Research Article

Environmental education at regular schools and in youth and adult education

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ABSTRACT

This study aimed to comparatively investigate the concepts of environmental education (EE) related to elementary school students enrolled in regular schools and in youth and adult education (YAE) in Brazil. A qualitative study was conducted using unstructured interviews. These interviews were carried out with twenty two students of YAE and the regular elementary school with themes formed about relation between human being and nature, conceptions about labor and conceptions of EE. We used the technique of content analysis and Toulmin's argument pattern to analyze the data. The theoretical basis our study was the relation between the human being and labor. We considered the perspective of the ontological labor's in the transformation of nature by the human being, and the subsequent transformation of the human being by nature, forming a cyclic process. Our results show that the students' conceptions are related to a separation of the human being and nature, as well as their ideas about conservation and preservation of nature, recognizing their impacts on the environment. We did not verify any knowledge involving a more complex and critical comprehension about the relation between human beings and nature.This research suggests that the development and application of EE projects, should consider how subjects comprehend the relation between society and nature, leading to interesting outcomes.

Keywords: environmental education, environmental sciences, environmental sciences teaching, youth and adult education, regular education

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INTRODUCTION

The relation between society and nature is fundamental to the study of environmental education (EE). Therefore, the consensus, conflicts and interests inherent in the structures and forms of societal organization play a central role in how the subjects think about relations among themselves and their relations with nature (Nogueira, 2019; Stahelin et al., 2015; Trein, 2018). As a condition for the existence of human beings, labor can be understood as a collective necessity in their relationship with nature. This conception of human labor is ontological and education within this context is a process of mediation so that interactions between individuals enable human labor, thus being a process of humanization (Nogueira, 2023). Therefore, in the use of natural resources by humanity, when taking actions and making decisions, there are different interests among various social groups. Just as the interests related to environmental issues, EE is involved in political interests. In EE, educational processes should enable forms of balanced relationships not only with other forms of life, but also necessarily among human beings, considering economic, social, and cultural aspects. If we consider the exploitation among individuals of our own species as normal, we will hardly provide the capacity to overcome the understanding of nature as exploited by our species

(Nogueira, 2023). Human beings are nature relating in a complex way among the various existing ecosystems. Relationships occurring in a balanced way among all forms of life should occur not only through care and preservation of nature, but also as a condition of our existence as a species. According to Loureiro (2012), it is important to emphasize the need for human beings to understand EE as part of themselves, not just related to the human being external to nature.

In approaches regarding environmental issues, the use of resources should be considered with a critical process of the current economic system, thinking of future generations. The economic development of the current system and its unsustainable manifestations regarding the planet's resources affect the ecological and social spheres at a global level (Freitas et al., 2012). Influences and manipulations regarding sustainability for inclusive and sustainable economic growth must be present in educational processes (Kopnina, 2018). Planetary and ecological human interaction is present knowledge in the approach to environmental issues, occurring in an interdisciplinary way (Costa & Loureiro, 2017). The need to involve knowledge from various areas considering the global context with its economic, social, ethnic, cultural, etc., aspects are trends in EE according to research conducted in nine countries (Ardoin et al., 2013). These ideas about the relations between society and nature also involve the foundations of the

conceptions of EE. That is, in studying the conceptions of the relationship between society and nature, carried out by our research subjects, we can better understand their relations with the conceptions of EE.

Non-exhaustively, we have found researchers who have focused on research on conceptions related to EE in regular elementary education (Barreto & Cunha, 2016; Liefländer et al., 2013; Venturieri & Santana, 2016; Zsóka et al., 2012). However, regarding the relationship between human beings and nature, conceptions about labor and conceptions of EE, no research was found that involves comparative studies between students of youth and adult education (YAE) and regular schools. Therefore, this research aimed to comparatively understand the conceptions of EE related to students in elementary education enrolled in regular schools and YAE in Brazil.

METHODOLOGY

Considering this context, our study presents a comparative research on the conceptions of students related to EE in two public schools of the City of Paranaguá, State of Paraná, Brazil. One of these schools was a regular elementary school, whereas the other was an elementary school for YAE. In the Brazilian education system, YAE includes both elementary and high school periods. YAE is intended for young people and adults who did not continue in their studies, or for those individuals who did not have access to an elementary school and/or high school at the appropriate age. In the Brazilian context, elementary school is separated into two parts: elementary school I, corresponding to years 1-4, and elementary school II, years 5-9. In the case of YAE, students are placed in classes for elementary school I or elementary school II. In contrast, students at regular schools are enrolled according to their age, and classes progress from year 1 to 9. A search conducted in the main databases of scientific journals did not show similar research.

