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LEARNING STYLES INFLUENCES ON SATISFACTION AND PERCEIVED LEARNING: ANALYSIS OF AN ONLINE BUSINESS GAME

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ABSTRACT

This paper aims at verifying the existence of influences of learning styles on satisfaction and perceived learning, considering participants of a Brazilian nationwide online business game (SEBRAE Challenge). The sample consists of 46 undergraduate students (Accounting & Business). After determining each student's learning style (according to Kolb's experiential learning theory), we analyzed the differences of satisfaction and perceived learning based on each observed learning style. The findings show that all learning styles proposed by Kolb's theory were present within the sample, and that no evidences were found in terms of individual learning styles' influences on satisfaction and perceived learning.

INTRODUCTION

More than ever, it is seemingly impossible to disregard technological advancements and the respective impacts in our lives. Such changes even affect the way we analyze and promote education in a broad sense, as well as in business education (Theóphilo, 2002).

It is evident that we need to rethink business education, updating all the means to current needs. In this track, the *Intergovernmental Working Group of Experts of International Standards of Accounting and Reporting – ISAR,* within the *United Nations Conference on Trade and Development – UNCTAD* conducted various meetings aimed at proposing a global curriculum model directed to accountancy postsecondary programs. This model bears not only the components of a qualification system to accountants – including techniques, skills, and desirable values required for the graduation (UNCTAD/ISAR, 1998a), but also the contents that should be considered as a guide in order to prepare and organize a program in tune with the global needs within the field (UNCTAD/ISAR, 1998b).

Regarding the required skills in terms of the accounting profession, the mentioned proposed model highlights the following idea (UNCTAD/ISAR, 1998a, p. 5): "It is not sufficient for aspiring professional accountants to posses only theoretical knowledge. Accountants must also have ability to apply theoretical knowledge to practical, real-life situations, by obtaining, analyzing, interpreting, synthesizing, evaluating and communicating information."

Considering these arguments, it is clear that we need to promote a different business education, allowing students to experience, in a more significant way, the environment in which they will act professionally: the business environment. It is required to change the focus, from a less creative education environment, full of lectures and deeply based on textbooks (Albrecht & Sack 2000, p. 43; Sauaia, 2003) to a new approach, including, as mentioned by Albrecht & Sack (2000, p. 64): "some elements of group work to teach leadership and working together, role playing to teach negotiation, technology assignments to teach technology, and larger projects to teach project management."

Such need is stressed by the U.S. Department of Education that determined in 1991 as a national education goal, the enhancement of critical thinking in college graduates. The current literature review shows that business programs' curricula approach critical thinking skills in three ways: problem-based learning, course-content-embedded learning and as an element underlying other pedagogies (Braun, 2004).

In this way, the business game teaching approach, characterized by its simulation capabilities of activities of an organization, bearing distinct complexity levels, while also allowing interactions with an also simulated economic environment, appears as a valid teaching alternative supporting students concerned with exercising planning, as well as developing top-level decision making skills (Fripp, 1984).

The mentioned comments and ideas highlight the possibility of using business games as a teaching technique that may support the achievement of current demands of business education. Student's autonomy stimulated through the business game approach is expanded when it is applied online, based on communication resources and the Internet. On the other hand, the use of online business game as a teaching tool is a barely explored issue in Brazil. In this

way, in order to understand the online business game approach it is important to study people who experienced it, analyzing their own traits and impressions while attending this type of business game.

Thus, this paper aims at verifying the existence of influences of the learning styles on the satisfaction and perceived learning, considering participants of an online business game.

LITERATURE REVIEW

Studies on learning have distinct approaches while trying to comprehend how people learn and the conditions of learning, as well as considering the attempt to identify the role of the agents and their instruments to facilitate learning.

Psychology and education literature bears alternative theories and concepts in terms of learning. In general, there is a behavioral approach considering learning as a long-lasting behavior change of the individual, ignited by several stimuli, changing his thoughts, feelings, and actions (Gagné, 1985; Gil, 1997; Libâneo, 1994; McKeachie, 2002).

