

MODELS AND GAMES: A PROPOSAL FOR A DIDACTIC INTERVENTION IN THE TEACHING OF PHYSICAL GEOGRAPHY FOR ELEMENTARY SCHOOL

Victor Gustavo Oliveira da Silva

Undergraduate student in Geography at the Federal University of Pernambuco. <u>victor.gustavo@ufpe.br</u> <u>https://orcid.org/0000-0001-7304-2867</u>

Camila Gardenea de Almeida Bandim

Undergraduate student in Geography at the Federal University of Pernambuco. camila.bandim@ufpe.br. https://orcid.org/0000-0003-4183-6608

Daniel Rodrigues de Lira Professor Dr. linked to Geographic Sciences Department – Federal University of Pernambuco. <u>daniel.rlira@ufpe.br</u>. <u>https://orcid.org/0000-0001-9559-2480</u>

ABSTRACT

The educational process is an activity that requires attention from those involved in its implementation. In many cases the school atmosphere becomes monotonous, and the teacher occasionally is unable to encourage the students. As a way to overcome the classic classroom model, there are some didactical tools that can be used by the educator. Several alternatives are available to teachers to reach the construction of knowledge in a meaningful way. The models and educational games are learning tools that are widely discussed in the scientific literature; nevertheless, their application in day-to-day life is still scarce. The didactic tools can achieve satisfactory results regarding the objective of knowledge construction, as they are used in conjunction with the teacher's planning. This paper seeks to present an intervention proposal for basic education, using the construction of models and educational games as tools to provide a pleasant, stimulant and effective education that allow the recognition of geographic knowledge and phenomena.

INTRODUÇÃO

The school environment, in which the Geography teaching activities are developed, has as one of its primary functions the presentation of activities and other elements that seek a greater relationship of the subject involved in the teaching and learning process with the objects of analysis of the Geography classes.

The use of practical activities makes possible the development of a closer relationship of the students with the content presented by the teacher. About what was presented above, Neves (2010) shows that the use of these activities triggers a greater significance and approximation of theory with the students' daily lives.

As Sousa and Albuquerque (2017) shows, the teacher seeks for new processes to make the development of their work more significant, detaching themselves from traditional teaching precepts. The purpose of this process is to make the student feel like a participant



in the construction of knowledge. Another objective is to awaken the students' interest in the content, so the knowledge is necessary not only for approval in exams.

New technologies make it possible for children and adolescents that have access to the internet and who enjoy using smartphones and/or other electronic devices to be bombarded with a lot of information. The algorithms of social media applications are programmed to increasingly value short videos that hold the attention instantly. As a result of this new reality, the teaching and learning process has needed to accompany the process of making content more dynamic, seeking the most varied ways to reach students to transform the monotonous classes of the past into more attractive processes (CARVALHO et al., 2016; FERNANDES et al., 2018).

There are several methods that enable the development of a more active class for the subject of Geography in the school environment. To mention, we have: conceptual maps, field work, mock juries, seminars, directed studies, case studies, workshops, etc. Each of these methods has its unique characteristics of use and elaboration (PITANO & ROQUÉ, 2015; SOUSA et al., 2019). Thus, the contents that were previously presented in a traditional way, using an oral presentation supported by the board and chalk/marker, gain new alternatives to their presentation, leaving it up to the teacher to choose one of these methodologies to adapt the content (COUTINHO & CIGOLLINI, 2014).

Sousa & Aquino (2014) emphasize the need for implementation of tools that seek to make the process of learning instigating, so that the student becomes an active subject in the process of building their knowledge. Sousa et al. (2019), points out that the methodological procedures aim to assist the students in communion with the possibility of awakening curiosity and interest in some contents. The referred authors point out that the classes that make the intersection between the content theory and a classroom practice can mitigate the distance between some contents, especially Physical Geography, being up to the teacher the work of reducing these differences.

For the development of this paper, the teaching methodologies through the use of models and educational/didactic games as possible tools to be used in a Geography class for elementary school are discussed.

Castrogiovanni (2000) defines the maquette as a three-dimensional model that seeks to represent the space, functioning as a geographic laboratory that enables the identification and perception of reality by students and teachers. Fernandes et al., (2018 p. 04) defines the models as "drawings of reduced or enlarged scales of a space, based on real data and variables."

As Botelho (2005) presents, the production of models, and other quality teaching materials, are extremely important. This material is essential in the organization of the teaching-learning process. Also according to the aforementioned work, interactive teaching materials stimulate student participation. Carvalho et al. (2016) presents that the making and use of models can be widely explored.

