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Future educational challenges from a science and technology perspectives.

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Environmental perception and relationship with marine and coastal environments: the perspective of basic education students from a Brazilian coastal city

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Abstract

The aim of this work was to investigate the environmental perception of marine and coastal ecosystems of students from a coastal city of Brazil. We used a questionnaire composed by “The Coastal Questionnaire” (CEQ, a Likert-type response instrument based on Wiseman and Bogner’s Model of Ecological Values) and by an essay question (Is there any relationship between your daily life and the marine and coastal environments? If you answered “yes”, explain this relationship.). The questionnaire was applied to 360 students from Ubatuba (Brazil). Most students were located in the Preservation+Utilization-category (81%), followed by Preservation+Utilization+ (16%). Only few students were located in Preservation-Utilization- (2%) and Preservation+Utilization+ (1%). About the relationship of marine and coastal environments with daily life, 51% of students answered “no”, 46% answered “yes” and 3% did not respond. The main explanations were related with living in coastal environments (31%), recreation (27%) and affection (22%). It is believed that the results were positive, specially related to Preservation component. However, they highlighted that Environmental Educational programs that focus on marine and coastal environments may have a special attention to promote relationship and to minimize consumerist and utilitarian student’s views, which became evident on the explanations of the essay question.

Keywords: Coastal environments; Environmental Perception; Marine environments, Model of Ecological Values; The Coastal Questionnaire (CEQ)

INTRODUCTION

Different people may have completely different perceptions to the same environment. Therefore, Ursi, Towata and Saito (2015) highlighted the relevance of studies that focus on environmental perception (EP). It is important to know EP to plan actions aiming to increase population knowledge about the ecological, economic and social importance of distinct environments. In this way, White (1977) recognized EP as a fundamental step for development and improvement of Environmental Education programs.

Although there is not a consensus about EP concept, due to its complexity (Ursi and Towata, 2018), it can be considered as the relations between the individual and the environment which occur through perceptual and cognitive mechanisms (Bell, Greene, Fisher and Baum, 2001). Environmental values and attitudes are also an important part of EP. Some of the most



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emblematic approaches in EP researches aim to understand how individuals are distributed on a continuum biocentric-anthropocentric view.

The Wiseman and Bogner's Model of ecological values can be considered an evolution of this approach, which has a two-dimensional nature (Figure 1). Preservation (P) and utilization (U) are two important but not necessarily related components of EP. Preservation is a biocentric dimension and utilization is an anthropocentric dimension. The model allows for individuals to be placed in one of four Cartesian quadrants:

- P+U- position might be expected from a strong environmentalist, someone with deep concern about conservation;
- P-U+ position might be expected from someone with apathy toward conservation issues and a view of nature as a source of natural resources to be used for the benefit of human development;
- P+U+ position might be expected from someone with a strong desire to protect the environment, but at the same time believe that the primary purpose of nature is to benefit humans;
- P-U- position might be expected from someone with a lack of interest in the environmental issues.

