

A Board Game to Support Teaching Cost Accounting

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Abstract— This article presents a strategy to support the teaching of Cost Accounting Discipline through a board game. The proposal use of the game, in higher education students in the Bachelor's degree in Accounting Sciences, has the purpose of complementing traditional education. With the objective of playful, the process with game component's inserted in a vocational educational context is focused on the students motivation in a simulated activity.

Index Terms— Game-Based Learning; Board-Game-based; Cost Accounting Vocational Discipline.

I. INTRODUCTION

In the course of Accounting Sciences are recommended courses of specific training for professional activity, among these is the discipline of Cost Accounting, due to its relevance to the decision-making process of a manager [27].

According to Manegon [19], the traditional method of teaching, which is extremely teacher-centered, leaves students with opportunities for practical application of the concepts learned in class, since the concepts disseminated are, over time, forgotten. As a result, it is important to complement the didactics applied in the classroom with some tool or method that promotes the acquisition of knowledge within the teaching area more effectively.

Increasingly, students' lack of motivation in the classroom [12] is perceived, perhaps due to the approach in the teaching practice or the indiscipline of students [11].

So, using methods that somehow attract students' attention in a broad, engaging and enriching classroom-driven content provide a broader view of Cost Accounting.

The purpose of this paper is to propose the elaboration of a board game exclusively focused on cost accounting, in the baccalaureate courses in Accounting Sciences, in order to highlight this strategy as valid for the improvement of the teaching-learning process.

II. THEORETICAL FOUNDATION

A. Pedagogical Games in Higher Education

The games have been used for centuries and its concept has undergone several modifications in recent years [28].

What was once seen as just fun, hobby, different jokes, often with context out of reality, has now come to be seen as a possibility of teaching strategy.

With educational purpose, which highlights its importance in teaching-learning, it is important to stress that the content presented in the game is in sync with the discipline to be applied [28].

The games have come to be seen as an alternative way to search for knowledge and have become a valuable tool for playful applications having as a characteristic to be designed quickly for the desired purpose, this provides easy adaptation to the desired content [9; 28].

For a long time the term "teach" was confused with "transmit", and in this context, the learning individual was a passive agent of learning, and what he taught, a transmitter not necessarily present in the learner's needs.

Nowadays, it is known that there is no learning without learning, and that it is only through transformation, through the facilitator's action and through the process of search for knowledge, which must always start from the learner [14].

B. Traditional Cost Accounting Teaching

With the demand of professionals in the accounting and administrative area, it is very common for institutions and teachers to resort to new teaching methodologies, with the aim of delivering the academic prepared to the job market.

According to Iudícibus [18], the main objective of accounting is to generate useful information for decision making. Accounting, because of its complexity, requires constant knowledge, practice, study and updating, due to rapid changes in legislation.

In the context of accounting, one of the most important and difficult areas, Cost Accounting, stands out as essential and needs to be seen in an efficient way to aid decision-making within companies [21]. Because it is a large and complex area, it becomes a difficult discipline, causing difficulties in teaching it.

Cost accounting is a technique for identifying, measuring and reporting costs and services, generating accurate and fast information [2], making it a reference within companies for providing information and data that are reflected in decision making, affecting directly the financial sector of the same, aiming at immediate profits and the planning of the future.

Analyzing the costs for decision making has become a fundamental task for the good management of a company [8], that is, with the help of Cost Accounting, the manager has the knowledge to evaluate the stocks, control the purchase and sale price and clear results.

In this context, cost accounting within companies becomes essential, requiring people qualified for this area who, necessarily, depend on a quality teaching-learning process, that prepares the student for this function.

According to Barreto et al. [7], the field of education is under great pressure for change, so it is with other organizations, so that the concern is taking care of private institutions and it is fundamental that the student is prepared from the beginning of the undergraduate course.