Sousa et al. (2019) discusses the models as a possibility of activity to be performed for students in the discipline of Geography. For the authors, when the models are implemented in the school environment, the understanding of the proposed themes are better observed. Sousa & Aquino (2014) presents that the models enable a significant learning of the most diverse themes and contents. Luz and Brinski (2011) point out that



the models enable students to interpret what is represented, being extremely valuable in the inter contextualization of phenomena.

Pitano & Roqué (2015) present that the models awaken an interest in the students, to the point of making them seek to interpret the place where they live, contextualizing it with the contents of Geography. This feeling of recognition of the place enables them to value their places and acquire knowledge about the problems that are evidenced in the space. On this point, Castrogiovanni (2000) shows that it is the teacher's responsibility to create situations in which the student would be responsible for creating solutions to the reality proposed by the teacher.

Suzuki et al. (2021) presents that through the reduced size representations, several physical and human concepts of Geography can be approached, such as: hydrography, climatology, vegetation, geomorphology, urban geography, agricultural geography, cartography and many others. The contents can be worked either in isolation, or in communion with other concepts and disciplines, in the most varied scales. Sousa & Aquino (2014) discuss that the models have the ability to present geographical concepts such as scale, orientation, legends, etc.

Pitano & Roqué (2015) point out that the maquette differs from other teaching resources due to the fact that it allows a three-dimensional visualization of the environment to be analyzed. The three-dimensional feature is a factor that facilitates the understanding of phenomena and recognition of areas.

For years, Geography at school was seen as a subject based on the simple fact of memorizing theoretical content. The didactic games provide the possibility of passing on knowledge in a way that is different from the traditional teaching model.

Kiefer & Batista (2020) point out that educational games are widely used by educational researchers in Geography as playful tools that aim at a meaningful learning of the contents.

The present work proposed the possibility of a school intervention. The content chosen was the water cycle and its consequences on the dynamics and landscape. For the proposed activity, a model and an educational game were developed. The model and the game were elaborated for a sixth grade class.

The topic chosen to be addressed in the classroom is based on skill EF06GE04 of the Common National Curricular Base. This skill aims to describe the water cycle taking into account the variations in surface runoff in natural, rural, and urban environments, and to recognize the main morphologies of a watershed (BRASIL, 2018).

The objectives of this work are to present an intervention proposal in a school in the hinterland of Pernambuco, using these teaching materials for the continuation of the class and presenting procedural issues related to the use of models and educational games.

MATERIALS AND METHODS

The present work was initially developed as an evaluative activity in the subject: Methodology of Geography Teaching II, ministered to a Geography graduation class, linked to the Geographic Science Department of the Federal University of Pernambuco.

Considering the importance of planning, the first stage of the proposal was based on the development of a lesson plan entirely linked to the use of models and educational games.



The chosen theme was the hydrological cycle. The proposal was developed for elementary school. In this way, and understanding Geography as a science that sometimes presents themes that have an abstract visualization, in several situations the teacher encounters the difficulty of explaining some geographical contents and concepts, especially for very young students. Thus, it is necessary that the Geography teacher recognizes methodological paths that aim to solve the problem previously mentioned.

Gomes et al. (2014), discusses planning, emphasizing it as essential

The Planning Action is an activity that should be part of the routine of every professional teacher. It is a job that requires reading the content, reflection and choice of the best way to approach it in the classroom, associating the information to the student's reality and proposing the objectives of understanding it. In this sense, planning is a complex process that must contain several aspects that involve the explanatory development of the content in the classroom. (GOMES et al., 2014, p. 79)

In this way, it is clear the need for the lesson plan, because it is this that will guide the lesson objectives, as well as the ways by which they will be achieved. Another extremely important factor in a lesson plan is the notion of how long, approximately, it will take to be executed. The lesson plan acts as a conductor that guides the teacher about his or her objectives and opens a range of creative options in order to achieve them.

After the production of the lesson plan, a scale model that represents the water cycle theme was built. According to Chaves & Nogueira (2011), the teacher has the challenge of using techniques and resources to provide information and teach the content so that students develop skills and feel motivated to learn. Gomes (2015) points out that the maquette enables students to approach the abstract - which is presented in three-dimensional materials, in an experience closer to the real. Therefore, the idea of producing the scale model represents the intention of using more playful methodologies that promote better use in teaching-learning in Geography.

