CORONOPOCALYPSE: AWARENESS AN PREVENTION STRATEGIES WITH THE USE OF DIGITAL GAMES

Coronopocalypse: estratégias de conscientização e prevenção com o uso de jogos digitais

Coronopocalypse: estrategias de sensibilización y prevención con el uso de juegos digitales

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Resumo: Este trabalho visa aprofundar os cuidados com o coronavírus. Um jogo digital foi construído e seus aspectos técnicos e mecanismos foram testados com alunos do ensino fundamental, como layout, interatividade, diversão e jogabilidade associando-os às habilidades científicas encontradas no Programa Básico Nacional Comum – BNCC "Base Nacional Comum Curricular" (BRASIL, 2017).). É um jogo que envolve a compreensão das formas como os vírus são transmitidos e as atitudes e medidas adequadas para prevenir a transmissão de doenças a eles associadas. Esse referencial teórico é composto pelos estudos de Benvindo (2019) e Borges (2013), com experiências sobre o uso de tecnologias e gamificação; Vygotsky (1999), sobre a importância de um espaço colaborativo para a aprendizagem; e Gee (2003, 2004, 2005 e 2014) sobre gamificação e design de jogos. Espera-se que este trabalho abra caminhos para práticas pedagógicas e proporcione pesquisas mais avançadas sobre as possibilidades de uso de jogos digitais na educação e que essa reflexão possa impactar na produção de materiais e recursos didáticos.
Palavras-Chave: Jogos. Ensino. Covid. Prevenção.

Abstract: This paper aims to deepen the care for the coronavirus. A digital game was built and its technical aspects and mechanisms were tested with elementary school students, such as layout, interactivity, fun and gameplay associating them with science skills found at Common National Basic Syllabus – BNCC "Base Nacional Comum Curricular" (BRASIL, 2017). It is a game that involves understanding the ways that viruses are transmitted and the appropriate attitudes and measures to prevent the transmission of diseases associated with them. This theoretical framework is composed of studies by Benvindo (2019) and Borges (2013), with experiences on the use of technologies and gamification; Vygotsky (1999), on the importance of a collaborative space for learning; and Gee (2003, 2004, 2005 and 2014) on gamification and game design. It is expected that this work will open paths for pedagogical practices and provide more advanced research on the possibilities of using digital games in education and that this reflection may have an impact on the production of teaching materials and resources.
Keywords: Games. Teaching. Covid. Prevention.

Resumen: El presente trabajo pretende profundizar en la atención ante el coronavirus. Se construyó un juego digital y sus aspectos técnicos y mecanismos fueron probados con estudiantes de la escuela primaria, como el diseño, la interactividad, la diversión y el juego, asociándolos con las habilidades científicas que se encuentran en el Common National Basic Syllabus - BNCC "Base Nacional Comum Curricular" (BRASIL, 2017)). Es un juego que implica comprender las formas en que se transmiten los virus y las actitudes y medidas adecuadas para prevenir la transmisión de enfermedades asociadas a ellos. Este marco teórico está compuesto por estudios de Benvindo (2019) y Borges (2013), con experiencias sobre el uso de tecnologías y gamificación; Vygotsky (1999), sobre la importancia de un espacio colaborativo para el aprendizaje; y Gee (2003, 2004, 2005 y 2014) sobre gamificación y diseño de juegos. Se espera que este trabajo abra caminos para las prácticas pedagógicas y proporcione investigaciones más avanzadas sobre las posibilidades del uso de juegos digitales en la educación y que esta reflexión pueda tener un impacto en la producción de materiales y recursos didácticos..
Palabras clave: Juegos. Enseñando. COVID-19. Prevención.

INTRODUCTION

The big motivation for working with games comes from our experiences with the classroom and with undergraduate level game training. Thinking more generally, the intention is to use digital games in the process of teaching in order to solve some problems that schools have, such as student motivation. They are tools that contribute a lot to playfulness, interactivity and the clarification of values.

