

USE OF THE LABORATORY OF MANAGEMENT IN THE PROCESS OF LEARNING FROM THE PERSPECTIVE OF THE REVISED BLOOM'S TAXONOMY

USO DO LABORATÓRIO DE GESTÃO NO PROCESSO DE APRENDIZAGEM A PARTIR DA PERSPECTIVA DA TAXONOMIA REVISITADA DE BLOOM

*Crisomar Lobo de Souza¹
Antonio Carlos Aidar Sauaia²
Fábio Lotti Oliva³*

ABSTRACT

This study illustrates how the activities of the laboratory of management can contribute to generate interest and improve the process of student learning. The article analyzes the activities generated in the laboratory of management with the revised Bloom's taxonomy. Potential effects and benefits of the teaching and learning of these activities associated with the revised Bloom's taxonomy will be discussed. Therefore, the objective of this study is to report the whole process of learning during the classes of laboratory management (SIMULAB). The primary data were collected from companies that participated in the laboratory of management through the completion of forms of decision-making and results obtained in the SIMULAB. In addition to the collection of data, was conducted interviews with students of participating companies. The study showed that during the development of activities in the SIMULAB led the students to create innovative projects to compete among themselves as a result. Furthermore, it was observed that the students participated actively in the process of development of activities.

Keywords: learning, laboratory management, learning in education.

RESUMO

Este estudo ilustra como as atividades do laboratório de gestão podem contribuir para gerar interesse e melhorar o processo de aprendizagem dos alunos. O artigo analisa as atividades geradas no laboratório de gestão através da taxonomia revisada da Bloom. Os efeitos e benefícios potenciais do ensino e da aprendizagem dessas atividades associadas à taxonomia revisada da Bloom serão discutidos no artigo. Portanto, o objetivo deste estudo é relatar todo o processo de aprendizagem durante as aulas de gestão laboratorial (SIMULAB). Os dados primários foram coletados de empresas que participaram do laboratório de gestão por meio da tomada de decisão e resultados obtidos no SIMULAB. Além da coleta de dados, foram realizadas entrevistas com alunos de empresas participantes. O estudo mostrou que durante o desenvolvimento de atividades no SIMULAB levou os alunos a criar projetos inovadores para competir entre si por resultado. Além disso, observou-se que os alunos participaram ativamente do processo de desenvolvimento das atividades.

Palavras chaves: aprendizagem; laboratório de gestão; aprendizagem em educação.

¹ Pontifícia Universidade Católica de São Paulo - PUC-SP

² Universidade de São Paulo - USP-SP

³ Universidade de São Paulo - USP-SP

INTRODUCTION

A large part of the students who attended the university were born in the decade of 80. Accustomed to using technology and perform multiple tasks at the same time, many feel discouraged in the face of traditional classrooms. The challenge for universities is to promote classes in an environment where the student will be motivated to use a series of knowledge and skills that will be effective learning and motivation for the student.

This study illustrates how laboratory management (SIMULAB) can contribute to creating interest in the student, contributing to the process of learning. Therefore, this study has worked with the concept of the Bloom's taxonomy revisited, establishing a link with the activities performed by the students in the SIMULAB, which contributed to determining the performance of the organization. Primary data were analyzed from two companies, obtained during eight quarters of operation in a laboratory, and compared the results obtained by each one. Therefore, this study aimed to elucidate the following question problem: the revised Bloom's taxonomy applied to the laboratory of management assists in student learning? As a result of this research, there is evidence of students' use of all phases of the revised Bloom's taxonomy, and as a consequence, each round, students developed better strategies for the game. Therefore, it is concluded that there was progress in student learning developed throughout the activities.

LITERATURE REVIEW

Learning

Learning is considered a complex issue without a single definition to be accepted in a particular model. It is more traditional settings since visions as others trying to explore new possibilities and ways of thinking (Illeris, 2018b). Illeris (2018a), defines the concept of learning as a process of any living organism in which there is a permanent change in their capacity that is not solely due to biological maturation or aging. Following Illeris (2018a), the learning outlines two different processes: an external process where there is the interaction of the individual with their social environment, cultural and material, and other internal psychological processes of preparation and acquisition. Still, according to the author, many theories of learning focus their studies in only one of the two processes, such as the traditional behaviorist and cognitive theories of learning and some modern theories, that channel only for the internal psychological process.

