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THE INCLUSION OF THE COMMERCIAL DIGITAL GAME SPIDER-MAN IN PEDAGOGICAL STRATEGIES FOR ELEMENTARY EDUCATION WITH THE USE OF LEARNING ECOSYSTEMS

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ABSTRACT

The expansion of technology has had a great impact on various social spheres, including education. Whether through digital platforms, applications or digital games. And in the scenario of digital games, it is clear that they have caused major changes in the behavior of the population, from economic to cultural habits. This ranges from playing on your cell phone while waiting for public transport, to the way teachers teach their classes. In this context, the present research aims to think about the use of commercial games as learning facilitators, considering their multidisciplinary articulation through a learning ecosystem. From this, the following question is presented as problematic: how can the commercial digital game of Spider-Man be used as a learning facilitator when thinking about its multidisciplinary articulation through a learning ecosystem? As a methodology, an exploratory qualitative approach is used. The study presents a conceptual discussion about education through experience, learning ecosystems and digital games as a pedagogical strategy (PE) within a learning ecosystem. In addition, an analysis of the Spider-Man game is carried out according to what is proposed in the National Common Curricular Base (BNCC). In the conclusions, the potential of the present study and what is possible to think about in future studies are presented, as well as a reflection on the analysis framework presented and how to use it in future investigations.

Keywords: Pedagogical Strategies. Learning Ecosystem. Marvel Spider-Man game.

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INTRODUCTION

The expansion of technology has had a great impact on various social spheres, one of the most significant being education. Technological advancement has brought new possibilities for teaching and learning, through digital platforms, educational applications, and digital games. Access to the internet and technological devices has allowed teachers and educators to explore innovative approaches, expanding teaching methodologies and enabling the creation of collaborative activities. This technological evolution creates a favorable scenario for the implementation of new pedagogical strategies that stimulate student learning and engagement.

According to an article published by Jonas Valente (2020) for Agência Brasil, in 2019, about 74% of the Brazilian population had access to the internet, which represents approximately 134 million people connected to the web. These numbers demonstrate the massive presence of technology in people's daily lives and reinforce the importance of its use in the educational context. As a result, teachers have started to include more and more activities based on digital tools, such as video classes, interactive simulations, and educational games. The use of these technologies aims to make learning more dynamic, accessible, and adaptable to the needs of students, contributing to the development of cognitive, social, and emotional skills.

Currently, technological resources are inserted in various educational contexts, from social networks and digital games to virtual art exhibitions and digital fashion shows. These tools can be used to connect curricular content with the students' reality, stimulating critical awareness about different topics and encouraging learning through experience. This set of educational technologies can be understood as learning ecosystems, that is, interactive environments that allow the exchange of knowledge in a diversified way, promoting interdisciplinarity and the development of new skills.

Within this scenario, the insertion of digital games in the educational context has become a topic of great relevance, as it provokes a necessary reflection on its potential as a teaching tool. Digital games have been gaining ground in education due to their multiple pedagogical applications, and can be used to teach everything from mathematical and linguistic concepts to topics related to history, science, and physical education. In addition to contributing to the learning of specific content, games also favor the development of skills such as logical thinking, problem solving, decision-making, and teamwork.

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It is important to note that there are different categories of digital games, the main ones being educational games (also called "serious games") and commercial games. Although they have different objectives, both can be used in a complementary way in the school environment. Educational games are developed with the explicit intention of teaching certain content, while commercial games, although created for entertainment, can be adapted for educational purposes. When incorporated into pedagogical planning strategically, digital games allow students to learn while having fun, making the teaching process more engaging and motivating.

In addition to the cognitive and social benefits, digital games can also stimulate students' emotional development, helping them to deal with frustrations, improve persistence, and strengthen their ability to solve challenges. The Game Brasil Survey (PGB) pointed out, in its 7th edition, that 73.4% of Brazilians play digital games, representing a 7.1% increase in the number of players compared to 2019. This growth was mainly driven by the pandemic, which increased the consumption of digital content and reinforced the presence of video games in people's lives. Given this reality, integrating digital games into the school environment can be an effective strategy to connect students with learning and provide more meaningful experiences in the educational process.

However, despite the numerous benefits, the excessive use of digital games also presents challenges that must be considered. Prolonged exposure to screens can lead to health problems, such as eye fatigue, sleep disorders, and sedentary lifestyle, in addition to possible impacts on children's social development. The Brazilian Society of Pediatrics (SBP) recommends that children from the age of 12 should not exceed three hours of daily exposure to digital games and that they should never spend the night playing (BERNARDO, 2020).