Today, we agree with Lima Lopes et al. (2021) by stating that in the process of teacher training for teaching, discussions on the role of technologically mediated communication processes are rare. It has already been discussed that the educational context underwent many changes caused by the technological evolution (LISKA, 2018). It has required the reformulation of the methodologies and tools used for teaching. Therefore, it has been proposed taking into account the professional engagement and continuing education devices provided on Common National Base for initial and continuing teacher education - BNC-Formação (BRASIL, 2019) and the creation of a digital game. The results will be analyzed in the end of this work.

When it comes to teaching game, it can neither be a way to memorize contents nor a task. Furthermore, the entertaining feature that some digital media have cannot be underestimated. Teachers can take advantage of it in education, but not totally deviate from it. This is a very common mistake in teaching plans: trying to give a pedagogical applicability to a resource and turn it boring for the students.

Taking this care, the game was created with a pedagogical perspective, considering the use of technological resources in order to develop some specific skills in the student's daily life. These skills encompass both creativity, autonomy and innovation, as well as skills in the field of science, such as building values from the current pandemic context, expanding them into other aspects in which the student classifies the issues related to the threats and vulnerabilities that can affect both society and environment.

As it was said, nowadays schools face major problems around student motivation and engagement, even more in this context. Games or the incorporation of game elements (called gamification) such as aesthetics, mechanics and dynamics in other non-game contexts (KAPP, 2012) can provide an opportunity to help schools solve these difficult problems.

In the next sections, hypotheses will be weaved to present some considerations about the use of technologies and games and the importance of a collaborative space for learning. The game that was built and its technical aspects and mechanisms will be exposed --such as layout, interactivity, fun and gameplay. Beyond that, they will be associated with the science skills found at BNCC[1] (BRASIL, 2017).

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[1]The Common National Curriculum Base (BNCC) is a normative document that defines the organic and progressive set of essential learning that all students must develop throughout the stages and modalities of Basic Education.

Finally, the student assessment will be detailed with some possibilities and challenges. The aim of the present work is to focus on stimulating creativity, logical and critical thinking through the construction and strengthening of the ability of arguing and interacting with various cultural productions making use of information and communication Technologies.

DEVELOPMENT

Initial Hypotheses

First, an initial hypothesis that the relationship between games and education can contribute to the teaching and learning process was raised. It acan stimulate collaboration, creativity to solve problems and students' lack of interest in science classes.

With creativity, a path that starts from an initial idea until reaching the final results was followed and, along this path, mistakes were made, decisions were taken to overcome them, cases of success occured and, above all, relationships were created, which helped in achieving the goals set.

The beneficiaries of the research results will be students and teachers who, when exploring digital games for the construction of knowledge, will have at their disposal resources and auxiliary tools for the process, which will be described in more details in the next sections.

Theoretical framework

According to BNCC (BRASIL, 2017), skills that involve the use of games can stimulate creative, logical and critical thinking through the construction and strengthening of the ability to ask questions and evaluate answers, to argue, to interact with diverse cultural productions, making use of information and communication technologies, highlighting engagement, viral marketing strategies and explaining the mechanisms of persuasion. As a result, it enables students to broaden their understanding of themselves, of the natural and social world, of the relationships of human beings with each other and with nature.

Borges (2013, p. 2), defends the use of gamification in education. It consists of using game elements in a context outside of them, such as the personification of characters, the use of points and rewards, in order to motivate action, assist in problem solving and even promote learning. Since games and gamification are the topics approached, It is necessary to differentiate what each one means. The use of games would be when someone deals with the games themselves (whether digital or tabletop, board etc), immersed in a world, a character (or several), interaction with the scene, challenging feature etc.

Gamification, on the other hand, would be using the characteristics of a game in other ways, in other contexts (outside of a game). For example, do you know when Kindergarten students earn a

"star" for the tasks they perform? This is gamification, as it remembers the points that the playable character accumulates as he goes through the stages. Ways to encourage the protagonism and autonomy of students and teamwork can also be considered gamification. This work is not dealing with the game itself, but with the use of its features in everyday life.