In terms of the learning in education, three approaches are identified: the behaviorist where the individual responds to stimuli to which it is exposed, the cognitivist in which accentuates the process of cognition where the development of the individual will be the result of their potential and experiences during the various stages of life, establishing meanings to their reality in which you are located, and finally, the humanistic approach that considers the individual freedom to make their choices according to each situation. (Moreira, 1999).

Cognitive theories focus on internal cognitive structures and consider learning how changes in these structures. Its pedagogical focus is on the processing and transmission of information using communication, explanation, recombination, contrast, inference, and resolution of problems. (Illeris, 2018a). The use of the taxonomy of Bloom fits well in theories of cognitive development (Dochy, Rijdt, &

Dyck, 2002). Adams (2015) Makes a placement that it is essential to note that the most common use of Bloom's taxonomy focuses on cognitive learning skills, instead of affective or psychomotor skills.

Revised Bloom's Taxonomy

In the decade of 1950, Bloom (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956) created a way to categorize the levels of reasoning skills required in situations of the classroom and became known as the Bloom's Taxonomy. There are six levels in Bloom's taxonomy, each requiring a higher level of abstraction of the students as they progress in their knowledge.

The first level of knowledge, the student to acquire specific information where there is storing such information and where it puts the knowledge of the main ideas that are being taught. On the second level of Bloom's taxonomy, comprehension, students begin to understand the information. With this level, they will be able to interpret the facts. In the third level, application, students apply or use the knowledge they have learned. They can solve a problem with the information they acquired will be able to create a viable solution. In the fourth level, the analysis, students will be required to go beyond the knowledge and application and see the patterns that they can use to analyze a problem. In the synthesis, the fifth level, students can use facts received to create new theories or make predictions. They can organize the knowledge of various subjects and synthesize this information before concluding. And finally, the level of evaluation, students are able to assess the information and reach a conclusion, as its value or the bias behind it.

In the decade of 1990, new concepts, technologies, and theories had been incorporated into the educational field, which counted with new publications on psychopedagogical advances and with numerous practical work. In 1995, a group of experts met in Syracuse, New York. The group has attempted to seek a balance between the structuring of the original taxonomy and the changes brought about by technological advances and strategies incorporated into education to review the theoretical assumptions of Bloom's Taxonomy. This group of experts was supervised by Krathwohl (2002). In the year 2001, the report of this review of Bloom's Taxonomy was published in the book titled: a taxonomy for learning, teaching, and assessing: the revision of Bloom's taxonomy of educational objectives (Anderson et al., 2001). Were related aspects of cognitive development, competence, and the ability to allocate two-dimensional feature the original taxonomy of Bloom. From the definition of two-dimensionality, were combined the type of knowledge to be acquired and the process used for the acquisition of this knowledge (Anderson et al., 2001).

The new structure of the cognitive process in revised Bloom's taxonomy maintains six levels, which are: the first level, remember, is related to recognize and play ideas and content, and is represented by the following verbs: recognizing and playing; the second level, understand, is related to establish a connection between the new and the previously acquired knowledge, and is represented by the following verbs: interpreting, exemplifying, classifying, summarizing, inferring, comparing and explaining; the third level, apply, is related to run or use a procedure in a specific situation and may also address the application of knowledge in a new situation and is represented by the following verbs: running and implementing; in the fourth level, analyze, is related to divide the information into relevant and irrelevant, essential and

less important and understand the inter-relationship between the parties and the corresponding verbs are: differentiating, organizing, assigning and completing; on the fifth level, evaluate, is related to make judgments based on criteria and qualitative and quantitative standards or efficiency and effectiveness, your verbs are: checking and critiquing and finally the last level, create, means putting elements together with the aim of creating a new vision, a new solution, structure or model using previously acquired knowledge and abilities and is represented by the following verbs: generalizing, planning and producing (Anderson et al., 2001; Krathwohl, 2002).

In Bloom's taxonomy of revised, any goal is represented in two dimensions, why did the possibility of building a two-dimensional table. The dimension of the knowledge forms the vertical axis of the table, while the size of the cognitive process would form the horizontal axis. The intersections of knowledge and the categories of the cognitive process would form the cells. The new dimension of knowledge, contains four primary categories, Table 1 (Anderson et al., 2001; Krathwohl, 2002).