C. The Gamification Process

Gamification is defined as the use of game mechanics, dynamics and aesthetics in an environment other than the game itself, in order to engage, motivate, train or modify the behavior of an individual [29].

According to Rodrigues [26], games for both children and adults may have the ability to open space to new situations where people explore their own creativity. Thus, play strategies contribute to the absorption of new content, so that it does not feel pressured to learn content as an obligation, but to fix its understanding in a simple and fun way.

According to Deterding and Dixon [10], the gamification lies within the elements of digital games, having, however, something more than just the fun.

The use of playability techniques, using board games in the teaching environment, will facilitate the development of some skills, such as: critical sense, collection of assumptions, concentration, imagination, organization and argumentation, which are elements worked in the logical reasoning [3; 31].

Therefore, the use of these elements of games generates positive benefits in learning, such as: higher levels of productivity and individual achievements, and high levels of motivation.

Thus, it is noticeable that the use of this process positively influences the underlying motivational issue.

III. RELATED WORKS

The search for new methodologies has been expanding, causing students and teachers from various areas to search for new ways to attract and diversify content.

Currently there are several board games on the market that, although they are different and cover different contents, present common goals, such as fun, interaction and, in the case of educational games, deal with specific content in the classroom.

The Board Games in Higher Education have been used by the areas of Computer Science in the Software Engineering discipline, such as SoftGame [19] and PM-Master [30], seen in Figure 1.

The game SoftGame aims to assist in the teaching-learning process, stimulating students in the development of physical and mental skills, in order to put into practice knowledge acquired in the classroom in the specific discipline of software

engineering.



a) *SoftGame* [19]

b) *PM-Master* [30]

Figure 1 – Board Games for Software Engineering

With the approach between the subjects: introduction to software engineering, requirements engineering, software production and process models, project planning and quality management, including software testing, maintenance and evolution [19].

The PM-Master game is a board game used at the end of a series of classes, presenting the knowledge about the project management life cycle, with the purpose of reviewing and fixing this knowledge [30].

In the health areas are the games MyPath [23] and Structure and Dynamics [14], seen in Figure 2. In (a) the game focused on psychology and (b) for nursing.

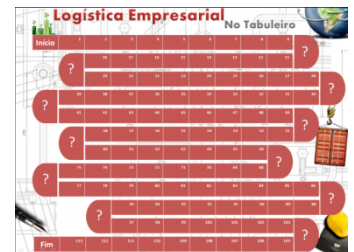


a) *MyPath* [23].

b) *Structure and Dynamics* [14].

Figure 2 – Board Games for Health

In the area of management and business, the board games that stand out are the Entrepreneur Game [15] and the game Business Logistics in the Board [25].



a) *Entrepreneur Game* [15].

b) *Business Logistics Game on Board* [25].

Figure 3 - Business Board Games

SoftGame [19] is focused on teaching Computer Science; the PM-Master [30] is intended for Project Management; My Path [23] and Structure and Dynamics [14] have a focus on learning involving health; the Entrepreneur Game [15] and the Business Logistics Game on Board [25] were developed for the application of business management learning.

All follow rules, structures, concepts, different contents, and the main focus of all of them is the use of the game as an auxiliary tool in the teaching-learning process.

The games seek through the play strategies to contribute to the absorption of content, so that it does not feel pressured to learn this content as an obligation, but to fix its understanding in a simple and fun way, making the class more attractive, motivating, dynamic and pleasurable.

I. PROTOTYPE DEVELOPED

The game will be crafted in the form of a board and its illustration and development will be based on demonstrating the industrial process of a confectionery company and all its basic costs involved. The Game is being developed according to the basic thermology of Cost Accounting, with the purpose of adding and complementing the content in class.

The Game will reflect the industrial process of a company, focusing on the production of pants and shirts. During the match, the participant will encounter situations involving the administration of a company and all its costs involved, addressing situations that occur within the companies, being able to identify and analyze each situation, comparing with the content delivered in the room.