Portuguese language activities created with the intention of being playful and that use some common commands in games, for example, activities in which a question leads the student to continue in the game, or to wait for a colleague to reach that question or, still, if the student in the end has a reward, we can call them gamified. Example, to make it clearer: "Answer question number 5 (if you get it right, go ahead; if you get it wrong, go back to question number 3. These are strategies commonly used in board games, aimed at engaging students' participation. Its efficiency: see if students are more involved with activities of this type.

In games, according to Gee (2003, 2004, 2005 and 2014), players voluntarily invest countless hours in developing their problem solving skills. The learning needs that the game requires for the player to overcome challenges are what contributes to providing entertainment and, consequently, repeatability, the player's desire to continually play in the environment.

For Leffa et al. (2012), digital games are a social practice characterized by the intensive use of language, involving the player by immersion, bringing them into the game, and requiring knowledge from them to meet the challenges posed. Thus, it is believed that a game session produces a permanent impact on the player, more intense than a book, a song or a movie, since there is a greater mental involvement in the subject.

The entertaining value of a digital game, for example, according to Leffa et al. (2012), it is more important to define it as a game than its educational value. A good electronic game is one that is addictive, not necessarily one that teaches; a pedagogical game with an emphasis on the use of interactive resources, but with a low entertaining value, would be on the border between the game and the didactic exercise.

Leffa et al. (2012) presents some categorical and continuous variables that would characterize a game, which may be mandatory or optional:

A) Categorical (which are not measured by a scale of value, but by belonging, or not, to a certain category). They would be:

(1) the algorithm, which makes the game an interactive event, sensitive to the user's gestures, sometimes responding to what he does, sometimes proposing new actions;

(2) the player's physical action (some games that involve physical engagement);

(3) electronic support: the screen or monitor, speakers and numerous graphic elements that inform the game's progress such as cursors, buttons and scrollbars, in addition to input devices such as keyboard, controls, mouse, joysticks, pedals, steering wheels, software and hardware, input and output etc.

B) Continuous:

(1) Playfulness;

(2) Interactivity and

(3) Explanation of values.

In addition to these specificities, Gee (2003, 2004, 2005 and 2014) presents some principles for gamification. In summary, it is expected that a game design:

(1) Determine the major and minor goals;

(2) Offer clear and small tasks;

(3) Present more difficult tasks as the game progresses;

(4) Don't allow the player to fail at the beginning, so as not to discourage him;

(5) Create a challenge using game elements and mechanics, considering each type of player;

(6) Let the player take control, but don't let him get lost or get stuck to the point of giving up the game.

Leffa (2020), when verifying to what extent the gamification of teaching activities can contribute to learning, shows that pure and simple gamification, based on the use of game mechanisms, does not guarantee student motivation. According to the students, the relevance of the content with topics of interest to them and the didactic design of the activity, with an emphasis on multimodality and the use of interactive tasks, are more important.

This suggests us the expansion of resources that games offer for gamification, seeking them attributes and principles that are more relevant to learning than the simple application of scores, trophies and leadership tables, known as PBL (Points, Badges and Leaderboards). Thus, Leffa (2020) recommends looking for essential elements in games, such as the intrinsic pleasure of playing, persistence in the face of challenges and the possibility of obtaining a performance superior to competence. "All are characteristics that teachers would most likely like to see transposed to their classroom, seeing students with pleasure in studying, persisting in the challenges encountered and overcoming their limits, exactly as happens in games" (LEFFA, 2020, p 12).

We know that a teaching project that involves the use of Digital Information and Communication Technologies (TDICs) must be designed with great caution. Benvindo (2019) explains that the use of technological tools can favor student learning and interaction, indeed. On the other hand, although they favor them, they are not the guarantee of learning, as they need to be used intentionally and planned. The figure of the teacher is essential, someone who knows where you are starting and where you want to go with certain proposals.

