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Platformization of education in the State of Paraná: analysis of the implications of the use of digital games based on Historical-Cultural Theory[1]

Plataformização do ensino no estado do Paraná: análise das implicações da utilização de jogos digitais a partir da Teoria Histórico-Cultural

Plataformización de la enseñanza en el estado del Paraná: análisis de las implicaciones de la utilización de juegos digitales desde la teoría histórico-cultural

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Abstract: This article discusses the platformization of education in the state of Paraná and its implications for teaching. This research is based on the master's thesis "Digital Games and the Teaching of the Concept of Number in the First Year of Elementary School", defended in 2025. Supported by the principles of Historical-Cultural Theory, the platformization of education in the state of Paraná, its limits, and possibilities were highlighted. Documentary research was conducted on the games available on the Student Digital School Portal, provided by the Government of the State of Paraná, to understand how games guide automated tasks. It was assessed that these games do not promote the development and understanding of the concept and are limited to the empirical. It was concluded that digital games are teaching tools that can contribute to the organization of teaching, but they do not replace the work of the teacher and, without appropriate interventions, do not promote the appropriation of mathematical concepts.
Keywords: Platformization; Teaching; Historical-Cultural.

Resumo: Neste artigo se discutem a plataformização do ensino no estado do Paraná e suas implicações no ensino. Essa pesquisa é advinda da dissertação de mestrado "Os Jogos Digitais e o Ensino do Conceito de Número no Primeiro Ano do Ensino Fundamental", defendida em 2025. Com apoio nos princípios da Teoria Histórico-Cultural, evidenciaram-se a plataformização do ensino no estado do Paraná, seus limites e possibilidades. Foi realizada pesquisa de caráter documental nos jogos presentes no Portal Escolar Digital do Aluno, disponibilizado pelo Governo do Estado do Paraná a fim de se compreender como os jogos orientam tarefas automatizadas. Avaliou-se que esses jogos não promovem o desenvolvimento e a compreensão do conceito e se limitam ao empírico. Concluiu-se que os jogos digitais são ferramentas didáticas que podem contribuir com a organização do ensino, mas não substituem o trabalho do professor e não promovem, sem as adequadas intervenções, a apropriação dos conceitos matemáticos.

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Palavras-chave: Plataformização; Ensino; Histórico-Cultural.

Resumen: En este artículo se discuten la plataformización de la enseñanza en el estado del Paraná y sus implicaciones. Esa pesquisa resulta de la disertación de maestría "Los juegos digitales y la enseñanza del Concepto de Número en el Primer Año de la Enseñanza Fundamental", defendida en 2025. Con el apoyo en los principios de la Teoría Histórico-Cultural, se evidenciaron la plataformización de la enseñanza en el estado del Paraná, sus límites y posibilidades. Fue realizada una pesquisa de carácter documental en los juegos presentes en el Portal Escolar Digital del alumno, proporcionado por el Gobierno del Estado del Paraná a fin de comprender cómo los juegos orientan tareas automatizadas. Se constató que esos juegos no promovieron el desarrollo y la comprensión del concepto y se limitan al empírico. Se concluyó que los juegos digitales son herramientas didácticas que pueden contribuir con la organización de la enseñanza, pero no sustituyen el trabajo del profesor y no promueven, sin las adecuadas intervenciones, la apropiación de los conceptos matemáticos.
Palabras clave: Plataformización; Enseñanza; Histórico-Cultural.

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Introduction

While games and play are part of the lives of many children, adolescents, adults, and seniors, there is also an aversion to learning mathematics. Unsatisfactory — and sometimes negative experiences — with this subject hinder learning and contrast with the satisfaction that games and play provide. These findings have allowed us to reflect on how games can contribute to the teaching and learning of mathematical content.

Games have accompanied history throughout different eras and civilizations. Dating exactly when games originated, in which civilization, or for what purpose, is a problematic. The trajectory of humanity, we see that games are historical, cultural, and recreational assets that reflect the identity of peoples, places, times, interests, and needs.

In addition to the differences and particularities present in games, they aid in the process of psychological development, since playing involves everything from simple to complex actions, which change over the course of interactions with others, with rules, with content, and with strategies, according to the needs to be met. The fact is that, in today's social context, there are countless games — from the most traditional, such as dominoes, to the most technological and digital — that can be played individually, with friends, in person or virtually, with acquaintances or strangers, and even against the computer itself.