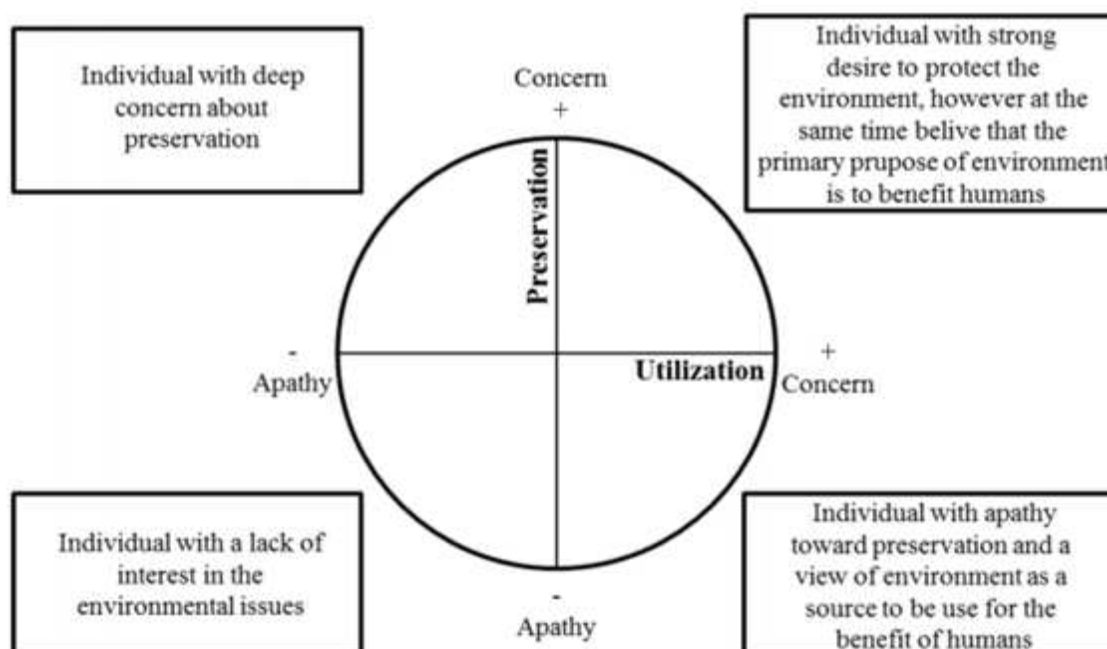


Figure 1. Representation of a two-dimensional model of Environmental Perception. Ursi and Towta (2018), adapted from Wiseman and Bogner (2003).

Bogner and Wiseman (1999) developed a measurement instrument that consists of a list of items with Likert-type responses, grouped into 2 secondary factors: Preservation (composed by 3 primary factors - intent of support, care with resources, and enjoyment of nature) and



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utilization (composed by 2 primary factors - altering nature, human dominance). Johnson and Manoli (2008) simplified the instrument and developed TEQ - “The Environment Questionnaire”.

More recently, Ursi and Towata (2018) adapted the items of TEQ to investigate specifically the EP about marine and coastal ecosystems, developing CEQ - “Coastal Environment Questionnaire”. The author emphasized that any research instrument based on the Model of Ecological Values focused especially on these important ecosystems could not be found previously on literature.

Coastal ecosystems need to be seriously approached on environmental discussion, since they are at the complex and dynamic interface between the land and the sea, and are occupied by dense human populations, many of them living in rapidly growing megacities (Michael, Post, Wilson and Werner, 2017). Coastal and marine environments have been suffering several damages due to this population growth, pollution and other human activities (e.g. temperature change, increased acidity, decreased oxygen level, habitat destruction) (Babier, 2017; Fauville, 2017).

In this context, the present work investigated the EP about marine and coastal ecosystems of students from a coastal city of Brazil (Ubatuba), intending to subsidize future Environmental Educations programs on the region. The aims of the investigation were:

- to evaluate the position of students in relation to the categories in the Model of Ecological Values;
- to understand if and why students establish relationship with marine and coastal environments.

METHODOLOGY

A questionnaire, composed by: (1) essay question “Is there any relationship between your daily life and the marine and coastal environments? If you answered “yes”, explain this relationship.”; and (2) CEQ was used as research instrument. CEQ was developed by Ursi and Towata (2018) specifically to evaluate the perception about marine and coastal environments and was composed by 16 items with Likert-type response.

The instrument was applied to 360 students (12-17 years old) from 3 basic education schools from Ubatuba (São Paulo State, Brazil). The city is one of the most important tourism center in the Southeast coast of the country. The 3 schools are aimed at local population, and most of the students’ families work in activities related with tourism or fishing. The students voluntarily participated in the research after signing a written consent form and receiving information about the research goals. The school principals also signed a consent form, agreeing with the research.

The explanations of the essay question were 330 analysed by open categorization, using Straus and Corbin (1990) methodology. CEQ responses were 330 analysed as described by (Johnson and Manoli (2008)). Items of CEQ were statements with a five-point Likert-type response. Scoring involved assigning points, from one point for ‘strongly disagree’ to five



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points for 'strongly agree'. For each of primary and secondary factors means were calculated. For Preservation and its three primary factors, mean scores between 3 and 5 indicate a pro-environmental perception (P+) while mean scores between 1 and 3 indicate the opposite (P-). The opposite is true for Utilization and its two primary factors, mean scores between 1 and 3 indicate a pro-environmental perception (U-) while mean scores between 3 and 5 indicate the opposite (U+).

