The Use of Business Simulators in Business Education: Reporting Experience and Assessing Results[1]

Douglas Heinz[1] https://orcid.org/0000-0001-8364-5821

Maria J. C. de Souza Domingues[2] https://orcid.org/0000-0001-7771-144X

Iara Regina dos Santos Parisotto[3] https://orcid.org/0000-0002-0718-3992

[1] Centro Universitário para o Desenvolvimento do Alto Vale do Itajaí
[2,3] Universidade Regional de Blumenau

ABSTRACT

The use of business simulators for teaching administration is an educational strategy present in Higher Education Institutions (HEIs). Using game dynamics to stimulate competitiveness, the simulators are characterized as an active learning methodology. Scientific literature has pointed out the advantages of this practice, in addition to discussing related themes, such as the performance assessment of participants. In order that, an aspect that can still be explored is the process of adopting these simulators. Aiming to fill this gap, the aim of this study is to assess the perception of participating academics of the experience of implementing and using business simulators in an undergraduate course at a Community Higher Education Institution (HEI) in the State of Santa Catarina. The results show that the adoption of a business simulator must be accompanied by pedagogical criteria, such as the definition of clear learning objectives, and operational criteria, such as the preparation of classes and the procedures for applying the game. In addition, the results of an investigation carried out with academics of administration who participated in the application of the simulator are highlighted. The students' perception was positive about the game's contributions to their professional training, especially for allowing the integration of contents worked individually during the course.

KEYWORDS

Simulation games. Learning methods. Higher education.

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Uso de Simuladores Empresariais no Ensino de Administração: Relatando a Experiência e Avaliando os Resultados

RESUMO

A utilização de simuladores empresariais para o ensino de administração é uma estratégia educacional presente em Instituições de Ensino Superior (IES). Utilizando a dinâmica de jogos para estimular a competitividade, os simuladores se caracterizam como uma metodologia ativa de aprendizagem. A literatura científica tem apontado vantagens desta prática, além de discutir temáticas relacionadas, como a avaliação de desempenho dos participantes. Apesar disso, um aspecto que ainda pode ser explorado é o processo de adoção destes simuladores. Visando suprir tal lacuna, o objetivo deste estudo é avaliar a percepção dos acadêmicos participantes de experiência de implantação e utilização de simuladores empresariais em um curso de graduação de Instituição de Ensino Superior (IES) Comunitária do Estado de Santa Catarina. Os resultados apontam que a adoção de um simulador empresarial deve ser acompanhada de critérios pedagógicos, como a definição de objetivos de aprendizagem claros, e operacionais, como a preparação das turmas e os procedimentos de aplicação do jogo. Além disso, são destacados os resultados de uma investigação realizada junto a acadêmicos de administração que participaram de aplicação do simulador. A percepção dos estudantes foi positiva quanto às contribuições do jogo para a sua formação profissional, sobretudo por permitir a integração de conteúdos trabalhados de forma individual durante o curso.

PALAVRAS-CHAVE

Jogos de simulação. Experiências de aprendizagem. Educação superior.

El Uso de Simuladores de Negocios en la Educación Gerencial: Informe de Experiencia y Evaluación de Resultados

RESUMEN

El uso de simuladores de negocios en la educación empresarial es una estrategia educativa presente en las instituciones de educación superior (IES). La literatura científica señala las ventajas de esta práctica, pero un aspecto que aún puede explorarse es el proceso de adopción de los simuladores. El objetivo de este estudio es presentar la experiencia de implementar y usar simuladores de negocios en un curso de pregrado en IES en el Estado de Santa Catarina. Se presenta un informe de experiencia que destaca la necesidad de prestar atención a los detalles pedagógicos, como la definición de objetivos de aprendizaje claros. También se destacan los resultados de una investigación realizada con estudiantes de negocios que participaron en la aplicación del simulador, demostrando una percepción positiva de las contribuciones del juego a la formación profesional, especialmente para permitir la integración del contenido cubierto durante el curso.

PALABRAS CLAVE

Juego de simulación. Método de enseñanza. Enseñanza superior.