The game will cover the main departments of a company, through colored houses that will identify in which department the situation is occurring: blue is Accounting obligation, yellow is the financial sector, pink is destined for human resources, orange represents production situation, brown is the warehouse, dark blue is the sales department and black, green and red define situations of advantages and disadvantages during the plays, see Figure 4:



Figure 4 - Test paper prototype.

Like any company, the decision made by the manager can influence the entire administrative process, so the game has random paths and crosses during the plays, where the player will have to choose the best way to go during the game, and may suffer the consequences of choosing the wrong path.

During the course, the player will have to keep the company working, so the best decisions have to be made, the player must follow exactly the instructions of the house in which to stop, when faced with the crosses will have to choose which way to go.

The player can make loans, make investments and acquire insurance, either for the protection, investment or survival of the company.

During the match, players are faced with common situations of a company, such as payments of expenses and employees, purchases of raw material for production, inventory control, sales of goods, gains on the sale of goods, contingencies and setbacks, such as delay in production and situations such as theft and fire, tax penalties, social awards.

The winner will be the participant who, at the end of the match, better manage the company, which guarantees a greater volume of resources in the company's cashier, the result will be defined by the first two participants who reach the final point.

The game will simulate the routine of a company and how the decision making can influence the final result, the focus is that in the end the player will be able to identify the costs in a simple and practical way.

Several tests were carried out, based on the prototype, where small errors were found, such as: situations in disagreement with the discipline, financial values incompatible with the plays, letters with wrong descriptions. With the tests it was possible to adjust the game according to the discipline and the reality of the companies, providing greater complexity and vision in comparison of the game with the reality of the companies.

Thus, board game is transformed, leaving only to be a prototype, according to Figure 6 and 7.

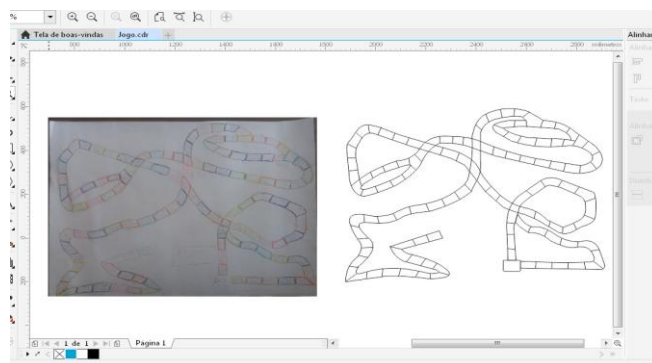


Figure 6 - Test prototype transforming 1.

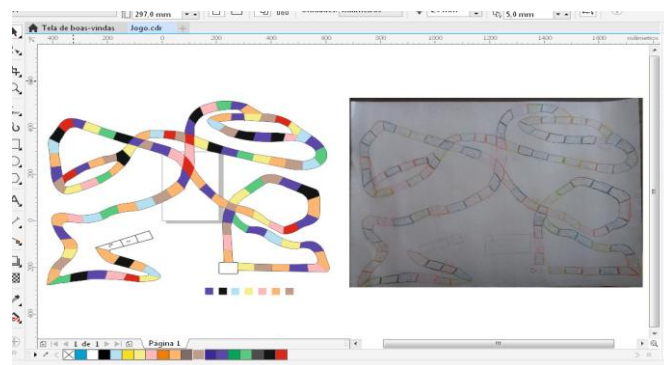


Figure 7 - Prototype of transforming tests 2.

The game will still have support from extra cards (stock control of pants and shirts, bad cards, lucky cards), promissory

notes, insurance policy, bank investments, pedestrians, manual and money simulation notes (US\$).

II. METHODOLOGICAL DESIGN

The objective of this article is to highlight the development of a strategy that can aid the teaching and learning process during the classes of Cost Accounting in higher education.

