

DIGITAL GAMES FOR GEOGRAPHY TEACHING¹

Christian Nunes da SILVA*

Vivianne Nunes da Silva CAETANO**

Abstract: This article aims to analyze and discuss the use of Digital Interactive Games by educators in the classroom, as a resource for geography teaching-learning process in middle and high school education. This discussion arose from the analysis carried out by under graduate students of the UFPA Geography course, during the course Introduction to Cartography Teaching in the years 2013 and 2014, at which time the games analyzed gained recognition in its full potential by students who participated in the activities in classroom. In this sense, we propose a brief discussion, based on the analysis of some selected examples on how these digital interactive games can become fundamental importance of resources for teaching Geography and how should be used and applied in the classroom by educators in a critical way, allowing students adequate learning about the geographic space.

Keywords: Interactive Digital Games; Geography Teaching; Teaching-Learning Process.

Resumo: O presente artigo propõe analisar e discutir sobre o uso de jogos interativos digitais, como objetos de aprendizagem, a serem utilizados por educadores em sala de aula, como recurso no processo de ensino-aprendizado de geografia nas séries iniciais. Essa discussão surgiu a partir da análise de alguns jogos digitais disponíveis na internet, realizada por alunos da graduação do curso de geografia da Universidade Federal do Pará (UFPA), nos anos de 2013 e 2014, momento em que essas ferramentas ganharam o reconhecimento de seu potencial por parte dos discentes. Nesse sentido, objetiva-se uma breve discussão, a partir da análise de alguns exemplos selecionados, sobre como esses jogos digitais podem tornar-se recursos de fundamental importância para o ensino de Geografia e de que maneira devem ser utilizados e aplicados em sala de aula pelos educadores de forma crítica, o que possibilitará aos alunos uma aprendizagem adequada acerca do espaço geográfico.

Palavras-chave: Jogos Interativos Digitais; Ensino de Geografia; Processo de Ensino-Aprendizagem.

I. INTRODUCTION

In recent decades the teaching of Geography has undergone a number of changes, notably regarding the preparation techniques and cartographic representation, with emphasis on the progress achieved with the use of computers and advancements in collecting spatial information through remote sensors (TAYLOR, 2010). In this sense, it

¹ This work is the result of the implementation of the project “Cartography in the classroom: training of teachers of public schools in the use of mapping and geotechnologies” funded by the Dean of Extension of the Federal University of Pará. For the textual preparation we appreciate the help of Madson José Nascimento Quaresma, who contributed to the debate on the use of interactive games in Geography teaching.

* Educator of the Geography and Cartography at the Federal University of Pará (FGC/UFPA). email: cnunes@ufpa.br.

** PhD graduate student at PPGA/UFPA. Member of the Academic Production Group Territory and Environment in the Amazon (GAPTA/CNPq). email: viviannenes37@hotmail.com.

is important to analyze the processes of change in the art/technique/science/discipline related to cartography, considering the new (geo)technologies and the changes that the man has been ingrafting in the geographical space in recent years. However, when we remember the relationships that take place in our society, it is also necessary to observe the activity of educators who abide to teach how the geographic space is occupied and how relationships between individuals interfere with the landscape setting. In this sense, the role of the educator in his activities should direct the criticality of the students, so that both reflect directly on the training of the professional/citizen being formed and how this will also act in the human and natural works.

Thus, in this text we could not leave out the discussion about the activity of teachers who work with the geographic space, handling cartographic products (maps, atlases, globes, models, etc.) seeking to optimize their practice with the tools currently available, as an important support in the teaching-learning process, and among these tools, we will outline the digital interactive games. In this case, some of the learning objects and/or practices mentioned in this manuscript can serve as a model for use in laboratories and classrooms, since it is considered the main subject and/or the issue of class as well as the environment and the daily lives of students, because it is one of the roles of geography, to make the world understandable for students (FRANCISCHETT, 2011).