In this case, the scale model is used as a tool to explain the content. The development process of the model is done by the teacher a moment before the class, so organization is fundamental to program and apply this intervention.

The materials needed for this project had an average expense of approximately R\$ 25.00, being considered a low cost production. It should be noted that many items can be replaced by recyclable options such as: recyclable paper, PET bottles, cardboard, among others. The materials used to create the scale model are listed below, followed by the procedures for its assembly.

Materials used in making the scale model

- ➤ Styrofoam sheet with 15 mm of thickness
- ➤ Styrofoam ball with a size of 150 mm
- ➤ Glue for paper and styrofoam
- ➤ Gouache paint



- ➤ Paint brushes
- ➤ Office paper
- ➤ Toilet paper
- ≻ Stylus
- ➤ Pencils
- ≻ Pens
- ≻ Water
- ➤ White cardboard
- ➤ Blue Ribbon
- ➤ Transparent straws

Steps to build the scale model

1st: The styrofoam sheet was divided into two parts of equal sizes, overlapped and glued together using the styrofoam glue;

2nd: The styrofoam ball painted with yellow ink was used to represent the sun;

3rd: The cardboard was cut into the shape of clouds. Soon after, a blue ribbon was added to a cloud to represent the rain. To attach the cloud to the model, transparent straws were used;

4th: It is necessary to mix white glue with water in order to use it to create paper layers and for gluing;

5th: With the styrofoam sheets already glued, the styrofoam was cut out. The ocean and the river were drawn using the bas-relief technique. Soon after, they were painted with blue ink to represent the water bodies;

6th: To build the landforms, it is necessary to make little balls with sheets of paper, group them, and glue them together in order to obtain the desired shape. Then the structures were covered with layers of toilet paper and moistened with a mixture of white glue and water. The process was repeated several times until the texture was created;

7th: The processes of the water cycle were printed on arrows, cut out and attached to the transparent straws. After this process, they were placed on the model in order to represent the processes;

8th: After drying, the structures were painted, using the following color palette: brown to represent the terrain, dark gray to represent small rocky outcroppings, and varying shades of green to represent the vegetation;

9th: To finish the scale model, the clouds were attached to the model using the transparent straws.



Besides the products mentioned above, there was also the creation of a didactic game called "A Dança da Água¹", based on the "board with a trail" model, as a form of evaluation of the class with the hydrological cycle model.

This way, the proposal was integrated into the methodology of the use of gamification, which is a powerful tool to attract and hold students' attention, especially when dealing with complex subjects and content. Even more so when considering younger students, its dynamics makes the study moments fun, associating learning to something pleasant. In Geography teaching, using this method is a way to facilitate the learning process, because it spontaneously arouses the students' interest, making it a fun way to learn (Brenda, 2013).

Like the model, the game must be built before the class time, because it will be the tool used to evaluate the teaching and learning in the classroom. Similarly to the mockup, the game is considered low cost, having an average cost of R\$15.00 for its elaboration. Below is the list of materials used, along with the step-by-step sequence.

Materials used to build The Water Dance game

- ➤ Literature search for questions and rules of the game
- ➤ Questions and rules printed on a rectangular frame
- Printed pictures of trees, bushes, rain, sun, question mark, and a cubic dice with 6 facets, numbered from 01 to 06.
- ➤ Cardboard
- ➤ Blue gouache paper
- ➤ Yellow gouache paper
- ➤ Silver paper
- ➤ Hydrocolor pen
- ➤ Cardboard
- ≻ Glue
- \succ 2 plastic dolls with base

Steps taken to make The Water Dance game

1st: The questions and dynamic actions of the game were printed and cut out. Soon the questions and dynamic actions were glued on cardboard and cut out, forming cards;

2nd: Printing and cutting out a dice model available on the internet. Later it was glued onto the cardboard and assembled, paying attention to the extremities;

3rd: The quantity and figures used for the representation were as follows: three trees to represent the challenges, three clouds/precipitation and three suns to represent the dynamic actions of the game, and 6 question marks to represent the quizzes;

¹ The Water Dance



4th: Oval shapes were drawn on the yellow gouache paper, and then cut out;

5th: The figures representing the special 'boxes' were cut out and pasted onto the gouache paper;

6th: On a blue gouache paper the game was named, this will be the board. After that, the path of the game was traced. The Starting point was defined, where the game begins, and the oval shapes were distributed along the board until the End point;

7th: The numbering of the number of squares and the distribution of the figures representing the special squares (tree, rain, sun, and question mark) on the formed trail took place;

8th: Soon after, the decoration of the board took place. Images of clouds and rain were used to maintain coherence with the theme worked on;

9th: Printing and cutting and pasting the figures used to represent the characters.