Introduction

Game-based Learning (GBL) has received increasing attention in the educational field. Some of the possible explanations for this are the ongoing changes in didactic models, which increasingly turn to active methodologies that defend student-centered learning, the emergence of empirical evidence that attest to the effectiveness of games in learning and understanding of complex issues and, finally, the interest of training professionals in the intensity of involvement and engagement that games can promote (GARIS; AHLERS; DRISKELL, 2002). The application spans several areas, from how to perform tasks (airplane piloting, war games and others) to more specific approaches related to deep levels of learning, for example as obtaining information from various sources for quick decision making, creating strategies to overcome difficulties and understanding of complex systems through experimentation (PRENSKY, 2003).

In game-based learning situations, participants develop critical thinking skills better preparing them to plan future strategies, in addition to learning to apply theories and models explored in the classroom (DOYLE; BROWN, 2000). Games motivate, engage and promote effective learning goals, providing opportunities for students to experience, practice, interact and actively reflect in a collaborative, student-centered environment (VLACCHOPOULOS; MAKRI, 2017), who are also encouraged to get in touch with others team members discuss and negotiate subsequent steps, thus improving, among other things, their social skills (PIVEC; DZIABENKO; SCHINNERL, 2003).

In the field of Administration education, one of the adopted GBL strategies is the use of business simulations. These strategies enable learning about the complexities of managing a business where application rather than definitions of business concepts, functions, and operations are most important. Players virtually manage a for-profit or non-profit organization and participate in teamwork in a business area (COSTIN; O'BRIEN; SLATERRY, 2018; VLACHOPOULOS; MAKRI, 2017; GRECO, BALDISSIN, NONINO, 2013). This strategy also makes it possible to visualize the best solutions in a complex environment and promote improvement in the process of training future professionals in the field of business administration (BUTZKE; ALBERTON, 2017).

Despite its relevance, there are still few scientific publications with empirical evidence on the use of digital games in the business area, including possible positive learning and engagement outcomes (FU; HAINEY; BAXTER, 2016). One reason for this can be the lack of formal policy frameworks or guidelines recommended by governments or educational institutions on the adoption of games and simulations in education (VLACHOPOULOS; MAKRI, 2017). One of the aspects that seems to lack further scientific development is the process of implementing simulators as an educational strategy. The identification of aspects that affect the implementation and achievement of results in the use of business simulators emerged as an investigation problem.

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Aiming to contribute to the expansion of the content in this respect, the aim of this study is to assess the perception of academics participating in the experience of implementing and using business simulators in an undergraduate course at a Community Higher Education Institution (HEI) in the State of Santa Catarina. The proposed evaluation takes place in two stages. Initially, an experience report of the implementation of the simulator at the IES is presented, including, in addition to the application, the entire process of planning, pedagogical analysis and decision-making that culminated in the adoption of the technology. Then, the research analysis conducted with a class that used the simulator in the second semester of the year 2019 is carried out, allowing the visualization of the results obtained and their alignment with what is presented in the literature and what the HEI expects from the use of this teaching strategy.

Therefore, the following content is organized as follows: in addition to this introduction, section two presents a review of the scientific literature related to the topic; section three highlights the methodological procedures used; section four contains the experience report on the implementation of a business simulator in an HEI; section five analyzes the results of research conducted with academics who participated, during a semester, in business simulation activity; finally, section six brings the conclusions.

Business Simulation Game

Educational games, in general, are applications that use video and computer game features to create engaging and immersive learning experiences to deliver specified learning objectives, outcomes and experiences (FREITAS, 2006). The motivational characteristics of games and the belief that they can develop useful skills have led to optimism about their usability as a teaching method (CONNOLLY *et al.*, 2012).

Between the different kinds of educational games, simulators are among the most used. They are a replica of real events, decisions, resulting performance and consequences of decisions taken within a given context, allowing for interactive and experiential learning (COSTIN; O'BRIEN; SLATERRY, 2018). They also provide a structured environment for learning through complex problems (DOYLE; BROWN, 2000), as they allow to represent a complex environment, system or process that is intrinsically relevant to the learner, who recognizes the relevance of the scenario to their vocation or aspirations of career (CORTI, 2006). At a time when the nature of work is drastically changing, business simulators also provide opportunities for the development of capabilities aligned with the needs of modern organizations (GEITHNER; MENZEL, 2016).