With changes in society's lifestyles and technological advances, we are faced with new forms of relationships between people. However, without understanding the concepts, these

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relationships do not materialize. We can play during a trip, at home, at school, online or offline, free or paid games, available on cell phones, laptops, computers, tablets, and even in digital stores. We therefore understand that teaching activities must be intentionally planned by teachers so that children can learn the concepts.

The appropriation[4] of concepts through games should be thoroughly explored and discussed among teachers. We realize that this connection between games and mathematics teaching is not yet recognized as a teaching strategy in educational activities, especially when it comes to digital games. As a result of the COVID-19[5] pandemic, digital games have become a topic of debate among teachers. The pandemic has required social distancing due to the transmission of a highly contagious virus, which has compromised and threatened people's lives and required changes in social and work relationships. In this context, games have emerged as one of the few tools capable of alleviating feelings of loneliness and fear in children, adolescents, and adults.

In the quest for this reinvention, educational institutions needed to ensure remote learning and teaching, with online classes and without the direct assistance of teachers, as had been the case until then in face-to-face classrooms. Teachers had to develop strategies that would somehow promote interaction and interest in learning among children, even though they often did not have a good command of online resources. In this scenario, one of the tools used by teachers to try to encourage children's participation in remote classes was digital games, even though many were unfamiliar with them. By adopting digital games as a teaching tool, some teachers aimed to promote entertainment, fun, and learning, within the limits of what was possible.

Given this, games are perceived by teaching teams and teachers as resources that enhance learning, are inherent to teaching activities, and can promote fun and learning. We emphasize that, “the more humanity progresses, the richer its accumulated socio-historical practice becomes, the more the specific role of education grows, and the more complex its task becomes” (Leontiev, 2004, p. 191). In this sense, the teaching process has become more complex throughout history, in line with human evolution and needs.

We understand that education, human relationships, and culture have changed over the past five years. Children born after social distancing began are involved in different

[4] According to Leontiev (1978, p. 268), "in order to appropriate objects or phenomena that are the product of historical development, it is necessary to develop in relation to them an activity that reproduces, by its form, the essential traits of embodied activity accumulated in the object.", that is, the action of the individual on it is necessary.

[5] As stated on the website of the Ministry of Health, "COVID-19 is an acute respiratory infection caused by the SARS-CoV-2 coronavirus, potentially serious, with high transmissibility and global distribution". Available at: https://www.gov.br/saude/pt-br/assuntos/covid-19. Accessed on: 25. oct 2024.

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relationships and a different cultural process. Considering the above, our objective in this study is to analyze the games made available on digital platforms by the Government of the State of Paraná for teaching mathematics, especially in the early years of elementary school. From this perspective, we understand mathematics as a science that integrates different concepts that are transformed into school content and taught to children from early childhood education onwards. Furthermore, digital games can be used as resources in teaching different concepts, such as the concept of numbers.

As for digital games, Yabushita et al. (2023) assert that the Paraná State Department of Education introduced a digital platform known as the "Digital School Portal." This portal is characterized as an online system developed to offer educational support, with free resources, tools, and digital content. However, in our research, we did not find any reference to the institution responsible for developing and maintaining the platform.

Finally, we discuss and highlight the limitations and possibilities of using games and digital platforms as teaching tools. Furthermore, we highlight the importance of teachers understanding the purpose of these resources and how they can be linked to the teaching of numerical concepts, with a view to providing systematic and organized teaching that allows children to engage in activities and recognize the mathematical meanings present in the proposals, without separating arithmetic, geometry, and algebra.

Platformization of education in the state of Paraná

The COVID-19 pandemic has boosted the use of Information and Communication Technologies (ICTs) worldwide, and, in the face of social distancing, people have used them as a strategy to continue working and studying. We understand that even before this period, ICTs were already being discussed by researchers and academics. However, during the pandemic, there was a sudden change in how we think, behave, and communicate (Silva and Gusmão, 2024). Prior to this period, ICTs were discussed and studied by researchers from the scientific and academic communities. With the expansion of these technologies during the pandemic, we have noticed "[...] significant changes in the way we communicate, think, and behave" (Silva and Gusmão, 2024, p. 2). ICTs have gained ground in schools, both as tools for staff and as mobile devices that children use for studying (Rosa et al., 2023).