That way, through bibliographic research and analysis of interactive gaming sites in the world wide web, we will make a selection and appreciation of some didactic and pedagogical tools available on the internet for use by educators who stick to studying and teaching about geographic space, whether geographers, biologists, physicists, sociologists or other. So we will discuss about the use of interactive games on computer environments that can be used in classrooms, in order to streamline the teaching-learning process and instigate discussion with students about the geographic space that surrounds them. Already, we emphasize that it is important to analyze the geography teaching in face of prospects of new information and communication technologies (ICT), to be used as learning objects (CASTELLAR; SACRAMENTO; MUNHOZ, 2011), considering that the main goal of these technologies is to facilitate the understanding of the phenomena that occur in society.

II. THE TEACHING OF THE GEOGRAPHIC SPACE

Nowadays, a major challenge for teachers is to overcome traditional teaching that has proven ineffective in the teaching-learning process, a process that every day passes off in an efficient connection between the speaker (teacher) and the receiver (student). In short, finding new ways of teaching is one of the great challenges of today's schools. The use of resources (such as music, newspapers, magazines, maps, models, globes, games, etc.), which serve to effectively support and enable the student to an expected understanding of the content also makes itself more necessary every day more, i.e., in

this process, playing and learning must walk together because it should not only be an obligation, but a collective and pleasant construction.

To Silva (2014; 2015) the teaching-learning process should be thought of as a practice that sees the students as subjects belonging to a given time and a specific space where the teacher is the facilitator of the learning process, and is committed to the teaching practice, aiming for a direct relationship between the content transmitter and assimilating thereof, i.e., the teacher-student relationship. Being the educator the organizer and planner of their own practice, through critical methods, and in which are really committed to student learning and knowledge building. However, what can be seen, in the case of Geography teaching that we find in some Brazilian schools is a teaching based on content fleeing the reality of the students (SPOSITO, 2006), uncompromised with the social context of them, reinforced by a traditional method of teaching – decorative and encyclopedic, which inhibits criticism from students about the environment to which they belong, that is, the critical apprehension of the student lived space.

In this sense, the geographical content that is taught/transmitted to students, does not include in its speech a critical view about the reality to be studied, providing an uninteresting content because it evades reality, significantly compromising the learning of them and encouraging a view in which Geography is a decorative and monotonous discipline to be studied. This conception of geographical science was built and permeates the Brazilian Geography teaching to this day, because, for a long time, it has been historically neglected its true political role (LACOSTE, 1989), as a training tool for critical and analytical subjects of their living space.

At the present time, there was a “rescue” of the geographical science education, from reformulations occurring in Geography teaching, before the eagerness for a position that would strengthen the role of geography as a trainer science of conscious and critical subject, before the formation/construction of their social space. These changes were perceived in the educational system with the direct and indirect activities of researchers, educators and students who contributed to the consolidation of this change. Therefore, new methods and practices were oriented towards fulfilling this eagerness (SILVA, 2014).

That is, despite the Geography teaching still suffering great influence of the traditional method, it is gradually being constructed from a new method (FRANCISCHETT, 2011), concerned about the students as subjects and not as simple external content receptacle of their historical and social reality. Thus, geography, although known for some time as an important tool in the geographic space education, should contribute to the learning process of the students’ to be favored by a method that lead them to see themselves as subjects belonging to the content taught, providing an assimilation that facilitates the seizure according to cognitive levels, acting reflexively in the society in which it operates and instrumentalizing it so it can understand their reality to interfere

in it consciously. Digital interactive games can help fulfill this role, in teaching the geographic space, to better understanding the social and environmental reality.

III. INTERACTIVE GAMES FOR GEOGRAPHIC SPACE TEACHING

First of all, it is important to identify two types of digital interactive games that are available for adaptation to be used in the teaching activity: *educational games and video games*. Although different, educational games and video games have much in common – after all they start from the same principles, its main features are uncertainty, rules, fictitious actions and uncertain results. However, while educational games focus on educational content explicitly, usually related to mathematical activities, geographical, biological or foreign language activities, video games, do not adopt educational content explicitly, but emphasize only the entertainment content, which does not prevent the educator from adapting the game for use in the classroom².

