

## Board games as pedagogical tool – reflections about pandemic and stone age <sup>1</sup>

### Jogos de tabuleiro como ferramenta pedagógica – reflexões sobre pandemic e stone age

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#### ABSTRACT

The boardgames based in strategy can be considered important cultural phenomena with educational potential. Seeking for the balance of ludical and pedagogical functions we consider the use of games in the perspective of reading and understanding the world as a teaching resource in the development of skills. In this experience report, we present two games used within the scope of an extension project. The game “Stone Age” takes us back to Prehistory, enabling us to work in village management, operationalization of historical and mathematical concepts and the socialization and interaction of students. The game "Pandemic" is based on cooperation between all players in search of curing diseases across the globe. The methodological path was based on the proposition of studying the bibliographic references related to the theme, as well as the realization of workshops, in which we evaluated the application of board games as pedagogical tools. Our interpretation key appears to be valid, from the results presented in the workshops, underlining the importance of promoting teaching and learning activities with games in interface with the extension.

**Keywords:** board games, didactic resources, interation, teaching.

#### RESUMO

Os jogos de tabuleiros baseados na estratégia podem ser considerados importantes fenômenos culturais com potenciais educativos. A partir da busca do equilíbrio das funções lúdica e pedagógica, consideramos o uso de jogos na perspectiva de leitura e compreensão de mundo como recurso didático no desenvolvimento de habilidades. Nesse relato de experiência, apresentamos dois jogos trabalhados no âmbito de um projeto de extensão. O jogo “Stone Age” nos remete à Pré-História possibilitando o trabalho em gestão de aldeias, operacionalização de conceitos históricos e matemáticos e a socialização e interação dos estudantes. O jogo "Pandemic" é baseado na cooperatividade entre todos os jogadores em busca da cura de doenças por todo o globo. O caminho metodológico baseou-se na proposição de estudo dos referenciais bibliográficos pertinentes à temática, assim como a realização de oficinas, em que avaliamos a aplicação dos jogos de tabuleiro como ferramentas pedagógicas. Tem-se que a nossa chave de

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interpretação se coloca como válida, a partir dos resultados apresentados nas oficinas, sublinhando a relevância do fomento de atividades de ensino e aprendizagem com jogos em interface com a extensão.

**Palavras-chave:** jogos de tabuleiro, recursos didáticos, interação, ensino.

## 1 INTRODUCTION

The games have been considered a stimulating and healthy pastime since ancient times, not only being based on luck, but, on the other hand, relying on strategy to achieve their goals. In the specific case of boardgames, the 20th century marked a wave characterized by two news: the valorization of the idea of multiple competition and the fundamentation of the decision-making process. In this work, we present the use of two boardgames from the Extension Project entitled “Jogo Cooperativo” (“Cooperative Game”) developed in the Federal Institute of Education, Science and Technology of South of Minas Gerais (IFSULDEMINAS) in partnership with the Municipality of Pouso Alegre.

Stone Age (2008) was created by Bernd Brunnhofer and released in Brazil by Devir (2015). It comprises the category of strategic games based in dice whose theme is prehistory. Its mechanics cover the allocation of workers, the collection of components, the selection of cards and the roll of dice, passing through the management of villages in different areas (population, food, construction, plantation, mining etc.). Players work on the skill of strategic management of a village. In this approach, we can reflect on historical and mathematical concepts in the management of human society based on calculations, decision making and strategies that uses logical reasoning and resource operationalization.

The game Pandemic was created by Matt Leacock and launched in Brazil, in 2015, by Galápagos. It can be categorized as strategic with the scientific theme with hand management mechanics, component collection, cooperativeness, players with different skills and area movements. The main objective is solve the pandemics exposed on the board, so that individualistic actions never reach the ultimate goal, that is, save the humanity. In fact, even more actual the Covid-19 pandemic is placed as a backdrop to this possibility of learning through the board.

## 2 METHODOLOGY

The research was proposed in two stages: a) study of the theoretical-methodological references that bases the investigation; and b) analysis, description and application of boardgame workshops. Considering the Extention Project developed in the Federal Institute we found oportunites to realize workshops and execute the research purposes in 2019 and 2020 in institutional events in the campus and the complex of arts and sports of the city (Complexo de Artes e Esportes Unificado – CEU).

However, considering the Covid-19 pandemic crisis, the research was affected in the practical aspect facing the impossibility of applying face-to-face activities. During this time, the extention project has been promoting information about the boardgames through social networks by the effort of scholarship students, detailing game modes, tips and suggestions, in order to expand the reach of the school in the community and foster future partnerships with other educational institutions in the region. We are considering the realization of presential events with satisfactory sanitary conditions in the near future.