Although ICTs are identified as an important resource for teaching, according to Rosa et al. (2023), schools are often neglected, receive no investment, lack adequate infrastructure,

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and have few adequate technological resources, which leads us to realize that ICTs are only a discursive reality and not a material one. Although regulatory documents advocate the use of technological resources, some school environments and social realities do not have adequate infrastructure. In this regard, the Ponto BR Information and Coordination Center (2022, p. 27) mentions that one of the priorities of educational policies "is to expand the dissemination and quality of connectivity in the country's basic education institutions, especially its diffusion in school spaces used by students and teachers".

The use of these technologies has influenced educational policies and practices, as many schools have begun to "[...] prioritize the educational process with a focus on digital platforms and the personalization of learning in networks" (Silva and Couto, 2024, p. 1). However, even though its use in schools is advocated, there is inequality in access to digital technologies in our country, since, according to the Ponto BR Information and Coordination Center (2022), only part of the Brazilian population has secure and quality access to technologies, and this cannot be overlooked.

It is a fact that, as Hersing et al. (2024, p. 153) state, "the pandemic also boosted the use of apps and platforms in the context of educational practices in Brazilian schools [...]," that is, it contributed to the teaching and learning process. According to Hersing et al. (2024, p. 156), schools are institutions that are "[...] historic and fundamental to the development of societies [...]," directly affected by changes in society, as we have seen during the pandemic.

Among the many technologies that have gained prominence among teachers, children, and families are digital platforms. Before the pandemic, schools only had textbooks to guide teaching, but with the pandemic, they now have ICTs, which, for us, are essentially no different: they are tools that mediate teaching or should be. In this sense, Silva and Couto (2024, p. 13) argue that the use of these platforms in teaching is marked by the protagonism of humans and non-humans, which indicates that education is increasingly related to "[...] algorithmic actions of platforms that guide, condition, control, and monitor our educational actions and performances."

We have seen that should serve as a warning, as digital platforms are owned by private institutions and purchased by public institutions. When public institutions make such platforms available, they allow private companies to access data on children and teachers in public schools. Such actions involving the production and sale of platforms contribute to the expansion of private companies in the public sector, which often intend to act "[...] increasingly as substitutes for public services [...] replacing labor and

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reconfiguring teaching work to the point of creating self-dependencies and didactic limitations [...]" (Alves and Lopes, 2024, p. 50).

Even in the face of this worrying scenario, we cannot deny that these platforms perform countless functions that change teaching and learning. Poell et al. (2020, p. 2) understand platformization as "[...] the penetration of infrastructure, economic processes, and governmental structures [...] into education, as well as fostering the reorganization of cultural practices."

Digital platforms should be recognized as non-neutral instruments. Silva and Couto (2024) highlight that they present values and norms in their architectures, as well as everything that involves education. This is because, as Saviani (2005) points out, there is no neutrality in education; after all, all educational practices are laden with the power relations that exist in society. These platforms, like everything else involved in educational activities, have interests that reveal conflicting purposes.

In this relationship between the organization of teaching and digital platforms, the social function of schools must be ensured, that is, "[...] the acquisition of the tools that enable access to elaborated knowledge (science), as well as access to the rudiments of that knowledge." In other words, the function of school is to make human beings the holders of historically accumulated knowledge and enable them to act actively in society (Saviani, 2005, p. 15). For this reason, Hersing et al. (2024, p. 165) highlight the need to reflect on the use of these platforms in teaching and learning, since "the critical use of applications and platforms is also an important element in the context of digital inclusion and the formation of a digital citizen." Teachers can use these platforms as allies in the teaching process, but they must understand their actions as tools for life in society and not limit themselves to them in organizing their teaching. Such platforms have transformed teaching and changed the way we teach and learn.