In addition, the World Health Organization (WHO) warns of the risks of addiction to digital games. Psychiatrist Shekhar Saxena, director of the WHO's Department of Mental Illnesses, highlighted in an article for Veja Saúde that, although most children and adolescents play games without harm to their health, about 3% of *gamers* can develop compulsive behavior in relation to games (BERNARDO, 2020). Another point of attention is the impact of violent games on children's behavior. The WHO points out that excessive consumption of this type of content can reinforce the idea that violence is a viable solution to conflicts. However, the rating of games plays an essential role in this regard, ensuring that the content is appropriate for the age group of the players. If parents and educators

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monitor this aspect and set healthy boundaries, the benefits of digital games tend to outweigh the risks.

The theoretical discussion proposal of this study is structured in three main thematic axes, each addressing fundamental aspects for understanding the intersection between technology, digital games and learning:

1. Educational games and commercial games from the perspective of education through experience: this axis is based on the theoretical contributions of Mercado (2006), Dewey (1979) and Bondía (2002). Dewey emphasizes that learning occurs most meaningfully when individuals actively interact with their environment, applying concepts in a practical way. Mercado (2006) expands this discussion by examining how playfulness can be a determining factor for the absorption of knowledge. Bondía (2002), in turn, introduces the idea of "knowing experience", emphasizing that true learning transcends the simple memorization of information, being built through personal experiences and reflections;
2. Learning ecosystems: this axis is based on the studies of the European Commission (2013) and Schunk (2000). The European Commission proposes an interconnected learning model, in which different educational resources and actors come together to create a dynamic and interactive environment. Schunk (2000) complements this perspective by exploring social learning and the way the environment influences the construction of knowledge. In this context, learning ecosystems can enhance the use of digital games in education, promoting an interdisciplinary and integrated approach;
3. Pedagogical strategies applied to the use of digital games in education: based on the works of Freire and Nogueira (2002), Rodrigues (2002), Sosteric and Hesemeier (2002), Ramalho, Simão and Paulo (2014), Manata (2004), Braga (2015) and Borges and Schwarz (2005), this axis explores innovative methodologies for teaching. Freire and Nogueira discuss dialogical and critical education, while Rodrigues and Sosteric & Hesemeier analyze how technology can be integrated into the pedagogical process. The other authors bring approaches that highlight the need for motivational strategies to engage students, emphasizing the role of games as effective tools to enhance learning.

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EDUCATIONAL GAMES AND COMMERCIAL GAMES: EDUCATION THROUGH EXPERIENCE

Digital games represent an important portion of the entertainment industry, both in terms of the number of avid consumers and the high amount invested and generated by them. However, there is a great reluctance on the part of society to see them as a form of learning through playfulness. By conducting a brief systematic review on digital games on the Unique platform, it was possible to notice that educational games appear with great prominence in publications on digital games, with more than 200 thousand articles on digital games and education. The academic community seems to have found, in educational games, the validity for digital games.

Mercado (2006) highlights that educational games are educational tools that entertain while motivating. But, while educational games gain the status of educational tools, games that have a purpose of leisure and entertainment still carry a great stigma about themselves. One of the first suggestions for advanced research on digital games on the Unique platform is "digital games and violence", where there are more than 50 thousand complete articles that have digital games as their main subject.

It is not the intention of this work to question the validity of these researches, but to open questions to think about digital games, which have the intention of leisure and entertainment, also as educational tools that have the power to teach through experience. In fact, when one thinks about the concept of education through experience proposed by Dewey (1979), it is noticeable that educational digital games have a lot to learn from leisure digital games. Dewey (1979) also says that experience and education are not equivalent terms, and he also reinforces his point of view by emphasizing that it is a mistake to think that all genuine education takes place through experience. The quality of this experience will have a direct impact on whether what was explored through the experience will be educational or not.

Bondía (2002) states that "experience is what passes us, what happens to us, what touches us. Not what happens, not what happens, or what touches". Thus, the author agrees with Dewey (1979) and establishes that experience is only relevant if it actually involves the subject, that is, if it is important for what he deems pertinent. Borges and Schwarz (2005) point out that the main objective of developing a game is to create a product that is fun to play, presents surprises, provides challenge to players and promotes social connections.

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However, Dewey (1979) raises the issue of the fleetingness of pleasant experiences. The author says that:

> The experience can be immediately pleasant and, however, contribute to careless and lazy attitudes, thus acting on the quality of future experiences, and can prevent the person from taking from them everything they have to give. On the other hand, experiences can be so disconnected and disconnected from each other that, although pleasant and even exciting in themselves, they do not articulate cumulatively. (DEWEY, 1979, p.16).

Through this passage from Dewey (1979), it can be seen that the academy's concern with the quality of educational experiences in digital games is justified. It's very easy for a commercial digital game to provide exciting experiences, but not articulate with other knowledge. However, there is also another bias that seems not to be taken into account: that of the quality of the experience generated by educational games.

When talking about educational games, it seems to be common sense to think that any educational digital game will educate through experience, as it unites school knowledge with the experience of playing. Mercado (2006, p. 81) says that "teachers found in computer games a powerful motivator for the beginning of the teaching-learning process". It is necessary to take into account that, when bringing a school subject in the form of a game, it is not automatically guaranteed that it will provide an instigating experience, and even a game can be as boring and tedious as the most traditional class.