RESULTS AND DISCUSSIONS

Class planning is of fundamental importance to achieve success in the teaching-learning process. Understanding this, the intervention proposal presents as an initial result, a lesson plan precisely to guide the teaching processes. As exposed, the proposal shows an unconventional class focused on the use of active methodologies.

Many doubts permeate the teaching of Geography about planning, techniques and methods to provide an effective learning, especially for teachers in training, generating a reflection about the work. Thus, it is a fact that the organization resulting from the construction of the lesson plan is fully guiding for the education professional to be able to guide his lessons.

In the formation process of Geography teachers, it is ideal to understand that for the construction of a quality and equitable education, it is essential to think of a Geography teaching that addresses issues related to an increasingly diverse student body, which reflects the diversity that constitutes society (CUSTÓDIO & RÉGIS, 2016). Therefore, the search for more dynamic and playful classes that integrate students to the content are very important.

The training of university graduates presents a gap between what is seen in higher education and what actually is basic education. Thus, contact with the school environment is essential for the training of future teachers, but for this contribution to be satisfactory, it is necessary to have planning, since "teaching is the process of deciding on the concrete performance of teachers in their daily pedagogical work, involving actions and situations, in constant interactions between teacher and students and among the students themselves" (PADILHA, 2001. p. 46).

The absence of planning may result in monotonous and disorganized classes, triggering the students' lack of interest in the content and making the classes unstimulating. It should be emphasized that the busy daily lives of teachers is a major factor that makes it impossible, in most cases, to draw up lesson plans, because it is a time-consuming task.

As previously discussed, planning is an essential action to be performed by the teacher in order to achieve the objectives proposed for the educational action. The typology of the document will depend on the project to be implemented in the school. A larger project,



which requires several classes to be completed, requires a didactic sequence that covers the content presented and seeks to achieve the proposed objectives. Thus, for the development of a school intervention proposal in just two hours of classes, a lesson plan is the ideal document because it has methodological procedures and objectives that can be achieved in a more restricted time frame.

The lesson plan that governs the intervention proposal presented in this paper is shown in Table 1.

Board 1: Lesson Plan

Lesson Plan

Discipline: Geography
Grade: 6th grade
Workload: 100 minutes
Theme/Axis/Field: The water cycle and its implications
Objective:

Recognize the importance of water for the life of living beings.

- Know the physical states of water.
- Identify the stages of the water cycle.

Ability(s) according to BNCC:

(EF06GE04): Describe the water cycle, comparing runoff in urban and rural environments, recognizing the main components of watershed morphology and hydrographic networks and their location in the land surface modeling and vegetation cover.

Materials Required: Board, pilot/chalk, model and game referring to the topic.

Contextualization:

The water cycle is a biogeochemical cycle that ensures the circulation of water through the physical environment and living beings, ensuring the continuous movement of the substance. The water cycle, also known as the hydrological cycle, refers to the continuous movement of water through the physical environment and the beings that inhabit it. The cycle takes place through the atmosphere, hydrosphere, lithosphere, and biosphere. It is, therefore, an important biogeochemical cycle that enables the maintenance of the resource in the environment.



It is important to point out that the water cycle varies according to the place where it occurs. Factors such as vegetation cover, altitude, temperature, and soil type, for example, directly affect the amount of water involved in the process and the speed at which the cycle is completed.

Methodology:

The class will be divided into two parts. The first refers to an expositorydialogue class, with initial questions to get an idea of the level of knowledge of the students and also to stimulate their reasoning on the subject.

The theoretical class will occur with the representation of the hydrological cycle through a model previously prepared by the teacher(s), this tool being the key point for the continuation of the class.

The lesson aims to be dialogical, proposing to interact with students by asking questions, such as: Do you know what the water cycle is? Where does the water you consume come from? Which elements are part of the cycle? etc. This knowledge of the students' preconceptions is a very important tool in the teaching-learning process, since they significantly help to guide the rest of the lesson.

Based on this, the explanation is initiated using the maquette. This in turn will have the main elements of the physical landscape that directly and indirectly influence the cycle, seeking to list and present some of the most important structures for the hydrological cycle phenomenon. The visual presentation of the phenomenon through the model aims to enable a more effective understanding by the students. The visualization of the environment in a reduced scale allows them to build relationships with the landscape experienced in their daily lives.