When aiming at promoting changes in behavior, aptitude, and knowledge, the experiential learning cycle is regularly applied (Keys & Wolfe, 1990). Kolb's experiential learning theory justified the use of rich, active learning environments, of which business games are a specific type.

These ideas from Keys & Wolfe indicate that, when related to business game facilitated learning, the experiential learning cycle, as proposed by Kolb (1984), should be considered. This affirmation is stressed by Fripp (1984) while discussing the use of business games in managerial training: "The best known theoretical approach to learning, which supports the need for managers to have an active orientation and, at the same time, a more passive and thoughtful one, is due to Kolb".

On the other hand, using Kolb's learning styles inventory presents some questioning regarding its adequacy. Authors like Freedman and Stumpf (1978, 1980) question Kolb's instrument accuracy as well as his experiential learning theory. On the other extreme of this issue it is possible to find authors like Bostrom et al. (1993) and Wyrick (2003) attesting the validity of the mentioned instrument.

In this sense, this paper considers that the learning theory supporting business game methods and techniques is the experiential learning theory. According to Kolb (1984), this occurs when a person gets involved in some activity, develops a critical analysis, extracts some useful concepts, and applies the results.

Business games support learning through experiences that represent the dynamics of an organization. In order to facilitate learning, all the phases of Kolb's experiential learning cycle should be equally explored.

According to the analyzed literature, certain people bearing specific learning styles tend to prefer a particular subject area: "(…) divergers have careers in the humanities and social sciences, assimilators prefer to work in the natural sciences and math related fields, and accommodators enter business and social professions. Convergers tend to be ones whom enter science-based professions like engineering" (Wyrick, 2003).

Such characteristics may influence students' preferences for specific teaching methods rather than others.

One of the relevant parameters of this research is the perceived learning of business games participants. Learning theories develop the idea of learning through an internal (mind) or external (behavior) approach. In addition, perceived learning and actual learning are different ideas, representing another way of analyzing learning.

On this particular issue, Johnson et al. (1996) highlight that perceived learning within a business simulation framework may be "defined as the self-evaluation by the participant as to the knowledge and skills acquired during the simulation", and the authors found useful the adoption of perceived learning to support the teaching and learning process, due to the fact that involvement and perceived realism presented relationships with perceived learning.

In this sense, it is required to develop an instrument capable of recognizing such learning from the standpoint of the own participant's perception. In other words, there is a decision of considering the participant's feelings related to his learning from experiencing a business game.

Therefore, this paper measures the business game participant's perceived learning using the educational taxonomy of learning objectives as proposed by Bloom (1954), and reviewed by Anderson & Krathwohl (2001), using the concepts related to the cognitive process dimension. This taxonomy, according to Bloom (1954) aims at students' expected explicit changes considering the educational process. It is also important to consider that learning expectations and actual learning are different ideas, even observing relevant relationships between them (Claxton and Murrell, 1987).

Inspired by these objectives, Brazelton (2000) stresses that "the purpose of Bloom's taxonomy is to distinguish between memorized knowledge and intellectual activities involving different abilities and skills."

Bloom's taxonomy involves a set of cognitive changes in an increasing sequence, from the more simple to the more complex one. On this particular aspect, and relating the idea to this research, it is worth to mention that measuring changes in cognition (Winitzky and Kauchak, 1995) does not mean measuring behavior change: people may know what to do, but they may not do it.

However, knowledge is the basis for all cognitive processes becoming required by all other subsequent levels of the considered taxonomy. When the knowledge increases, other levels appear, resulting in ever-increasing abilities.

Business game participants' satisfaction level has been studied by several authors (Fripp, 1984; Olivas; Newstrom, 1981; Sauaia, 1995), and it is possible to find consensus on the reviewed literature regarding the use of business game approach within an educational environment and the increase in participants' satisfaction and motivation. On the

other hand, such studies are focusing on the business game use based on face-to-face settings, characterized by the physical presence of instructors and learners in the same physical environment, at the same time. However, it is convenient to state that there is no consensus among participants in terms of the satisfaction level created by business games. Some students prefer other teaching methods, such as the case approach, instead of games.