In this way, it is possible to see that for a game to provide education through experience, it is necessary to have some guidelines, both on the part of educational and commercial games. Educational games must be aware of the fact that they do not only repeat the same problems of traditional education, using only other formats. There are many educational games, but which of them are really thought-provoking, proposing experiences that touch students?

Figure 1 – Educational Games x Commercial Games

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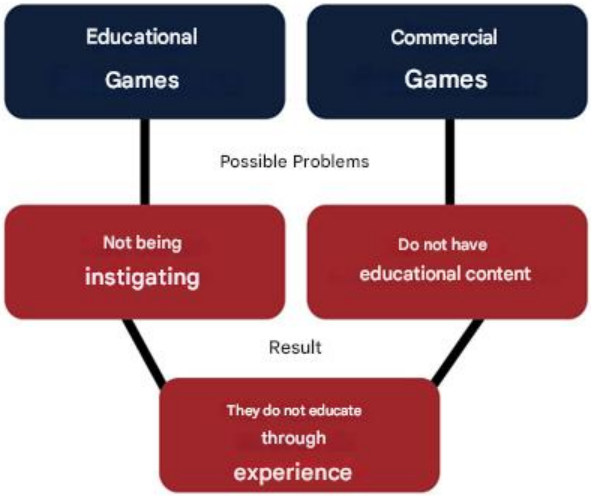

Source: Prepared by the authors based on Dewey (1979).

On the other hand, as for commercial games, few question that they can be exciting, but are they articulated with other knowledge? Thus, Figure 1 shows a relationship between educational and commercial digital games and their relations with the principles of education through the experience of Dewey (1979).

By analyzing Figure 1, it is possible to see that there is a concern in society about the non-occupational factor of commercial digital games, and this is proven with the large number of publications in this regard. But as has been analyzed so far, there is no similar concern with educational digital games not producing educational experiences. And at this point, it has already been concluded that they can indeed have this problem, when they only reproduce the same plastered way of education as traditional schools.

LEARNING ECOSYSTEMS

From technological advancement and its transformations in society, some areas such as education, culture, communication and leisure have sought to deepen the studies and resources to be made available in practices and teaching, whether for the face-to-face or distance modality. Technology can cause profound transformations in the social and educational reality, as long as it is used appropriately and in accordance with the theoretical perspective that underlies the teacher's pedagogical work.

Formal and traditional learning environments have always placed the teacher or specialist on a stage, treating students, in general, as spectators. The development of ecosystems constituted by complementary learning environments based on the concept of Ecology requires a significant change in the way of thinking about the educational act.

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The challenge is to create fertile, dynamic, living and diverse environments where learning activities, knowledge and ideas can be born, grow and evolve. And for this, an approach is needed that is not limited to considering only the technological aspects related to learning via the web, but that privileges an ecological, integrated and holistic approach, in short, an approach that favors a vision of learning.

It is in this sense that the European Union recognizes that the integration of these digital learning ecosystems, together with the development of innovative pedagogies and the use of technologies, can provide a revolution in education, exponentially increasing the quality of both teaching and learning itself (EUROPEAN COMMISSION, 2013).

The learning ecosystem reaches all participants involved in the learning process. It can be applied individually or collectively. What differentiates it from the usual process is that in it, teachers and students teach and learn alternately. If there are new ways of living, feeling and thinking, it is also necessary to think about the new ways of teaching and, above all, of learning in the new expectations and new challenges that are faced not only by students, but also by teachers, since everyone is inserted in a society full of digital technologies. The contents to be taught are discussed and defined by teachers and students, and should be organized in the format of activities that unite the needs of interest of the student. For this, activities can take place everywhere. Whether in the classroom, through *m-learning*, through practical or social activities.

Lifelong learning is becoming increasingly important. The alliance between formal and informal learning contexts, enhanced by technology, is necessary to connect individuals, creating dynamic and ecological networks capable of responding to the challenges of society and its digital ecosystems. The "new" knowledge societies need educational systems, where classrooms are connected to continuously updated knowledge instruments and networks. The classic hierarchy of the relationship between teacher and student is becoming an ecosystem of knowledge, which can extend throughout the student's life, and the student's objective is to create and maintain human resources capable of improving the competitiveness of their organization, through the application of their knowledge.

In this context, it is essential that teachers themselves know how to take advantage of these technologies, and use them in the creation of new learning environments, more motivating, more stimulating and, above all, be able to develop, in their students, the essential skills for their integration in this new digital era of the 21st century. A good learning

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ecosystem is based precisely on context and student-centered emphasis in order to create learning experiences in which students form or construct their learning and understanding according to the experiences they have had in the most diverse situations (SCHUNK, 2000).