Table 1 - Category of knowledge in Bloom's taxonomy of revised

| Category | Description |
|---------------------------------|---|
| Knowledge Effective | Related to essential content that students must master in order to be able to achieve and solve problems supported this knowledge. In this category, the facts do not need to be understood or combined, only played as presented. |
| Knowledge Conceptualizes | Related to the inter-relationship of the basic elements in a more elaborate context that students would be able to find out. Simplest elements were addressed, and now need to be connected. Phishing, structures, and models were organized and explained. At this stage, there is the implementation of an important model, but the consciousness of their existence. |
| Knowledge Procedural | Related to the knowledge of "how to accomplish something" using methods, criteria, algorithms, and techniques. At this moment, the abstract knowledge begins to be stimulated, but within a single framework, and interdisciplinary. |
| Knowledge Metacognitive | Related to the recognition of cognition in general and to the conscience of the breadth and depth of knowledge acquired about a private content. In contrast with the procedural knowledge, this knowledge is related to interdisciplinarity. The main idea is to use knowledge previously treated (interdisciplinary) for the resolution of problems and/or the choice of the best method, theory, or structure. |

Source: (Anderson et al., 2001)

Methodology

The research was exploratory. It aimed to direct exploration with the participants of the object of study to familiarize the researcher with the object that was being investigated during the research. The method used in the research involved, as well as the bibliographical survey, interviews with participants, analysis of the tasks performed, analysis of decisions and results obtained through the collection of primary data of the laboratory environment, where he led a game of companies (Creswell, 2007; Richardson, 2012).

In the laboratory management, the game of companies became an environment of decision-making in which each participant was orchestrated with the textbook laboratory management (Sauaia, 2010). The primary data were obtained through the experience of the game companies in the classroom, the forms of decision-making, interviews with participants, and the reports provided to each quarter and at the end by the participating companies and (www.simulab.com.br). The objective of this research was to understand how the process of Bloom's taxonomy was

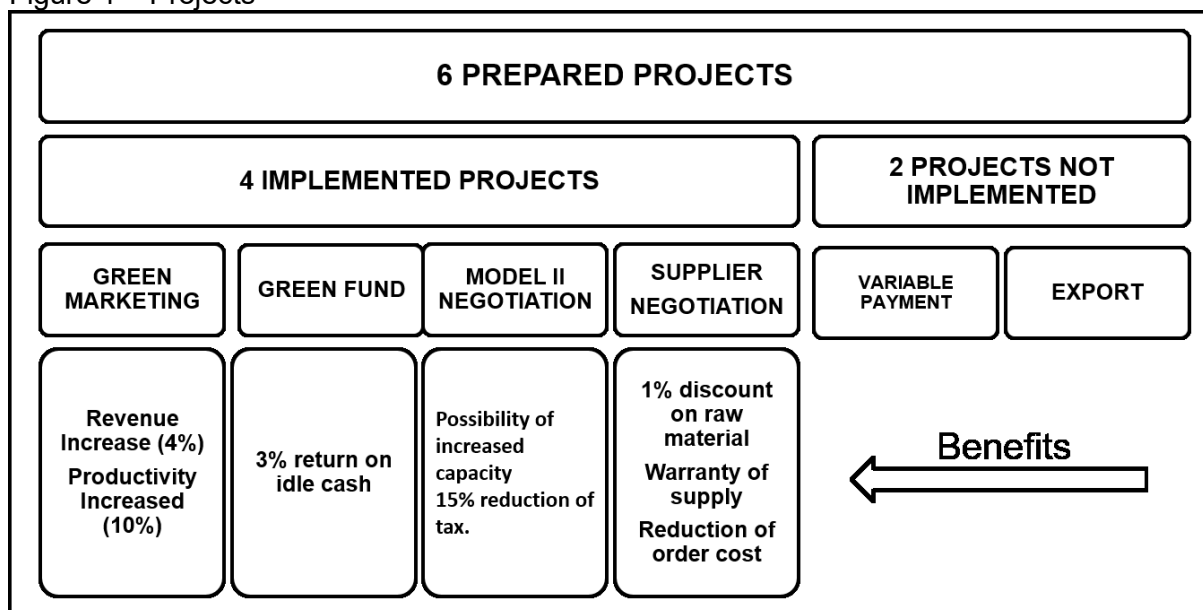
experienced in participating companies in laboratories in which the target company was the TRITEC.