Another factor that differentiates these two tools is the form of investment in both. While the first – the educational game, to be developed, relies on the assistance of government agencies or non-governmental organizations (NGOs), their aim is to teach young people and children; video games are developed by major entertainment industry companies such as Nintendo Entertainment System; EA Games – Electronic Arts, Blizzard Entertainment, SEGA, etc., which finance these games with high investment values, with the intention of pure entertainment. Despite the split, we emphasize here the digital interactive games that are both used as entertainment games and as educational games, therefore, depending on the game, in addition to entertain, they may also be used in education. For the teaching of geographic space, the main objective of these digital interactive games is the presence of facts, content and geographical categories, aimed at teaching geography.

In this sense, the game *Half na Floresta* (Half in the forest) is an example of an educational game (Figure 1). The game basically consists in trying to save the fauna and flora. The idea of this interactive game is very important for the formation of young people, but coming up on the problem of graphic quality and “playability”, a fact which attracts a small audience and gets low scores on the central goal (and perhaps the only goal) which is the environmental education. On the same subject line many other interactive games are offered on the Internet that emphasize environmental issues and present concepts as selective collection of trash, waste, pollution, recycling, etc³.

² Before selecting a digital interactive game is necessary some guidelines to be presented forward.

³ Other games with emphasis on environmental education can be accessed at: http://jogos360.uol.com.br/educacao_ambiental



Figure 1: Half in the forest: Educational game.
 Source: <http://portal.ludoeducativo.com.br/pt/play/half-na-floresta>

In Figure 2 we see an interactive game available on the internet that seeks to encourage users to find ways of relief in a landscape. The game runs with options, according to questions on the screen, where the user selects the relief that they find correct. This game shows the main tips on the screen, where the user knows the basic concept of what he is looking for and scores more points for responding quickly and correctly.



Figure 2: Educational geography game where you must find out the different types of relief.
 Source: <http://migre.me/ozXIA>

The teacher can use this game as an aid in teaching about coastal geomorphology, because games of this type guide the user to know more about the relief demonstrated in the landscape. Despite sluggish and limited visuals, this game is a suitable tool to deepen the basics of landscape. The teacher can also encourage individual use in the lab or create groups to answer questions on the subject, the group that answer correctly more often and more quickly “wins” the dispute.

Games as SimCity (Figure 3), which simulate virtual realities, every day becomes more attractive to youngsters and adults as well. In the game in question it is necessary to create a city and manage it so as to bring economic investment, sanitation, health, education, security, as if the student/user were the manager of a real city. All these activities are borne by the player, who should control the overall development and ensure the city. In this sense, the player/user to win must have the skills of a manager, because his virtual city needs to have adequate infrastructure to meet the inhabitants’ demands.



Figure 3: Interactive online game: SimCity.

Source: <http://www.simcity.com/>

In this virtual reality can be entered the geography content related to urban spatial planning policies, as well as the geographical concepts of territory, place, town and city. Also in relation to SimCity, Araújo; Leal and Evangelista (2014, p.3) state that:

It is a game that allows the exploration of various topics and basic concepts of geography with playfulness, stimulating interest and participation of the student. Through this computer game one can create, plan, build and manage cities, simulating and visualizing urban scenarios resulting from various forms of human intervention, prompting reflection on the world view and underlying geography to that assistance. Using this feature in school requires specific

knowledge from the teacher. A planned and organized labor to achieve the proposed objectives is essential. First, there must be a previous preparation of the instrument, so it can have a demonstrable effect on the classes and content related to discipline. Then, it is necessary to adhere to its subjects and the application at school in an attractive way for students.

