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**ABSTRACT**

**THIS PAPER PRESENTS SOME OF THE RESULTS OBTAINED FROM A BROAD SURVEY WHICH IDENTIFIED THE MAIN EDUCATIONAL ASPECTS OF BUSINESS GAMES IN BRAZIL. IT IS BASED ON THE SELF-ASSESSMENT OF 659 PARTICIPANTS: UNDERGRADUATES, GRADUATE STUDENTS AND BUSINESS PEOPLE. THE RESULTS OF THE FACTOR ANALYSIS - TEN FACTORS ACCOUNTING FOR 65.8% OF THE TOTAL VARIANCE - SHOW THAT COGNITIVE LEARNING (30.7%) WAS THE MOST IMPORTANT DIMENSION SUMMARIZED BY 38 VARIABLES STUDIED AND SATISFACTION (3.9%), THE FIFTH ONE. RATHER THAN BEING JUST PLEASANT AND INVOLVING, AS SUGGESTED BY CRITICS, BUSINESS GAMES WERE SEEN BY STUDENTS AS A RICH AND DIVERSIFIED OPPORTUNITY TO GAIN COGNITIVE (30.7%), COOPERATIVE (4.1%), COMPETITIVE(3.6%) AND AFFECTIVE (3.2) LEARNING.**

**Introduction**

In times of democracy and economic recovery, education becomes an important goal of the Brazilian authorities. As the economy opens up, Brazil attempts to become an internationally competitive country? joining the new common market of LAFTA (MERCOSUL). External ties have been reinforced and the idea of citizenship at different social levels has been emphasized. The management of resources becomes result oriented, based on a new model of managerial competence, in which business people take on an important role, leading the irreversible process of change. After so many years of waning and preparation, the distant future is now approaching (Sauaia 1995:1). Managerial education, previously reserved for an elite, has now become widespread. Performance levels, which were defined as static references, have become flexible targets. Traditional classrooms are turning into laboratories” (Larréché 1987:565) complementing on-the-job training. The student or professional preparing to become a manager

is subject to two kinds of demand:

- a) To acquire knowledge pertaining to the science of administration and to continually widen his knowledge base: *cognitive learning*
- b) To develop technical and behavioral skills in the application of knowledge, to practice the art of administration, to affectively and emotionally interact with people at work and share a satisfying atmosphere:  
*affective learning.*

The, traditional education, based on accumulating memorized information regarding the management science is no longer suitable. Academic institutions may fail unless they concentrate on the cognitive and affective development of the student, the two areas proposed by Rogers (1972:4). In order to extend the use of business games in Brazil, we tried to answer the questions:

- Do they actually result in learning, or, as critics say, do they just bring an atmosphere of pleasant and relaxing play? These are the central points of this survey.

**Business Games in Brazil**

Despite being introduced in the seventies, the use and the study of business games in Brazil is still limited at just a few of the larger Business Schools. At the Faculty of Economics, Administration and Accountancy (FEA) of the University of São Paulo, four dissertations have examined the theme from the conceptual and methodological points of view. Business games have been examined as a teaching method in Administration and as an instrument of research (Tanabe, 1973). The teaching-learning question was discussed by Beppu (1984) who presented a “proposal for practical teaching”, a model of manual application for undergraduate courses in Accountancy. Martinelli (1987) focused on “Business Ecology”. Using these concepts as a basis, he examined advantages and disadvantages of 25 games.

Sauaia (1990) studied the technology and practice of business games through a review of the literature, considered at the time to be limited. He looked at the experience-sharing aspects of games, conceived and applied the first version of the Learning Assessment Questionnaire and produced a data base with

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the responses of 573 participants in 1988 and 1989. A dichotomic analysis showed that:

- a) There was a wide acceptance of the method by participants (83% said that the business games offered learning with greater participation and benefit)
- b) Games showed to be used very little (90% were taking part for the first time).

Catelli (1993) developed a business game model for management control - GECON. This exercise works with companies manufacturing steel products and deals with "the management and information systems", where the market is represented by the instructor.

### Learning Theories

Various authors have discussed the theme of learning (Hilgard 1973; Bigge 1977; Ferrández *et alli.* 1977; Rogers 1972). Rogers (p. 4-5) classified learning into two general types, saying that at one extreme one finds the learning of meaningless syllables, memorized with difficulty and soon forgotten. Such learning deals exclusively with the brain and has no involvement with personal feelings. In contrast, Rogers's experiential learning is full of meaning. II:

- a) Involves the whole person both affectively and cognitively;
- b) Comes from within the learner. Even when the first stimulus comes from outside, the sense of discovery, achievement and understanding come from within;
- c) Penetrates the learner and brings about changes in his personality;
- d) Can be evaluated by the learner, who will know whether it is meeting his needs and clearing up his doubts;
- e) Is meaningful and is part of the development of the whole of the learner.