The spaces used were a multipurpose room of the municipal educational complex, with available tables and chairs counting with the publicity of the workshops on social networks. We used also the classrooms of the Federal Institute and the Mathematics Laboratory, during institutional events and divulgation to the academic community. The units of analysis involved the participation of civil servants of the school and students from public schools of the city.

In this work, we list the boardgames Pandemic and Stone Age to evaluate the pedagogical potential, considering its exploration strengths in logical reasoning, strategy, cooperativeness, science and humanities content and socialization. The choice sought to meet games that serve different publics - children, teenagers and adults. These are games of intermediate duration and difficulty and can be applied to any age group, starting from basic education.

We emphasize that, throughout the pandemic, boardgames acquired new meanings becoming part of the interaction between people in moments of social isolation. Pandemic, for example, provides relevant reflections on the current context. In this scenario, it was possible to realize meetings between friends and families during this time, reinforcing the results found during the workshops.

We also emphasize that, based on the details of this research, it is possible to expand the list of boardgame options that can be applied in the educational field, checking the dimension of the validity of the investigation since our choices are just a small fraction

of the plenty of available options. The availability of boardgames is increasingly wide, allowing to evaluate their dialogues in the pedagogical scope. In addition, we seek to offer access to high-cost cultural goods providing the workshops.

### 3 THEORETICAL REFERENCE

Huizinga (2019) defines the game as a cultural phenomenon – something innate to the ludic man (*homo ludens*), being a voluntary activity or occupation carried out within certain limits of time and space, according to agreed and mandatory rules. In this game context, there are feelings of tension, joy and awareness that characterize the individual's involvement. We consider the propositions of Huizinga (2019) to be elementary in the use of the game as a pedagogical tool.

According to Marques (2020), games have two functions: ludic (provide fun, pleasure, entertainment, involvement and imagination) and educational (there are contents that complete the subject in his knowledge and his apprehension of reality). We verified that the boardgames pervade the sphere of entertainment, being, also, pedagogical tools. They constitute possibilities for expanding our mental map as cultural phenomena located in time and space with representations and impressions of reality.

The balance of recreational and educational functions is the objective of a didactic or educational game, that is, in a scenario of imbalance, there may be a prevalence of playfulness or only promote teaching (disagreeing with the importance of ludic in learning). The balance of the ludic and educational functions is the objective of a didactic or educational game, that is, in a scenario of imbalance, playfulness may prevail or only promote teaching (disagreeing with the importance of playfulness in learning).

Considering this perspective, the ludic represents the possibility of integrating thinking, acting and feeling. Thus, we start from these notions in the construction of a theoretical-methodological framework which supported the proposal of workshops validating the didactic potential of the boardgames Stone Age and Pandemic.

### 4 RESULTS AND DISCUSSION

The game Stone Age (2008) was created by Bernd Brunnhofer and released in Brazil by Devir (2015). It comprises the category of strategic dice games whose theme is prehistory. Its mechanics cover the allocation of workers, the collection of components, the selection of cards and the roll of dice, valuing the management of villages in different areas (population, food, construction, plantation, mining etc.). The players work for

themselves, being a game that depends on the ability to manage your village more efficiently than others. We can work on concepts related to History, Administration and Economics in the management of human society.

Players must survive the Stone Age weather by working on different fronts (hunting, farming, tool making, metals), gathering enough resources to grow the population. We can play with up to 10 members for each tribe in three phases: a) first - individuals are arranged in regions of the board that can bring benefits in that round; b) second – we activate each of the choices in order of preference; and c) third – we feed the population to survive in that round, being able to advance in the civilizational development or backwards, including the loss of villagers.

Once again, we find ourselves in a scenario of difficulties for humanity, although, at that moment, in a past context in which we have the first formations or villages. Unlike “Pandemic”, each player acts for himself and the skill in civilizing management is fundamental, counting points at the end, according to the performance. Players relive ancient times by gathering wood, breaking stone, extracting gold from rivers, producing clay, or making tools.

Stone Age can be played by 2 to 4 people and can last from 1 to 3 hours. There are a series of tool figures numbered 1 to 4, working as important elements that soften the luck of the dice and help in the search for resources. There are 7 numeric dice (6 faces from 1 to 6). There are also several resources (wood, brick, stone, gold and food) represented by their own items. The game still provides a series of cards that are essential for the final set formed that will decide the winner. There are also technology cards (with a green background) that help advance agriculture, number of households, total tools or the number of workers.