After planning, executing and evaluating the results, it will be able to verify if these resources help in classes and if they actually favor individual and collective growth, contributing to the development of a broader view of the reality that surrounds us. In addition, it is mandatory to measure its effectiveness by allowing reflection on content, as well as creativity and innovation, to motivate and engage students in their learning.

METHODOLOGY

During the investigation of electronic game portals for science education, some examples were listed. The incorporation of new resources suggested by students were not dispensed. "Coronavirus Prevention" is a memory game with an attractive template as an alternative to playfully teach children how to prevent themselves. Among its goals, it is included understanding the means of contagion of Coronavirus and the importance of vaccination; realizing the importance of the scientists and science development for the promotion of public health; and understanding the importance of searching for reliable news sources. As a tangential skill, it aims to identify, classify and differentiate images through the differences and similarities between them.

It is an object of carefulness that what is called "digital game" or "game" has been used in teaching only to mask boring activities while making them slightly less boring. It is important to be careful with traditional activities disguised as games, in an attempt to teach and have fun at the same time: "these animated exercises dress like games, but they are stripped of anything that resembles a game" (OSTERWEIL; LE, 2010, apud LEFFA et al, 2012).

Thus, an interactive exercise in which the student responds to questions asked by the computer with automatic feedback has an algorithm, electronic support and student activity, but would not be considered a game, as it would not match the six characteristics expected in detailed game design by Gee (2014).

Figure 1: Coronavirus Prevention. **Source:** https://www.escolagames.com.br/jogos/prevencaoCoronavirus/, accessed on 10/06/2021.

5 Senses (5 Sentidos), as its name suggests, works with the identification of situations in which we use hearing, sight, touch, taste or smell. It aims to know the senses, the organs responsible for their perception and understand the function of each one. It is visually appealing and features a narrative of a monk who is meditating and needs the player's help to answer the correct questions and not let him fall to the ground. Like the previous example, it boils down to a question and answer activity that could be given on paper and converted into a flash to look beautiful, attractive and playful.

Figure 2: 5 Senses. **Source:** https://www.escolagames.com.br/jogos/cincoSentidos/, accessed on 10/06/2021.

"Can or can't?" works on prevention and awareness strategies against Covid-19. As it has no difficulty level and the advance to the other screens is limited to two buttons, the player may make a mistake on the first attempt and lose interest in the game. We defend that the information brought is very important, but random. Depending on the answer, they allow the player to fail early on and this can discourage him.

Figure 3 - Can or can't? **Source:** http://www.multirio.rj.gov.br/index.php/interaja/jogos-educativos/15967-pode-n%C3%A3o-pode, accessed on 10/06/2021

Coronapocalypse[2] emerged from a proposal to work the knowledge of the forms of virus transmission with appropriate attitudes and measures to prevent diseases associated with them, according to skill. Its prerequisites only involve being literate to understand the instructions and lessons of the game, in addition to having knowledge and equipment such as a computer or smartphone to play.

It is a game with an interdisciplinary characteristic, with the main deepening in skills of the component of the Science syllabus. It involves knowledge of the ways in which some microorganisms are transmitted (viruses, bacteria and protozoa) and appropriate attitudes and measures to prevent diseases associated with them. Among the learning objectives are: to discuss the reasons why protective habits are necessary to maintain health; to identify possible risky situations and to list preventive attitudes to avoid them; to signal the construction of values from this context, expanding them into other aspects in which the student classifies issues related to socio-environmental threat and vulnerability; and to identify, list and explain the presence of risk factors in students' homes, school or while commuting to school.

In the narrative, the coronavirus (main character, playable) is circulating on the street and several children are wearing and without protective masks (enemies). The rules are to destroy unmasked enemies and not touch masked enemies. The interaction is a side-scroller. The greater the number of enemies destroyed, the higher the score; the greater the contact with protected enemies (3 lives), game over. Although it is frightening to have a virus in the player's control that infects children, it is expected that the feelings and emotions involved will trigger reactions in order to make a commitment to the use of protective equipment. We use Construct 2, for game design, and Adobe Fireworks, for the construction of screens and sprites.