The experience focused by this paper was developed within a distance education environment, and as a result, it was not based on the face-to-face paradigm, while relying on computers. Therefore, there is a concern related to investigate participants' satisfaction in the light of a non-traditional environment.

In this sense, considering the business game object of this research, it is important to observe that the decision-making activities always occurred on a face-to-face basis. This is because the team was able to use only one computer (always the same computer during the entire process). Thus, the team had to meet adopting a face-to-face approach in order to decide and deal with the whole online environment. By using the online environment, this particular business game was promoting the participation of geographically spread teams.

The growing expansion of distance education based on the use of new technologies, mainly the Internet (Arbaugh, 2000; Arbaugh; Duray, 2002), brings the need to evaluate students' satisfaction level in terms of this alternative way of education. Researchers have normally used this parameter as part of the assessment of computer-based distance education (Davis, 1989; Arbaugh; Duray, 2002). Student's satisfaction level in terms of distance education, based on information technology is a determining factor to evaluate the need for reviewing and promoting changes in the employed technology (Davis, 1989).

In this sense, the student's satisfaction can be understood as a level of his contentment in terms of how the business game experience is conducted. This evaluation aims at measuring his contentment level regarding the virtual environment organization, student's self-evaluation, and team performance during the game experience.

If, by one hand, the distance education can bring an educational performance increase, in several senses (Arbaugh; Duray, 2002), by the other hand, the innovation on the employed methodology, along with the use of new technologies may interfere inhibiting this gain, mainly considering the different relation between the user and the means to promote the educational activity. Studies like the one conducted by Davis (1989) have been demonstrating that student's satisfaction in distance learning environments is strongly related to the perception of technology utility and ease of use. This perception of utility and ease of use may be measured through identification of users' satisfaction level (Medeiros & Cybis *apud* Teixeira et al., 2002).

People use a specific instrument, according to its capacity of helping them while improving their work performance, which is called the perceived utility. However, even though a user can be convinced of the instrument's utility to his work performance improvement, the decision of using it still requires the assessment of the difficulty level of operating it. This is the so-called cost and benefit evaluation, where the user will use certain instrument while it is capable of bringing more benefits than the required efforts to use it. This is called the perceived ease of use (Davis, 1989).

According to Bertoletti et al. (*apud* Teixeira et al., 2002), for a technology to achieve success and to be effectively used, it is required to be useful to a specific audience, to be easy of understand and use, and to bear an attractive interface, stimulating the user while calling his attention. These authors still stress that the relevance of evaluating the perceived ease of use due to the fact that it allows the identification of problems that may harm user's interaction, many times responsible for frustration, anxiety, and bad performance. But, although the perception of utility and ease of use is relevant, there are other factors that also contribute to user adhesion (Arbaugh, 2000; Davis, 1989).

In general, the reviewed literature presents that student's satisfaction in relation to computer-based distance learning may be associated with causes and effects. Causes are basically (not only) related to two variables: perception utility and perception of ease of use of the employed technology for class delivery (Davis, 1989). On the other hand, the effects of this satisfaction are related to the student's disposition to participate of new experiences based on this media (Arbaugh; Duray, 2002).

This paper analyses the participant's satisfaction of those who experienced a distance-learning environment involving a business game approach.

Considering that one of the goals of this paper is to determine the participants' learning styles, and specify the details of the business game environment, using the experiential learning theory, the analysis of the participants' learning styles is based on Kolb's theory (1984). When referring to experiential learning theory, Claxton & Murrel (1987, p. 25) highlight that "the theory deals not only with style but also with the more basic questions of learning and individual development". Thus, this paper is supported by this theory while discussing business game.

When dealing with learning styles, Kolb's experiential learning theory recognizes the existence of four distinct learning styles: divergers, assimilators, convergers, and accommodators. According to Carthey (1993), each style is described next:

Divergers, the first studied group, perceive information through a concrete way and process it in a reflective way. The learning occurs through listening and sharing ideas. They are imaginative thinkers that believe in their own experiences, analyze an experience through several lenses, value intuition, and work for harmony. This group is especially interested in people and cultures.