Research conducted in 2022 by the Regional Center for Studies on the Development of the Information Society (CETIC) in Brazilian schools shows that, in early childhood education and the early years of elementary school, approximately 77.6% of schools do not use virtual environments in teaching, while 22.1% do. Furthermore, 53% of teachers do not use digital platforms in the teaching process (Fundação Getúlio Vargas, 2022). The use of these tools in the school environment is considered something new, and the school community has difficulties in handling and adopting these instruments. The reality regarding the use of these platforms was also investigated in the state of Paraná in 2023, and the results were published by the Paraná Teachers' Association (APP). In this survey on the use of platforms by teachers, it was found that

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> [...] only 16.9% of teachers in the Paraná state school system say that the technological platforms used in the classroom have improved student learning. For 40.3%, learning has worsened. Meanwhile, 42.7% say that the results have been neither positive nor negative (APP, 2023).

Although the use of digital platforms is increasingly present in everyday school life, there is still a challenge for institutions and professionals in dealing with these tools. In addition to the socioeconomic gap that characterizes schools and the professionals who work there, the infrastructure of schools and the investment they receive to access and train in the adoption of technologies and platforms do not provide opportunities for children and teachers to learn. This problem, both nationally and in the state of Paraná, is characterized as an obstacle to educational processes. Oliveira (2020, p. 197) emphasizes that it is up to schools and teachers, in relation to digital games, to

> [...] offering children contact with cultural objects, presenting and explaining the relationship with the content being worked on in the classroom, allows us to think about how much children, if subjected to a quality, diverse, challenging education, can develop countless potentialities and advance in their development.

Investing in training teachers to master the use of platforms linked to concept formation is essential because, according to Lima et al. (2024, p. 72), we understand that teachers play a fundamental role in occupying "[...] a position in researching, screening, preparing, and monitoring these spaces for pedagogical purposes [...]." We do not disagree that these digital platforms are allies in the teaching and learning process, but to this end, it is necessary to ensure teacher training and adequate infrastructure in educational institutions so that their use benefits everyone, both children and teachers in public schools. To this end, it is necessary to value teachers and offer continuing education that enables the use of games, since, to organize systematic teaching that promotes children's development and learning, one must be prepared to mediate the relationships established between subject, content, and form. It is a fact that

> [...] lack of knowledge about the capabilities of these resources also contributes to teachers not considering them to be a great ally. This knowledge comes from curiosity about the equipment, in continuing education courses that are offered to them and which, incidentally, are the basis and maintenance of knowledge [...] (Silva et al., 2016, p. 120).

The losses and consequences of digital platforms can be identified in two ways, because there will be no benefit if the conditions and preparation for their use do not exist, even with public investment. We need to understand that, in society, the use of technologies as allies in

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the teaching and learning process can enable the appropriation of historically accumulated knowledge, if we are aware of their limits and possibilities.

Games from the Digital School Portal for students in the state of Paraná

In the search for strategies that can be explored on these platforms to promote the teaching and learning process, games stand out because they are resources available for working with content and because they attract the attention and interest of children and teachers. When we reflect on digital games, we understand them as cultural objects, "[...] because, in addition to being instruments of human creation, they express social and cultural aspects [...]" (Oliveira, 2020, p. 193). According to Leontiev (2004, p. 291), through education it is possible to transmit to new generations all the human and cultural knowledge developed throughout history, since "the more humanity progresses, the richer its accumulated socio-historical practice becomes, the more the specific role of education grows, and the more complex its task becomes".

We highlight that societal progress directly influences the educational process, transforming human needs and teaching methods, as in the case of technologies, which directly modify teaching and learning. Digital games implicitly reflect changes in society, shifting interests, and changing human needs. Furthermore, the use of these games as an aid to teaching and learning enables new playful experiences that broaden children's interaction with cultural objects. According to Gomes (2022, p. 19),

> [...] digital games can promote the development of concepts in various areas of knowledge, including mathematics, as they can provide opportunities for students to understand concepts in a fun and interactive way, rather than simply memorizing them, thus contributing to the development of a positive relationship with mathematics.

For such experiences to be possible, it is essential to consider the entire organization of teaching, the concept to be taught, and the stages of human development. Otherwise, teaching with these games, without a proper understanding of the subject-content-form triad, will reinforce the myth that games are a "fun and interactive" way to learn.

> The use of digital games should not be focused on filling idle time during class hours, and their selection should follow the pre-established proposal for building children's knowledge. One must also be careful not to allow the child to view their presence in the classroom as a moment of fun that has no meaning. It is understood that it is extremely important to verbalize the purpose of the action and the reason for its use to children (Lopes, 2022, p. 60).