RESULTS

Most students were located at the Preservation+Utilization- category (81%), followed by Preservation+Utilization+ (16%). Only few students were located at Preservation-Utilization- (2%) and Preservation-Utilization+ (1%) (Figure 2).

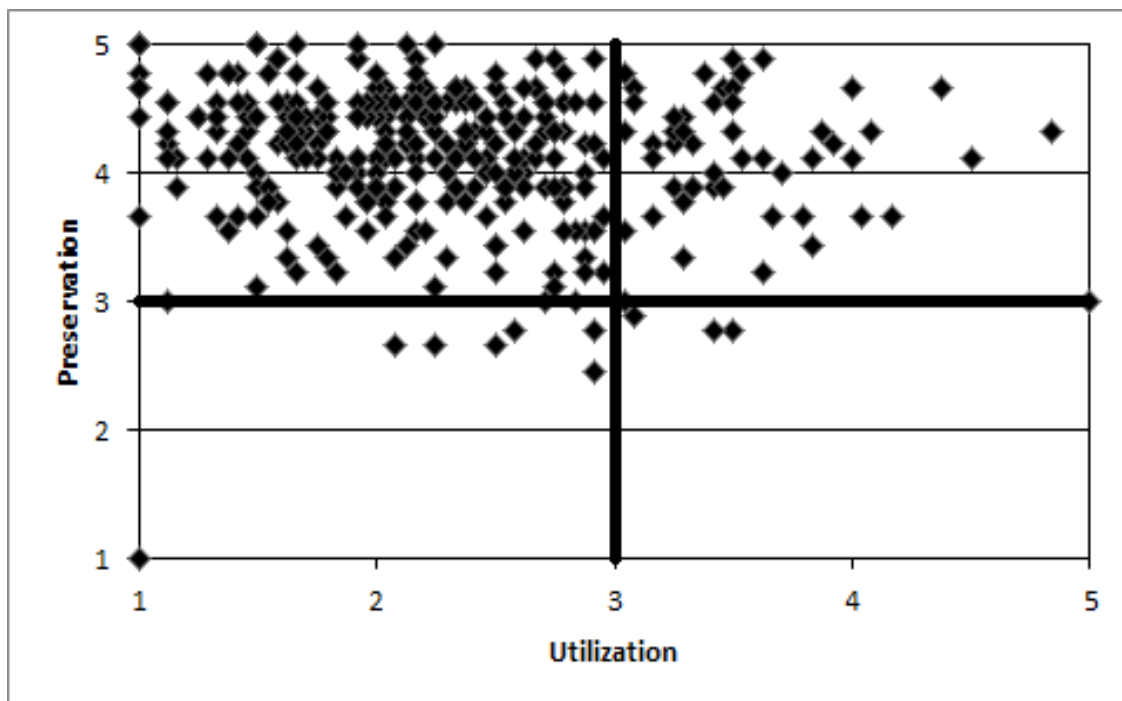


Figure 2. Model of Ecological Values quadrant scores for students from a coastal city (Ubatuba, Brazil).

About the relationship of marine and coastal environments with daily life, 51% of students answered “no”, 46% answered “yes” and 3% did not respond.

The main explanations were related with living in coastal environments (31%), recreation (27%) and affection for these environments (22%). Global relationships, as garbage production influencing environment or the role of marine organisms in the production of oxygen, were observed only for 8% of the participants. The lowest percentages of occurrence were detected for the categories Nourishment (5%), Work (4%) and Responsibility (3%). A high percentage of the students (22%) did not explain their answer or give explanations that was not applied to the question (Table 1).



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Table 1. Description and examples of categories found on explanations about the relationship of daily lives of students with the marine and coastal environments.