Learning is seen more as an active process of building and acquiring knowledge. The educational environment must be planned in a way that supports and challenges the student's intelligence. The teacher becomes a facilitator who is in continuous dialogue with the students and who must also adapt the learning experience during the process, taking the initiative to direct this experience to the point where the students want to create value. Students must take ownership of the process of problems and solutions, since the essential goal is to support them to become effective thinkers. And this goal is achieved when multiple roles are adopted in the process, such as that of consultant, mediator and leader. In these situations, cooperative learning allows people in a certain group to alternate roles as teachers and as students.

DIGITAL GAMES AS A PEDAGOGICAL STRATEGY (PE) WITHIN A LEARNING ECOSYSTEM

Educational planning refers to the plan that guides the teacher's decisions, his conception of education, learning, the way of planning and the knowledge that must be worked on. Through this, it is necessary to establish educational objectives of the theme to be addressed, pedagogical strategies and evaluation activities, representing the responsibilities of the teacher and his objectives in a clear and complete way possible. Manata (2004, p. 08) confirms the importance of strategies considering that "the planning process aims to promote a change in teaching strategies in everyday pedagogical practice".

In addition, it is important to highlight that planning must be done based on references in the search for intentionalities, realizing that pedagogical action must be supported by theoretical assumptions, which according to Rodrigues (2002, p.17) "establish the guidelines of the work, defining procedures and methodological strategies".

And in view of this planning, it is possible to think of pedagogical strategies within a learning ecosystem that have an experience-oriented approach. Thinking in this way makes it possible to advance in educational processes. In his works, Paulo Freire places a strong emphasis on the existential field, on the experiences already elaborated by the students in the context in which they are inserted, arguing that popular groups and movements should

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know better what they already know; that they must arm themselves "through the greater organization of knowledge that circulates in their bodies" (FREIRE; NOGUEIRA, 2002, p. 26).

Faced with the challenges posed by the new digital education tools, it was necessary to reformulate the ways of learning, teaching, transmitting knowledge and holding the student's focus during the learning process. For this, some researchers saw in games characteristics that could circumvent student involvement, bringing playful teaching to education, that is, learning in a pleasant way, as stated by Borges and Schwarz (2005). Hence the need to enhance studies around digital games as learning objects, as they understand that games can contribute to the teaching-learning process. Learning objects (LO) are "any entity, digital or not, that can be used, reused, or referenced during the learning process that uses technology" (IEEE, 2002).

Thus, in this article, commercial digital games are understood as an object of learning. Because learning objects can be any digital material or resource for educational purposes, that is, resources that can be used in the educational context in various ways and by different subjects. This more specific definition is based on Sosteric and Hesemeier (2002), who consider as learning objects from images and graphics, videos, sounds, tools to any other digital educational resource to be used for educational purposes and that contain suggestions about the context of their use. LO's have pedagogical characteristics when it aims to facilitate the construction of knowledge and when the techniques are related to technology (BRAGA, 2015).

From this perspective, the pedagogical aspects of LO are: interactivity, autonomy, cooperation, cognition and affectivity; The technical aspects are: reliability, interoperability, storage, availability, accessibility, portability, ease of installation, maintainability, granulability, aggregation, durability and reusability.

According to Borges and Schwarz (2005), digital games entered education as a pedagogical strategy through the study of playfulness in teaching-learning. Digital games were inserted in education with the intention of captivating the interest of students through playfulness (RAMALHO; SIMON; PAULO, 2014). Digital games are great learning objects for any age, as they provide interactivity, thus facilitating learning. Education professionals must curate the various materials available and take advantage of the educational power of these LO.

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However, it is necessary for educators to have good evaluation criteria so that the planned objectives can be met when they use these methodologies (RAMALHO; SIMON; PAULO, 2014). Therefore, the pedagogical strategy is a way to facilitate and complement the teaching work, as well as to help the student to obtain new knowledge on various subjects and build learning in order to solve hypotheses or a challenge, enabling the student to have initiative, knowledge and innovation.

In this context, a digital ecosystem represents a dynamic and synergetic complex of digital communities with their connections, relationships and dependencies located in digital environments, which interact as functional units and are interconnected through actions, information flows and transactions.

METHODOLOGY

Regarding the methodology of this research, an exploratory qualitative approach was used, since it works with interpretations of social realities (BAUER; GASKELL, 2002), with the objective of comparing or describing characteristics, contexts and establishing relationships (RAMOS, 2013). Qualitative research, after data collection, guides the analysis of these data or supports the interpretation with more detailed searches (BAUER; GASKELL, 2002). The analyses and results of this investigation were carried out in a descriptive manner. According to Gil (2008), qualitative research of a descriptive nature aims to report the characteristics of a given population or phenomenon, using standardized data collection techniques. The development of this research was carried out according to the following steps:

- STEP 1: Conducting a brief theoretical survey on the concepts of digital games, focusing on the differences between educational games and commercial games. After that, the search for the theoretical framework on learning ecosystems was carried out, in order to show the possibilities of inclusion of digital games as pedagogical strategies within learning ecosystems;
- STEP 2: a base of criteria was built for the selection of the commercial game to be analyzed. The BNCC (EF67EF08) was selected, which is intended for the discipline of Physical Education for students in the 7th grade of Elementary School. It belongs to the gymnastics unit, with the object of knowledge physical conditioning gymnastics and proposes as a skill "to experience and enjoy physical exercises that require different physical capacities, identifying their types (strength, speed, endurance,

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flexibility) and the bodily sensations caused by their practice". (BRAZIL, 2018). The choice for the 2020 Marvel Spider-Man game occurred because it was in accordance with the indicated qualifier for lesson planning according to the BNCC, and was also on the list of Playstation's best-selling games in 2020;

- STEP 3: the analysis and verification of approval of the Marvel Spider-Man game was carried out for its use as a pedagogical strategy, based on the criteria created in step 2;
- STEP 4: started the strategic planning for the Physical Education discipline of the 7th grade of Elementary School, with the use of the Marvel Spider-Man game. It is important to emphasize that to be a learning ecosystem, the ecosystem must be initiated at the time of lesson planning. For this, the pedagogical strategy of this research consists of using agile methodologies such as Peer Instruction and gamification, so that the student can have more autonomy during his learning and that he can also learn collaboratively.

CHOICE OF THE GAME MARVEL SPIDER-MAN

The choice for the Spider-Man game was due to the fact that it was the best-selling Playstation 4 exclusive digital game of all time, according to data from the NPD Group released by Metro UK (2020). The game's popularity as the best-selling game of the decade provided this curiosity to carry out the study with an emphasis on education.

The following table was built according to the list released by the NPD Group in July 2020 and published by Metro UK (2020), showing the best-selling Playstation 4 exclusive games of all time, at the time of the survey.

Table 1 – Five best-selling Playstation 4 exclusive games in the US until July 2020

1. Marvel's Spider-Man (2018)	Release Date: September 7, 2018
2. God Of War (2018)	Release Date: April 20, 2018
3. Horizon Zero Dawn (2017)	Release Date: February 28, 2017
4. The Last Of Us Part 2 (2020)	Release Date: June 19, 2020
5. Final Fantasy 7 Remake (2020)	Release Date: March 2, 2020

Source: Prepared by the authors based on data from the NPD Group, published by the newspaper Metro UK (2020).

Although the list above shows that the five games are considered appropriate for teenagers, the indicative age ratings for each of them according to the information contained in their covers are: Marvel's Spider-Man (2018) from 12 years old, God Of War

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(2018) and The Last Of Us Part 2 (2020), only for people over 18 years old, Horizon Zero Dawn (2017), suitable for ages 14 and up, and Final Fantasy 7 Remake (2020) has a Teen rating, which places the game as suitable for ages 13 and up.

In this way, Marvel's Spider-Man (2018), in addition to being the best-selling Playstation 4 game of all time, is still the only one suitable for 12-year-old players. This criterion became very important for the development of this research in order to make it broader, and it is possible to apply its implementation to students between the 7th year of Elementary School and the last year of High School, always considering the contents that will be addressed in each class according to the BNCC.

MARVEL'S SPIDER-MAN (2018)

The NPD Group says that Marvel's Spider-Man (2018) is the company's biggest sales success and Sony is keen to explore that. The company's website, when announcing the game, starts with positive reviews: "One of the best games on PS4. Period." - Nerdist. "A spectacular adventure." - IGN. According to IMDB, 14,763 users have rated this game, giving it a total of 9.2 out of 10 (METRO UK, 2020).

The story of Spider-Man, according to Ramos (2019) began in 1962, quickly becoming a milestone in the superhero universe. The author states that the focus on everyday life is a differential in the Spider-Man stories. In addition to facing the super villains and defending noble principles, his alter ego, Peter Parker, has to deal with a series of conditions and tribulations very similar to those of any individual, such as not having enough money to cover expenses, dealing with emotional disappointments, putting up with a boss who despises what he does in his heroic identity, and provide the best possible conditions for your Aunt May.

In this way, any product derived from the Spider-Man franchise already has a familiarity factor, however, this game specifically seeks to distance itself from that. If in most creations the most important thing is to show the process of transforming the clumsy boy into a great hero, Marvel's Spider-Man (2018) puts the player in a somewhat different context.

> This isn't the Spider-Man you know or have seen before. He is an experienced Peter Parker, who has a better command of the art of fighting the big criminals in New York City. At the same time, he's struggling to balance his chaotic personal life and

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> career, all while the fate of Marvel's New York is in his hands. (ALEMÃO, 2020)[5]element.

In this way, it is believed that the chosen game has a great potential to be worked on in a school environment, as it initially presents a high degree of acceptance among the public and, automatically, already ends up arousing the interest of the student because it is a well-known character.

MARVEL SPIDER-MAN GAME REVIEW CRITERIA

The challenge during this process was not only to analyze the game, but mainly to create parameters to be analyzed that could be useful for the present research and at the same time provide subsidies so that the same approach to the analysis of other games and for different audiences could be experimented.