The explanation will seek to create a relationship between the lesson's theme and other subjects that were previously presented during previous lessons, such as the theme of the Earth's surface and landforms. Another important point to be addressed within the time allotted for the lesson is the quest to understand the difference between the hydrological cycle that occurs in a rural environment and the one that is evidenced in an urban environment, and its impacts on society.



During the second and last part of the class, an evaluative activity will be proposed with the game 'The Water Dance'. The educational game is based on the dynamics of a board with a trail, with the theme focused on the water cycle. The activity seeks to ask questions and bring curiosities related to the proposed theme, with the goal of reaching the end, and thus conclude the activity.

Initially, it is proposed to divide the room into two groups. The answers to the questions must have a general consensus among the members of the group, and the movement of the pieces can alternate among the members. As a result of the dynamic, there is the development of the students' participation in works that require companionship.

Proposed Evaluation Activity

The Water Dance game is an active methodology proposal that encourages students to interact with the subject. According to Kishimoto (2005), the games may have different meanings and senses, varying only the context in which it is inserted. This activity takes on the values that society imposes on it, with variations occurring due to space and time. Understanding this, this game must be previously built by the teacher, made and adapted to the desired theme, making an abstract phenomenon visual, in this case the hydrological cycle.

The game consists of the following elements: a thematic board with a path divided into "houses", boxes or squares, where players will advance as it is ordered at each turn; a box with order cards, which must contain questions about the theme explained during the lesson, as well as curiosities and relevant information to contribute to the learning of the content; it must also contain the dynamic commands for the execution of the game itself, such as: stay where you are, back one house, jump two houses, go forward one house; and finally, a dice.



Thus, as Piaget (1976) discusses, games are means that contribute to the cultural enrichment of students, and not only activities that aim at entertaining them with the purpose of spending energy. In this way one can add characteristics or bring examples close to the students, such as, for example, how the hydrological cycle processes occur for that area, making teaching and learning more satisfactory for both the student and the teacher.

The evaluation with games will analyze if the contents were assimilated and, thus, systematize the subjects, in a significant learning, providing a pleasurable, relaxed, and motivating evaluation.

Source: Authors (2022)

The scale models and the teaching of Geography

The lesson with the aid of the scale model promotes interdisciplinary work, relating the content covered with other geographical contexts. The teaching-learning of Geography with a scale model is a privileged way to relate the teaching content to the reality of the world and of the student, a unique opportunity to approach the real space.

The model of the water cycle (Figure 1) follows this intention, being able to present the processes of the water cycle from coastal environments to inland areas, and therefore can be taken as examples of how this water behavior occurs for the student's location. Botelho (2011) points out that the recognition of the water dynamics and the impacts of soil sealing on the environment allows the student to recognize the phenomena in the model, better understanding the place where he lives and making assimilations between the theoretical content and reality.

Sousa et al. (2019) presents that the student must be an active subject in the process of building his knowledge. It is up to the teacher to take into account the students' previous knowledge when designing their activities. The use of models allows the student to create the spatial representation where he is inserted, taking into account what is presented by the teacher in the classroom. The authors mentioned above also point out that through the methodology of models, a critical view of reality can be developed.

The combination of the theoretical contents of the subjects with the students' experiences helps the process of knowledge building on the part of the students, as the students recognize that the topics discussed in class have some purpose in their reality.

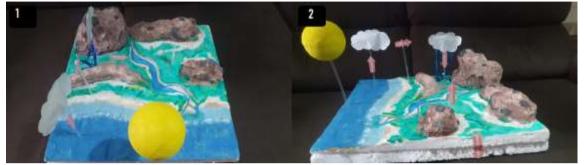
With the use of pedagogically appropriate mockups for different subjects and contexts, students will be able to understand some concepts more easily compared to other didactic resources (PITANO and ROQUÉ, 2015 p. 02).

Corroborating this line of thought, it is possible to assume that, by presenting the representation of geographic spaces through the most diverse teaching materials, in this



case the scale model, is an important alternative for the teaching of Geography and for the teaching and learning process. However, it is important to note that it is a product that demands time, and due to the exhaustive workload of the education professional, most of the time it becomes something impossible to develop for each class.