These simulators generally challenge the participants to allocate resources in a way that promotes the increase in the results of a virtual company (SCHMELLER, 2019). As business schools have emphasized the development of integrated curricula, while the availability of information and communication technologies increases, the use of simulators has been considered an increasingly used strategy to generate the integration of concepts and interdisciplinary work (PALMUNEN *et al.*, 2013).

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Simulation helps students apply the content learned in the classroom, connecting theoretical issues to real-world situations, developing their analytical skills and comparing different points of view, which leads to improved critical thinking as they use nature interactive simulations to develop arguments, make judgments, and assess situations. Simulations also encourage students to develop self-awareness (VLACHOPOULOS; MAKRI, 2017). As several concepts can be approached in a simulator, instead of the participants learning just a certain topic, the whole area of interest of the theme can be explored, which expands the learning scope (DOYLE; BROWN, 2000).

As a teaching method, business simulator games have a special value for combining inputs, application, reflection and feedback on decisions made and results obtained (GEITHNER; MENZEL, 2016). Another advantage is the possibility of developing tasks and experiential situations that would otherwise be unfeasible, for reasons of cost, time, logistics and/or safety (CORTI, 2006), as through games and simulators it is possible to simplify and present elements of the "real world" in a way that can be contained within the classroom (DOYLE; BROWN, 2000). The challenge is to develop applications capable of demonstrating the transfer of learning while remaining engaged and fun (ARNAB *et al*., 2014).

The use of simulators provides participants with an experience that is equivalent to the role of the CEO (Chief Executive Officer) of a company, including with regard to the need to balance resources (SCHMELLER, 2019). Players also learn with contextual information contained in the game dynamics, in the process of playing the game and in the consideration of benefits, costs, results and rewards resulting from decision making (DOYLE; BROWN, 2000). In addition, games and simulations in teaching promote creativity among participants, who develop a shared vision of their learning, decision-making independence, attitude towards risk and adaptability (COSTIN; O'BRIEN; SLATERRY, 2018).

The adoption of teaching methodologies that simulate practice with the use of new technologies can also help in the process of improving management education. The development and use of simulation-based business games has a great impact on the way of teaching and learning in business schools (BUTZKE; ALBERTON, 2017). One of the main characteristics that lead to this is that the presence of competitiveness in business simulations is an opportunity to take advantage of the dynamic of having other people trying to achieve the same thing, a situation that is almost always beneficial to the student experience, creating additional pressure analogous to market competition (LEWIS; MAYLOR, 2007).

Method of Research

Aiming to respond to the objective of the study, a mixed research strategy was adopted, including qualitative and quantitative methods. For Creswell (2007), quantitative and qualitative methods are two extremes of a continuum, where mixed methods are in an intermediate position, incorporating both approaches.

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Initially, the process of implementing a business simulator in HEIs in the state of Santa Catarina was resumed, covering from the decision-making process for the use of the tool, the implementation period and the practices used in the classroom. The experience report, for Cavalcante and Lima (2012), is a descriptive research approach that presents a reflection on a set of actions that address a situation experienced in a professional environment and that is of interest to the scientific community. In this sense, the report of the implementation of the simulator at the IES makes it possible to revisit the decisions taken, evaluating its impacts on the course and on student learning, in order to support possible improvements in the process or even guide other academic actions with a similar purpose.

In order to facilitate the interpretation of the collected information presented in the report, tables were organized summarizing the main points identified. Miles and Huberman (1994) corroborate this procedure by recommending that the analysis of qualitative data be supported by visual representations, such as graphs or schematics, instead of narrative modes.

The second stage consists of survey-type research applied to a class of 35 students from the last phase of the on-site undergraduate course in Administration at the HEI studied. Nine questions were included in the research instrument, created with the Google Forms tool and made available online through a shared link in the communication area of the simulator itself. Eight of these questions were formulated based on relevant aspects identified in the literature review elaborated in section 2. The ninth question was related to the main objective of implementing the simulator at the IES, the integration of the contents studied in the course subjects. The answers were given using a 7-point Likert scale, with [1] Strongly Disagree and [7] Strongly Agree.

Two participants in the class did not respond to the questionnaire, even after sending a public message in the simulator's communication environment. The form was anonymous, so it was not possible to identify the two non-respondents. Thus, the final research sample included 94.29% of the participants.