DESCRIPTIVE ANALYSIS OF THE RESULTS OF THE COMPANIES

Were examined the results of the company TRITEC and INOTECH, its rate of return in the first and second years, and the results related to innovation projects obtained by the company TRITEC. The currency of the companies was the American dollar. The company TRITEC, drew six projects, and only four were effectively deployed in figure 1.

The project of innovation of green marketing aimed to meet the material and immaterial needs of society in short, and, mainly, in the long term. It is intended to contribute to the improvement of the quality of life and the preservation of the planet, minimizing the impacts caused by the company in the long term, and, at the same time, ensuring the survival of the organization and the satisfaction of *stakeholders*. The project was implemented in the third quarter, with the quarterly investment of \$50,000 in cultural projects and marketing, facing social causes. This project has benefited the company in an increase of 8% in gross revenue (reducing costs by 4%) and productivity gains of 10% from the quarter 7 (Table 2).

Figure 1 – Projects



Source: Prepared by the authors

Table 2 - Green Marketing

| Green Marketing | Quarter 03 | Quarter 04 | Quarter 05 | Quarter 06 | Quarter 07 | Quarter 08 |
|-----------------------|------------|------------|------------|------------|------------|------------|
| Rate (%) | 4 | 4 | 4 | 4 | 4 | 4 |
| Gross Revenue (\$) | 5,390,334 | 4,460,986 | 4,438,222 | 6,148,184 | 6,913,951 | 5,250,059 |
| Return Mkt Green (\$) | 165,613 | 178,439 | 177,529 | 245,927 | 276,558 | 210,002 |

Source: Prepared by the authors

This negotiation is based on the country's legislation that provides tax incentives for organizations that contribute to social projects through donations and sponsorships. On the other hand, it may receive an incentive for the deduction of income tax.

The project of innovation Green Fund was implemented from the fourth quarter, which has invested its resources not used directly in the production process, i.e., surplus and idle, contained in the box, in the financial market, more specifically in a fund of actions formed by companies that comprise the Corporate Sustainability Index (ISE), so it could obtain a remuneration on the box and encourage good practices of sustainability in the business environment. The TRITEC invested all available value in the box and got a return of 3% of the value available in the previous box (the credit was released in other expenses as an extraordinary income), table 3.

Table 3 - Green Background

| Green Background | Quarter 4 | Quarter 5 | Quarter 6 | Quarter 7 | Quarter 8 |
|------------------------|-----------|-----------|-----------|-----------|-----------|
| Return Rate (%) | 3 | 3 | 3 | 3 | 3 |
| Unit (\$) | 1,718,280 | 2,241,378 | 2,396,598 | 3,315,315 | 2,872,339 |
| Return Green Fund (\$) | 51,548 | 67,241 | 71,897 | 99,459 | 86,170 |

Source: Prepared by the authors

At the end of the first year, the company TRITEC has developed a project with the government to enable a model, with the production in 3 shifts, which would benefit the company and other interest groups, generating greater demand for factors of production (suppliers), lower average prices (distributors) and expansion of the market (consumers). The government, in conjunction with the Union, would have the opportunity to implement a social action: the distribution of income, with more jobs for vendors and workers, which would result in greater economic activity and an increase in the collection of taxes. The agreement was closed for opening the model two, and a reduction of 15% of the income tax as an incentive from the government, since the company proposed to increase the number of jobs and the distribution of income. Table 4 shows the gains obtained with the project.

Table 4 - Government Project

| Government Project | Quarter 6 | Quarter 7 | Quarter 8 |
|-----------------------------|------------|------------|------------|
| Rate (%) | 15 | 15 | 15 |
| Income Tax (\$) | 518,862.00 | 993,871.00 | 529,363.00 |
| Discount Go Government (\$) | 77,829.00 | 149,081.00 | 79,404.00 |

Source: Prepared by the author

At the end of the first year, TRITEC had demand for 785,551 units; however, it offered 591,763 units of products. The company sought a solution to meet the repressed demand in the last quarter. After assessing the alternatives and their respective risks, we chose to open the second round, through negotiations with the government. For the opening of a second round, TRITEC needed larger batches of raw material. The demand for larger consignments of raw materials has increased the bargaining power of the supplier, which gave the TRITEC a discount of 1% on purchases of raw materials and the exemption from the cost of request from quarter 6. The negotiation also guaranteed the supply of raw material by the supplier. Table 5 demonstrates the gains obtained with the supplier.