Rogers' ideas lead to some fundamental questions: Are business games, in the way they have been used in Brazil, a complete educational experience? Do they provide *cognitive* and *affective learning*, providing the involvement mentioned by Rogers? Are they vehicles of meaningful learning, the most important quality of experiential learning?

### Hypotheses of the Survey

Almost all of the literature in this area comes from outside Brazil. In the previous survey (Sauaia, 1990), business games showed a high level of satisfaction and

proved to be preferable as educational method to lectures and seminars. In order to establish a set of variables for a model describing options for instructor intervention (Keys and Wolfe, 1990:317), the central problems of this survey in Brazil were defined as:

- 1) What are the main variables to be found in business games?
- 2) What are the critical dimensions summarized by the variables studied?
- 3) What is the relative importance given by participants to the elements of *satisfaction* and *learning* in business games?

As a consequence, the following hypotheses were defined in order to help us make comparisons with proposals in the international literature:

H<sub>0.1</sub>: The typical elements of business games are not present in the programs analyzed;

H<sub>0.2</sub>: If they are present, satisfaction has a greater explanatory power than learning.

### Methodology of the Survey

*All scientific psychology should take into account total situations, that is, the state of the person and of the environment. This implies the need to find ways of representing the person and the environment in common terms, as part of the situation* (Kurt Lewin).

This survey combined field research and laboratory conditions. A questionnaire was completed in 1993 and 1994 by participants in the 26 programs studied. The simulated environment was set up with a version of *The Executive Game* (Henshaw and Jackson 1979). This game is not complex and could easily be adapted to different educational objectives. Byrne (1979) considered *The Executive Game* a relatively simple but a viable management training environment because the simulation allowed participants to engage in 8 of 10 managerial roles and skills found by Mintzberg (1973) (Keys and Wolfe, 1990:313)

The Learning Assessment Questionnaire Similar surveys made by specialists in business games used questionnaires which attempted to identify the main dimensions in the programs. Miles *et alli* (1986:14) formulated a questionnaire with 28 items, on a 6-point Likert scale, combining questionnaires produced by Chisholm *et alli* and by Byrne, both in 1979, in order to verify the learning effects in a comparative study of different educational techniques such as lectures, simulations and case studies. They also quoted the study of Anderson and Woodhouse (1984: 14), who compared lectures, simulations and case studies. The authors believe the three educational methods

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help in the acquisition of knowledge, behavior and skills, though in different degrees.

As well as the study of Miles *et al* (1986), we observed the behavior of those who took part in the first business games programs, administered in 1988 and 1989, as a reference for development of the questionnaire. These replies were an important element to make up the final version of the questionnaire. Based on previous works (Wolfe 1985; Miles *et al*. 1986; Segev 1987; Archer 1990; Sauaia 1990) and on the idea that instrumental questions should be based on directly observable structurally-related facts, these elements were identified:

- a) Self-evaluation (Miles *et al* 1986:20-1) - An open question asked for the strong and weak points of participants;
- b) Complexity of the decision making structure proposed by the simulated company environment (Keys and Wolfe 1990:309), also discussed by Hall and Cox (1994:34);
- c) Previous participation in business games;
- d) Involvement in the phases of the program (Sauaia 1990:141 -2): ‘Presentation, “Simulation” and “Evaluation of Results”’
- e) Beneficial stimuli and motives (Archer, 1990:6);  
~ Resulting educational benefits such as knowledge, skills and behavior, according to the structure proposed by Bloom (1959) and studied by Ferrández *et al* (1977: 75-81);
- g) Objective performance of simulated companies measured by “return on equal to the rate (Wolfe 1985:282; Segev 1987:573);
- h) Educational approach offering greatest participation and benefit: lectures, simulations and games or seminars (Miles *et al* 1986:19);
- i) Understanding the rules of the game, which is partly responsible for the learning process in the program (Philipatos and Moscato 1971; Jackson 1995:42);
- j) General opinion regarding enthusiasm, involvement, interest and learning through business games (Steinmetz and Patten 1967:34)

In order to describe the participants’ opinions, 38 variables were adopted (Figure 1):

Figure 1 - Opinion Variables

Aspects Measured	Variables
Preferences related to the structure of the program	7
Intensity of involvement in the phases of the program	3