The results were organized in a table containing the average score of the answers, the standard deviation, the mode, and the maximum and minimum values of the answers for each question. This procedure represents the application of the quantitative method of analysis, which, as explained by Richardson (1999), in order to guarantee the accuracy of the results and avoid distortions in the analysis and interpretation of data, being frequently applied in descriptive studies.

Business Simulator Proposal Implementation

The following report presents the experience of implementing and applying a business simulator game in an undergraduate course at a Community Higher Education Institution (HEI) in the State of Santa Catarina. The particular interest of this case is that it comprises all the previous pedagogical analysis and the decision-making process regarding the adoption of the simulator, in addition to its effective application.

Context: the Motivations for Adopting a Business Simulator

The Higher Education Institution (HEI) in question had as a pioneering course precisely that of Business Administration, which began in the 1960s. In view of the new challenges in the area, in 2014 the Structuring Teaching Nucleus (STN) of the course started discussions on new approaches methodologies and improvements that could be implemented. The need to provide academics with activities of theoretical-practical integration and of a multidisciplinary nature was perceived. The objective defined by the course professors was to develop in academics an integrated view of the different administrative processes studied through disciplines.

Some STN members had already used simulators and argued that their application would have a great impact on the course. The argument was that the tool contributes both to the formation of technical and behavioral skills, especially due to the need to work in teams. Agreement on the adoption of the tool was unanimous, and triggered a series of actions, summarized in Table 1.

Table 1. Timeline of the context of insertion of the simulator in the HEI Business Administration course

Year	Main developments
2014	Discussion by the STN about new didactic-pedagogical approaches for the course. Supplier research and contracting. Responsible teacher training.
2015	Start of using the simulator. Approval of the new pedagogical project for the course, with emphasis on the application of the simulator.
2016	Entry of the first classes with the new pedagogical project.
2019	Use of the simulator based on the principles defined in the new pedagogical project.

Source: report of the teacher responsible for the application of the simulator

Other aspects that motivated the decision were the need to operationalize the principles of interdisciplinarity present in the pedagogical project of the course and the recommendation, by the Dean of Education, to expand the use of Information and Communication Technologies (ICTs) in the institution's academic activities. The simulator was perceived as an educational resource capable of simultaneously meeting both objectives.

In July 2014 a representative of a supplier company was at IES presenting its solution for the STN. The acquisition decision was made, in September of the same year, the coordinator and two other teachers participated in advanced training. One of these teachers took responsibility for the application of the simulator.

A parallel discussion was about how to insert the simulator in the pedagogical project of the course, as it is a long-term activity, requiring several hours of class. The STN identified a 7th phase discipline with a relatively open menu that would allow the simulator to be used, as long as it occupies a maximum of 50% of the provided class hours. After contracting with the supplier company, the simulator was adopted as planned in the first semester of 2015.

That same year, the course's Pedagogical Project was restructured. With the simulator already in use and its application receiving positive feedback from academics, the STN decided to allocate the entire course load of the discipline to the tool, renaming and also changing the application phase, which moved to the last semester (8th phase). This pedagogical project came into effect in 2016, therefore, it was from the second half of 2019 that academics started to use the simulator within this new didactic approach.

About the Simulator

It is a completely internet-based software. Access is via a website, with individual login. The student is directed to the environment by a game code that the supplier informs the professor.

The supplier company has different scenarios of company types. Thus, the first step in applying the simulator is to define with the supplier company which scenario will be used with the class. Then the company creates this scenario and provides the code to the professor.

After registering the teams in the simulator, the participant accesses the main environment, with a decision registration area (prices, hiring, etc.), a reporting area that simulates a business system of the ERP (Enterprise Resource Planning) type and other additional resources, such as newspapers with market information and instruction manuals.

The teams must analyze the reports, understand the situation of the company and the market and make administrative decisions that cover different areas of administrative performance, such as production management, logistics, finance, marketing, accounting and people management. These decisions take the algorithm of the game to offer a demand for products for each team. Based on the demand and the decisions taken, the companies' revenues, expenses and other administrative aspects are simulated, leading to results. The game is divided into thirteen periods (rounds), the first being simulated.