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For this to be possible, teachers must have a good command of digital games and the concept to be taught, using these tools in a systematic way, enabling children to engage in activities and understand the reason for playing digitally to learn and understand the concepts. Mastering the digital game to be used and the concept to be taught helps to understand and develop possibilities for using this tool, because in addition to knowing the digital game, it is necessary to consider how this resource is perceived, the learning process and the student.

When we reflect on digital games related to the principles of Historical-Cultural Theory, we understand them as cultural objects developed by humans – "it is not an instinctive activity, but rather a productive, objective, human, collective, and cooperative one, carried out through purposeful actions [...]" (Oliveira, 2020, p. 193). For children to engage in mental activity while playing, it is necessary to intentionally organize teaching and create needs that must be satisfied.

Oliveira (2020, p. 197) argues that "the use of digital games in learning can be considered an interesting strategy because it is close to children's daily lives [...]," since in today's society the use of digital games is common among all ages, but in a random way and without any teaching objective. It is up to teachers to go beyond these everyday uses and recognize digital games as an educational tool. In this vein, some education departments provide children with access to games through the acquisition of digital platforms, including that of the state of Paraná.

In Paraná, we highlight the investments and incentives provided by the Paraná State Department of Education and Sports (SEED-Pr) for these acquisitions. According to Yabushita et al. (2023), in 2019 SEED-Pr implemented the Digital School Portal, with the aim of creating a virtual space with training and information content for children and teachers. According to the official website of the Government of the State of Paraná (2025), on this portal "[...] you will find free educational and informational content that can contribute to your learning and teaching practice".

For example, in the game "Jogo Tabuada do Dino" (Dino's Multiplication Table Game), the message "Choose which multiplication table you want to study" is displayed (Escola Games, 2025). The options include addition, subtraction, multiplication, and division, all referred to as multiplication tables. When we select the subtraction operation, the numbers appear in a table with possible operations with results ranging from 1 to 10. Once again, the result must be indicated by selecting the numbers on the keyboard. You cannot proceed to the second operation if the first one is not correct.

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When we think of the word tabuada, its etymology refers us to the noun "tábua," a flat piece of wood. This meaning explains, according to Lopes (2007, p. 14), the fact that the "multiplication table is a special type of table, which in primary education[6] is associated with the memorization of arithmetic facts and, in particular, multiplication facts." Therefore, from a mathematical point of view, multiplication tables are representations made in tables in sequential order with operations. In both games, we see that the multiplication table is reduced to memorization and reproduction of results, following a sequential logic, in which the difference of 1 is added, that is, 1+1=2=3, 1+2, and so on.

When the answer is correct, the game shows the dinosaur character celebrating, and when the answer is incorrect, the character appears crying, showing his sadness, and asks the child to "try again". However, there is no indication or guidance that encourages the child to think about the mistake and arrive at the correct solution. This reaction of joy or sadness from the characters in the games is evident in other games such as "Conjunto nas nuvens" (Set in the Clouds), "Eu sei contar" (I Can Count), "Operação Pirata 1" (Pirate Operation 1) and "Operação Pirata 2" (Pirate Operation 2), and "Zoo Louco" (Crazy Zoo). The child recognizes the mistake or correct answer through the message, the character's expression, or the voice narrating the game. However, mistakes made do not lead to reflection. According to Libâneo (2011, p. 86), "students who learn mechanically, in most cases, do not develop their own reasoning, do not form conceptual generalizations, are unable to make connections between one concept and another, and do not know how to apply a general relationship to particular cases."

Another aspect we highlight is the proposal to explore multiplication tables for children enrolled in the 1st grade of elementary school as a concept related to numbers, materialized by two games: "Dino's Multiplication Table" and "Master of the Multiplication Table." In both games, multiplication tables are not only associated with multiplication, but with all arithmetic operations: addition, subtraction, division, and multiplication.

By proposing the game "Tabuada do Dino" (Dino's Multiplication Table), the platform encourages an automated task toward mechanized results through specific arithmetic operations in which, from one operation to another, the difference is plus or minus 1. However, it should be noted that thinking about teaching multiplication tables from the 1st grade of elementary school is not a recent debate.