The interviews were carried out with eight students (out of 16) in YAE school, and 14 students (out of 28) in their 9th year at regular elementary school. The determination of this number of participants is based on the degree of saturation that research can achieve in function of the universe of students in the researched context (Fush & Ness, 2015). It is also based on what Flick (2012) considers as a balance of factors such as what is expected from the interviewees, the time needed for the interviews and the number of times the interviews will be repeated. Inclusion criteria included a great homogeneity of students, considering age, gender and school performance for a better representation of the researched context.

The research was qualitative with unstructured interviews. Prodanov and Freitas (2013) state that the script followed in this kind of interview is not rigid; this method offers more freedom for the interviewer to explore a theme and develop an interview that can take many directions. Questions are usually asked in an open manner. The interviews were organized according to orientation axes proposed in theoretical references about EE and relation between human being, nature and labor according to Guimarães (2013), Kopnina (2012), Layrargues (2015), Leonard (2011), Loureiro (2012), Nogueira (2018, 2019, 2023), Saviani (2013), Stahelin et al., (2015), and Trein (2018). The orientation axes schools are presented in **Table 1**.

The methodological basis we used was content analysis (Bardin, 2011; Neuendorf, 2017), which consists of defining the objectives of the research, outlining theoretical references, and considering the sample

Table 1. Orientation axes

Orientation axes
Relation between human being and nature
Dissociation or not of human being from nature
Labor and the relation of human being with the environment
Identification about the labor concepts in consonance with environment
Labor and its importance in the relation between human being and nature
Conceptions of environmental education

Note. Data adapted by the authors

analyzed. The samples are separated into analysis units that can be proposed either a priori, from theoretical references, or *a posteriori*, that may arise during the analysis process. According to the information analyzed, the content of the discourse is compared to the theory so we could verify the reliability of the information obtained.

We recorded the interviews and took notes to complement the interviews with the consent of the student participants. The interviews were then transcribed. After transcription, we reviewed and analyzed these documents, focusing both on the central text and student comments to further categorize the data. In addition to analysis units from content analysis, another means to complement the analysis was Toulmin's argument pattern (TAP). TAP was a good option for our study because allows to evaluate the effectiveness of the arguments and is appropriate for in situations that the answers we obtained in the interviews are short. Thus, TAP allows for a better quality of the analysis compared with other methods for longer responses that generally involved interviews with subjects with knowledge deeper of the research themes.

TAP consists of building logical arguments based on the structure of the answer. According to Colombo et al. (2016), Sasseron and Carvalho (2011a, 2011b), and Toulmin (2022), an argument is constructed in various phases, and each one of them represents the main anatomical units of the argument. TAP consists of the data (D), which are the facts used to establish the claim (C). The data alone are not enough for the claim to be valid. Therefore, it is necessary to add information that links the data to the claim; this information is called warrants (W). There are cases in which only the data, the claim, and warrants are not enough for the argument. In such cases, a modal qualifier (Q) is needed since it improves upon the veracity of the warrants. TAP also consists of a rebuttal (R), which reduces the strength of the warrants (i.e., the claims are contested). Finally, the backing (B) provides necessary support to the argument. TAP is represented schematically by **Figure 1**.

According to Azevedo et al. (2014), the methodological use of TAP allows us to fine-tune classroom learning to understand the creation of arguments that always involves the occurrence of learning.

PRESENTATION AND ANALYSIS OF DATA

Acronyms were used to designate students. For students enrolled in regular elementary school, the acronym used was RES, and for students enrolled in YAE school, the acronym used was YAE. Each student was identified with the acronym used for their school, followed by a number. In this study, we only present the a priori analysis units since a posteriori analysis units did not emerge. Analysis units for both schools are presented in **Table 2**.
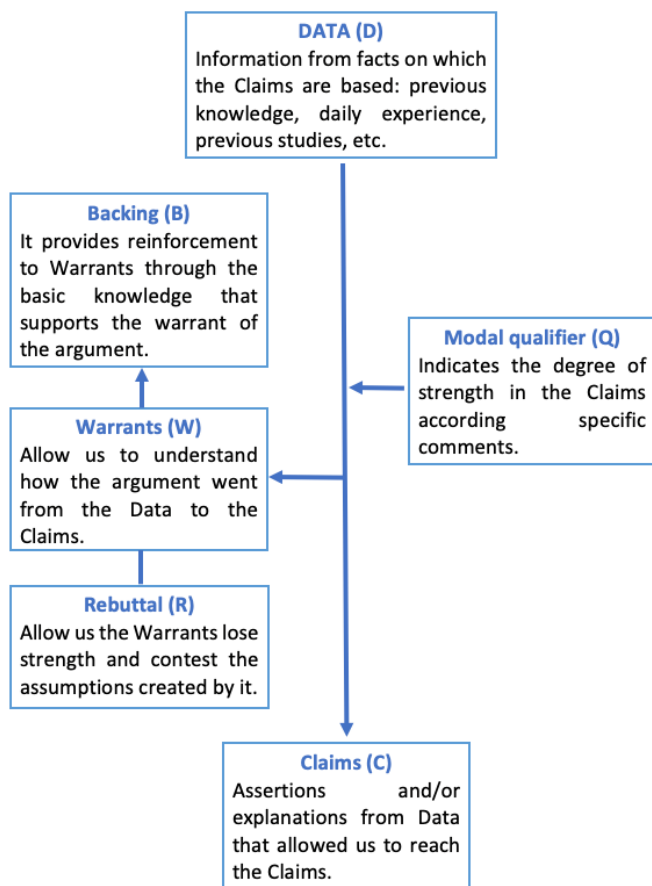
DATA (D)
Information from facts on which the Claims are based: previous knowledge, daily experience, previous studies, etc.