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[2] Beta version of the game can be tested at https://coronagameconstruct.netlify.app/. You can take the satisfaction survey and support our project at https://forms.gle/SdgCzAf3KTqCv1To8
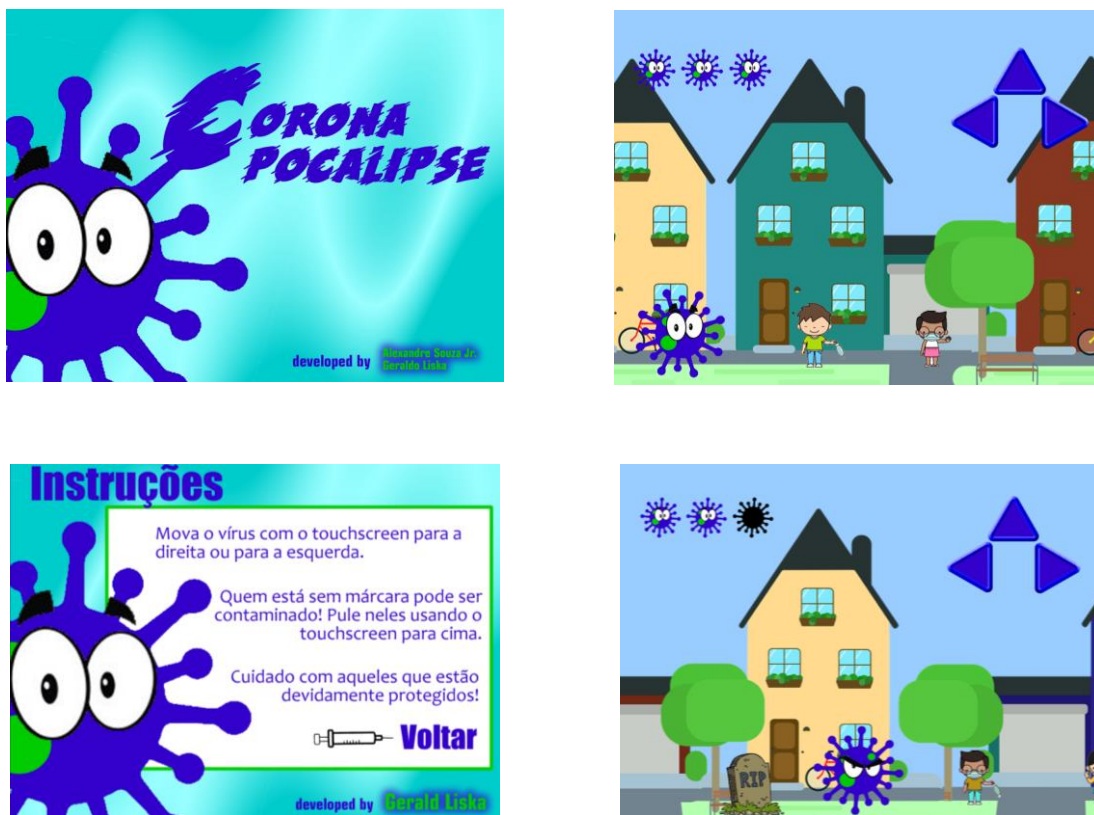
Figure 4: Coronapocalypse**. Source:** From the author

In this sense, tangential learning is important for the teaching and learning process. The object of study does not necessarily need to be the main theme of the digital game. The tangential learning strategy is also a promising concept to promote more self-directed and proactive learning. Consequently, digital games can be important tools in the learning process, motivators and curiosity generators.

For the assessment of learning, it is suggested that students respond about the importance of using masks in the current context as preventive attitudes. In order to identify possible risk situations and relate preventive attitudes to avoid them, students should create a poster (on cardboard or with programs such as Canva) based on what was taught in the classroom with an expository class and contact with the game. The product will be shared with the school community as a way of raising awareness. Suggestion of poster to be produced:

Figure 5: Probability of contagion. **Source:** Available at http://saovicentedosul.rs.gov.br/site/2020/05/13/mascaras-diminuem-probabilidad-de-transmissao-do-coronavirus/; access on 06/10/2021.