The professor must select, among available criteria (economic-financial indicators), the one that will be used to rank the results. To win, teams must have the best result in the chosen criteria at the end of the rounds. The competition format, highlight Lewis and Maylor (2017) is an opportunity to take advantage of the dynamic of having other people trying to achieve the same thing, a situation that is almost always beneficial to the student experience, creating an additional pressure analogous to a market competition.

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Simulator Features

The activity with the formation of teams. The game provider suggests teams with three or four members with defined roles. The professor identified that without an initial direction, students tend to form teams with their closest group of friends, a situation that experience has shown to be not the best. The professor's tactic is to carry out an introductory dynamic unrelated to the game, with free teams. Academics naturally organize themselves into their affinity groups. As in the simulator each participant has a defined role (for example, finance director), the members of an initial dynamics team are all given the same role in the formation of companies for the game, forcing them to be on different teams.

Then there is the preparation of academics. The supplier company offers a series of slides used by the teacher, in addition to manuals accessible by digital means.

Over time, it was observed that preparation is particularly important, as it encompasses all aspects on which the simulator is supported. Without a good knowledge of it, academics will have difficulties in the rest of the activity. Preparation involves three distinct steps:

a) Guidance on the game scenario: explanation of business rules, such as factors that affect demand, criteria for hiring employees, how to replace stocks, etc.
b) Guidance on how to use the platform, access resources, menus, among others.
c) Demonstration of reports that provide strategic information.

For the professor, it is also important that in the preparation stage the criteria for defining the ranking of the game are explained in detail.

A test round follows. This activity has a special importance, because even with a detailed preparation, it is in practice that doubts arise, the logic of the activity is discussed and a broader understanding of the didactic proposal and the simulated environment can be obtained. The test round also allows mistakes to be made without "result pressure".

The professor presents and discusses the results of the test round. Those who achieved positive results should seek to understand what was right, while underperforming teams can review their approach and correct decisions. Only then does the game actually start, in the original conditions.

Until 2017, team building, preparation and test round activities were carried out in four classes, all on the same day. It was observed, however, that the understanding of the complete dynamics was compromised. Therefore, since 2018, the professor has set aside two school days, equivalent to eight classes, for these three stages. Despite the longer time at the beginning, it has been evident to the professor that the game dynamic works better this way, and in the end it is possible to complete the twelve rounds in the same period.

Simulator Application

At the beginning of the simulator application, academics need a full day of classes to prepare the decisions for a period, which in the simulated environment represents a game round and is equivalent to three months of company operation. From the fourth round, it is usually possible to simulate two periods in one day, due to the learning curve of the participants.

Another concern is to keep participants involved during the application period of the game, developed throughout the academic semester in a curricular unit of the course. The simulator itself helps in this task by offering special situations such as the expectation of strikes and crises. The professor also uses his own dynamics, such as a contest to choose the best company name. When simulating each round, the professor presents the results to the group, discusses the ranking and emphasizes possible changes in the result that may affect performance, trying to maintain a process evaluation that institutes the student as the subject of their learning process.

Upon completion of 12 rounds, participants are awarded a grade. This has been the most challenging point for the professor. The traditional approach was to assign a score to each team according to their final ranking (first place = 10.0, second place = 9.0, etc.). From 2018 onwards, the professor decided to include in the final grade an individual performance evaluation, with a maximum result equal to 1, used to multiply the ranking grade.

The relative value of absences over the total number of classes applied to the game was also calculated, and the result (maximum 1) multiplied by the score obtained so far (reproducing a situation in the business environment, where an employee can also receive a penalty for unjustified absence). The impact on the final grade is similar to that of the performance appraisal.

Despite representing an advance, this approach did not fully meet the expectations, as it reduced the student score due to absences or poor performance evaluation, with no incentive in return for obtaining good results. In order that, in 2019, another evaluation model was implemented, with the ranking score having the lowest maximum value (6.0) and the performance evaluation and frequency adding points to the final score. Thus, instead of a loss, there is a reward for the participant with a good performance.

The main points of the experience acquired by the professor in five years of applying business simulation dynamics in a Business Administration course are summarized in table 2.