[6] We kept the term primary education, as the author uses to refer to the school stage from seven years of age, a term created by the Law of Guidelines and Bases of National Education - n.o 4.024, (Brazil, 1961). Currently we call this period of Elementary School I, which begins at the age of six (Brazil, 2006).

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This is because Irene Albuquerque published the book "Metodologia da Matemática" (Mathematics Methodology) in 1958, which relates to games, as they reproduce the same formal logic in the organization of content, without reaching the essence of the concept. For children to grasp the concept of numbers, it is necessary to provide them with the conditions to understand numbers, symbols, and operations, as it is not enough to recognize numbers if they do not understand the need to perform tasks, as in the case of multiplication tables. Davydov (1982) proposes that teaching be organized in such a way that children engage in learning activities, reflect, abstract, and represent their ideas based on records. The game "Tabuada do Dino" does not encourage children to think, question, and develop strategies to solve the operations, as it is configured as operation training, in which it is up to the child to enter the correct answer to advance to the next level, without needing to understand the concept.

Recognizing that digital games are common in society, we believe it is necessary to investigate, based on the games available on the Digital School Portal for children to access, the current conception of the concept of numbers for five- and six-year-olds in the first year of elementary school.

Games about numbers are limited to trial and error, counting, and associating quantities, and disregard the essence of the concept and conceptual links such as one-to-one correspondence; the decimal number system; ordering; grouping; number sense; place value; and comparison. Furthermore, in none of the games we analyzed did we verify the number by comparing magnitudes, emphasizing the scientific aspect rather than the empirical one, as proposed by Davydov (1982). We found that numerous essential conceptual aspects in teaching the concept of number are disregarded without intertwining the other mathematical meanings (arithmetic, algebraic, and geometric).

In addition to these misconceptions in how numbers are used, we highlight other concerns that working with these games raises for us as teachers:

a) the fact that, when clicking to start the game, the child is faced with music and voices narrating or telling them what to do, creating a kind of noise pollution that hinders reading, attention, and understanding of what needs to be done. In addition, the commands, when narrated, do not create the need for reading, and at the beginning of literacy, the child must recognize the social function of reading, which is indispensable;

b) the inclusion of private institutions in public school environments, emphasizing the organizational nature of what should be taught, presenting games to teachers as something to be followed, like a script, without considering the teacher's qualifications to organize the work;

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c) Individualism in game actions. There is no interaction or collectivity in performing actions and solving problems during games. There is no room for collective action, discussion of data, or explanation of results, whether right or wrong, and there is no opportunity to learn from others.

We found that the games available on the Student Digital School are organized as lists of exercises, disregarding playfulness, the essence of the content, and the child. The platforms present a reduced idea of what numbers, teaching, and school are. The proposal to explore games and enrich teaching is illusory, since they do not enhance the teaching process, do not allow them to be used beyond what they are programmed for, removing their educational and playful character. Teaching and learning are much more than reproducing, memorizing, complying, and quantifying; they involve forming a human being who is aware of the historical and social relationships.

We believe that the use of these digital games available on the free access platforms provided by the Student Digital School, in their current configuration, does not maximize development. It is not enough to simply select a platform or game; it is necessary to carefully analyze the choices of these tools, in addition to being aware of the content and subject matter and supplementing what is lacking in the concept itself. After all, it is not the availability of free digital games that will promote learning. Moura (1992, p. 49) warns that, regardless of where the game takes place, whether in face-to-face classrooms or in virtual environments,

> when we use games as a teaching tool, they take on new dimensions, and this is what compels us to classify them according to the role they can play in the learning process. The game may or may not be a game in teaching. It can be as boring as solving a list of numerical expressions: it loses its playfulness. However, solving a numerical expression can also be fun, depending on how the work is conducted. The game should be a game of knowledge, and this is synonymous with movement of concept and development.

We agree with Hersing et al. (2024) that schools are historical institutions that are fundamental to human development and must keep pace with social change, modifying educational and methodological processes to meet human needs. Technologies and platforms cannot be disregarded in the school context, but, as Lopes (2022) points out, they must be configured as instruments of innovation and collaboration in teaching and learning that are appropriate to the objective conditions. Therefore, thinking about these games is a concern of ours as teachers, since we recognize the need for playfulness to be present in working with first-grade classes, not as a list of virtual exercises, but as teaching tools capable of enhancing children's thinking, acting, and reflecting on scientific concepts.