To signal the construction of values from this context, expanding them into other aspects in which the student classifies issues related to socio-environmental threat and vulnerability, awareness is made from the production of the material to its dissemination. Phrases such as "I take care of you, you take care of me", reinforce one of the basic skills for Elementary School., about exercising self-knowledge, empathy, dialogue, conflict resolution and cooperation.

To identify, list and explain the presence of risk factors in their home, school or while commuting to school, students will be invited to a debate, in which contributions can be analyzed synchronously, in a learning process that is mutual and cooperative.

Finally, the assessment includes: monitoring attendance and participation in classes production of expository material, student evaluation about the game. It is important to emphasize that the contribution of students is of great importance for planning an action that is not just on paper, but is able to be applied and adapted to different realities. Metaphorically, we are not concerned with an imagined, idealized cake recipe that has never been made or tested. Likewise, we also do not want a mold ready for any cake, without taking into account its specificities.

Data collection

In addition to the necessary bibliographical survey on the concepts and testing of the computational tools used, this is a qualitative and quantitative research, with a questionnaire and analysis of the answers among students, in order to assess their perceptions and probabilities of continuing to play the game after its final version.

Figure 6: Coronapocalypse in action. **Source:** From the author

Figure 7 - Initial explanations of game content and instructions. **Source:** From the author.

Thirty-five students between 8 and 11 years old from a public school in the State of Espírito Santo in Brazil participated in the research. With the application of the satisfaction questionnaire about the beta version of the game, we have some considerations about the students' knowledge about the subject and what can be used and improved, conform Figure 8.

We noticed that 91% of respondents play video games with some frequency, and 1/3 revealed having contact every day. This motivates the research to include this feature in classes, however, as was mentioned, without taking away the entertaining feature of the media. If this happens, they can get tedious for students, and we take care that these tools are not seen as tasks. Smartphones are the most used device, followed by computers and consoles. Only two students said they had a "PC Gamer" at home.
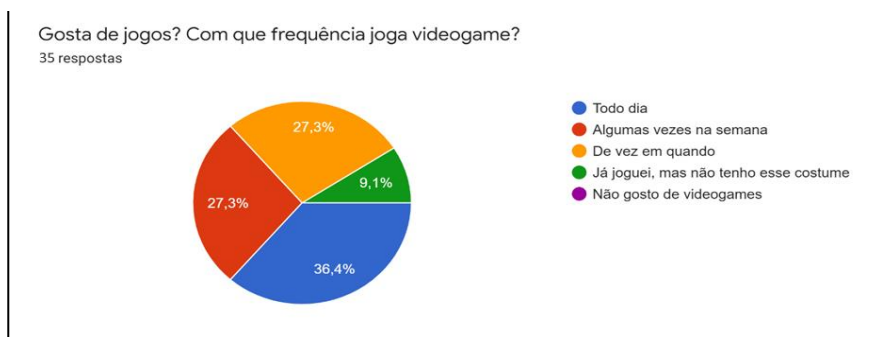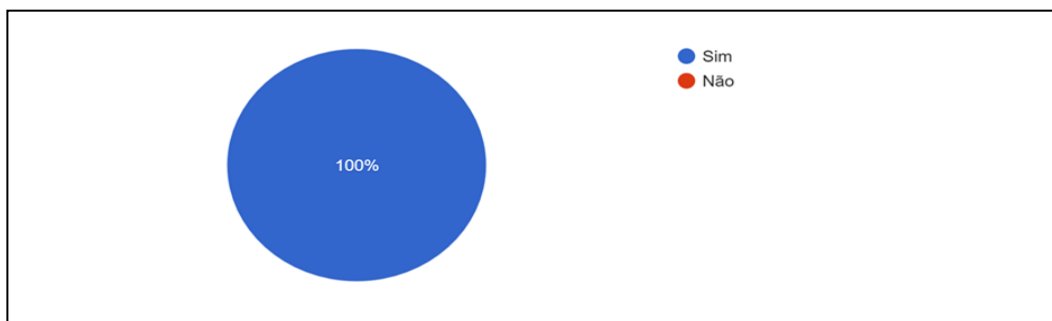