The results of innovation projects (Table 6) occurred from the third quarter. The four projects had higher return the marketing project Green, representing 1% of the projects presented, table 6. Secondly, it appears the green project background with 17.68%. The negotiation with the government was important because it allowed the company to benefit from the reduction of taxes, Passing this reduction for reduced prices or

investing more in their production capacity, which in the case of TRITEC, opted for the production increase with the opening of new shifts and hiring more people. With the implementation of two more projects in the second year, is that one of them is related to the opening of the second model of production Sauaia, (2010), the company has doubled, from the sixth semester, the results obtained with the innovative projects. The innovations represented a return of 5.03% on the total sales of the company in year 1 and 2, Table 7.

Table 5 - Project Supplier

| Supplier Project | Quarter 5 | Quarter 6 | Quarter 7 | Quarter 8 |
|----------------------|-----------|-----------|-----------|-----------|
| Rate (%) | 1 | 1 | 1 | 1 |
| Purchase MP (\$) | 1,250,000 | 970,000 | 940,000 | 900,000 |
| Return Supplier (\$) | 12,500 | 9,700 | 9,400 | 9,000 |
| Cost of request (\$) | 0 | 50000 | 50613 | 50613 |
| Supplier + Cost (\$) | 12,500 | 59,700 | 60,013 | 59,613 |

Source: Prepared by the authors

Table 6 - Benefits

| Green Marketing | Quarter 3 | Quarter 4 | Quarter 5 | Quarter 6 | Quarter 7 | Quarter 8 |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Return Mkt Green (\$) | 165,613 | 178,439 | 177,529 | 245,927 | 276,558 | 210,002 |
| Return Green Fund (\$) | | 51,548 | 67,241 | 71,897 | 99,459 | 86,170 |
| Discount Go Government (\$) | | | | 77,829 | 149,081 | 79,404 |
| Return of the supplier (\$) | | | 12,500 | 59,700 | 60,013 | 59,613 |
| Full benefits calculated | 165,613 | 229,987 | 257,270 | 455,353 | 585,111 | 435,189 |

Source: Prepared by the authors

Table 7 - Percentage innovations/sales

| | | |
|----------------------------------|---------------|---------|
| TRITEC sales (\$) Year 1 and 2 | 42,357,823.90 | |
| Innovation Projects | | |
| Return Mkt Green (\$) | 1,254,068 | 58.92% |
| Return Green Fund (\$) | 376,315 | 17.68% |
| Discount Go Government (\$) | 306,314 | 14.39% |
| Return of the supplier (\$) | 191,826 | 9.01% |
| Total projects (\$) Year 1 and 2 | 2,128,523 | 100.00% |
| Percentage innovations/sales | 5.03% | |

Source: Prepared by the author

In Table 8, compared to the two companies TRITEC and INOTECH, realizes that the company TRITEC obtained a higher result and stable the company INOTECH during those two years.

The company TRITEC, except in the first quarter, has managed to maintain a positive return on investment, and the fifth semester onward, a return above 4%, reaching 8.77% in the 6th quarter. It should be noted that, in the quarter six, the prices are virtually the same as those of the two companies, and INOTECH sold almost one hundred thousand products more than the TRITEC. However, the result of the TRITEC was much higher than the company INOTECH. This same analysis is also observed in the 7th quarter.

Although the total sales of the two companies (Table 8) were very close, note the superiority of TRITEC company about the return on investment (Figure 4). Part of this

sustainable return has the contribution of results obtained in innovation projects, in an increase in the volume of sales and customer monetary gains, which represented 5% of total sales in two years.