Figure 1 – Stone Age



Source: Survey data (2021).

The figure of a tribal chief represents who is the first player in the round. Each one has an individual board for the organization of achievements and resources with

spaces for tools, huts, value references etc. The large board, in addition to the individual boards, constitutes the entire action scenario with cards, resources and tools. Each player chooses a color, receives an individual complementary board, all elements and 12 food items, distributing the scoring and farming markers. As we have pointed out, there are three phases of action: allocation, resolution of actions and feeding the population.

The development of the game takes place with the execution of actions by each player, seeking resources and evolving the population of their village. The game ends with the use of all cards, so the score is calculated by winning whoever has the most points. The game requires an effort of abstraction and imagination of the scenario of adversity in prehistoric times, allowing this task to become more enjoyable from the boardgame, especially for elementary school age groups, where initially there are the first contacts with the study of this formative period of humanity.

Nomadism marked the beginnings of human life being an element present in the game when we choose where to place our workers in different areas of the board. Food is one of these areas and represents the need to maintain the species being necessary at each round. This can become a point of tension if the player does not feed their village, as the lack of food implies the elimination of villagers, exemplifying the difficulties of life in the Stone Age<sup>2</sup>.

Another workable concept in this theme is primitive communism<sup>3</sup>, that is, everything that was conquered in the Stone Age was the result of the collectivity, being exemplified in the boardgame at times when we tried to acquire resources. Chances of success arise when more workers are allocated to the activities and thus the resources are used to improve the village.

Another element of that context are the tools that represent possibilities of increasing production, elucidating the difficulties of hunting, for example, without the aid of instruments. Elements such as constructions and civilization cards still represent the complexification that emerged after the sedentarization of humanity with the installation of cities and the use of technologies.

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<sup>2</sup> Period of Prehistory designated by the use of stone tools, considered the most advanced technology at that time, from the beginning of the emergence of man to the Age of Metals, in which more advanced technologies based on copper, bronze and iron appear. Traditionally, the Stone Age is divided into the Paleolithic (or Old Stone Age) marked by nomadism and hunting-gathering; and the Neolithic (or Polished Stone Age), characterized by the sedentary revolution based on agriculture and livestock.

<sup>3</sup> Karl Marx (1818-1883), in the Communist Party Manifesto (1848), defines primitive communism as an organization in which work was carried out for the suppression of the immediate needs of the group, without concern for the accumulation of wealth, the land belonged to everyone and there was not slavery in the context of prehistoric societies.

Classroom work on prehistory can present difficulties for students to abstract, in the face of concepts and practices that are quite distant from contemporary reality, so Stone Age can help in this learning. Questions about sedentarization, agriculture, domestication of animals, use of tools and natural resources permeate the dynamics of the board. Together with the use of games, we understand that other didactic resources complement the teaching practice, and the films can also be very enlightening in this context.<sup>4</sup>

Stone Age is an easy game considering its rules, thematic depth and detailed art, facilitating the exploration of the historical themes presented, together with mathematical and management knowledge.

The boardgame Pandemic (2008) was created by Matt Leacock and released in Brazil, in 2015, by Galápagos. It can be categorized as strategic with the science theme, having hand management mechanics, component collection, cooperativeness, players with different skills and area movements. It presents teamwork as a key element, therefore, it is a boardgame that requires cooperativeness, that is, the joint work of all players *versus* the board.

Everyone's commitment is the essence for the game's resolution, so it is not individualized/competitive between players, but between everyone and the assembled game. The main objective is the resolution of the pandemics exposed on the board, so that individualistic actions never reach the final objective, that is, to save humanity. From this perspective, the context of the game comprises the outbreak of 4 virulent diseases, simultaneously, all over the planet. The author does not name the diseases, leaving the freedom of choice/association with real epidemics. Players must seek to combat the respective diseases by taking on the role of specialists who must treat outbreaks and search for a cure.