Another digital interactive game that has a significant user community is the Clash of Clans (Figure 4), which stimulates competition among several different users. This game is available for devices using the Android system (tablets, phones, etc.) and must be accessed via the Internet to download and dispute online. This type of game is configured in series of strategic war games, working the capabilities of people and warriors, who consider the geographic strategies in a fictional battlefield and that allow the user to interact online with other users via the world wide web.



Figure 4: Clash of Clans application screen.

Source: <http://migre.me/ozXoL>

Games of this type, despite working with alternate realities, fictitious, when are inserted in the school environment enables the educator to encourage the geographical knowledge of their students, so they see the importance of geography in the knowledge of geographic space, to achieve a certain goal and win. However, it is important to note that there is an emphasis on programming this kind of game in combat actions and mobility of objects, in which the plot can minimize the educational potential of geographic content.

In this case, understanding the virtual geographical space can be explained by the strategy that the user applies to the game, where the natural and socioeconomic characteristics of the game's environments can be worked according to their potential or as their obstacles. Interactive games like this, with war simulator features currently have a virtual reality very close to reality, that is, have well-developed military systems, as

well as all equipment used by soldiers in battle. Thus, much of the interactive games with an elaborate cartographic application also end up simulating the violence of those fights. So it is the educator's role to guide the resolution of these conflicts and minimize them as the focus of attention should be the geographical knowledge.

In Figure 5 we see a game that was the theme and result of a master's thesis in Geography by Gabriela Dambros (2014). Basically, the author has created and implemented a geo-game created by her and used as a mapping teaching tool in the classroom. The game, entitled "Pedrinho and Pedrita learning about the map", has an attractive and dynamic interface, with characters Pedrinho and Pedrita, and the figure of a counselor/mediator in the game, ie, a virtual teacher. It is possible to interact in this game in a city with fictional characters and places. In this game, students learn the basics of cartography in search of a treasure map.



Figure 5: Pedrinho and Pedrita learning about the map

Source: <https://pedrinhoproject.wordpress.com/>

In her dissertation, the author states:

It was intended to develop in students mapping skills, initially with the (re)cognition of types of views, the passing of three-dimensional to two-dimensional, cartographic alphabet, the notion of legend, scale and spatial orientation. In the game, first there is the home screen, which displays the visual identity and the name of it, as a way of representing the analyzed content. (...)The display highlights the pedagogical agents Pedrinho and Pedrita and elements that refer to geography and cartography as a map and compass, aiming to make it attractive to motivate the student to start the interaction. It is noteworthy that this screen is the first contact with the game and so it should be "seductive" and awaken in the student/player, the interest in unraveling the mysteries and overcoming the challenges posed.

Initiatives in this direction create new possibilities for geography teaching. The author presents various concepts and categories for reading maps and enables students/players learning the cartographic elements (symbolizing, guidance, representation types, etc). Undoubtedly, there is vast wealth and the potential of this type of game for teaching geographical knowledge, however, it is still explored little, either because of ignorance from educators, little disseminating time about the tool and/or lack of motivation on the part of students.

Thus, as we have seen in the tools presented, the main features observed in interactive games in these days and that can be developed in the classroom is undoubtedly the geographical knowledge. This knowledge is developed in the most successful games and at different ages. The increasing use of maps in these games is increasingly common, where players go to find or locate certain objects and phenomena that are needed to advance the numerous phases/stages of the game. In this sense, we can see that, as the world modernizes and becomes dependent on computers, the shape of fun too metamorphoses and interactive games will now be in the children, youth and adult's daily life around the world. This graphical evolution of the games can contribute so that students/users, often averse to geography lessons, see the geographical knowledge from a new perspective.

