



Satisfaction and perceived learning in business games: analysis of the moderating role of Debriefing

Satisfação e percepção de aprendizagem em jogos de empresas: análise do papel moderador do Debriefing

Satisfacción y aprendizaje percibido en juegos de negocios: análisis del rol moderador del Debriefing

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ABSTRACT

This article aims to examine the impact of debriefing (a reflective stage following action) on the relationship between satisfaction and perceived learning (encompassing knowledge, skills, and attitudes [KSA]) within the context of business games. The study analyzes self-reported data from 108 eighth-semester Business Administration students across two higher education institutions in Brazil, divided into two groups: an experimental group (who underwent debriefing) and a control group (who did not). The data was analyzed using Partial Least Squares Path Modeling (PLS-PM). The findings of this paper do not support the hypothesis that the debriefing stage significantly influences the relationship between satisfaction and perceived learning. Therefore, it is concluded that during business games, participants engage in ex-ante reflection in the decision-making process, oversee the implementation of proposed solutions ex-cursum, and evaluate results ex-post. While the debriefing process reinforces this final stage, it does not significantly affect the relationship between satisfaction and perceived learning.

Keywords: business games, debriefing, perceived learning, satisfaction.



RESUMO

Este artigo objetiva explorar o efeito do debriefing (etapa na qual os educandos fazem reflexões pós-ação) na relação entre satisfação e percepção de aprendizagem (conhecimento, habilidade e atitude em jogos de empresas. Para tanto foram examinadas, por meio da técnica Partial Least Squares Path Modeling (PLS-PM), as autodeclarações de 108 alunos do 8º período do curso de graduação em Administração de duas instituições de ensino superior no Brasil, divididos em dois grupos: experimental (exposto ao debriefing) e de controle (não exposto ao debriefing). Os resultados não apoiam a hipótese que a etapa debriefing influencie a relação entre satisfação e percepção de aprendizagem. Assim, conclui-se que durante jogos de empresas os participantes promovem reflexões ex ante no processo decisório, monitoram a implementação das soluções propostas ex cursum e a avaliação dos resultados ex post. O debriefing reforça essa última etapa, que não influencia a relação entre satisfação e percepção de aprendizagem.

Palavras-chave: jogos de empresa, debriefing, percepção de aprendizagem, satisfação.

RESUMEN

Este artículo examina el impacto del debriefing (una etapa reflexiva posterior a la acción) en la relación entre satisfacción y aprendizaje percibido (que abarca conocimientos, habilidades y actitudes [CHA]) en el contexto de los juegos de negocios. El estudio analiza datos autoinformados de 108 estudiantes de octavo semestre de Administración de Empresas de dos instituciones de educación superior, divididos en dos grupos: un grupo experimental (que pasó por el debriefing) y un grupo de control (que no lo hizo). Los datos fueron analizados utilizando el Modelado de Caminos de Mínimos Cuadrados Parciales (PLS-PM). Los hallazgos no respaldan la hipótesis de que la etapa de debriefing influye significativamente en la relación entre satisfacción y aprendizaje percibido. Por lo tanto, se concluye que durante los juegos de negocios, los participantes se involucran en una reflexión ex-ante en el proceso de toma de decisiones, supervisan la implementación de las soluciones propuestas ex-cursum y evalúan los resultados ex-post. Si bien el proceso de debriefing refuerza esta etapa final, no afecta significativamente la relación entre satisfacción y aprendizaje percibido.

Palabras clave: juegos de negocios, debriefing, aprendizaje percibido, satisfacción.

1 INTRODUCTION

The use of business games as a learning tool in business administration education has gained significant popularity in undergraduate programs (Araújo *et al.*, 2015). A review of the literature indicates that business games can positively impact participants' perceived learning, often drawing on experiential learning theory as their theoretical foundation, particularly through the lens of the experiential learning cycle (e.g., Meij, Leemkuil, Li, 2013). The primary argument supporting the acceptance of business games among learners is the combination of satisfaction and learning (Sauaia, 1997).