Backing (B)
It provides reinforcement to Warrants through the basic knowledge that supports the warrant of the argument.

Modal qualifier (Q)
Indicates the degree of strength in the Claims according specific comments.

Warrants (W)
Allow us to understand how the argument went from the Data to the Claims.

Rebuttal (R)
Allow us the Warrants lose strength and contest the assumptions created by it.

Claims (C)
Assertions and/or explanations from Data that allowed us to reach the Claims.

Figure 1. Schematic representation of TAP (Source: Authors)

Table 2 presents the analysis units in order of relevance, that is, from those that most emerged to those that least emerged. We verified that this order was similar at RES and YAE with the exception of the last analysis unit for RES "distortion of the understanding of the of the concept of labor. Labor is understood as either helpful or harmful to the environment".

The most relevant analysis unit for both schools was "*perception of nature as pure, clean and natural, dissociated from the human being and associated with the necessity of survival.*" This analysis unit shows how the students see the nature as a pure and untouched source of resources to meet human needs. This perception is evident in the words used by the students. For example, when asked about his/her understanding of nature, RES 12 stated:

> I understand more or less that we must protect nature … the trees, they are plants of nature and transmit oxygen for us, for us to live and … and … food crops are a type of nature, which generates food for us (RES 12).

In the above statement, using TAP, we were able to identify the following data: "*We must protect nature … the trees, they are plants of nature*" and "*food crops are a type of nature.*" We also identified the following claims: "*and transmits oxygen for us, for us to live and …*" and "*which generates food for us.*"

The student presents nature as something recursive that must provide human beings with the oxygen that they need to live. The student also presents nature as a food resource that should be preserved in order to meet the needs of human beings. For Kopnina (2012), they are anthropocentric understandings of social and environmental relations.

Regarding conscious consumption, Layrargues (2015) states that it is necessary to be critical and aware of consumerism since it intensifies the exploitation of natural resources to produce new goods and forces the economic system to remain the same. These two concepts (exploitation of natural resources and the economic system) are not present in the students' statements.

When we analyzed the data collected from students enrolled in YAE school, we observed that they dissociated nature from human activity. For instance, when YAE 4 was asked about his/her understanding of nature, s/he stated:

> Nature … it is all that was not created by men … everything is natural, so … how can I say … it is what man has not interfered with (YAE 4).

Using TAP, we identified the following data: "*Nature ... it is all that was not created by men ...*" We also identified the warrant, "*everything is natural, so ...*", and the claim, "*what man has not interfered with.*" This way of analyzing nature as something external to human beings is rooted in their experiences and historicity. It is a thought that is related to a conservative EE, as knowledge has developed that has allowed understanding of environmental issues to certain limits (Guimarães, 2013).

Loureiro (2012) argues that it is very difficult for students in EE to separate ideas about the environment from the radical notion that nature must be untouched. The author also presents ideas that imply a critique of technological development, as if it is completely destructive. It is verified that there is not a knowledge of contradictions existing in the relations between the human being and the nature and also possible ways to overcome them (Trein, 2018).

Nogueira (2018) corroborate the idea that nature is often seen as something outside of the human being This author also state that the process of EE today has a strong tendency to have ecologically correct practices, ignoring deep discussions about the risks and damages

Table 2. Analysis units

Regular elementary school (RES)	Youth & adult education (YAE)
Perception of nature as pure, clean and natural, dissociated from the human being and associated with the necessity of survival.	Perception of nature as pure, clean and natural, dissociated from the human being and associated with the necessity of survival.
Waste separation and recycling as a means of preserving the environment; dissociated from the society-consumption relation.	Waste separation and recycling as a means of preserving the environment; dissociated from the society-consumption relation.
Clear understanding of the human practices that contribute to environmental degradation; sense of belonging to the environment.	Clear understanding of the human practices that contribute to environmental degradation; sense of belonging to the environment.
Distortion of the understanding of the concept of labor. Labor is understood as either helpful or harmful to the environment.	