As members of the second group of Kolb's learning styles, **assimilators** perceive information through an abstract way, and process it through reflection. They use

theory and concepts to integrate their observations within what they are learning. This group needs to know the specialists' way of thinking on the particular subject and learn while thinking about ideas. They value the sequential thinking, and need details. Assimilators prefer traditional classrooms, and are more interested in ideas than in people. They also feel uncomfortable with subjective reasoning.

Convergers perceive information through abstraction and process them actively. Their learning occurs through theories' testing and common sense application. They are pragmatic and need to know how things work. They are objective, going straight to the point. They value strategic thinking and are task-oriented.

The fourth group from Kolb's theory is the **accommodators**. People in this group perceive information through a concrete way, and process it actively, integrating experience and application. They learn through trial-and-error. They are enthusiasts of new things, bearing an easy adaptation. When confronted by a theory that cannot support facts in a similar way as they can see, they start to dispose the theory.

Ramsay, Hanlon, and Smith (2000, p. 225) present one specific reason to be concerned about studying learning styles of accounting majors:

> Some authors have suggested that students should not be forced to use learning approaches that do not suit their cognitive style. The future of accounting education could be that institutions and staff provide a range of learning approaches (e.g., lectures, cooperative learning activities, multimedia), allowing students to choose learning opportunities that best suit their cognitive style.

RESEARCH METHOD

The business game object of this paper is the fourth edition of the SEBRAE Challenge, developed in 2003. It is a Brazilian nationwide competition, open to all students enrolled in any undergraduate program accredited by the Brazilian Ministry of Education.

The SEBRAE Challenge aims at stimulating the entrepreneurship approach and spreading the entrepreneur culture among undergraduate students all over the country; developing managerial skills within small business; allowing participants to have a real experience in managing a virtual company.

In order to participate of the game, students must set a team of at least three and at maximum five participants, and all team members must be enrolled in postsecondary institutions of the same state.

This paper focuses on undergraduate business students (Accounting & Business) who participated of the mentioned SEBRAE Challenge. Considering team mix, according to the rules of the event, it is possible to have students from different institutions or programs in the same team.

Analyzing the main data collection techniques related to hypothetical-deductive research (the case of this paper), it is possible to find the questionnaire (Vergara, 2004).

Thus, this research uses a questionnaire as a way of gathering its required data. The fact that the questionnaire acts as a more precise data collection instrument (Oliveira, 2003) also supports its use here.

The data collection instrument used in this study is divided into four distinct parts:

Part I – Participant Profile. This part of the questionnaire aims at unveiling some information from the participants related to the intervening variables of this research.

Part II – Participant's Perceived Satisfaction. In this part, the key is to determine the SEBRAE Challenge participant's satisfaction, based on the literature review. This part consists of eight questions where the participants can disclosure their opinion using a five-point Likert scale. The questions here were adapted from the previous work of Sauaia (1995), bearing the desired validity.

Part III – Participant's Perceived Learning. This part of the questionnaire uses questions based on the reviewed Bloom's taxonomy (Anderson & Krathwohl, 2001) and aims at identifying participants' behavioral changes related to certain perceived learning.

Also considering the goals of the SEBRAE Challenge presented throughout the introduction of this study, we decided to insert three additional questions in order to identify if the participants could reach those goals indeed. In this part of the questionnaire the responses were collected using a five-point Likert scale.

Part IV – Learning Styles. This last part of the questionnaire relies on Kolb's Learning Styles Inventory. This inventory consists of 12 sentences, each one with four options that must be ranked by the respondent. Based on the answers to these twelve sentences, the participants' learning styles are determined using a predefined framework (Carthey, 1993). The response is individual, fast, and direct (Anderson, 1994).

The Kolb's Learning Styles Inventory bears a strong validity, since it had been used in more than 150 researches (Karuppan, 2001).