To implement the strategy will be developed a board game, which in a playful way can represent situations occurred in the business environment, so that it can complement the student's vision of the content.

The board game will cover specific contents of Cost Accounting, involving the basic terminology of the discipline, addressing the direct costs, indirect costs, expenses, gain, investment, loss, revenue and disbursement.

In a qualitative way, it is intended to deepen existing knowledge, by gauging the great volume of information already received, in order to absorb and interpret it in the best possible way, with the purpose of knowing the phenomena through the meanings they have for people [20].

The application of the board game will be carried out in two distinct colleges, one located in the city of Paraíso do Norte - PR (Brazil) and the other in Primavera - SP (Brazil), private colleges of the interior, composed largely by students who studied in public schools, and today some of them work in paid activities during the day to pay their monthly fees, while others are supported by funding programs such as FIES - Fund for Student Finance and PROUNI - University for All Program (social programs in Brazil).

The course will be the baccalaureate in Accounting Sciences, in the discipline of Accounting of Costs, with students of the fifth and seventh semesters. The game will be applied only once in each class, with an average of 20 to 40 students, aged between 19 and 25 years.

To conduct the experience among higher education students and to compare learning before and after the application of the game, a questionnaire will be developed to test the knowledge and analyze the evolution after the use of the game.

According to Andrade [5], one of the characteristics of the research is the standard technique of data collection, performed mainly through questionnaires.

First, a questionnaire will be applied that tests the student's learning to the content to be approached by the game, then the presentation and application will be performed.

After the use of the game will be applied a second questionnaire, with the purpose of comparing with the first, where will be made the comparison between before and after, thus assessing the level of knowledge of the student.

A third questionnaire will be developed and applied, in this the student will be able to express his opinion regarding the methodology of games in the classroom, in order to evaluate the approval of the students.

After the application of the board game and the questionnaires will be possible to carry out the verification of learning and to verify the effectiveness and effectiveness of this educational strategy.

The objective will be to verify if the game of board, directed to the Cost Accounting, caused the expected effect, validating the proposal of this work: H0, H1, H2, H3 and H4 hypotheses have emerged, which seek to answer the guiding question of this work: "Is the application of the board game a motivating factor for users?"

H₀: Was the study valid? Was there any benefit?

H₁: Is there motivation when playing?

H₂: Does this motivation contribute to the content?

H₃: Formal learning time versus learning time with the tool: was it higher or lower?

H₄: Are the students' performance (with game and traditional) the same?

In order to answer the hypothetical questions, it will be necessary moments in class for the insertion of the tool, and moments in which the student has contact with the discipline through the traditional class, comparing with the complement to the content that the game can bring.

The analysis of the results will be graphically demonstrated for a better visualization of the obtained data, because with this data it will be possible to evaluate the effectiveness of the application of the games within the cost accounting, analyzing the degree of learning, comparing the before and after, acceptance of the students in relation to the practice used.

III. EXPECTED RESULTS

It is expected that, with the present work, the development of a Board Game, with specific contents of costs, will help the student in the teaching-learning process, contributing with the discipline of Cost Accounting and arousing the interest of the same by the content.

The expectation is that the teacher has in hand a methodology that assists him in the classroom so that, in some moments, the same can, in parallel with the traditional classes, use of material that attracts the students, promoting fun, interaction and fixing content.

That the student can become involved in the discipline and feel attracted and, without realizing it, within the context of the applied content.

That it arouses the interest of the student, causing the own one to disclose and recommend the Board Game - Costs, being able to arouse the interest of other teachers working in the accounting area to use the same one.

IV. FINAL CONSIDERATIONS

The objective of this study was the elaboration of a board game, based on the use of games for educational institution, with the purpose of assisting and complementing traditional teaching.

In order to support the development of this game, studies were developed that involved: cost accounting, work in the same line of research and the main elements of gamification: the development of a game and its techniques of interaction and engagement.

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