After the choice was made for the Marvel game Spider-Man (2018), the research efforts focused on defining a procedure to analyze it. Some alternatives were outlined, but in the end it was decided to work as follows: First it would be necessary to purchase the chosen game, since it is not free, then two of the people responsible for writing this article and another collaborator played the first 90 minutes of the game individually. After that, each of the players wrote a page about their perceptions of the game. After this stage, they met and read the texts, with the aim of looking for similarities. At this point it was important to find out which aspects had been repeated.

Thus, after this first observation, four points were selected that were repeated and that are somehow related: plot, environment/place, progression of the main character, main themes, challenges. In Chart 2 it is possible to clearly observe all the procedures performed that were described above.

Chart 2 – Procedures for the analysis of the Marvel Spider-Man game

1 - Purchase and installation of the Game.
2 - Play for 90 minutes individually.
3 - Write a page about perceptions about the game.
4 - Wait a day.
5 - Meeting with people who had also performed procedures 1, 2, 3 and 4 and conducting a collective reading of their productions in step 3.
6 - Find points that were repeated in the texts.
7 - Look for key concepts that explain the common points that were found.
8 – Create a Board where each concept represents a column and below write what you consider most important about it.
9 - Search the BNCC for subjects that are related to the notes found in the Table.

[5] Synopsis presented by Sony.

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Source: Prepared by the authors (2020).

As can be seen, Chart 2 briefly presents the procedures that led to the creation of Chart 3, which is used to score the elements that were later taken into account for the search within the BNCC.

MARVEL SPIDER-MAN GAME REVIEW

After creating Table 3, with the five points that were considered most important in the game, the elements that based the creation in the first instance were inserted, in a summarized way. By analyzing a filled board, it is possible to realize that there are many themes that can be explored with students in a classroom. The topics open space to work on various possibilities, and to think of new alternatives in the teaching-learning process. Therefore, when opening the National Common Curriculum Base (BNCC), we looked for a subject that aligned with any of these themes.

Note that this procedure can also be reversed. It is possible that a teacher first makes the choice of the BNCC to be worked on and then makes the choice of the game. It is important that the teacher carries out the procedures until the board is filled in to know the points that may arise in their pedagogical planning.

Chart 3 – Elements for analysis of the Marvel Spider-Man game

Weft	Environment/location	Main character progression	Main themes	Challenges
Use Spider-Man to prevent a major disaster in the city. Use Peter Parker to solve personal problems.	Big City New York Suburbs Underworld	One ability triggers the other. Get small items that will be important later.	Share Adventure Revenge Deadly Virus Threat Family Problems Love Problems Pollution	Handle the jump and web-throwing controls. Get different outfits. Reconcile Spider-Man missions with Peter Parker.

Source: Prepared by the authors (2020).

PEDAGOGICAL STRATEGIES USING THE MARVEL SPIDER-MAN GAME WITHIN A LEARNING ECOSYSTEM

In Freire's pedagogical conception, it is essential that the teacher starts from knowledge that students already have, from something that is not absolutely foreign to them, so that, later, such knowledge is systematized and deepened through contact with the contents that have established themselves as classics in each discipline. In this sense,

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the Marvel Spider-Man game can be used at school, as it presents students with knowledge that can be systematized and deepened in the school environment.

As previously explained in the theoretical framework, Paulo Freire places a strong emphasis on the experiences acquired by students throughout their existence, that is, in the context in which they are inserted (FREIRE; NOGUEIRA, 2002). This refers to what has been developed in the course of this research.

Given this, it is important to resume that the Marvel game Spider-Man recounts the life of photographer Peter Parker and his alter ego Spider-Man living their lives and adventures through New York City. And within this research it is believed that it is possible to relate the daily life of Peter Parker and the adventures lived by Spider-Man with the concepts of occupation and human activity.

It is known that the Brazilian context does not allow most students to own a Playstation 4, with the possibility that everyone could play the game entirely, with the aim of formulating a pedagogical strategy that provides for this process. However, today's reality also makes room for teachers to appropriate digital games without necessarily having for students to do this in the classroom.

Youtube allows the concept of "watching someone playing" gain more and more strength. The game Marvel's Spider-Man (2018) itself has a large number of videos where people simply record their performance during the adventure. Possibly the best known video of the game is made by the Jacksepticeye channel[6] , which had more than 12.5 million views and over 34 thousand comments, in June 2021. Through a brief analysis of these comments, it was possible to verify from people who had played the adventure and were wanting to share their experiences to people who openly said that they did not own the console, but had a great desire to play. There is also a large number of comments from people claiming to be rewatching the video.

In this way, the research sought to create pedagogical strategies that will include the Marvel Spider-Man game through Youtube videos, facilitating access for all students in the class. If you chose to use the active methodologies Peer Instruction and Gamification for the development of the activity with students in the 7th grade of Elementary School. Active methodologies have in common the challenge of transforming the teacher into a kind of companion in the student's journey and not an isolated and superior figure, holder and relay of knowledge.