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Table 2. Main aspects observed in the reported experience of using the simulator

Item	Aspects of attention
Team building	Avoid groups formed by affinity. Have a strategy for building teams.
Preparation	Provide guidance on business environment rules and software operation. The time spent on this step reduces future errors and does not compromise the completion of the activity on schedule.
Test round	Collectively analyze the results. Point out successes and mistakes of the teams. Learning without pressure for results.
Simulator Application	Presence of a learning curve. Keep participants motivated. Create special dynamics.
Assessment	Make the assessment criteria clear at the beginning. Use additional criteria for ranking performance. Seek approaches that reward the student for good performance, rather than penalizing mistakes.

Source: report of the professor responsible for the application of the simulator

As can be seen from the report, there is a continuous attempt to improve the application of the simulator at HEI. An important aspect to understand if this process is generating the expected results is to evaluate the perception of the participants of the activities. In order to discover this, the next chapter discusses the result of an investigation conducted with a class that used the simulator at HEI.

Simulator Usage Assessment

In the second semester of 2019, HEI applied the tool to an eighth class and the last phase of its on-site business administration course. The classes were conducted in a computer lab by the same professor who is responsible for using the simulator since its implementation. At the end of the academic semester, with the completion of using the tool, the students in the class were found to answer a survey about their perceptions regarding the use of the simulator and its contribution to academic and professional training. The survey results are called up in table 3 and discussed below.

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Table 3. Results of users' assessment of the simulator

Question	Average	Standard D.	Mode	Máximum	Mínimum
1. The business simulator helped me to apply concepts studied in the classroom during the Business Administration course (VLACHOPOULOS; MAKRI, 2017).	5,970	1,334	7	7	1
2. The business simulator helped me to better understand the relationship between theories and practices in Business Administration (VLACHOPOULOS; MAKRI, 2017).	6,030	1,045	7	7	3
3. The business simulator motivated me to participate in classes (CONNOLLY *et al.*, 2012).	6,000	1,250	7	7	2
4. The simulator allowed carrying out activities different from those applied in the classroom (CORTI, 2006).	6,394	1,029	7	7	3
5. The competition provided by the simulator influenced my effort to participate in the activities (LEWIS; MAYLOR, 2007)	6,061	1,197	7	7	3
6. I did not feel pressured to obtain positive results while using the business simulator (LEWIS; MAYLOR, 2007)	4,091	2,127	1	7	1
7. Using the business simulator, I felt like managing a company in the "real world" (DOYLE; BROWN, 2000).	5,182	1,740	7	7	1
8. The use of the simulator encouraged me to develop creative solutions to deal with situations that needed to be resolved (COSTIN; O'BRIEN; SLATERRY, 2018).	5,727	1,153	6	7	3
9. The simulator allowed an integrated understanding of the different areas of a company (HEI educational objective)	6,030	0,918	7	7	4

Source: Survey data (2019)

Questions 1 and 2 deal with the applicability of the course contents to the simulated environment and the relationship between theory and practice, both points highlighted by Vlachopoulos and Makri (2017) as positive aspects of using the tool. The response pattern was quite similar, with an average close to six, indicating that the use of the business simulator allows participants to recognize the context in which the different themes studied during the course are effectively used.

In a complementary reading of the answers to question 1, it can also be identified that the contents covered by the course professors are aligned with market demands, as students recognize the validity of what they have learned to solve situations present in the simulator, which it represents the real business environment.

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The motivation generated in the participants, for Connolly *et al*. (2012), helps to explain the growing interest in the use of business simulators. The answers to question 3 corroborate this point of view, considering the average of six obtained. Along the same lines, another attraction of simulators is that they provide opportunities for carrying out an activity model different from that normally applied in the classroom (CORTI, 2006). This aspect was also recognized by the respondents, in question 4, with the highest average of the entire survey. Of these responses, the understanding that active methodologies, such as the simulator, amplify the interest of the participants in carrying out the proposed activities, which can lead to positive educational results.

For Lewis and Maylor (2007), the dynamics generated by the competitiveness present in a business simulator is usually positive for the participants. The answers obtained in question 5 confirm this point of view, highlighting that the fact of acting in a competitive scenario influenced the participants' efforts. In this sense, it is possible to suggest other types of methodologies that encourage competition (for example, quizzes), with the potential to be applied to improve learning. In the specific case of simulators, it is also worth noting that the role of the professor, acting as a moderator and solving conflicts in order to provide equal conditions for everyone, seems to be of great importance for the perception of justice and, consequently, maintenance of the stimulus caused by competitiveness present in the simulated environment.