In assessing the contributions of business games to business administration students' learning perception (the focus of this study), variables grouped into three dimensions — knowledge, skills, and attitude (e.g., Fitó-Bertran, Hernández-Lara, Serradell-López, 2015) — were used as proxies for perceived learning. From this perspective, some authors argue that the debriefing stage is crucial to participants' perceived learning (e.g., Meij, Leemkuil, Li, 2013). During this stage, participants engage in post-action (ex-post) reflection to understand the causes of successes and mistakes. However, it should not be overlooked that elements within business games could prompt participants to reflect during the decision-making process in each round, potentially reducing the impact of post-action reflection during debriefing. This raises the question of whether using games with or without debriefing results in an asymmetrical relationship between participant satisfaction and perceived learning.

2 THEORETICAL BACKGROUND

The global use of business games as a teaching and learning tool for business students has been steadily increasing. This growing popularity seems to be primarily driven by the perception that business games enable students to learn through engaging experiences, placing participants at the heart of the teaching-learning process (Peach, Hornyak, 2003).

In this study, which examines the educational role of business games, these games are defined as an instructional technique designed to offer participants a playful learning experience. This is achieved through a simulated representation of business reality using simulation practices and the interactivity of teamwork exercises (Naylor, 1971; Goldschmidt, 1977; Lacruz, 2004). In other words, business games replicate business environments where multiple groups manage different competing companies in the same industry, enabling participants to learn through hands-on experience.

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hands-on experience.

From this perspective, numerous studies on business games have drawn on Kolb (1984) experiential learning cycle to justify the use of business games as a teaching and learning tool (e.g., Araújo *et al.*, 2015). As Kolb (1984, p. 38) puts it, "Learning is the process whereby knowledge is created through the transformation of experience."

At the heart of this concept lies the tension between dialectical dimensions — concrete/abstract and active/reflective — which is resolved through mental processes that capture and transform experience. Learning is conceptualized as a four-phase spiral cycle in which individuals learn through their experiences, using these as a basis for translating them into concepts that can be applied in new contexts: concrete experience, reflective observation, abstract conceptualization, and active experimentation.

In business games, the experiential learning cycle starts with concrete experience. This then generates effects that participants encounter within the simulation, allowing them to comprehend the conditions of their immediate experience.

Next, by reflecting on the example drawn from the immediate experience, participants can analyze and identify actions that could be taken in similar situations while projecting plausible outcomes. This reflection fosters a general understanding of the situation, allowing the development of explanatory hypotheses that extend beyond that specific experience.

Finally, once the general principle is grasped, the learning outcomes can be tested through active experimentation. This experimentation takes advantage of the opportunities offered by generalization, continuously renewing the learning cycle.

Numerous studies have demonstrated that participants view business games as an instructional tool that promotes strong engagement and participation (e.g., Peach, Hornyak, 2003), enhances satisfaction (e.g., Sauaia, 1997), and significantly contributes to managerial training and learning (e.g., Fitó-Bertran, Hernández-Lara, Serradell-López, 2015).

In this context, some authors assert that debriefing is a crucial phase of business games, influencing participants' perceived learning (e.g., Meij, Leemkuil, Li, 2013). Thus, it is worth asking: **Does the debriefing stage moderate the relationship between satisfaction and perceived learning (knowledge, skills, and attitude) in business games?**



3 METHOD

This study, adopting a quantitative approach and cross-sectional design, explored the potential moderating role of debriefing in the relationship between satisfaction and perceived learning in business games among business administration students. The study can be classified as a quasi-experiment (Campbell, Stanley, 1979).

In this context, two groups were formed: an experimental group, which was exposed to the treatment (debriefing stage), and a control group, which was not. Measurements were taken from both groups only after the treatment. The study utilized Sims (2002) semi-structured debriefing framework. Moreover, test units were matched to ensure greater similarity between groups in terms of age, gender, and prior experience with business games, acknowledging that these factors could influence participants' perceived learning. Finally, once matching was complete, test units were randomly selected.

The GI-MICRO business game (version 6 demo) was chosen for the experiment due to its moderate complexity and prior use in several studies (e.g., Souza, Cardoso, 2012). This study is grounded in the teaching and learning process within business administration, specifically from the perspective of experiential learning theory. Drawing from a literature review and practical experience with business games, a data collection instrument was created, covering the aspects outlined in Table 1.

Table 1. Variables

Latent Variables	Manifest Variables	Scale
Satisfaction	SA1, SA2, SA3	Likert (5 points)
Knowledge	K1, K2, K3	
Skill	SK1, SK2	
Attitude	A1, A2, A3, A4	

Source: Prepared by the authors.