Image 1: Mock-up of the frontal water cycle (1); Mock-up of the lateral water cycle (2)



255

Source: The authors (2022)

Didactic games as an evaluation tool

Student assessment in education - at any level - is fundamental. Through it, the teacher has the possibility to monitor the learning, emotional, and cognitive performance of each student. It is important to recognize that assessment must always consider the context of the learner, so it is up to the teacher to seek dynamic assessment methods that promote the positive evolution of the student.

Therefore, educational games are indicated for activities that interact with the student because they potentiate several benefits. For Soares (2008), the game provides diversified linguistic interactions in relation to ludic characteristics and actions, i.e., ludic activities imply a sense of pleasure, fun, freedom, and voluntariness, containing a system of clear and explicit rules.

Thus, for the successful application of the games, it is necessary that the teacher has a notion of all phases of the game before it begins. It is important that the rules and procedures involved in the game are properly explained to the students in an objective and clear way. Below are the rules developed for the development of the board game (figure 2).



Image 2: The Water Dance game board (1) and questionnaire and dynamic action cards (2)



Source: The authors (2022).

For the implementation of educational games, the teacher must ensure that students are aware of the basic rules of the activity, and that they are clear, objective, and provide a condition for the dispute to occur equally among groups. It is emphasized that the teacher must work to ensure that there is no dubious interpretation of the rules.

The planning of the educational game The Water Dance took into consideration the following basic rules:

1) The group to start the game would be the one that would get the highest number on a die roll. In case of a tie, the die would be rolled again. After three attempts resulting in a tie, it is recommended to decide by the game 'Odd or Even';

2) The group that will play second will have the option to choose their preferred character;

3) The starting group will roll the dice. The number represented on the object will be the number of squares the group will move with their character;

4) In case any student (from either group) intentionally or unintentionally changes the numbering of the die, it must be released again;

5) The game has three special activity classes, represented on the board by different symbols;

5.1) The first special activity is represented by the image of a tree and represents a challenge to be accomplished. The challenge should be prepared in advance by the teacher;

5.1.1) If one of the groups moves their character to the challenge activity, they must perform;

5.1.1.1) If the group refuses the challenge, the challenge is passed on to the other group;



5.1.2) Satisfactory completion of the challenge, from the teacher's point of view, guarantees the group the possibility of advancing 2 boxes;

5.2) The second special activity is the weather charts. The activity is represented by the icon of a sun or a rain cloud;

5.2.1) By moving the character to a weather card, the group selects one of the available cards. Each card contains an action and/or information relevant to the dynamics of the game;

5.2.2) The card chosen by the group should be discarded;

5.3) The third special activity is the question cards, represented by a question mark;

5.3.1) When selecting a questioning card, the group must choose a card. Each card contains a questioning concerning the lesson presented earlier;

5.3.2) It is recommended to set a time limit for obtaining the response;

5.3.3) If the answer is correct, the group will advance two squares. In case the answer is incorrect and/or the group cannot answer the question, they will remain in the same place;

5.3.4) The question card must be discarded, even when the answer to it has not been obtained.

6) The group that gets the character to the finish line before the other group wins;

Kiefer and Batista (2020) present that educational/didactic games are very important tools to enhance the construction of geographic knowledge in students. Through this tool, it is possible to stimulate the knowledge of students and teachers, serving as a way to highlight how traditional teaching can be demotivating. The same authors point out that games enable the development of companionship.

Didactic games can be elaborated in a very diverse way. During the period of distance education, induced by the dissemination of COVID-19, the alternative of 'gamification' was widely discussed in the academic literature and applied by teachers as an alternative to give continuity to the educational process. Platforms such as Kahoot² and Wordwall³.

Due to the potential that the game has, it becomes indispensable to use it as a positive evaluative tool, precisely because it expands the knowledge of the class and works with the construction of reflection, the development of autonomy and creativity, thus establishing a relationship between play and learning.

CONCLUSIONS

Given the considerations made throughout the work, it is concluded that planning for Geography classes is a key element for the content to be taught successfully and satisfactorily for the student, but also for the teacher. Thus, research and study before planning are factors that will align the methodology. The methodological procedures must always seek pleasure and effectiveness in the act of teaching and also in the act of learning, so the teacher must think in both instances, teaching and learning.

² Available at kahoot.it.