It is important to emphasize that we do not want to transform the interactive games in the main object of study in the classroom, but that these games serve as a tool in the construction of geographical knowledge, with many issues that may be in the textbooks, in order to make it dynamic and attractive in geography classes. So, like any playful game that requires the use of imagination from the people, the details that are not real should be explained as such and the main features of the earth's surface, present in reality, should also be identified and discussed critically, showing students how reality can be understood through a game apparently without bonds with the topics discussed in class. From this, students can learn that a game in digital format aims to "represent" a real or fictional reality where geographical strategy is the differential (SILVA, 2014).

IV. FINAL CONSIDERATIONS

The interactive games have long been conceived as something strictly geared to leisure. An activity purely for fun, to be used in spare moments as relaxation that also contributed to the idleness of young people by stimulating the disinterest related to educational issues. However, this concept needs to be reviewed because as we demonstrate in this article, the knowledge of space (either real or virtual), can easily be explored from many games, which can also be used in awareness and knowledge of the users about geographic space and its visible and hidden features.

In this case, we suggest and recommend some procedures in choosing a digital interactive game to be used in the classroom, following the guidelines suggested by

Sposito (2006; 2012), De Toni and Ficagna (2005), Silva (2013a; 2015) and Brasil (2006), which may assist in the teaching material selection process, in this case, these suggestions were adapted for the use of digital interactive games:

1. Plan the class ahead, with the aid of a lesson plan in which the educator should check and select the content, objectives, methodology, necessary materials and equipment, handouts, target audience and forms of assessment;
2. The teacher must have prior knowledge of the interactive game that will be used, it is necessary advanced knowledge of the rules, functions, tips, shortcuts, and results to be explained before the start of their handling;
3. Before starting to play the game the educator needs to verify that the laboratory structure (hardware and software) is suitable for using a computer per student, it is important to enable the use and handling tool for all participants in the class;
4. Adjust the initial subject and the game to the age, grade and cognitive level of students/users;
5. Using the digital interactive games from subjects/themes pre-worked in the classroom. The game should serve as a complement to the class and not its principal object of analysis;
6. Look for games with good clarity and visibility (layout and design appropriate), so that it is possible to view the illustrations, pictures and text;
7. Working with few students/users per class. If possible, it is interesting to have the help of an intern/monitor to organize and guide students/users;
8. Avoid games and applications that lead to prejudice or inducing the origin of prejudice, ethnicity, gender, religion, age or socioeconomic status;
9. If possible, use games that can be acquired free of charge by students/users, so they can access and/or install on their own computers;
10. Check the concepts and categories (of geography, for example), presented in the game are accepted by the scientific community as a way to avoid induction to error and/or incorrect education;
11. Search other add-ons to the game, in addition to the lecture. Thus, videos, books, newspapers, websites, magazines and music, or extra content that can assist in the teaching-learning process (SILVA, 2013b);
12. Promote, during use of the interactive game, activities and group discussion, which will enable students/users to analyze critically the tools worked in class;
13. Create evaluation mechanisms for students to use each of the games, based on pre-established major issues and goals achieved with the class, in addition to performance in the application handling according to their rules and goals.

In addition to these criteria, the educator must set criteria and parameters for the selection of interactive games that use in their classes. It is therefore important that the main user/intermediate (educator or other professional who works with games) know that, today, there are several mechanisms (software) for choice, viewing or development activities for the classroom.

Again, it is not intended here omit the images and notebooks in favor of computers, tablets and mobile phones. The aim of this manuscript was to show that new tools, in a playful way, can contribute to a more dynamic class with a satisfactory result compared to those presented by the traditional way of teaching. Should be noted that educators need to teach classes in a more dynamic way, without, however, transforming the classroom into a current affairs show. Before that, one should aim at intellectual development of students and make the school environment more pleasurable. Demonstrate to students that intellectual playfulness and knowledge can be great allies, which will certainly bring positive results, not only for the academic life, but also for the training of citizens. This must be the great challenge for educators in the 21st century.