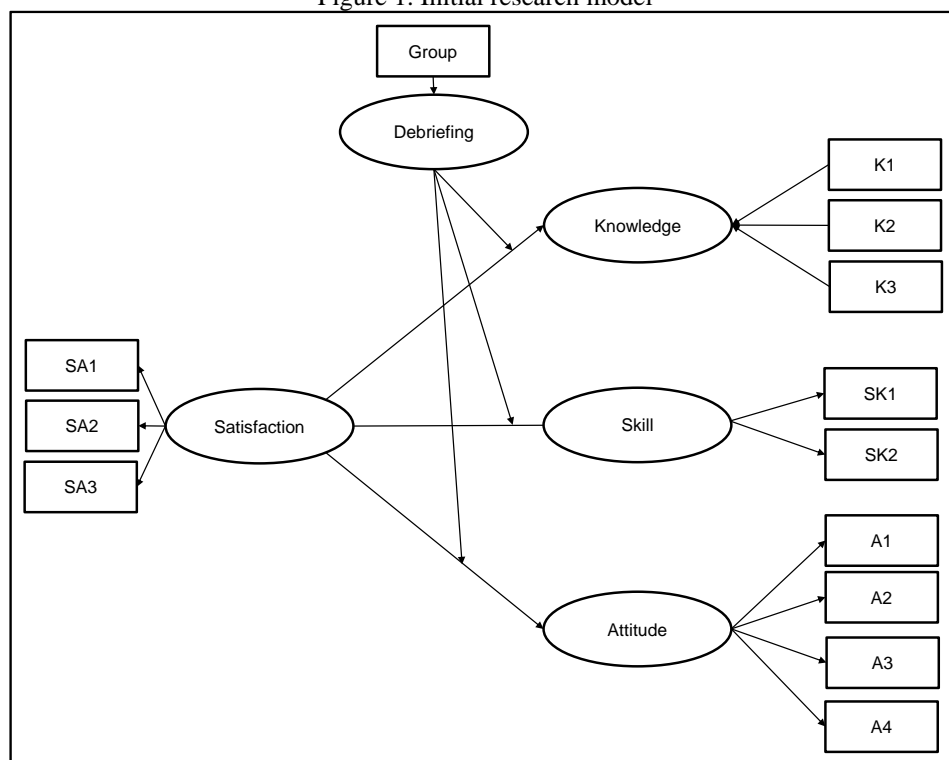
The GI-MICRO business game was conducted with eighth-semester undergraduate students enrolled in business administration at two private higher education institutions in the state of Minas Gerais, Brazil. Data was collected using a structured, self-administered questionnaire hosted on the online platform SurveyMonkey. The questionnaire was provided at the conclusion of the business game under the supervision of the game facilitator (the author of this study). All 112 participants completed the questionnaire. After addressing missing data, the



final sample consisted of 108 cases, with 55 in the experimental group (game with debriefing) and 53 in the control group (game without debriefing).

For data processing, the Partial Least Squares Path Modeling (PLS-PM) technique was selected as an approach to structural equation modeling. Based on the initial research model (Figure 1), and following the guidelines set forth by Chin (1998) and Barclay, Higgins, and Thompson (1995), the estimated minimum sample size was determined. This calculation considered a significance level of 0.05, a statistical power of 0.8, a large effect size ($f^2 = 0.30$), and three predictors (since the formative construct includes three manifest variables), along with moderation verification through multigroup analysis (control and experimental groups). The results indicated that a minimum of 40 observations per group was required.

Figure 1. Initial research model



Source: Prepared by the authors.

Thus, the sample size of 108 observations (53 in the control group and 55 in the experimental group) meets the minimum requirements for PLS-PM applications. Data processing was conducted using the 'plsmp' package version 0.4.9 (Sanchez, Trinchera, Russolillo, 2017) and the 'pwr' package version 1.2-2 (Champely, 2018) within R software version 3.5.2 (R Core



Team, 2018) for implementing the PLS-PM technique.

4 RESULTS

To analyze the results, a statistically accepted confidence level of 95% for applied social research was assumed. The analysis followed the recommendations of Sanchez (2013) and Hair *et al.* (2017).