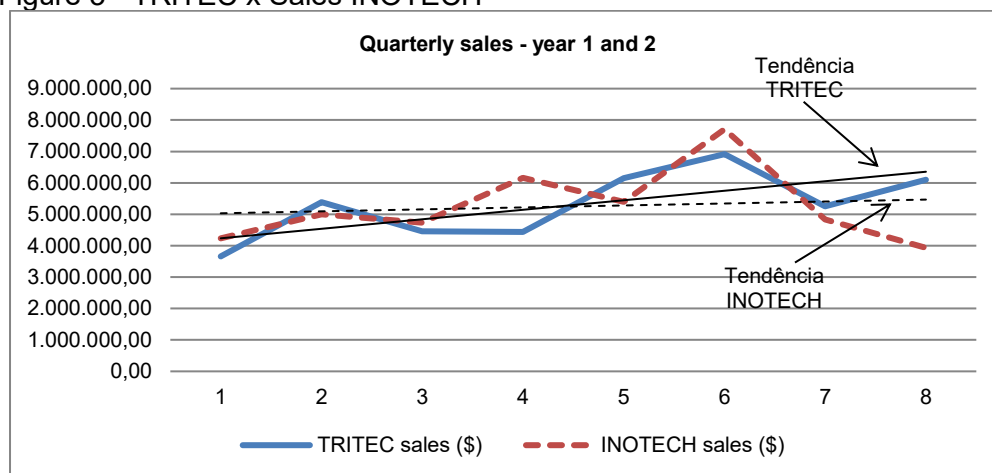
Table 8 - Comparative Study Companies

| TRITEC | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 | Quarter 5 | Quarter 6 | Quarter 7 | Quarter 8 |
|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Unit price. (\$) | 6.75 | 7.15 | 7.35 | 7.50 | 8.00 | 8.50 | 7.75 | 7.75 |
| MKT Share (%) | 31.26% | 35.39% | 33.76% | 29.94% | 36.87% | 32.61% | 33.39% | 40.62% |
| Sales | 542,107 | 753,893 | 606,937 | 591,763 | 768,523 | 813,406 | 677,427 | 786,692 |
| LDIR (\$) | -587.274 | 410,720 | 286,636 | 250,926 | 565,486 | 1,080,079 | 529,363 | 803,570 |
| Irr | -5,73% | 3,86% | 2,65% | 2,29% | 4,94% | 8,77% | 4,46% | 6,92% |
| Sales (\$) | 3,659,222 | 5,390,334 | 4,460,986 | 4,438,222 | 6,148,184 | 6,913,951 | 5,250,059 | 6,096,863 |
| INOTECH | Trim. 1 | Trim. 2 | Trim. 3 | Trim. 4 | Trim. 5 | Trim. 6 | Trim. 7 | Trim. 8 |
| Unit price. (\$) | 6.90 | 7.50 | 7.99 | 8.49 | 9.00 | 8.49 | 7.19 | 7.90 |
| MKT Share (%) | 35.38% | 31.30% | 32.91% | 36.73% | 28.74% | 36.40% | 33.16% | 25.70% |
| Sales | 613,500 | 666,937 | 591,763 | 725,986 | 599,216 | 907,795 | 672,612 | 497,717 |
| LDIR (\$) | -148.191 | 143,263 | 170,172 | 763,354 | 7 | 717,367 | -332.417 | -613.619 |
| Irr | -1,38% | 1,32% | 1,54% | 6,48% | -0,80% | 5,08% | -2,47% | -4,83% |
| Sales (\$) | 4,233,150 | 5,002,027 | 4,728,186 | 6,163,621 | 5,392,944 | 7,707,179 | 4,836,080 | 3,931,964 |

Source: Prepared by the authors

In Figure 3 It should be noted that the amount of sales of both companies, within two years, was similar. However, if a more accentuated growth projection for the TRITEC that the company INOTECH in quarter 8.