The available characters comprise 7 profiles: the doctor (removes diseases more easily than the others); the operations specialist (builds research centers); the scientist (healing skills); the contingency planning specialist (reuses event support cards); the researcher (facilities in exchange of cards); the travel agent (promotes movements of the

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<sup>4</sup> We can mention two films that deal with this theme. *Quest of Fire* (1981) sets Paleolithic Europe addressing the struggle for the control of fire by humanity. *Alpha* (2018) features a young man wounded during a hunt who must survive in the wild landscapes and find his tribe. *Quest of Fire (La Guerre du feu)*. 1981. Directed by Jean-Jacques Annaud. International Cinema Corporation (ICC), Ciné Trail, Belstar Productions See, France, Canada, United States. *Alpha*. 2018. Directed by Albert Hughes. Studio 8, Columbia Pictures. United States, China and Canada.

other players) and the quarantine specialist (prevents epidemic outbreaks). The game is very difficult requiring cooperation between each of the characters listed in the round. There are seven profiles, however the dynamics of the game is presented only for 2, 3 or 4 players. The interesting thing is that there are several possibilities for teams to fight pandemics.

Figure 2 – Pandemic



Source: Survey data (2021).

The board also presents several major world demographic centers on all continents, with one of the four epidemics predominate in four regional divisions (the yellow disease occurs in Latin America, part of the United States and Africa; the black disease in Africa, in the Middle East and the Indian subcontinent; the red one in Asia and Oceania; and the blue one in Anglo-Saxon America and Europe). Brazil is represented by the city of São Paulo. Geographic elements are stimulated with the layout of each metropolis on the map, as well as specific information such as population size.

The dynamics of the boardgame comprises the distribution of metropolis cards to each participant, a list of actions each round (moving between cities, treating infected populations, discovering cures, building research centers), as well as the infection of cities and buying new cards. The context also includes event cards that help each specialist, disease cubes in each of the four colors, research centers that can be built and where cures are performed, pawns for each “player”, markers of epidemic outbreaks and epidemic levels. The game starts in Atlanta (United States) where the headquarters of the CDC (Centers for Disease Control and Prevention) is located.

Summarizing, there are several situations against the players, for the sake of the board/pandemics and only one circumstance favorable to the conclusion, that is, the cure of epidemics. If the pile of metropolis/events cards ends, everyone loses the game, in the



same way that eight outbreaks occur or all cubes of a disease are used. As indicated, there are still epidemic cards that further intensify the spread of diseases across the board.

Thus, each player assumes a unique role within the team and must strategically plan the combination of everyone's skills in order to cure all pandemics and, obviously, win the game by saving humanity, in a race against the time. Otherwise, diseases spread to uncontrollable levels, beyond recovery, or if enough time elapses, everyone loses. Without coordination, the game over is a matter of time. The game essentially awakens teamwork, favoring interpersonal relationships. Therefore, cooperativeness and socialization are strengths. In addition, it provides the impulse to knowledge in the search for cures, creativity, fun, spatial awareness and world understanding.

Dystopian dynamics about pandemics permeate books, films, board and digital games and cultural experiences, such as "Pandemic", allow us for a better understanding of concepts related to science. The intention behind the creation of the game implies teamwork in an exciting way, not specifying which diseases would be, although it was produced between the epidemics of Sars (2003) and H1N1 (2009). Even more up to date, the Covid-19 pandemic (2020) is placed as a backdrop to this possibility of learning through the board. The pandemic situation boosted Pandemic sales (even surpassing the end-of-year sales - period of greatest demand) due to the relevance of the theme, as well as the moment of social distance and seclusion, emerging as an entertainment alternative (Lafloufa, 2020).

As much as the game does not directly bring explicit epidemics, we can associate processes related to science and medicine, such as endemic, pandemic, prevalence and incidence<sup>5</sup> to the various diseases that threatened human existence. The bubonic plague is historically considered to be the cause of the Black Death, which ravaged Europe in the 14th century and may have killed around 100 million people. Smallpox accompanied humanity for over 3,000 years and was eradicated in 1980. Cholera transmitted by consumption of contaminated food and water still kills thousands of people today.

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<sup>5</sup> The incidence refers to the rate of manifestation of a given disease being measured from the onset; it is calculated by the number of new cases divided by the number of people at risk, counting only new cases; and it is analyzed when studying the cause and effect of the epidemic. The prevalence comprises the number of cases of a disease in a given population over a period of time, measuring the proportion of the population that already has the disease. It is measured by the number of affected individuals divided by the total number of people, counting all cases. It is used to estimate the burden of an epidemic. A generalized outbreak of any disease, for example, may have had a high prevalence and incidence in a base year "x" and have been contained within that period; in the following year, for example, "x+1", the incidence will therefore be low, although the prevalence still remains high, as treatment may take longer to move to the next period.