Mattar (1999) discusses the forms of application of this instrument in terms of variables like, cost, time, sample control, measurement uniformity, respondents' educational level, among other aspects.

Hence, considering the geographical sample amplitude involving the entire state of *Minas Gerais* (Brazil), and the particularity of this problem (online business game), we used the Internet as the means of data collecting. In this sense, a password-protected website containing the questionnaire was made available to the selected students.

Several authors of research methodology (Rea & Parker, 1997; Creswell, 2003) stress the need for gathering respondents' authorization when dealing with data collection. This is a valid concern, which offers the researcher certain warrants to the use and analysis of the

collected material. In this way, all the subjects of this sample received an eMail message explaining this research, its reasons, purpose, goals, presenting the researchers, the research code and the password, while also asking the student's participation and implicitly authorization (when filling in the questionnaire).

DATA ANALYSIS

This research started focusing only on accounting majors from the state of *Minas Gerais* (Brazil), which participated of the SEBRAE Challenge (4th edition). But, according to the rules of this event, it was possible to have students from different majors organizing a team. In this sense, the number of cases observed by this research had expanded, involving not only accounting majors, but also business majors. In summary, a total of 388 students (majoring accounting or business, from private and public higher education institutions, male and female) represent the participants from the state of *Minas Gerais*.

After sending the eMail with instructions to all subjects of the sample, a total of 61 questionnaires returned. Among these, 15 were discarded due to the fact that they referred to students who had only enrolled in the business game, without any kind of participation in the proposed activities. Thus, the sample consists of 46 answers from students bearing all the requirements of this study. Several statistical procedures were developed using the data, including descriptives and comparisons of means, with the support of SPSS® (Statistical Package for Social Sciences) version 10.0.1. Table 1 summarizes the considered sample both in terms of program and gender.

The mean age for this sample is 25.6 years (*s*= 6.1). The institution type and program hours related to this sample are presented in Table 2.

Another relevant aspect that the literature emphasizes, in terms of influence on participant's perceived satisfaction, is computer literacy. In this sense, the data collection instrument presented five options allowing the respondents to develop a self-assessment. Most of the sample (76.1%) bears skills in terms of desktop solutions (basic or advanced), meaning that during the SEBRAE Challenge phases the use of computers did not interfere on participant's satisfaction.

Another element that helps identifying participant's satisfaction refers to the general opinion about the SEBRAE Challenge. An expressive number of participants (95.7%) classifies this online business game as good or very good, the two highest concepts in the adopted scale.

In terms of participants' opinions related to their satisfaction (with the media and the business game) and perceived learning (according to Bloom's taxonomy), a five-point Likert scale was used. Table 4 presents information on this particular aspect.

Results presented in Table 4 show that all means are higher than the scale mean (three), except for the items "Agreement with time extension (duration)" (mean= 2.67) and "Development of the 'Entrepreneur Feeling'" (mean= 2.65), both bearing the highest standard deviations.

These descriptive statistics indicate that, in general, subjects considered positively their participations (SEBRAE Challenge), and presented positive assessment of both satisfaction and perceived learning during the experience.

Examining influences of learning styles on satisfaction and perceived learning, first we determined the learning style of each subject, processing data according to Kolb's theory.

Due to the fact that the data did not present the requirements of parametric statistical procedures (McClave; Benson; Sincich, 2001; Pagano, 2001), a nonparametric procedure (Kruskall-Wallis) was used to verify the existence of significant differences when the answers (Table 4) were segmented considering the subjects' learning styles (Table 5).

Thus, the adopted procedure compares the subsets of answers based on the subjects' learning styles in order to test the following null hypothesis: "there are no significant differences of satisfaction and perceived learning among the observed learning styles". Table 6, presented next, registers the results of the mentioned nonparametric tests (the chi square statistics are omitted).

Analyzing the obtained results, we can observe that, in this sample, there are no significant differences of satisfaction and perceived learning when analyzed in terms of learning styles (considering that all obtained p-values are above the established limit of 0.05).