Degree of importance of the stimuli and the motives	9
Intensity of the benefits attained	9
Favorite educational method	3
Level of understanding of the rules throughout the Game	5
Performance of the simulated company	1
Overall opinion (degree of satisfaction with the program)	1
Total number of variables	38

### Program Design

The following structure was adopted for the business games surveyed:

1. Identification of the Educational Objectives;
2. Creation of scenarios, the economic environments of the simulation;
3. Creation of work teams based on the profiles of the participants;
4. Presentation of the contents of the program to the participants;
5. Experiential team work, bounded by the complex problem of the game;
6. Evaluation of the results by the participants;
7. Final seminar for the teams to share their strategies;
8. Application of the learning gained in the simulation to real life situations;
9. Completion of the questionnaire of this survey;
10. Sharing of each participants main insights.

### Criteria for Data Collection

The sample was set by questionnaires correctly filled in 1993 and 1994. As suggested by . authors, considerable methodological care was taken including the following steps:

- a) The majority of the survey (86.3%) was made with a population of company professionals in order to obtain generalizable results. Of the total of 659 respondents, only 90 (13.7%) were undergraduate students (as advised by Keys and Wolfe 1990:324);
- b) The simulated company model worked with an unspecified product and used fictitious names in order to ensure concept-based learning (Keys and Wolfe 1990:324),
- c) Multivariate analysis were adopted to analyze the primary data as the business games experience is rich in elements that may simultaneously vary and can be studied together, according to Bass (Keys

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- and Wolfe, 1990:318) and Wolfe (1985: 282);
- d) Emphasis was given to the realism of the simulated environment, taking great care with the terminology and the business environment for the managerial role simulation, as McGrath (1982) in Keys and Wolfe (1990:323) mentioned;
  - e) The four dimensions recommended by Snyder (1994:16-17) orient this survey:
    - ease of playing the Game: a moderately complex model was used;
    - scope of company functions: different managerial functions could be put into practice (marketing, finance, production, planning, and the board of directors);
    - theory: the programs were based on Business Administration, Accountancy and Economics theories;
    - adaptability of the simulation to the educational objectives and to different groups: the team and program structure were based on the profile of participants and educational objectives proposed by the program coordinators;
  - f) The mathematical model adopted has, according to Byrne (1990), internal validity - consistency of the functions of the model and of the way the simulation represents the real world. According to Wolfe (1985), it also offers an external validity, an applicability of the concepts to the real world;
  - g) The time as a variable: synchronized time, equal for all the participants, was established by the instructor; and the possibility of benefits resulting from spontaneous anticipation was given to the participants. This resulted in actions being taken asynchronously, and rewarded differently, as recommended by Thavikulwat (1994:13);

- h) The designer and instructor for all the programs surveyed were the same person, ensuring uniformity and consistency, both in the preparation and implementation of the laboratory environment and in the procedures for the data collection.

The questionnaires completed by participants at the end of each program were the actual material used for the multivariate analysis. This avoided errors transferring data. The game administrator cleared it up the participants' doubts that might have biased the replies.

### Data Processing and Result Analysis

*All more elaborate learning theories recognise that behavior is a function of different variables at the same time*

(Hilgard 1973:358).

A component factor analysis was used to reduce the variables to a smaller number of factors in order to represent the main dimensions present. Data processing, made in SPSS, found 10 orthogonal factors summarizing the original variables as they showed *eigenvalues* above 1. The *communality values* (see following tables) show the proportion of variance of each variable explained by all common factors. On the other hand, the *eigenvalue* related to each factor expresses the amount of variance of all the variables explained by the factor. After an A-type factor analysis (grouping of variables instead of individuals) was applied, 10 factors resulted of the linear combination of 38 opinion variables (Table 1), accounting for 65.8% of the total variance.

Table 1 - Experiential Learning Factors in Business Games

Order	Type	<i>Eigenvalue</i>	Percentage of Variance
1	Cognitive learning	11.664	30.7%
2	Experience parameters	2.545	6.7%
3	Complexity	1.984	5.2%
4	Cooperative learning	1.549	4.1%
5	Satisfaction in business games	1.491	3.9%
6	Competitive learning	1.383	3.6%
7	Affective learning	1.999	3.2%
8	Teaching method	1.118	2.9%
9	Team performance	1.053	2.8%
10	Learning atmosphere	1.004	2.6%
Total variance summarized by the 10 factors			65.8%