The Spanish Flu (the well-known [H1N1] may have killed around 50 million people in 1918). Swine flu, also H1N1, caused a pandemic in 2009 killing thousands of people. We can also mention the Ebola that plagues, above all, African countries today. Finally, Covid-19 (Coronavirus Disease 2019) is a highly infectious disease caused by the new severe acute respiratory syndrome [SARS-Cov-2] coronavirus, which has transformed the daily lives of humanity worldwide, with millions of people infected throughout the world.

In addition, in a complementary way, the use of other didactic resources elucidates the teaching practice. As for the theme of pandemics, we can cite two important references: the film *Contagio* (2011) which had a sudden increase in interest in the explosion of cases of the new coronavirus; and the recent documentary series *Pandemia* (2020), on “Netflix”, which presents different scenarios for combating influenza viruses and actions to prevent global epidemics.<sup>6</sup>

During the workshops realized in the aforementioned extension project, we noticed that the games, used as didactic resources, allow to expand student`s learning, providing space for reflections, discussions and socialization. We noticed that the opportunity to offer cultural goods to students from communities devoid of infrastructure, accentuated the extensionist content of the institution, since boardgames are not readily available. In addition, we noticed that students from different schools were even more interested in being part of the Federal Institute, verifying that the existence of projects, such as *Jogo Cooperativo* (Cooperative Game), infrastructure of the school and offered courses mean to be a differential in public education.

We verified the pedagogical potential of the boardgames listed, highlighting strengths such as practical learning (with greater retention), team reflection, cooperative

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<sup>6</sup> The director of *Contagion* (2011), Steven Soderbergh, sought to portray the challenges in containing a deadly pandemic, presenting, in addition to entertainment, information on the barriers of rapidly spreading diseases. Despite the limitations, the film seeks to be realistic, based on scientific paradigms, with an effort to demonstrate the impact of transmissions in didactic tones, comparing other diseases, explaining epidemic models and hygienic care. It also deals with political issues, showing that often the disinformation epidemic is as bad as the disease itself. The director himself states, in an interview, that there is a parallel between disinformation and disease, so that the two things spread together (Lafoufa, 2020). It is worth noting that it is very similar to the way in which some countries (and irresponsible behavior by leaders) have been facing the COVID-19 pandemic that, unfortunately, the disinformation epidemic is as contagious as the disease and its drastic numbers of infected and dead. *Contagion*. 2011. Directed by Steven Soderbergh. Warner Bros., United Arab Emirates and United States. The series *Pandemia* (2020), from “Netflix”, extols the work of scientists and doctors around the world, demonstrating challenges and hopes in the face of outbreaks. The documentary was produced in 2019, months before the disclosure of the new coronavirus, and it is very current underlining the importance of science. *Pandemic: How to prevent an Outbreak* (2020). Netflix. United States.

work, the development of thinking and logical reasoning, the consolidation of geospatial notions (location, direction, latitude, longitude), regionalization processes, characteristics of countries and cities, the formation of human societies, the challenge facing pandemics etc.

In this choice, we can work on concepts related to mathematics, history, geography, politics, management, administration, economics, geometry, among others. We emphasize that, in this ludical practice, we must provide to the target public experiences beyond the memorization of contents, enabling the transformation of the individual's passive state into an active agent, so that the use of boardgames is an interesting path in this construction.

We point out that the games have peculiar characteristics, as Kishimoto (1994) describes as relevant to the large family of games, highlighting common elements in the theoretical framework discussed (Huizinga (2019), Caillois (2017), Marques (2020), Miranda (2002), Vanzella (2016), Araujo (2019), Carvalho (2020) and others), such as the player's freedom and willingness to play; the pleasure; the existence of delimiting rules (implicit or explicit); the uncertainty of results, tension and random; be unproductive (does not generate goods or material elements); it has materiality and immateriality (cultural object); requires imagination and evasion of reality (player absorption); and it has contextualization in time and space. We verified, in view of the characteristics worked on, the potentiality of the game in its ludical and educational functions highlighting its peculiarity as a cultural phenomenon.

## 5 CONCLUSIONS

Considering the proposed interpretation key – the analysis of the use of boardgames as a pedagogical tool – we verified the potential of this didactic resource. The game can be a didactic resource that, in addition to providing an excellent playful experience, allows educational practices. We emphasize that cooperative games are a unique opportunity to develop teamwork skills. Therefore, ways are opened to value essential skills and competences in the 21st century as cooperativeness, problem solving and logical reasoning.

Therefore, seeking for the ludic and the pedagogical functions, we emphasize the contributions of the use of boardgames in the school environment involving students in more meaningful learning processes through strategies that favor collaboration between students, the teacher-student relationship and learning projects.

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