Figure 8: Question 1. **Source:** from the author

Table 1: Evaluation of categorical and continuous variables

From 1 to 5, how do you rate the look of the game? Is it attractive? Are the drawings beautiful?	From 1 to 5, how do you rate the game content? Can you learn anything from him?	From 1 to 5, how do you rate the fun of the game? Would you be unaware of time passing?	From 1 to 5, how do you rate the game's challenge? Would you continue playing until the next few levels?
5	5	5	5

Font: From the author.

100% of participants said they were satisfied with the look of the game, its content, the fun it provided and the challenge, in addition to recommending it to a friend or colleague. Although we are happy with the result, we know that it may be a biased sampling, as the students know the creator teachers, in addition to being the educators who test the games with them. This can bring some interference.

Figure 9: Question 5. **Source:** from the author

When the students were asked to list strengths, the comments highlight the look, control over the characters (ie, we go beyond a board game), and the goal.

Table 2: Positive and negative points

Use the space to comment on what made you MOST satisfied:	Use the space to comment on what made you LESS satisfied and what could be improved
everything	more phases
the protection of characters	more stages and difficulty
control the virus	climb the window
the look	enter the building
the masked people	nothing
of the movements	punctuation
to control the virus	climb on the porches and score
of the virus and the characters	
to play , I don't play much	
of the objective	

Font: From the author.

In order to notice weaknesses and improve the alpha version of the game, it was asked the participants of the research to report what made them less satisfied. Among the answers, the game offers few levels, the easy difficulty level and the short duration. Therefore, the suggestions involve more stages and greater difficulty, the possibility of entering the buildings instead of just passing in front of them (greater interaction with the scenario) and showing the acquired score as you progress through the screens.

Returning to our hypotheses, it cannot be underestimate the entertainment characteristic that some digital media have. Teachers can take advantage of it in education, but not totally deviate from it. This is a very common mistake in teaching plans: trying to give a pedagogical applicability to a resource and end up making it boring for the student. We participated in a course in which one of the activities was the creation of avatars, but in the next task the work was with another resource and the avatar, which could be used, was lost. Therefore, we remember the Risk Methodology (MATTE, 2008). Normally, in a classroom, what comes from outside is completely filtered by the teacher and all productions made in class are destined for them. Matte concludes: "The only need is a grade, that is, an abstract assessment that, instead of actually assessing, just decides whether or not the student will need to go through the process again" (MATTE, 2008, p. 174). The focus of the risk methodology is autonomy, dedication, insistence and responsibility. When we think of creating the poster as a product after the game, we propose an activity in addition to writing a text for the teacher, where students could create and diagram with their own texts and share among colleagues, post on social networks, with that, make the tools really attractive and the learning more playful.

Taking this care with the playful and pedagogical perspective, it is possible to take advantage of technological resources in order to develop some specific skills in the student's daily life. These skills encompass both creativity, autonomy and innovation, as well as linguistic competence, such as reading, identifying and reproducing instructional injunctive texts for games and reconstructing and reflecting on the conditions of production and reception of texts belonging to different genres in the game world, which shapes these language practices.

CONCLUSION

We are not concerned with an imagined, idealized "cake recipe" that has never been made or tested. Likewise, we also do not want a mold ready for any cake, without taking into account its specificities. In the approach, it was prioritized the opportunity for reflection and the freedom to choose paths that suit the students' reality and increasingly improve the teaching and learning process.

When we analyze games, we do not discard the work required of their creators. it is known that these resources take time to be idealized and it is not questioned the skills and efforts of the

professionals involved. It is hoped that this research will open paths for pedagogical practices and provide other more advanced studies that reflect on the possibilities of using digital games for learning and that this reflection will have an impact on the production of teaching materials and resources.

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