

# Playing Citizens: A Ludic Approach to Ocean Literacy and Heritage Education in Niterói

João A. L. Coelho, Diego M. Silva e Carolina N. Spiegel

Instituto de Biologia – Universidade Federal Fluminense (UFF) – Niterói, RJ – Brazil.

coelhojoao@id.uff.br, dimadeira@id.uff.br, carolinaspiegel@id.uff.br

**Abstract.** *The present short paper brings a report on gameplay workshops that were held in a municipal public school in the Brazilian city of Niterói, as part of a university-school integration project for the promotion of Ocean Literacy and Heritage Education. Called “Cultural Wave”, the project was thought for helping school students to perceive themselves as sociocultural actors in a city that is historically bonded to the ocean.*

**Keywords—** *Ocean Literacy, Heritage Education, Didactic Games, Ludic Learning*

## 1. General Information

The United Nations Decade of Ocean Science for Sustainable Development (Ocean Decade) was proclaimed by UN General Assembly in 2017, following the UN’s first World Ocean Assessment (WOA) in 2016 [United Nations 2017], which confirmed the need for an “integrated, coordinated, proactive, cross-sectoral, and science-based approach to coastal and marine management” [Evans *et al.* 2019]. The Ocean Decade (2021-2030) aims to achieve a significant change in knowledge and management of the ocean by combining efforts from UN agencies, governments, the scientific community, and civil societies [Ryabinin *et al.* 2019]. As a member state of the Intergovernmental Oceanographic Commission of UNESCO (IOC), Brazil compromised to support the Decade. Its implementation on a national scale is a duty of the Ministry of Science, Technology, and Innovation, which is the country’s representative on IOC [Mcti 2022].

On a municipal scale, the city of Niterói provided a good example of becoming the first Brazilian municipality to launch a website dedicated to the Decade. The hub *Oceano que Queremos* presents information on news and events as well as a map of local initiatives supporting the city’s Ocean Decade Agenda [Niterói 2022]. Niterói is a coastal city with more than 500 thousand habitants, located on the east side of Guanabara Bay, directly opposed to the metropolis of Rio de Janeiro. The city has traditions of artisanal fishing and nautical sports and presents a remarkable cove landscape featuring cultural buildings designed by Brazilian architect Oscar Niemeyer. Its name comes from Tupi-guarani “Nitcheroy”, meaning “hidden water”, which was given for the previously called “Vila Real da Praia Grande” in 1835, one year after the settlement became the capital of the Guanabara province [Luz 2008]. The city’s foundation dates to 1573 when the temiminó chief Arariboia received lands in the area. However, archaeological evidence suggests the region was already habited by sambaqui societies in 6000 B.C [Kneip 1981]. These populations thrived for thousands of years, mainly due to the high abundance of fishing resources in Itaipu and its surroundings.

One of the initiatives that can be found in the hub *Oceano que Queremos* is the *Cultural Wave* project, which is currently being developed and executed by the

“Laboratório de Genética Marinha e Evolução” of Universidade Federal Fluminense (UFF) in a partnership with Niterói’s city government, to foment Ocean Literacy and Heritage Education in municipal public schools. Through the crosstalk between students, docents, and employees from schools and the University community, the project expects to achieve significant improvement in teaching-learning conditions. Its strategy is to promote ludic approaches towards the production and the registry of knowledge about cultural and natural heritages in Niterói, therefore operating as a scientific-literacy tool and a way to develop students’ socioenvironmental conscience, self-esteem, and notion of belonging.

At the time of this writing, the municipal school E. M. Levi Carneiro located in the Sapê neighborhood in Niterói has been the first and only school to host the *Cultural Wave* project. Among developed activities, there were gameplay workshops in which the students were invited to learn while playing games. In this context, several studies addressed the role of games as an important tool for education [Debrenti and László 2020], [Campos *et al.* 2021]. Belo and Paranhos observed that a didactic game was efficient as a tool for teaching Marine Biology to students from the 6<sup>th</sup> and 7<sup>th</sup> grades of Primary Education in public schools in the state of Rio de Janeiro [Belo and Paranhos 2012]. With this said, the present paper is focused on reporting the methodology of the gameplay workshops that took place in E.M Levi Carneiro as part of the *Cultural Wave* project, while also discussing observations.

## 2. Report of Action

So far, six gameplay workshops have been implemented inside the school, on days May 24<sup>th</sup>, June 28<sup>th</sup>, and July 07<sup>th</sup> of 2022, but more are intended to happen still in this year. Participating students came from the 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, and 9<sup>th</sup> grades of Primary Education. Workshops shared a similar pre-execution plan, with a few differences at each time.