[6] Available at: https://www.youtube.com/channel/UCYzPXprvl5Y-Sf0g4vX-m6g. Accessed on: 2 Apr. 2025.

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Naturally, these approaches have collaborative characteristics, and this digital interaction paves the way for more dynamic learning. In it, the student needs to elaborate ideas and manifest their knowledge publicly, acting even more as the protagonist of their learning.

In the case of Peer Instruction, it focuses on the student organizing their time outside class to continue their learning and also needs a unanimous decision from the group, facilitating dialogue, debate, and collaboration among students. It was also decided to use Gamification, because as a game would be brought with one of the contents covered, it was believed that including gamification would bring more dynamics and interaction between students. Gamification works through bonuses for completed tasks, however, in this planning it is used in a collaborative and non-competitive way, as the student always has the possibility that when he earns a bonus for successful completion of the activity, he can share the point with another colleague of his choice.

The use of digital technologies during the activity was also chosen as one of the pedagogical strategies, as the possibility of increasing student motivation and interaction was considered, generating better learning results. It was found that it is possible that video games contribute to the class contents, as they would be a previous knowledge of the student, as well as the teacher would play the role of mediator between the classroom contents with the contents covered in the games.

Chart 4 – Planning with the use of pedagogical strategies within a learning ecosystem

Theme	DIFFERENCES BETWEEN OCCUPATION AND HUMAN ACTIVITY Learning about the differentiations between occupation and human activity using the Marvel Spider-Man game and the agile methodologies Peer - Instruction and Gamification as pedagogical strategies.
Discipline	Physical Education |7th year of Elementary School
Pedagogical strategies	Active methodologies: Peer Instruction throughout the planning of the activity and Gamification and the Marvel Spider-Man commercial game at specific moments. And the use of digital technologies.
Technologies used	VLE (virtual learning environment), Youtube, Kahoot, Miro and Mentimenter.
BNCC: EF67EF08	Experiment and enjoy physical exercises that require different physical capacities, identifying their types (strength, speed, endurance, flexibility) and the bodily sensations caused by their practice.
Step 1 – Using gamification, Marvel Spider-Man and AVA Game	Read the texts and watch the videos on the VLE: Watch the Spider-Man video and read the PPT about the difference between occupation and human life. Afterwards, make a relationship between the two and comment on the forum, you should also comment on the post of at least two colleagues. Whoever has the most interactions gets 1 point and the possibility of donating another point to a colleague.

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Step 2 – Using Gamification, Marvel Spider-Man and Kahoot Game	Spider-Man video analysis test and reading the text about occupation and human life on Kahoot + Gamification Bonus for 1st place (one response of the Exam and the possibility of giving the answer to a colleague.
Step 3 – Using Prezi	Lecture by the teacher with the support of prezi.
Step 4 – Using Mentimet	Individual Conceptual Test using Mentimeter.
Step 5 – Using Teamwork and Collaboration	Are you sure of the answer? Discussion with peers: definitive answer
Step 6 – Using Mentimeter	Groups choose the correct alternative and answer in Mentimeter
Step 7 – Using Mentimeter (teacher should look at Mentimenter results)	Teacher, it's time to Calculate! If less than 30% got it right, go to step 8 If the group was between 30% and 70%, then run to step 12 If more than 71% get it right, go straight to step 13.
Step 8 – Using Miro and Marvel Spiderman Game	It seems that the concepts need to be revised! Using the Miro tool, the teacher will do a support dynamic. Students will make a list of actions (verbs) that Spider-Man did during the game. The teacher, together with the students, organizes the verbs by association (occupational areas). An area is chosen and Choose an action (activity). About it, other small actions are discussed Assigned.
Step 9 – Using Mentimenter	Time for the new Individual Concept Test! Using Mentimenter
Step 10 – Using Teamwork and Collaboration	Are you sure of the answer? Discussion with peers: definitive answer
Step 11 – Using Mentimenter	Groups choose the correct alternative. No Mentimenter
Step 12 – Using Dialogue	It seems that the students are on the right track! It is time to present the answers and, if you want, discuss the points of error/doubt
Step 13	Huhull it's time to celebrate!! And to start a new theme!

Source: Prepared by the authors (2020).

From this planning, it was possible to observe the possibilities of using pedagogical strategies within a learning ecosystem, and it was possible to choose the use of a commercial digital game, Marvel Spider-Man. And this shows how much education can think of other teaching alternatives, which seek playfulness based on the experiences and experiences of students.

TEACHER MARGARIDA'S PERCEPTION OF THE USE OF THE MARVEL SPIDER-MAN GAME IN THE CLASSROOM

Teacher Margarida has always sought innovative methodologies to involve her students in Physical Education classes. With more than ten years of experience in elementary school, she noticed the difficulty of some students in engaging in the proposed activities, especially those that involved theoretical concepts about physical fitness. The

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idea of using a commercial digital game as a pedagogical tool piqued her interest, and she decided to try the approach suggested by the research, applying it with her 7th grade class.