CONCLUSION

This study demonstrates that, based on this sample, the participants of SEBRAE Challenge 2003 consider the experience as very relevant and valid, in terms of satisfaction. They also feel that business games supported by a distance education environment represent an important instructional experience, based on the fact that they are willing to attend an online business game (the highest obtained score: 4.07).

In terms of the perceived learning, the subjects consider the experience as a significant one. And, here is important to stress certain advantages: the business game could recover previous knowledge (mean= 3.69), and also develop the analysis skills (mean= 3.87). Thus, we can sustain the viability of the use of online business games as an instructional component to improve business education, supporting students while developing the required business skills.

While analyzing the proposed goals of the SEBRAE Challenge, the students of this sample did not consider that attending this event was related to the development of their "entrepreneur feelings" (mean= 2.65). This particular aspect may stress that entrepreneurship is more related to other parameters than managerial experiences like those emphasized by business games.

In conclusion, no evidences were found in terms of individual learning styles influences on participants' satisfaction and perceived learning in this online business game. This fact may lead to conclusion that participants of this kind of experience may decide to attend based on the convenience or opportunity rather than their personal style. On the other hand, the presence of all learning styles (as proposed by Kolb), within the sample, indicates that while developing and conducting new business games, the learning styles should be considered in order to improve the results of this type of experiential approach.

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Table 1 – Attendance by Program and Gender

	Accounting	Business	Total
Male	21	8	29
Female	16	1	17
Total	37	9	46

Table 2 – Type of Institution and Program Hours

	Public	Private	Total
Morning	12	0	12
Evening	12	22	34
Total	24	22	46

Table 3 – Computer Literacy

	Frequency	
	Absolute	**Relative**
Low skills	4	8.7%
Basic Desktop Solutions (MS-Office: Word Excel, Powerpoint, Outlook)	26	56.5%
Advanced Desktop Solutions (Excel advanced functions, image edition etc.)	9	19.6%
Advanced User (specific applications, databases, queries etc.)	5	10.9%
Programming (Delphi, V.Basic V.C, Java, Scripts)	2	4.3%

Table 4 – Perceived Satisfaction and Learning

	ode	ean	St d. Dev.
Satisfaction with the adopted media			
Team work involvement (collaboration)	3	3.30	1.263
Ease of use (software)	4	3.88	0.879
Quality of online support	4	3.30	1.152
Satisfaction with the business game			
Participation satisfaction	5	3.98	1.064
Willingness to attend again	5	3.91	1.189
Willingness to attend a face-to-face business game	5	3.85	1.299
Willingness to attend an online business game	5	4.07	1.237
Agreement with time extension (duration)	1	2.67	1.592
Perceived Learning (Bloom)			
Remember	4	3.69	0.866
Understand	4	3.35	0.924
Apply	4	3.54	1.168
Analyze	4	3.87	1.046
Evaluate	4	3.65	0.899
Create	3	3.58	1.066
SEBRAE Challenge – Goals			
Development of the "Entrepreneur Feeling"	3	2.65	1.353
Managerial Improvement	3	3.37	1.103
Management Experience	3	3.09	1.071

Table 5 – Sample's Learning Styles (Kolb)

	Frequency	
	Absolute	**Relative**
Accommodator	5	10.9%
Assimilator	10	21.7%
Converger	17	37.0%
Diverger	14	30.4%
Total	46	100.0%

Table 6 – Learning Styles Differences (Kruskall-Wallis)

	p-value
Satisfaction with the adopted media	
Team work involvement (collaboration)	0.421
Ease of use (software)	0.583
Quality of online support	0.322
Satisfaction with the business game	
Participation satisfaction	0.843
Willingness to attend again	0.554
Willingness to attend a face-to-face business game	0.490
Willingness to attend an online business game	0.481
Agreement with time extension (duration)	0.110
Perceived Learning (Bloom)	
Remember	0.742
Understand	0.818
Apply	0.674
Analyze	0.365
Evaluate	0.560
Create	0.816
SEBRAE Challenge – Goals	
Development of the "Entrepreneur Feeling"	0.816
Managerial Improvement	0.961
Management Experience	0.888