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Teaching and learning in Historical-Cultural Theory: games and learning mathematical concepts

Based on Historical-Cultural Theory, we emphasize the need for children to engage in activities, reflect on concepts, and understand the process of knowledge formation. The games available do not create reasons for learning; according to Moura (1992), teachers should use tools such as games to enhance learning. To learn mathematics as a language and activity, it is necessary to create reasons and needs for learning.

Leontiev (2004) and Elkonin (2017) reaffirm the need for children to engage in activities, because at that moment, the actions and operations they perform take on meaning, providing motivation that drives new transformations and promotes psychological development. If the child does not recognize the necessity of the actions and operations they must perform, learning what is essential may not take place. We emphasize that, even with the development of mathematical knowledge, studies, research, and technologies, when analyzing the games available on the platforms, we find a traditional educational scenario based on formal logic, common for years.

When analyzing the platforms and games available at Escola Digital do Aluno, we found a diversity of games and themes, but at the same time, a repetition of the same games available for children to access, such as logical reasoning, logic, patience, and puzzles. When reflecting on the characterization of content available to children, recognized as games, we note the presence of some:

a) with the intentionality adopted in current guiding documents such as the National Common Core Curriculum (Brazil, 2017), such as citizenship, financial education, and problem solving;

b) some with content related to school subjects in action and adventure games such as Racha Cuca and Educational Games;

c) some games with purposes that stray from full humanization, as we have identified that they do not recognize equality among people, such as “girls' games.”

Given these findings, we question how or in what way these games available at the Student Digital School contribute to the teaching process. Based on our analysis of the math games as they are made available to children, we raise the following issues:

a) The variety and diversity of mathematical content offered in the form of games, as we found proposals involving perception, rounding, sets, counting, number lines, to others aimed at secondary education, such as statistics and trigonometry, and higher education, with calculations, differential equations, and complex exponential functions.

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Thus, the variety and diversity of content offer opportunities for work ranging from early childhood education to higher education.

b) The layout of the platforms does not follow the same pattern, as some are organized, such as "Escola Games" and the National Campaign for Community Schools - Center for the Development of Meaningful Learning Objects (CNEC-NOAS), and include content identification, age group, and a search bar, which facilitates access for children. However, there are others with a disorganized layout, such as "Racha Cuca," a Gaming Website that does not include these features. The child has no visual support to organize and select the game most appropriate for their age group and school year.

c) The excess of advertisements and linked ads on these platforms. We emphasize our concern regarding this aspect, since, in addition to overloading the platforms, they hinder navigation, link products that are far removed from the children's universe, and may pose potential security risks. We must not forget that, in our search, we identified games suitable for children enrolled in the 1st year of elementary school, who often do not have a firm grasp of reading and may click without reading and without knowing exactly what the click implies.

d) Informative texts, lesson plans for teachers, and other texts explaining why games are used in mathematics are available on all platforms except the Games Website. We emphasize our incomprehension about these texts being available on the Student's Digital School, after all, who or what interest do they serve? We highlight that the presence of these texts can both help teachers organize their work with games and limit them to just a set of rules to be followed. At the same time, these functions expose the teacher's performance, who needs descriptive material to teach them how to conduct classroom work, generates a certain dependence and lack of autonomy to organize their teaching actions, and reveals to families and children how much the platform alone can offer the teaching of mathematical content.

Conclusions

The processes of learning and human development occur throughout an individual's life, from birth onwards, transforming according to each period, social and collective relationships, and the mediations provided by education, especially schooling. We know that even before starting school, children have experiences with mathematical concepts, expressed by arithmetic, geometric, and algebraic meanings and by the relationship between quantities. However, upon entering school, children understand the

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historical and scientific nature of mathematical concepts and recognize that the physical and symbolic instruments, signs, and concepts that make up for this science reveal human needs and must be appropriated by it.