All six workshops began with the students playing a simple commercial game known as *Perfil* and for this purpose, the classrooms were divided into five groups and a color was chosen by each of them to represent their respective pieces in the game. One at a time, a card was read by a monitor, and the objective of the game was to guess the card’s answer correctly. The answer could be a person/character, an animal, a thing, or a place. The cards were previously selected so that they would feature persons, animals, things, or places that would be interesting for discussing Ocean Literacy and Heritage Education (e.g. shark, squid, diver, museum, *Nemo* the movie character). At each round, one group should choose a number ranging from 0 to 20, corresponding to clues or eventual conditions (move forward or backward, lose your round, or “a guess at any time”) and have the chance for one guess to answer the card. Answering correctly would make the group’s piece move spaces in the map corresponding to 20 minus the number of tips given in the round so that the first to reach final line would become the winner of the game.

After playing *Perfil*, it was time for showing students examples of ethanol-fixed sea invertebrates with representants from the phyla Porifera, Cnidaria, Mollusca, Annelida, and Echinodermata – which were borrowed by laboratories from the Department of Marine Biology in UFF. For the showcase, students remained in their group formation and the animal examples were presented to them by the monitors, along with descriptions of the taxa observed.

After this point, we conducted an oral presentation, which addressed important marine ecosystems found in Brazilian territory and some cultural and natural heritages of Niterói, with an emphasis on the marine RESEX (Extractive Reserve) of Itaipu and socioecological aspects concerning its existence. The reserve comprehends an area of 3943,28 hectares [Inea 2022] and has a complex ecosystem with two coastal lagoons, a dense ombrophile forest, and small islands. Also, influence from the resurgence phenomenon of Cabo Frio contributes to high rates of primary production in the marine reserve [Castello and Krug 2015]. The creation of the RESEX happened in 2013, after years of demands, and was motivated by the goal to preserve the local community of fishermen, which has been practicing artisanal fishing using traditions that survived for generations [Tubino *et al.* 2007]. All presentations featured these aspects, and they only changed at each one's density of content and used language, according to the respective audience's classroom and grade.

The presentation ended with an invitation for the students to play a modified version of the game known as *Timeline*. This remake of the game consisted of twelve cards representing twelve different events related to Niterói's heritages and to the ocean. Both faces of the card were almost equal, the difference being that only one showed the correct date of the occurrence of the event. Thus, the game rules were simple: with the undated face turned up, students in the group should try to organize all twelve cards in chronological order of their respective events. Since the students had already been asked to form five groups before, five decks of this modified-*Timeline* were distributed in all workshops, one for each group to play as a team. Some of the events of this game had been cited in the oral presentation. After playing the game, in one of the classrooms – from the 7<sup>th</sup> grade - students were also asked to create their card, drawing something that represented a heritage for themselves.

### 3. Discussion

It turned out that playing *Perfil* worked well as a first step, probably because its rules are simple to understand, and students may have found motivation in the competitive and guessing aspects of the game. The sea collection showcase was also a successful approach, being a moment of joy for most students, when almost all of them demonstrated interest in the animal species. Regarding the collection, something that was asked by students in all six workshops was if any of the presented animals were alive, for which they were answered “no”, almost always followed by a small reaction of sadness. This observation has been an inspiration for thinking of a “live collection”, consisting in QR codes that could be linked to websites featuring videos of the animals alive, attached to the examples of sea animals that are taken to the next workshops to come.

The *Timeline* gameplay was also a moment for interesting observations. At that time, one student noticed that the symbol in Niterói's municipal schools' uniforms is a representation of the MAC, which is the city's Museum of Contemporary Art and one of the most important anthropogenic components of the city's landscape [Luz 2008]. Besides that, one of the *Timeline* cards represented the date the Portuguese arrived in Brazil. It wasn't the first card, so others should come first in chronological order, such as one representing the occupation of Tupi-Guarani in Guanabara Bay or even the sambaqui. However, students almost always put the Portuguese arrival as the first card, which may be an indicator of a Eurocentric perspective towards Brazilian national history.

The creation of cards for *Timeline*, in the 7<sup>th</sup> grade classroom, is also worthy of discussion. By inviting students to depict something that represents a heritage for themselves, it could be said that we bring a dialogical perspective to Heritage Education [Tolentino 2019], since students participate as actors in this educational approach, evoking heritages that relate to their own culture. As discussed by [Yamaguti 2018] the questions “It is a Heritage for who?”, “The Heritage makes sense for who?” emerges in most anthropological academic research discussing cultural heritages. This opposes to a Heritage Education approach where students’ knowledge is disqualified in the didactic process [Demarchi 2018]. Considering this, it was interesting to notice that among students’ evoked heritages, the Rio-Niterói bridge was the most drawn with four representations, followed by the MAC and the *Arena Fazendinha* – a place some students reported as the local club where they go dancing and have fun in Sapê Neighborhood – both depicted two times. One of the students portrayed the “feijoada carioca” a Brazilian traditional food and another drawn the “sausage pasta” that is served in school lunch.