When evaluating the external loadings of the manifest variables (MVs) in the reflective constructs (Satisfaction, Skills, and Attitude), it was identified that SA2 had a value of 0.288. This indicates that the latent variable (LV) Satisfaction explains only 8% of the variance of SA2 (i.e., the square of the external loadings). Hair *et al.* (2017) recommend that MVs with external loadings lower than 0.4 be removed from the construct.

The adjustment of the measurement model was conducted through an iterative process involving model re-estimation and evaluating the impact on unidimensionality, convergent validity, and discriminant validity. Removing the SA2 MV led to an improved model fit, which justified its exclusion. Table 2 presents a summary of the results.

Table 2. Evaluation of reflective measurement models

Constructs	Unidimensionality			Convergent validity ^a	Discriminant validity ^b
	Dillon-Goldstein's Rho	1 st Eigenvalue	2 nd Eigenvalue	AVE	(AVE) ^{1/2}
Satisfaction	0.76	1.24	0.76	0.61	0.78 ^c
Skill	0.88	1.68	0.42	0.77	0.88 ^c
Attitude	0.79	2.01	0.97	0.50	0.70 ^c

^aOuter loadings $\geq 0,7$, except the variable A2 (0,605). ^bIndicator's outer loading on the associated construct is greater than any of its cross-loadings on other constructs. ^cThe square root of each construct's AVE is greater than its highest correlation with any construct.

Source: Prepared by the authors.

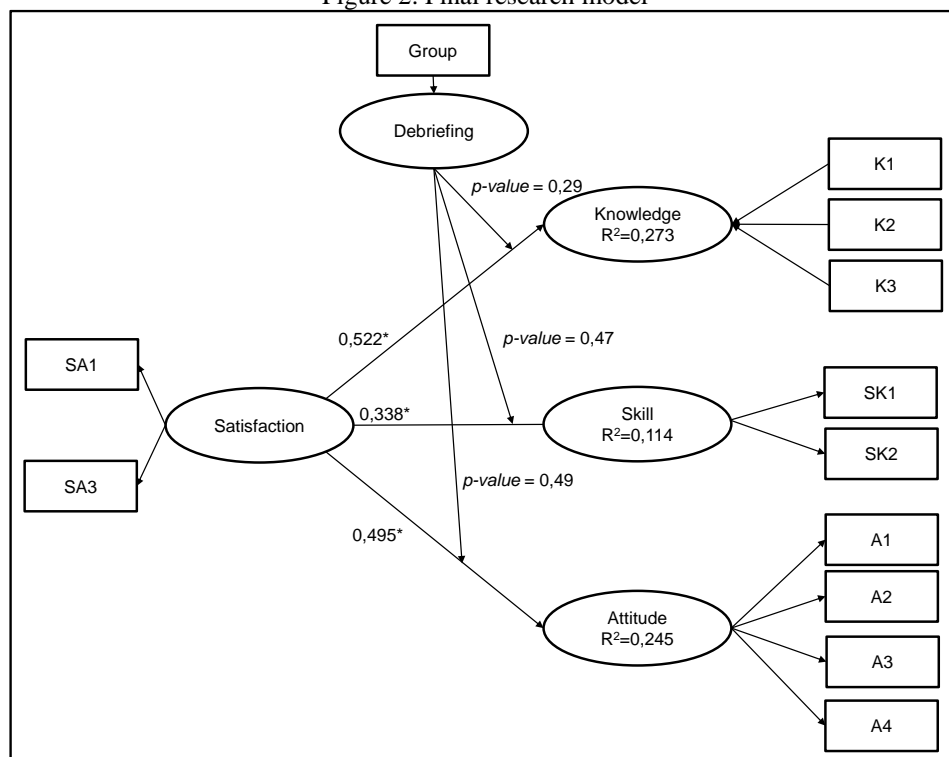
As shown in Table 3, for the reflective constructs, the unidimensionality of the measurement models can be confirmed based on Dillon-Goldstein's rho and the eigenvalues of the MV matrix. Convergent validity is indicated by the AVE values for all LVs and external loadings, while discriminant validity is demonstrated through the cross-loadings and Fornell-Larcker criteria. Similarly, the measurement of the formative construct Knowledge was validated through the analysis of statistical significance (p -value < 0.05), the relevance of weights, and



collinearity ($VIF < 5$).