Both knowledge gained from relationships outside school and relationships within school with scientific knowledge promote psychological development, but it is through systematic, intentional, and planned teaching that humanization is ensured. However, it is necessary that we understand the strategies and theoretical-methodological principles that aid in school education and in the learning process of children, as it is the correct organization of learning that guides mental development (Vygotsky, 2010). In this way, learning is essential for children to develop unnatural human characteristics. However, we must not forget the social advances that characterize humanity, and today, talking about games is closely associated with technology. Games, as instruments created by humans, mobilize the actions of students and teachers, which is why they should be investigated.

Technological advances were accelerated by the COVID-19 pandemic, which changed the global educational landscape. With in-person classes impossible, the alternative for continuing the school year was to incorporate technology into education and transform teaching from in-person to remote. Amid criticism and defense regarding the adoption of technologies, both during the pandemic and post-pandemic periods, it is a fact that they have gained ground and become even more present in educational relationships.

In Brazil, state governments have proposed projects to make platforms and games available to integrate technology into teaching in schools. The Paraná State Government, through a virtual space aimed at children called the Digital School portal, provides free educational content, platforms, and digital games to children enrolled in the public school system.

Resulting from numerous policies, school education in Brazil, with some specificities in the state of Paraná, has been the target of privatization policies. From the analysis of the games and platforms, we perceive that the governmental interest aligns with a capitalist nature. This becomes evident when we access these resources, as the organization and content are limited to empirical and mechanized knowledge.

When analyzing the Digital School for Students portal, we found the presence of numerous platforms and games. We evaluate that the games available on the portal do not consider aspects of human development and the historical construction of knowledge, as they generally consist of mere reproduction of tasks performed on paper in the classroom and do not advance to better learning conditions.

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Although the games are characterized in the Digital School of the Student as educational, we do not identify in them an effective potential for the psychological development of children. On the contrary, we emphasize that it is the objective living conditions that determine how much the individual can learn and develop. It is through the appropriation of knowledge produced historically, mediated by instruments and signs, that individuals become part of the mankind. Furthermore, we found that essential aspects and conceptual connections of numbers are not covered in the analyzed games, such as one-to-one correspondence, decimal numeral system, ordering, grouping, cardinal and ordinal numbers.

The games guide automated tasks that do not favor development or understanding of the concept, remaining limited to working with children's sensory perceptions.

We also realize that the historical process of developing the concept is reduced to a traditionalist ideology, which conceives learning as a set of actions in which children are only required to reproduce, memorize, trace numbers, and form sets of objects. According to Davydov (1982), teaching should be organized in such a way that the child compares the magnitudes of real objects, determines equality and inequality among them, observes the relationships and differences between the objects, and uses symbols that represent these comparisons, since, through comparisons and analyzes, they will appropriate the concept of number. In contrast, we found that the games available on the Escola Digital do Aluno portal do not consider who the child is or scientific knowledge, as playing requires only clicking, dragging pieces, and comparing quantities, limiting themselves to observable data, as in the mentioned example of the game *Eu sei contar*.

We emphasize that the platforms present numerous ads and advertisements that interrupt and hinder the child's gaming dynamics, making the virtual environment, even if acquired and purchased by the state, an unsafe space for their access. These ads make navigation difficult, link products distant from the children's universe and may bring possible safety risks.

We also identified that the games, according to the age group indicated on the platforms (5 to 6 years), do not consider who the child is, that is, a subject in the process of literacy. In the first year of elementary school, children usually have no mastery of reading and can click without understanding what they are doing or the implications of their actions. Its operations are restricted, therefore, to trial and error. Despite these findings, we argue that games and digital platforms are educational tools capable of contributing to the organization of teaching, but they do not replace the teacher's work.

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Although we recognize that games and digital platforms can be allies in the teaching process, we understand that the games available in the Student's Digital School, by themselves, do not allow, based on the principles of Cultural-Historical Theory, the appropriation of concepts. Conversely, open access games are restricted to a traditionalist conception, guided by capitalist interests.

The game, as a teaching instrument, should serve as a mediator of historically accumulated knowledge. In addition, the appropriate organization of teaching, the mastery of content by the teacher and the understanding of the periodization of human development can promote children's learning, making them critical and socially active. After all, it is not enough to know that 1 is 1; it is necessary to understand the whole logical-historical movement that constitutes the concepts as we know them today. However, the games analyzed privilege aspects related to the external connections of numbers, not considering internal connections.

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