Ocean Literacy, which also guided our activities, already existed in the United States as a movement to incorporate Ocean Sciences-related topics into formal education in the early 2000s [Pazoto *et al.* 2022]. However, Ocean Literacy was only adopted in Brazil in 2019, following the Portuguese release of the book *Ocean Literacy for All: A toolkit* by UNESCO [Pazoto *et al.* 2021], which discusses the 7 principles that govern the movement. Today, Ocean Literacy is promoted as a goal for achieving the behavioral change expected for the Ocean Decade [Unesco 2021]. In this context, the *Cultural Wave* project makes itself important for Niterói, as it helps in the formation of ocean literate citizens and in bringing the city closer to the path towards the ocean we want.

#### 4. Acknowledgements

We are grateful to the "Laboratório de Genética Marinha e Evolução" (UFF), to the teacher Carmen Pazoto and the students from Levi Carneiro school. This article receives financial support from PDPA-FME Niterói/UFF/FEC (Programa de Desenvolvimento de Projetos Aplicados - Fundação Municipal de Educação Niterói/ Universidade Federal Fluminense/ Fundação Euclides da Cunha).

#### References

- Belo, C. L. and Paranhos, R. (2012). Ensino de biologia marinha através de um jogo sobre a baía de Guanabara. In *IV Encontro Nacional de Ensino de Biologia II Encontro Regional de Ensino de Biologia*.
- Campos, L. M. L., Bortoloto, T. M. and Felício, A. K. C. (2003). A produção de jogos didáticos para o ensino de ciências e biologia: uma proposta para favorecer a aprendizagem. In *Caderno dos Núcleos de Ensino*.
- Castello, J. P. and Krug, L. C. (2015). *Introdução às Ciências do Mar*. Editora Textos, 1<sup>th</sup> edition.
- Debrenti, E. and Laszlo, B. (2021). Developing elementary school students’ mental computation skills through didactic games. In *Acta Didactica Napocensia*.
- Demarchi, J. L. (2018). O que é, afinal, a Educação Patrimonial? Uma análise do Guia Básico de Educação Patrimonial. In *Revista CPC*.

- Evans, K., Chiba, S., Bebianno, M. J., Garcia-Soto, C., Ojaveer, H., Park, C., Ruwa, R., Simcock, A. J., Vu, C. T. and Zielinski, T. (2019). The global integrated world ocean assessment: Linking observations to science and policy across multiple scales. In *Frontiers in Marine Science*.
- Inea (2022). <http://www.inea.rj.gov.br/>. Accessed: 2022-07-09.
- Kneip, L. M., Morais, J. L. d., and Cunha, F. L. D. S. (1981). The radiocarbon dating of the " sambaqui de camboinhas" - Itaipu, Niterói, RJ, Brazil. In *Anais da Academia Brasileira de Ciencias*.
- Luz, M. D. (2008). "O Melhor de Niterói é a vista do Rio" políticas culturais e intervenções urbanas: MAC e Caminho Niemeyer.
- Mcti (2022). <https://decada.ciencianomar.mctic.gov.br/>. Accessed: 2022-07-09.
- Niterói (2022). <https://oceanoquequeremos.niteroi.rj.gov.br/>. Accessed: 2022-07-09.
- Pazoto, C. E., Silva, E. P., Andrade, L. A., Favero, J. M., Alô, C. F. and Duarte, M. R. (2021). Ocean Literacy, formal education, and governance: A diagnosis of Brazilian school curricula as a strategy to guide actions during the Ocean Decade and beyond. In *Ocean and Coastal Research*.
- Pazoto, C. E., Silva, E. P. and Duarte, M. R. (2022). Ocean Literacy in Brazilian school curricula: An opportunity to improve coastal management and address coastal risks?. In *Ocean and Coastal Management*.
- Ryabinin, V., Barbieri, J., Haugan, P., Kullenberg, G., Smith, N., McLean, C., Troisi, A., Fischer, A. S., Arico, S., Aarup, T., Pissierssens, P., Visbeck, M., Enevoldsen, H. and Rigaud, J. (2019). The UN Decade of Ocean Science for Sustainable Development. In *Frontiers in Marine Science*.
- Tolentino, A. B. (2019). Educação Patrimonial e construção de identidades: diálogos, dilemas e interfaces. In *Revista CPC*.
- Tubino, R. A., Monteiro-Neto, C., Moraes, L. E. and Paes, E. T. (2007). Artisanal fisheries production in the coastal zone of Itaipu, Niterói, RJ, Brazil. In *Brazilian Journal of Oceanography*.
- Unesco (2021). Ocean Literacy Within the United Nations Ocean Decade of Ocean Science for Sustainable Development, A framework for Action.
- United Nations (2017). The First Global Integrated Marine Assessment: World Ocean Assessment I. In *Cambridge University Press*.
- Yamaguti, J. G. (2018). Antropologia, Patrimônio Cultural e Educação Patrimonial. In *Cadernos Naui*.