Question 6 needs attention in terms of the results presented in table 3. Initially, it should be clarified that it was constructed in a negative format (I did not feel pressured...) to maintain the same pattern as the answers to the other questions, where the value of 7 is the maximum of scale, represented greater agreement with the question in a positive context. This characteristic was communicated to the respondents, but the high variability of the responses may indicate that doubts remained, which in this case would mean that it becomes impossible to interpret the results. On the other hand, accepting the results as valid, the answers indicate that the pressure for results generated by using a simulator, which was pointed out by Lewis and Maylor (2007), did not happen for the respondents, as the average grade was 4, an intermediate point of the scale, with a high standard deviation, indicating that there is no cohesion regarding this aspect of the use of the simulator.

Question 7 dealt with the student's perception of feeling that he was acting in the "real world" during the application of a business simulation scenario. Although the average grade was above the neutral point of the scale (grade 4), this value was lower than most other questions, indicating that this understanding was not clearly proven to the participants, an argument defended by Doyle and Brown (2000). Many factors can lead to this result, and for this reason the topic deserves further investigation, even so, it becomes noticeable that as much as a simulator contributes to bringing the academic world closer to the business reality, there are limits that still need to be considered in this understanding.

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The use of creativity to solve problems present in a simulated environment (COSTIN; O'BRIEN; SLATERRY, 2018), investigated in question 8, received an average score of 5.7 (five point seven), indicating that the participants perceived this aspect of use of business simulators during the game, but not as strong as other elements investigated in the other questions, a conclusion evidenced by the low standard deviation observed. It should be noted that a business simulator is an environment with well-defined rules and certain limits imposed by the scenario used, which in a way limits the participants' ability to improvise and use creativity, when compared to other activities and/or more practices flexible situations

Finally, question 9 addresses the main objective of HEI when implementing the simulator, the integration of the contents studied in the different subjects of the course. The average score above 6.0 out of six, the relatively low standard deviation, and even the minimum score of the respondents on this question, 4, on a scale of 1 to 7, indicates that the simulator is generating the expected result by itself only one positive result, which demonstrates that all the effort made to implement the tool, reported in chapter four, is proving to be promising and fruitful in terms of learning for the participants.

Conclusions

As shown in the theoretical framework presented, the use of simulators in teaching seeks to form skills in a dynamic and attractive way. This study focused specifically on an experience of applying business simulators in the Business Administration course.

When deciding to use a business simulator, the STN of the course presented in the experience report aimed to promote interdisciplinarity, provide an integrated understanding of the contents presented individually across the courses offered and expand the use of Information and Communication Technologies as a teaching resource. The information presented evidenced the necessary conditions for such objectives to be met, such as alignment with the pedagogical project of the course, the search for adequate solutions, teacher training and the construction of didactic and evaluation processes. More than that, it was evident from the improvements made over the period reported that the application of a business simulator as an educational strategy is a process in continuous construction.

Regarding the research carried out with academics who used the simulator, the results showed that many of the benefits pointed out by the scientific literature were in fact observed in the class in question. In addition to corroborating previous research, this finding indicates that the use of the simulator at HEI is in line with educational practices considered effective.

Business administration is characterized by being a multidisciplinary field of studies, covering contents from several different areas (finance, marketing, logistics, production, etc.). Although specific, knowledge related to these areas is only useful, in business management, if considered in an integrated manner, that is, understanding the implications of its use together in the business context. In this sense, it is worth mentioning that, in the perception of academic users, the simulator has contributed to an integrated view of the knowledge covered during the course, the main objective pursued by the HEI when it adopted the tool.

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In addition to contributing to the increase in the literature on the subject, this study also provides opportunities for future investigations related to what was discussed. One point that can be explored is the evaluation of the effective absorption of knowledge by academics using the simulator, going beyond the positive perception found here. Also, comparative studies can be carried out using different classes in which the same simulation scenario is applied or between classes that use different tools and scenarios, to understand how the specific characteristics of the simulation environment affect learning

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