REFERENCES

- ARAÚJO, T. H.; LEAL, J. M.; EVANGELISTA, A. M. A utilização de jogos eletrônicos no ensino da geografia no contexto da tecnologia educacional. In.: Anais do VII Congresso Brasileiro de Geógrafos: A AGB e a Geografia brasileira no contexto das lutas sociais frente aos projetos hegemônicos, Vitória-Espírito Santo. 2014. p. 01-10.
- BRASIL. Secretaria de Educação Básica. Guia do livro didático 2007: Geografia: séries/anos iniciais do ensino fundamental. Secretaria de Educação Básica. Brasília: Ministério da Educação, Secretaria de Educação Básica, 2006.
- CASTELLAR, S. M. V.; SACRAMENTO, A. C. R.; MUNHOZ, G. B. Recursos Multimídia na Educação Geográfica: perspectivas e possibilidades. *Ciência Geográfica*, Bauru, v. 15, n. 1, jan./dez. 2011. Available at: <http://migre.me/bP5Qb>. Acess: November 2012.
- DAMBROS, G. Por uma cartografia escolar interativa: jogo digital para a alfabetização cartográfica no ensino fundamental. Santa Maria: UFSM, 2014 (Dissertação de Mestrado em Geografia).
- DE TONI, M. P.; FICAGNA, N. C. Livro didático: deve ser adotado?. In: Anais do IV Encontro ibero-americano de coletivos escolares e redes de professores que fazem investigação na sua escola, Lageado, RS, 2005. Available at: <http://migre.me/oHN47>. Acess: July 2011.
- FRANCISCHETT, M. N. A cartografia no ensino-aprendizagem da geografia. Available at: <http://migre.me/ozXtk>. Acess: February, 15th 2011.
- LACOSTE, Y. A geografia – isso serve, em primeiro lugar, para fazer a guerra. São Paulo: Papirus Editora, 1989.
- SELBACH, S. Geografia e didática. Petrópolis, RJ: Vozes, 2010.
- SILVA, C. N. A representação espacial e a linguagem cartográfica. Belém: GAPTA/UFPA, 2013a.

_____. Ferramentas aplicadas no ensino de cartografia: O atlas geográfico digital, o webgis e os jogos digitais interativos. *Geosaberes: Revista de Estudos Geoeducacionais*. v. 04, p. 50 - 60, 2013b. Available at: <http://migre.me/ozXpR>. Access: January 2014.

_____. *Percepções geográficas: educação, sociedade e meio ambiente na Amazônia*. Belém: GAPTA/UFPA, 2014.

_____. Interactive digital games for geography teaching and understanding geographical Space. *Creative Education*, v.06, p. 692 - 700, 2015. Available at: <http://www.scirp.org/journal/PaperInformation.aspx?PaperID=56362>

SILVA, C. N.; CAETANO, V. N. S; OLIVEIRA NETO, A. *Ensino de geografia e representação do espaço geográfico*. Belém: GAPTA/UFPA, 2013

SPOSITO, E. S., O livro didático de Geografia: necessidade ou dependência? Análise da avaliação das coleções didáticas para o ensino fundamental. In.: SPOSITO, M. E. B. (org). *Livros didáticos de História e Geografia: avaliação e pesquisa*. São Paulo: Cultura Acadêmica, 2006. p. 55-71

_____. Livro didático em geografia. do processo de avaliação à sua escolha. In: PAVÃO, A. C. A série “O livro didático em questão”. Available at: <http://migre.me/oHN8u>. Access: January 2012.

TAYLOR, D. R. F. Uma base conceitual para a cartografia: novas direções para a era da informação. *Portal da Cartografia, Londrina* v. 3 n. 1, 2010. Available at: <http://migre.me/ozXrf>. Access: February 2012.

TUPY, F. Videogames e geografia: um marco de intersecção nas paisagens reais, virtuais, lúdicas e de aprendizagem. In: SILVA, C. N.; CAETANO, V. N. S; OLIVEIRA NETO, A. *Ensino de geografia e representação do espaço geográfico*. Belém: GAPTA/UFPA, 2013, p. 33-46.