Category (% of occurrence)	Description	Example
Residency (31%)	Place/environment where student lives.	“Because we live on the coast and we get along with the marine environment.”
Recreation (27%)	Visits to the beach, sports and recreational activities.	“I go to the beach a lot, I like to dive and see the environment.”
Affection (22%)	Positive feelings about the place/environment.	“I really like the marine environment.”
Global relation (8%)	Global relationships such as garbage production influencing marine and coastal environments or the role of marine organisms in the production of oxygen.	“Because everything that happens with the marine environment affects many things, the economy and our way of life.” “Because marine algae are the main suppliers of oxygen.”
Nourishment (5%)	Nourishment in general or some specific type of food.	“I eat a lot of fish.”
Work (4%)	Work activities of the student of his/her family (eg. Fishing, tourism, trade).	“Because I work at the beach, selling açai*.” “Because it generates enough jobs for us who live here.”
Responsibility (3%)	Feelings of care and responsibility towards the place/environment.	“When I can, I collect the garbage tha badly educated tourists leave on the beach.”
Cannot explain (8%)	Student declares that do not know the explanation.	“I do not know.”
Not applied (11%)	Answer has no connection with the question asked.	“We are human and they are animals.”
No explanation (3%)	No replay.	

* Açai is a typical Amazon fruit, that is very consumed as a cream in many parts of Brazil.

DISCUSSION

Previous investigations conducted in Brazil reported that students from coastal city establish more relationship with marine and coastal environments than students that live far from the sea (eg. Towata and Ursi, 2017). Nevertheless, the percentage is lower than expected (around



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50%), as observed in the present research. Savietto, Katon, Towata, Berchez and Ursi (2014) also reported a percentage around 50% of students from coastal city that can establish relationship with marine and coastal environments. However, this percentage had a slightly increase after student's participation in the Environmental Education project called "Underwater Interpretative Trail", described by Berchez, Carvalhal and Robim (2005), that was focused on field activities, including snorkeling.

Towata, Katon, Berchez and Ursi (2013) also observed a positive influence of Environmental Education activities on the establishment of relationship with marine and coastal ecosystems. For students from São Paulo city, the percentage grew from 20 to 50% after the participation in the interactive exhibition called "Out of Water Trial". Before the activities, the relationship was based mostly on nourishment and pollution. After the activities, the explanations were still focused on nourishment, however also focused on some new categories, as the use of products derived from seaweeds on daily lives. These results highlighted the importance of project that focus on coastal ecosystems to help people developed proximity with these environments.

It is possible to notice that the main relationship that students can establish with coastal environments are usually related with utilitarian reasons, especially residency, nourishment and recreation, as also observed by Katon, Towata, Berchez and Ursi (2013) and Katon, Towata, Berchez, Oliveira and Ursi (2014). In this work, it was not detected a strong presence of nourishment, but affection was reported in a higher frequency (around 20%), which can be considered an encouraging result. Authors, such as Pooley, Psych and O'Connor (2000) or Hinds and Sparks (2008), had already emphasized the importance of affection in the process of Environmental Education and, as a consequence, in the promotion of environmental conservation.

Comparing the results of this research with the other article using CEQ for evaluated EP specifically about marine and coastal environments (Ursi and Towata, 2018), it can be observed that the categories found to EP of students were similar, since most students were located at the P+U- category, followed by P+U+. Data obtained by Johnson and Manoli (2008; 2011), when they investigated students' Environmental Perception in general (using TEQ, with situation more related to land ecosystems), was also similar with the data observed in the present research, being participants placed mostly in the two categories related to pro-environmental perceptions (P+U- and P+U+).

It is believed that the pro-preservation position of students, which was reported for both land and coastal environments, can be considered a positive result. However, it is important to deal with the pro-utilization position. By working with the concept of sustainable development, the Environmental Education programs could promote better models based on the wise use of resources, with concerns for equity and durability (Sauvé, 1996). Consequently, the pro-utilization position could be minimized by educating the citizen to be more conscious about the use of resources (Ursi and Towata, 2018).

CONCLUSIONS

Most students were located at pro-preservation categories of the Wiseman and Bogner's Model of Ecological Values, which can be considered as a positive result. However, the



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occurrence of 17% of students located at pro-utilization category highlighted the importance of programs that focus on marine and coastal environments, having a special attention to utilization of these ecosystems and trying to minimize consumerist and utilitarian student's views. It was also evidenced by the results related to the relationship with marine and coastal environments, in which it was possible to detect explanations mostly focused on residency and recreation. However, the affection by the environment was also well remembered, suggesting that developing Environment Education through emotion and sensibilization can be a promising approach.

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