³ Available at wordwall.net/pt



However, it is understood that the lesson plan should be subject to modification. The variation should occur according to the class and/or grade level. Therefore, although the focus of this paper is the use of models and educational games in a primary school class, it should be noted that these methodologies can be applied by teachers in kindergarten, high school, and college classes as appropriate. Changes in procedures can be made regarding the phenomena presented in the model and the language used to present the theoretical content. It is also concluded that the use of the model by the teacher serves to guide the activity in addition to teaching the content in a better way, without separating theory from practice. In this integrated and playful way, it becomes easier to attract and keep the students' attention and arouse their interest as the theme is discussed.

A possible ally to teaching with models is the Google Earth Pro platform, which through its relief visualization tool, can be applied by the teacher in communion with the presentation of models. The use of the two aligned methodologies allows the student to experience the content from a more multiple perspective.

Finally, in relation to the didactic game as evaluation, it can be concluded that the mission of the journey present in the game The Water Dance, will become challenging and engaging to instigate the player (student) to actively participate. In this way, he will be instigated to understand the subject well and be able to complete the game. Even though it is composed of different rules, these are simple, enabling understanding by any age. Very complex rules can end up discouraging the students. The evaluation works together with these elements, because in addition to the knowledge about the subject, the game must promote conditions for the completion of the game and thus verify each learning.

In general, the lesson plan presented and the set of didactic activities that constitute it form an effective methodology to approach the teaching of Geography about the hydrological cycle. They promote the construction of spatial relationships and the development of geographic reasoning. With this set of didactic resources, the child can visualize the geographic space and the elements that compose it, such as: the ocean, rivers, mountains, vegetation, etc. The models also have the possibility of representing the processes and phenomena that occur in space. Through the models it is possible to analyze the dynamics of the relief, facilitating for the teacher the process of teaching the content, making the teaching very comfortable, pleasurable and with quality for the preceptor.

ACKNOWLEDGMENTS

The thanks go to Federal University of Pernambuco - UFPE; Geographic Sciences Department - DCG; to Pró-Reitoria para Graduação - PROGRAD; to National Council for Scientific and Technological Development - CNPq e a Fundação de Amparo à Ciência e Tecnologia do Estado de Pernambuco - FACEPE

BIBLIOGRAPHIC REFERENCES

BITAR, J. C. M.; SOUSA, C. L. A geografia e o uso da linguagem cartográfica na educação básica. **CONGRESSO NACIONAL DE EDUCAÇÃO e ENCONTRO SUL BRASILEIRO DE PSICOPEDAGOGIA**, Paraná, 26 a 29 de outubro de 2009, 13p. Disponível em: https://educere.bruc.com.br/cd2009/pdf/2290_1356.pdf. Acesso em: 17 maio 2021.



BOTELHO, Lúcio Antônio L. A; SILVEIRA, José Silvio; ANDRADE, Soraia Maria de. Produção de material didático-pedagógico para o ensino de Geografia e do meio ambiente. **Cadernos de Geografia**, Belo Horizonte, v. 15, n. 25, 2005.

BOTELHO, R.G.M. Bacias Hidrográficas Urbanas. *In*: GUERRA, A.J.T. **Geomorfologia Urbana**. Rio de Janeiro: Bertrand Brasil, 2011.

BRASIL. Ministério da Educação. Base Nacional Comum Curricular. Brasília, 2018.

BRASIL. **Base Nacional Comum Curricular.** Brasília: MEC, 2017. Disponível em: <<u>http://basenacionalcomum.mec.gov.br/images/BNCC_20dez_site.pdf</u>>. Acesso em: 29 de abril de 2022.

BREDA, T. V. **O uso de jogos no processo de ensino-aprendizagem na Geografia Escolar**. (Dissertação de Mestrado). Mestrado em Ensino e História de Ciências da Terra. Campinas: Universidade Estadual de Campinas, UNICAMP, 2013.

CARVALHO, Juliana Wilse Landolfi Teixeira de; MYSCZAK, Luciano Augusto; OLIVEIRA, Fabiano Antonio de. Bacias hidrográficas simuladas em maquetes: prática pedagógica para ensino fundamental e médio. **Geosaberes**, Fortaleza, v. 7, n. 13, p. 25-39, 2016.

CASTROGIOVANNI, Antônio Carlos. Apreensão e compreensão do espaço geográfico. *In*: H.C. CALLAI, Helena Copeti; KAERCHER, Nestor André; CASTROGIOVANNI, Antônio Carlos. **Ensino de Geografia: práticas e textualizações no cotidiano**. Porto Alegre, Mediação, 2000.