According to Hair Jr. *et alli* (1995), in the social sciences where the information is often less precise, it is not uncommon to consider

acceptable the solution that accounts for 60% of the total variance as a satisfactory solution. Each orthogonal factor is associated with a sub-group of

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variables. They define the underlying dimensions of the learning process that took place in the games. Hair Jr. *et alli* (1995: 384-5) also consider factor loadings above 0.30 of minimal significance. Those above 0.40 are considered more important, and above 0.50 are considered significant. They suggest minimum populations of 350, 200 and 120 people respectively with these factorial loads. As a consequence of the size of the population (659 questionnaires), the minimum restrictions to ensure meaning and quality for the results were made. The first orthogonal factor shows significant factor loadings in 21 variables of different sections in the questionnaire (Table 2). The most significant factor loadings (above 0.70) summarized the variables related to the main “*educational benefits*” noticed -knowledge, skills and behavior - the well-known trio on which education is based. The other variables also have significant factor loadings between 0.51 and 0.30. When examining the greater factor loadings summarizing this factor, we conclude that participants recognised *cognitive learning* rather than *satisfaction* as the most important dimension. The second group of variables that most contributed is that of “beneficial items”, and, finally the third group

refers to the Nievel of understanding of the game rules” taking place during the simulation phase. Twenty one variables, out of 38, make up the main factor in this analysis, accounting for 30.7% of all the variance of the 38 variables. It should be emphasised that variables like the method “simulations and games”, the overall opinion”, the “game administrator and the teammates” -everyone who underwent the experience - were also included. This factor was called “*cognitive learning*”, through which participant realizes he is obtaining various benefits in the form of knowledge, skills and behavior. In addition to the learning of concepts, they become aware of the game itself, of the dynamics in the environment set, showing his own rules and characteristics. They learn to work as a team as they compete each other, bringing their expectations and interests to the program and sharing them with the game administrator who supports, helps and challenges them. They learn through dialogue, lose their doubts and look for essential information which may turn into competitive advantages. They work in a challenging but protected environment, which gives them the security to take risks.

Table 2 - Factor 1: Cognitive Learning

Variables	Factor loadings	Commonality
Practising control of the results	.788	.704
Acquiring new knowledge	.769	.725
Adapting to new situations	.761	.728
Making analogies with work	.758	.671
Updating knowledge	.756	.674
Practising decision making	.753	.725
Integrating knowledge	.727	.692
Attempting to explain the results	.725	.654
Practising problem analysis	.711	.682
Interest in the subject	.514	.673
Method: Games and Simulations	.481	.559
Atmosphere of the game	.462	.636
Competition among companies	.448	.538
Understanding of the rules in the final evaluation	.419	.665
Expectations of the experience	.384	.689
General opinion	.363	.535
Understanding of the rules of the simulation	.349	.724
Understanding of the rules in retrospective	.335	.724
Game administrator	.324	.475
Teammates	.305	.516
Loss prevention	.301	.622
Eigenvalue = 11.664		Percentage of Variance = 30.7%

The fourth orthogonal factor (Table 3) explains 4.1% of the total variance and associates the variables connected to the phases of the program - “the simulation”, the “review of events” and the “final evaluation of the results”, which

provide an understanding of the rules of the game”. The “review of the events”, the first sharing in the Game at the end of the competition, has the highest factor loading (0.738). The “final evaluation of the

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Results” (0.665) also allows for a more shared learning when compared to the “simulated management”. Here, the competition and the shortage of time concentrate the attention of the player on the managerial decisions

of his team. This has been called the phase of ‘Cooperative Learning’ and can be associated with the “perceptive/reflexive phase” as proposed by Kolb (1976) and Jackson (1995:42).

Table 3- Factor 4: Cooperative Learning (perceptive/reflexive)

Variables	Factor Loading	Communality
Understanding of the rules in the review of the events	.738	.724
Understanding of the rules in the final evaluation	.665	.665
Involvement in the final phase	.528	.616
Understanding of the rules in the simulated management	.501	.724
Eigenvalue = 1.549		Percentage of Variance = 4.1%

The fifth factor (Table 4) clearly summarizes the *satisfaction* associated with the “Business Games” method. The variables “taking part again in this game” and “taking part in other games” account for this factor as they have high factor loadings over 0.70. On a lower level (0.40), one could find the variables “preference for Games and Simulations” and “overall opinion”, also connected to the *satisfaction*. The sixth factor (Table 5) explains 3.6% of the

variable longer duration has the lowest loading (0.420). This factor was called Satisfaction in Business Games. The opinion presented here is associated with the general preference for the method itself, indistinctly referring to “this Game” and to “other Games”, showing a clear hope of players to take part in further games in the future.