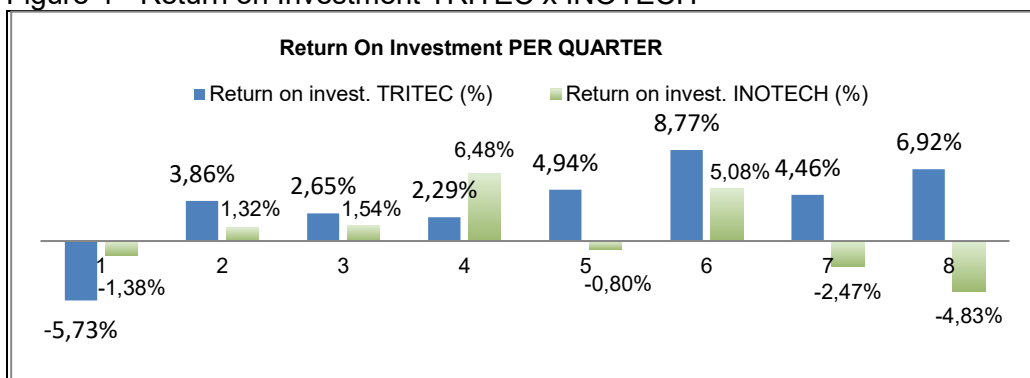
Figure 3 - TRITEC x Sales INOTECH



Source: Prepared by the authors

In Figure 4, it is observed that the return on investment of the TRITEC over the two years, remained better than your competitor. Except, in the first quarter, in which the IRR - internal rate of return was negative, the TRITEC maintained profitability and above your competitor, it was only exceeded in the fourth quarter. Such differences in performance have their origin in the innovation projects of value.

Figure 4 - Return on Investment TRITEC x INOTECH



Source: Prepared by the authors

DESCRIPTION AND ANALYSIS OF THE PROCEDURES ADOPTED

The analyzes in this study were based on the game environment of companies, which occurred in the first half of 2012, the discipline of Laboratory Management, offered in the program of master and doctoral degrees of the FEA USP-SP. Four consecutive games were conducted and analyzed only the data of the Game 3 composed by the results of eight quarters. In this game, two competing companies, INOTECH and TRITEC, were managed by three students each. The third company, newcomer, was created by the teacher as a new entrant, who had as policies operate on the average of the decisions of the two other competitors. All companies began operations in the same condition factors, differing only as to the intellectual capital. Initially, students were instructed to read the book management laboratory (Sauaia, 2010), so that all participants know the economic rules of the simulator and make a plan beforehand.

A questionnaire answered by six managers of the two companies showed the differences in the creation of knowledge of the two companies. The TRITEC held a total of 16h of extra meetings, while the INOTECH held only 2h bonus. There was an exchange of information on the knowledge and skills of each director on the part of the TRITEC, which can be deduced by the response to the questionnaire that the INOTECH there was an argument for this. Another point reported by TRITEC, participants exchanged information about the market, competition, government, and external variables to elaborate projects. Already in the company, INOTECH has not performed this exchange of information so that they could discuss these situations for a possible strategy, nor the strategy prior to the drafting of the plan has been much debated by the company INOTECH.

In this first phase identifies the first process of Bloom's Taxonomy, remember, where companies would have to search and read about the rules and data of the company's operations and market.

Still, in the beginning, it identifies the second process of Bloom's taxonomy, where students have interpreted the data obtained, comparing with the market and deduce a business plan exemplifying them, as reported below: The object of this research companies - TRITEC and INOTECH - drew up his plan of management in 4 steps,

based on the model proposed by Sauaia (2010). Note in Figure 5 that the TRITEC has developed its plan of management with a focus on quality, sustainability, and innovation. Not very different, the INOTECH also developed its plan with a focus on innovation, differentiation, and sustainability.

Figure 5 - Management Plan, Vision, Mission and Values

| | TRITEC | INOVATECH |
|----------------|---|--|
| Vision | Be a reference in the market, recognized for excellence in quality, sustainability, and innovation. | To be the leader in the industry in the value generated for the shareholders and innovation projects. |
| Mission | Act sustainably in the market, providing quality products, and adding value to stakeholders. | To become a leader in value for investors will adopt a strategy of differentiation and innovation, consistent distribution of dividends, and investment in the quality of the product. To invest and develop projects for sustainability, citizenship, and politics. |
| Values | Sustainable development, entrepreneurship, innovation, ethics and transparency, readiness to change, and respect for diversity. | ----- |

Source: Prepared by the authors

The third process of Bloom's taxonomy, apply, shall be verified by the deployment of strategies already in the first round. Then, after the closure of the first round starts the process of Bloom's taxonomy, analyze the results are analyzed. At this stage, students organize the data for a better analysis, separate and tribute weights to results, and conclude on the outcome. As soon as it begins the fifth process, evaluate, students do a check with the planning because they designed earlier and made a criticism about what happened. In the last stage of the process, students will create new strategies solutions to continue with the wheels, which can be seen from the initiatives of projects made by the students. The cycle of Bloom's taxonomy is repeated in almost all rounds. Each round, students will acquire more experience and knowledge, raising the level of solutions presented.

