchased, compared to the ones developed internally in the universities, and over 90% of users believe in the benefits of the practice of Games recommended by literature. The difficulties presented were: the lack of trained teachers and high acquisition costs.

Barçante (2010) presents all the stages of a Business Game implementation applied in a graduated Industrial Administration course from CEFET-RJ, Federal Center for Technological Education of Rio de Janeiro, called JOGAI-CEFET. This article was awarded in the 41st ISAGA Annual Conference with the Best Paper Award. Two other researchers were awarded prizes of equal content (Saaia,

#### Exhibit 1

#### Thesis and dissertations on S&G published in Brazil from the year 1973 to 2010

1973-1990	1991-1995	1996-2000	2001-2005	2006-2010	TOTAL
5	12	21	19	53	101

#### Exhibit 2

#### Ranking of Universities with two or more theses on S&G in Brazil

Brazilian Universities	Number of theses
Universidade de São Paulo	7
Universidade Federal de Santa Catarina	5
Universidade Estadual de Campinas	3
Universidade Federal do Rio de Janeiro	2
TOTAL	17

2003; Souza, Bernard & Cannon, 2010) granted by the Conference of ABSEL.

Similarly to what happens with flight simulations used in the training of professional pilots, the Business Games provide benefits and protections, which make them highly attractive to participants. According to Barçante & Castro Pinto (2007), some advantages of using business games are: encouraging creativity; scenario changing; systematic gathering of information; new skills development; communication practices; experiences exchange; new roles experience; business view; decision-making in risky environment; protection against actual losses; instructive fun;

In addition to the benefits described above, according to (Elgood, 1993) a business game also:

- Provides the teams using a standardized resource to support planning and decision-making, with a user-friendly interface and exempting the use and knowledge of spreadsheets software;
- Enables a more proactive decision-making process, giving teams more time to concentrate efforts on identifying strengths and weaknesses, opportunities and threats, and the analysis of external and internal environment of the company, among others;
- It is an excellent database, storing the entire history of the planning teams, preserving data integrity of each period (completed and planned), generating data for analysis in expert systems, making the interpretation and evaluation of the user learning process;
- Can be used both as a decision support tool as well as an instrument to rating specific planning skills, since the student is the one who defines its goals and objectives.

### BRAZILIAN GAME RATINGS

Many different classifications have been made by scholars in Brazil. According to Mayer (2009), Barçante &

Castro Pinto (2007) and LaCruz (2004) the classifications are as follows.

- a) As to the means of results examination: the computerized ones – are those in which the calculations and reports are issued via computer; the manual ones – calculations and reports are made manually;
- b) Regarding functional areas: General Administration Games – which simulates all functional areas integrated, without excluding anyone; Functional Games – which focuses on a specific business unit of the company;
- c) Regarding the interaction between the teams they are classified as: interactive – in which decisions of a company affect the outcome of the other; Non-interactive – in which decisions of an enterprise does not affect the outcome of the other;
- d) Regarding the sector of the economy they can be: Industrial, commercial, financial and services;
- e) About the response time, S&G exercises can be in real time, through correspondence and by remote processing;
- f) About the basic nature of the game: Systemic Games with emphasize the functioning of a system; Human Games – addressed to the problems of human variables present in negotiations; and Mixed Games – which have systemic and human components;
- g) Regarding functional areas it has the General Games in which oligopolist industrial enterprises compete between them; the Specific Games is designed for a specific company from the modelling of its sectorial activities; Sectorial Games that simulate enterprises of a sector of the economy; and functional games, where the model emphasizes a function within the company;
- h) Regarding the skills involved, there are Behavioral Games, which are designed for personal development, emphasizing behavioral skills. The Process Games face the managerial development, which emphasizes technical skills, and Market Games, which emphasizes marketing technical skills;

### Exhibit 3

#### Ranking of Universities with two or more dissertations on S&G in Brazil

Brazilian Universities	Number of dissertation
Universidade Federal de Santa Catarina	25
Universidade de São Paulo	12
Universidade Federal de Santa Maria	10
Universidade Federal do Rio de Janeiro	5
Pontificia Universidade Católica de São Paulo	4
Universidade Federal do Rio Grande do Sul	3
Universidade Estadual de Maringá	2
Universidade Federal da Bahia	2
Universidade Federal do Ceará	2
TOTAL	65