CHAVES, A. P. N.; NOGUEIRA, R. E. A inclusão de estudantes cegos na escola: um campo de debate e reflexão no ensino de Geografia. *In*: FREITAS, M. I. de; VENTORINI, S. E. **Cartografia tátil: orientação e mobilidade às pessoas com deficiência visual**. Jundiaí: Paco Editorial, 2011.

COUTINHO, J. S.; CIGOLLINI, A. A. Alternativas metodológicas para o ensino da

geografia nos anos finais do ensino fundamental. Governo do Paraná, 2014.

CUSTÓDIO, G.A. RÉGIS, T. C. Recursos didáticos no processo de Inclusão Educacional nas aulas de Geografia. *In*: Nogueira, R. E. (org), **Geografia e Inclusão Escolar: teoria e práticas**. Florianópolis: Edições do Bosque, 2016.

FERNANDES, Taynah Garcia. et al. A CONSTRUÇÃO DE MAQUETES COMO RECURSO DIDÁTICO NO ENSINO DE GEOGRAFIA. **Revista Equador**. v. 7, nº 2, p. 96-109.

GOMES, Amanda Aparecida da Silva Fontes, et al. O planejamento da ação docente: relatos de experiências dos pibidianos de geografia. *In*: CARVALHO, Ana Maria, et al (org). **Veredas da Formação Docente**. Mossoró: Edições UERN, 2014. p. 75-84. 2014.

GOMES, M. F. V. B. Paraná em relevo: Proposta pedagógica para construção de maquetes.**Geografia Revista do Departamento de Geociências**, Londrina-PR, v. 14, n. 1, p. 207-216, 2015

KIEFER, Ana Paula; BATISTA, N. L. Relato de experiência sobre o uso de um jogo didático como uma ferramenta para o ensino de Geografia. **X Fórum Nacional NEPEG de Formação de Professores de Geografia**, p. 51-60, 2020.



KISHIMOTO, Tizuko Morchida (Org.). **Jogo, brinquedo, brincadeira e a educação**. 8. ed. Cortez: São Paulo. 2005.

LUZ, R. M. D. da; BRISKI, S. J. Aplicação didática para o ensino da geografia através da construção e utilização de maquetes. **Revista Geográfica de América Central**, Costa Rica, Número Especial EGAL, p. 1-20, 2011.

NEVES, K. F. T. V. Os trabalhos de campo no ensino de geografia: reflexões sobre a prática docente na educação básica. Ilhéus, BA: Editus, 2010.

PADILHA, R. P. **Planejamento dialógico: como construir o projeto político - pedagógico da escola.** São Paulo: Cortez; Instituto Paulo Freire, 2001.

PIAGET, Jean. **Psicologia e pedagogia**. Trad: LINDOSO, Ribeiro da Silva da. Rio de Janeiro: Forense Universitária, 1976.

PITANO, Sandro de Castro; ROQUÉ, Bianca Beatriz. O uso de maquetes no processo de ensino-aprendizagem segundo licenciandos em Geografia. **Educação Unisinos**, v. 19, n. 2, p. 273-282, 2015.

SOARES, M. H. F. B. Jogos e Atividades Lúdicas no Ensino de Química: Teoria, Métodos e Aplicações. *In*: Encontro Nacional de Ensino de Química (ENEQ), 14, Curitiba: UFPR, 2008.

SOUSA, L. M. S.; ALBUQUERQUE, E. L. S. Google Earth e ensino de cartografia: um olharpar a as novas geotecnologias na Escola Santo Afonso Rodriguez, município de Teresina, estado do Piauí. **Geosaberes**, Fortaleza, v. 8, n. 15, p. 94-104, 2017.

SOUSA, Marcos Gomes de, et al. Aulas de Geografia Física e metodologias aplicáveis ao ambiente escolar. **Geosaberes**, Fortaleza, v. 10, n. 22, p. 81-90, 2019.

SOUSA, Luzinete Santana; AQUINO, Cláudia Maria Sabóia de. A maquete como ferramenta facilitadora do processo ensino e aprendizagem em geografia: um estudo de caso na escola Ney Rodrigues de Vasconcelos, Timon/MA. **Geosaberes**, Fortaleza, v. 5, n. 9, p. 68-79, 2014.

SUZUKI, L. E. A. S.; SCHEUNEMANN, G.; SPIRONELLO, R. L. Construção de uma maquete didática e aplicação no ensino de conteúdos geográficos. **Revista Geografia em Atos (Online)**, v. 5, ano 2021, p. 1-22, DOI: http:s//doi.org/10.35416/geoatos.2021.7673