CONCLUSION

The concepts of Bloom's taxonomy here addressed were confirmed by the description of the experiment and the results obtained. The leaders of the company TRITEC, concerned with competition, if met, long hours, to draw up a plan of action. The idea was to obtain competitive advantages regular, for the company, over the years, remained stable economically and in gradual growth. Also, the company sought sustainable solutions with the environment and with social issues, without which such actions harm their financial result, which was possible through innovation with sustainability projects. This allowed him to create a competitive advantage, differentiating yourself from your competitor, who no longer compete with the TRITEC in new condition. The TRITEC, benefited with such projects getting better performance and stability. This analysis was realized that not all directors of the company INOTECH participated, different from TRITEC, where everyone participated and debated the outcome. This exchange of experience and knowledge, TRITEC led the company to think differently and from for a fight by the market, competing out of the game of the competition. While the TRITEC drew six sustainable projects and implemented four, in two years, the competitor has only two projects that have been put into practice.

This result was due to strong planning by the company and interaction among its directors. The process followed the cycle of the theoretical model proposed by Bloom (Bloom et al., 1956). That began with the study of standards until the final stage of the creation of ideas. By questionnaire and interview with participants, it was perceived that the TRITEC was the company that worked well these phases, as described in the description of the experiment, through various meetings and actions that took a long time for directors. In an interview with the directors of the company competitor, the INOTECH, we found that the number of meetings of its directors was much lower than the amount of hours invested by TRITEC. The initial phase of knowledge for a decision-making process in TRITEC was essential for the company to develop suitable projects. The company has succeeded, in the 5th quarter, doubling its production. This has provided a new differentiation of its competitor.

This study illustrated that through lab management, it is possible to apply the six levels of Bloom's taxonomy. In addition, the participants of the TRITEC company, who performed all the processes sequentially Bloom's taxonomy were those who had a better outcome, and possibly these students had a better advantage in terms of knowledge, proof of this was that each strategic movement in the roundtables signaled a different direction, for each company. Therefore, the laboratory of management was unable to verify, step by step, as Bloom's taxonomy can contribute to learning.

REFERENCES

- Adams, N. E. (2015). Bloom's taxonomy of cognitive learning objectives. *Journal of the Medical Library Association : JMLA*, 103(3), 152–153.
- Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., Wittrock, M. C. (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's taxonomy of educational objectives*. Addison Wesley Longman, Inc. New York: Addison Wesley Longman, Inc.
- Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives*. DAVID MCKAY COMPANY, INC. London.
- Creswell, J. W. (2007). *Projeto de pesquisa: métodos qualitativos, quantitativo e misto* (2nd ed.). Porto Alegre: Artmed.
- Dochy, F., de Rijdt, C., & Dyck, W. (2002). Cognitive Prerequisites and Learning. *Active Learning in Higher Education*, 3(3), 265–284.
- Illeris, K. (2018a). A comprehensive understanding of human learning. In K. Illeris (Ed.), *Contemporary theories of learning _ learning theorists in their own words* (2nd ed.). London: Routledge.
- Illeris, K. (2018b). *Contemporary theories of learning _ learning theorists in their own words*. (K. Illeris, Ed.) (2nd ed.). London: Routledge.
- Krathwohl, D. R. (2002). A Revision of Bloom's Taxonomy: An Overview. *Theory Into Practice*, 41(4), 212–218.
- Moreira, M. A. (1999). A teoria da aprendizagem significativa de Rogers. In *Teorias de Aprendizagem*. São Paulo: EPU.
- Richardson, R. J. (2012). *Pesquisa social: métodos e técnicas* (3rd ed.). São Paulo: Atlas.
- Sauaia, A. C. A. (2010). *Laboratório de gestão: simulador organizacional, jogo de empresas e pesquisa aplicada*. Barueri: Manole.