- i) Regarding the technology used, it has: the first generation games that are developed for large computers; 2nd generation games developed to operating systems with simplest programming language (PC); and 3rd generation games which have features like friendly interactivity, graphical environments, scenarios simulations, and system diagnostics based on artificial intelligence;
- j) Regarding to educational goals there are the Edutainment Games, which aim to teach in a fun way using a playful mechanism for associating pleasure with learning; and Analysis Games which aim to study a kind of business or some aspects of a business without using playful mechanisms;
- k) Regarding the way to use, the games can be classroom games (pen and paper), board games, computer games, e-mail games, book-game and dramatization (roller playing game-RPG);
- l) Regarding mathematical models there are the type 0 (zero), using statistical models; type I, which involve few dimensions and are deterministic; type II, make use of disturbs model; type III models, which include chaotic systems and type IV, based on probabilistic models;

In a research based on Brazilian Digital Library of theses and dissertations of the Ministry of Science and Technology, and in the menu theses and dissertations of CAPES using the keywords "Business Game, Game, Company Game, Game Theory and Simulations" we found the information presented in Table 1.

The Table 2 shows the ranking of Universities which have two or more theses defended related to S&G and Table 3 presents the ranking of Universities which have two or more dissertations defended related to S&G.

At about Brazilian Congress publications, we use six events as sources of information: three in administration and three in engineering, because they are events that bring together and have the largest number of articles about S&G. The information were collected in the online annals of the following events: Brazilian Congress of Engineering (COBENGE) between 1999 and 2009; National Meeting of Production Engineering (ENEGEP) from 1994 to 2010; Symposium on Production Engineering at UNESP (SIMPEP) between 2000 and 2010; Meeting of the

National Association of Post-Graduate Studies and Research on Administration (EnANPAD) between 1990 and 2010; Meeting of the National Association of Graduate Programs in Business Administration (EnANGRAD) between 2004 and 2010; Seminars in Administration (SEMEAD) between 1998 and 2010, as could be seen in Table 4.

It would be highly relevant if we got to know the number of articles about S&G published at CAPES Journal.

Other professionals are developing studies on S&G in Brazil. According to a simple search made in the Lattes platform, only for D.Sc. researchers, using the term "Business Games" we found 1,241 results. When it was included in the search "Other researchers", 2,815 results were found. This shows that S&G is in full process of consolidation in Brazil.

## CONSIDERATIONS AND CONCLUSIONS

When students take a single decision in a Business Game, they use a high level of rationality, as well as they try to visualize the consequences resulted from each possible alternative. Whenever they see the actions with their respective consequences, they make use of a pre-established mental model. However, when they need to take a decision with high level of complexity it is necessary to properly evaluate the available information, in a logical and coherent way.

Pidd (1998) asserts that someone can only model anything if observing the surroundings; and the sustainability represents precisely this: to observe all things around so that the management of the environment takes place under strict supervision.

The validity of a business simulation is a subject standing in the scientific research about S&G and is being discussed extensively, in a non-univocal way (Gosen, Niigata & Washbush, 2004; Grossler, 2004; Faria, 2001; Malik & Howard, 1996). However, through an integrated process of design, implementation and validation is possible to achieve success at the Academy with the use of S&G. It is important to note that there isn't any methodology developed that can determine which impact the S&G learning has on managerial success in the real world. Barçante (2007) says that there is no evidence that a good player means a good manager and vice-versa.

### Exhibit 4 Articles about S&G published in Brazilian scientific events

Scientific Events	Until 2000	From 2001 to 2010	TOTAL
ENEGEP 1994-2010	18	52	70
SIMPEP 2000-2010	1	22	23
COBENGE 1999-2009	5	14	19
EnANPAD 1990-2010	8	52	60
EnANGRAD 2004-2010	-	8	8
SEMEAD 1998-2010	1	43	44
TOTAL	33	191	224

Finally, S&G must be designed with extreme caution, taking into consideration the essential criteria such as complexity and realism, the depth of content and the method of execution. The authors believe that the Brazilian researchers who work on S&G have presented objective evidence that this is a fact, and hope this article should be the cornerstone to establish BRASIMGA – Brazilian Simulation & Gaming Association.

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