the participant is to understand the business problem

Table 4 - Factor 5: Satisfaction in Business Games

Variables	Factor Loadings	Communality
Participate again in this B.Game	.783	.723
Participate in other B.Games	.710	.723
Preference for B.Games and Simulations	.459	.559
General opinion	.433	.535
Longer duration	.420	.601
Eigenvalue=1 .492		Percentage of Variance=3.9%

variance. The “initial presentation” (0.869) in which teams are formed and the “trial round” (0.834) show high factor loadings. In these phases, dominated by individual and team competition, there is a general atmosphere of competition, sharing and cooperation remaining in the background. The major challenge of

during the presentation phase, and to be able to perform well in the “trial round” and the “simulated management”. This factor was called “Competitive Learning”, linked to the ‘concrete experience’ of Kolb.

Table 5- Factor 6: Competitive Learning

Variables	Factor Loadings	Communality
Understanding of the rules in the presentation phase	.869	.803
Understanding of the rules in the trial round	.834	.797
Understanding of the rules in the simulated management phase	.517	.724
Eigenvalue = 11.664		Percentage of Variance = 3.6%

The seventh factor (Table 6) explains 3.2% of the total variance and combines five variables from the same section of the questionnaire. involvement in the presentation” heads the list (0.784), followed by

“involvement in the simulation” (0.63). In the variables “interest in the subject, “involvement in the final evaluation”, and “competition between

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companies”, the factor loadings are above 0.30 and help the involvement of the learner. The “Learning Theories” relate involvement, in the learning

experience, to the affective element. This factor was thus called “Affective Learning”. Kolb (1976) called it “active experiencing”.

Table 6- Factor 7: Affective Learning

Variables	Factor Loadings	Communality
Involvement in the presentation	.784	.726
involvement in the simulation	.630	.728
Interest in the subject	.430	.673
Involvement in the final evaluation	.389	.616
Competition between companies	.304	.538
Eigenvalue = 1.200		Explained variance = 3.2%

Using these results as a basis, we can reject both the null hypothesis H0.1 of the inexistence of elements such as satisfaction and learning, and the null hypothesis H0.2 because, in the opinion of the respondents, *cognitive learning* (30.7%) is much more important than *satisfaction* (3.9%). The structure of the questionnaire was shown to be coherent (coefficient  $\alpha > 0.93$ ) and adequate for using in future surveys.

### Conclusions

1. The application of the factor analysis produced 10 dimensions that summarize *satisfaction* and *learning* in Business Games. The most important (accounting for 30.6% of the variance of the variables) was “Cognitive Learning” and this indicates that the Games were seen by players first as *learning* experience that also brings *satisfaction* (3.9%) i.e., a mean of gaining knowledge, skills and behavior in a pleasant and joyful environment. Another eight important dimensions were identified: “cooperative learning”, “competitive learning”, and “affective learning” accounted for the complementary aspects of the experiential learning (Rogers, 1972);
2. In contrast to traditional approaches, the participants were more involved, truly engaged with the learning task. They were aware of their strong and weak points and behaved as researchers involved with his team work. Treating players in a more responsible way, his colleagues and the Game administrator made the anxiousness for the end of the program be substituted by a feeling of sadness at the end of the game.

The results of the “factor analysis” bring opportunities for business games administrators to design

experiential programs. Greater control will be taken in the learning process by focusing on specific variables summarized by each of the following factors: cognitive learning; parameters conditioning the experiential learning; the complexity of the program; cooperative learning; satisfaction; competitive learning; affective learning; performance evaluation criteria; and the atmosphere in the experiential learning.

### Limits of the Study

*Global practices tend to favor the most able learners..* .Clarke and Clarke (1958)

The data collection was concentrated in the South and Southeast parts of Brazil and defined a group of characteristics of this region, a bias that prevents from generalizing the conclusions. The same business game model was used for all the programs, what means an advantage in the experience gained by the game administrator. The lack of diversity in the use of different games might represent a concentration of risks and therefore can be seen as a disadvantage. The game administrator was subject to natural fluctuations of mood, and there were different degrees of empathy with the 26 groups of students, what might have affected the primary data. The setting, the infrastructure and the moment when business games was presented in more extensive educational programs may all have had positive or negative effects on the opinions. In order to fit the submission format, results obtained from other multivariate techniques in this survey will be reported later.

P.S.: Bibliography and more information may be obtained from the author at the address: [asauaia@usp.br](mailto:asauaia@usp.br).