THE IMPLEMENTATION OF THE STRATEGY

When planning the activity, Margarida followed the protocol indicated in the study. First, it used the VLE (Virtual Learning Environment) platform to introduce the concepts of occupation and human activity, connecting them with the routine of Peter Parker, Spider-Man. In an online forum, students were encouraged to discuss and relate the hero's activities to their own experiences, creating a collaborative learning environment.

In the next stage, students watched excerpts from the Marvel Spider-Man game through videos on YouTube. Margarida chose to select specific scenes that illustrated the character's movement around the city, the execution of jumps and acrobatics, and the physical impact of these activities. During the screening, she paused at key moments to question the students about what physical capabilities were being demanded: strength, speed, endurance or flexibility.

After this analysis, the class participated in an interactive quiz on Kahoot, where they answered questions based on the content covered up to that point. The students who obtained the highest score were able to bonus a colleague, promoting cooperation and the active participation of all.

THE STUDENTS' REACTION

From the beginning, Margarida noticed a significant increase in student engagement. Even those who used to show disinterest in theoretical discussions were actively participating. The link between pop culture and curriculum content seemed to generate a stronger connection between students and the discipline.

One of the students, Pedro, commented:

> I never thought I would learn Physical Education talking about Spider-Man! It was really cool to see how his movements can be compared to ours.

Sofia, who was usually more reserved, surprised Margarida by actively participating in the discussions. On the AVA forum, she wrote:

> The part I liked the most was realizing that Spider-Man needs a lot of endurance and speed to face the villains, just as an athlete needs to train a lot to be able to improve his skills. I had never thought of this before!

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The enthusiasm of the students was also reflected in the practical activities in the classroom. Many began to apply the concepts discussed on the virtual platform in their routine, trying to identify in their own bodies the sensations related to the physical capabilities analyzed in the game.

CHALLENGES AND ADJUSTMENTS

Despite the initial success, Margarida faced some challenges during the implementation of the strategy. Some students have struggled with Kahoot due to the instability of the internet at school, which has caused some frustration. To get around this problem, she started to print some of the quiz questions and distributed them to students who were having difficulty accessing them. Thus, everyone was able to participate equally.

Another point was the need for adaptation for students with motor disabilities. To ensure inclusion, Margarida created complementary activities based on the observation and analysis of movements, allowing these students to contribute significantly to the class. In one of these cases, a student who used a wheelchair participated in the class by recording the main skills observed in his classmates and preparing a collaborative mural about the physical competencies analyzed.

CONCLUSION AND REFLECTIONS

At the end of the experience, Margarida realized that the use of the Marvel Spider-Man game within a learning ecosystem not only facilitated the understanding of theoretical concepts, but also motivated students to become more actively involved in classes. The interactivity provided by gamification and the use of active methodologies generated a more dynamic and collaborative environment.

In her final assessment, she wrote:

> The impact of this strategy was incredible. The students not only learned about Physical Education in an engaging way, but also developed skills of analysis, cooperation and critical sense. I plan to continue exploring commercial digital games in my pedagogical practice and recommend this approach to other teachers.

Margarida's experience demonstrates how commercial games can be used effectively in the school environment, transforming the way students interact with content and making learning more meaningful and engaging. Her case reinforces the importance of

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integrating the digital culture of students into teaching, promoting an education that is more connected to contemporary reality.

FINAL CONSIDERATIONS

With the elaboration of this research, it was possible to perceive that there is still a lot of reluctance, on the part of society, to understand that commercial digital games can be used as an instrument in the educational process, being something that goes beyond the violence that is "impregnated" in common sense. The same does not happen when referring to educational games, which are automatically seen as educational through fun. In view of this, the elaboration of this work brought authors who go beyond these issues and through their statements it was possible to realize that entertainment games have enormous possibilities to offer educational experiences when they are related to other contents.

Based on the analysis carried out in this research, it is believed that it was possible to make good use of the material analyzed from what was proposed. In addition, the analysis made it possible to expand the present study with emphasis on other games, perhaps with a comparison between educational games and commercial games.

However, it is important to return to the point of the initial discussion, where it is highlighted that the present research did not have the objective of making an analysis to prove that a certain game is superior to the other, but that both, when worked in the correct way and always obeying the age classification, intertwined can collaborate so that teachers can use technology to their benefit. And so, it is also important to highlight that the discussion presented in this research shows the relevance of bringing to the school context experiences that really touch students, so that in this way they understand the teaching context as something that is part of their repertoire.

Particularly, the proposal of this work was very interesting to justify the research problem, as well as to find the necessary subsidies to place games as part of a learning ecosystem and this as a way to assist the teacher in his pedagogical planning.

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