The validation of the structural model was performed by verifying the statistical significance and relevance of the path coefficients using the bootstrapping procedure, with 5,000 subsamples to obtain more accurate estimates. Additionally, the validation was achieved by assessing the coefficient of determination (R^2) and the mean redundancy index of the MVs (Figure 2).

Figure 2. Final research model



Note. R^2 : determination coefficient.

* Path: significant at level 0.05.

Source: Prepared by the authors

As observed, the relationships between Satisfaction and Knowledge, Skills, and Attitude were significant ($p\text{-value} < 0.05$), and the coefficients of determination (R^2) are considered satisfactory given the absence of different other factors that could influence learning perception, such as simulation duration (Lacruz, 2017). However, during multigroup analysis, no statistically significant difference was identified between the control and experimental groups ($p\text{-value} > 0.05$). Thus, the hypothesis that debriefing moderated the relationships between satisfaction and knowledge, skills, and attitude was rejected.



By exploring these relationships, it became evident that the experimental group had a higher average than the control group, except in the learning perception of the attitude construct. However, it is not possible to rule out, with a 95% confidence level, that these differences occurred by chance.

Thus, no evidence was found that the debriefing stage influenced the relationship between satisfaction and participants' learning perception (knowledge, skills, and attitude) in business games. However, this does not imply that the debriefing stage is unnecessary, as this study focused solely on moderating the impact of satisfaction on learning perception. In other words, this study does not provide evidence that debriefing does not moderate the relationship between business game experiences and learning perception, as shown by Lacruz and Américo (2018).

Finally, a Goodness-of-Fit (GoF) index of 0.345 was obtained as a general measure of model fit. According to Wetzels, Odekerken-Schröder, and Oppen (2009), GoF can be classified as small = 0.1, medium = 0.25, and high = 0.36. By this criterion, the overall fit of the study's model can be considered medium ($GoF = 0.345 < 0.36$). Additionally, the analysis of confidence intervals allowed for the assumption of precision in the PLS-PM parameter estimates for external loadings, weights, path coefficients, and R^2 .

5 CONCLUSION

This study aimed to investigate the moderating role of debriefing in the relationship between satisfaction and learning perception (knowledge, skills, and attitude) among business game participants, using experiential learning theory as a framework. The proposed analytical framework suggests that debriefing does not enhance the satisfaction elements in business games that contribute to learning perception. During business games, participants engage in ex-ante reflections during decision-making, monitor the implementation of proposed solutions ex-cursum, and evaluate the results ex-post. Debriefing reinforces this final stage, which appears not to influence the relationship between satisfaction and learning perception.

From the perspective of experiential learning, the stages of reflective observation and abstract conceptualization are anticipated. In business games, these stages can be reinforced by debriefing activities following the simulation rounds, enhancing participants' continuous processes of action and reflection, in line with the spiral cycle of experiential learning. However,



it is noted that this reinforcement did not impact the relationship between satisfaction and learning perception.

An alternative explanation lies in the research design. In the quasi-experimental setup, variables that could influence the relationship between satisfaction and perceived learning were controlled. Factors such as age, gender, previous experience with business games, participants' education level, the complexity and dynamics of the business game (e.g., number of stages, team size, etc.), the instructor who facilitated the game, and the debriefing method were all managed. The complexity of the business game, for instance, can potentially impact the outcomes (Lacruz, 2017). In more complex business games than the one used in this study (i.e., GI-MICRO), debriefing could potentially play a more significant role than in simpler games, as guided student reflection may be more effective than unguided reflection.

This study, like most, contains limitations. One limitation concerns the measurement of participants' satisfaction and learning perception in the business game through self-reporting. Learning perception may be influenced by the emotional dimension elicited by the business game, potentially leading to a halo effect in measuring perceived learning (Gentry, Commuri, Burns, Dickinson, 1998). Additionally, the results are specific to students from two higher education institutions and a particular business game, as seen in other studies (e.g., Dias, Sauaia, Yoshizaki, 2013). This specificity means that the results may depend on this particular game and the way the activity was conducted, thus limiting the ability to generalize findings to other business games.

Moreover, the results are entirely related to a specific method of implementing debriefing. The lack of a statistically significant relationship for the moderating variable (debriefing) may be attributed to the particular way the debriefing process was conducted. Consequently, further analyses with different business games and varied debriefing approaches are necessary before any generalized statements can be made.



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