Note. Data adapted by the authors

inherent in the processes of appropriation and utilization of environmental resources. Thus, according to the student data and to the authors cited above, EE disregards the political, economic, cultural and social processes that are part of our current reality.

The next analysis unit is "*waste separation and recycling as a means of preserving the environment; dissociated from the society-consumption relation.*" It presents recycling as a great way of saving environmental resources. However, in this unit, we did not identify substantial knowledge about the matter of consumption and consumerism, which have a direct relation with the degradation of the environment (since these issues are often related to the need for a higher quantity of raw material). This form of analyzing waste, without relating it to consumption, is clear in the statement made by YAE 6 when asked about his/her participation in the environment:

> I collaborate because I do not throw away trash (YAE 6).

Analyzing the above statement using TAP, the claim "*I collaborate*" (as an affirmation of his/her participation in the environment) combined with the warrant "*because I do not throw away trash,*" corroborate the form his/her participation in the environment. In his/her interpretation, the fact of not discarding trash in an inappropriate place makes his/her participation in the environment positive and appropriate; however, he/she lacks an understanding about how trash is generated, how to characterize his/her participation in this trash production, and how he/she sees himself/herself in the problems of consumption and consumerism. These conceptions are associated with a general concept of trash, similar to that defined by the United Nations Development Program (UNDP, 2011), that is, trash as something that its owner no longer wishes to own in a specific place and time, besides having no commercial value for this owner. Leonard (2011) affirms that consumption means the purchase and use of goods and services to meet particular needs, and consumerism refers to the attempt to satisfy emotional and social needs through purchases and products. In addition, consumerism aims to confirm and affirm personal values centered on the purchase/use of goods that go beyond the necessary and what the planet can supply. It involves a context of contemporary productive forces and production relationships, as well as their contradictions regarding the limits of nature (Nogueira, 2019). In the analysis, the statement made by RES 5 when asked if he/she sees himself/herself as a participant in environmental degradation is the following:

> Yes. Because we throw away … we produce trash … and the trash takes some time to decompose everything, so we only help to harm the environment (RES 5).

Using TAP, the claim is, "*yes,*" which means that the student recognizes he/she is also active in environmental degradation. The warrant, "*Because we throw away ... we produce trash ... and the trash takes some time to decompose everything,*" corroborates his/her self-affirmation as a degradation agent. The backing for the warrant is "*so we only help to harm the environment,*" which confirms the student's way of degrading the environment is through the production and disposal of trash. Currently, trash is seen as a great environmental issue because of where it goes, whereas recycling is presented as a great solution for this problem. Layrargues (2015) states that educational practice is still seen as a way to solve local environmental issues. By leaving recycling as the final activity, instead of using it as a theme generator to evoke questions

about the causes and consequences of the waste problem, we focus mainly on technical aspects, rather than considering the political problematics involved.

The next analysis unit is "*clear understanding of the human practices that contribute to environmental degradation; sense of belonging to the environment,*" which shows student comprehension of environmental problems. The following is a statement made by RES 13 when asked about his/her view of the environment:

> I am a part … ah! I am a living being, I am a part of the environment (RES13).

Using TAP, the claim is "*I am a part,*" which makes it clear that the student sees himself/herself as involved in environmental problematics. The warrants are "*I am a living being, I am a part of the environment,*" which justify his/her statement through the idea that every living being is seen as a natural being and is active in every environmental problematic.

The human being, seen as a natural being, must be part of every analysis of the question of his/her interference in nature. Society recognizes itself as an aggressor of the environment, as observed in the student's statement. At the same time, it seems that the student insists on not taking necessary actions to solve environmental issues. Thus, Nogueira (2023) adds that the ecological question is embedded in a contradictory society, since there are several proposals related to the appropriation of natural resources that are based on a number of interests, including political ones. At the same time, it is possible to verify a separation between the human being and nature, as shown by the first analysis unit. Here, the analysis shows a comprehension of the human being as part of nature. However, being part of nature does not necessarily imply being nature itself, because in the interaction with nature, the human being uses physical and mental strength, transforming nature. After nature is transformed, the human being is transformed once again, in a self-dependent process; that is, nature is comprehended as a conscious form, as humanized nature (Nogueira, 2023). Still concerning this analysis unit, another student shared his/her view of the environment:

> I am part … I see myself as one more person there … contributing in some way or also polluting in some way (YAE 2).

Using TAP, the claim is "*I am part,*" which shows his/her intention to position himself/herself as active in the human exploratory practices in the environment. The data is "*I see myself as one more person there,*" which reaffirms his/her posture as a participant in the degradation of the environment. The warrant is "contributing in some way or also polluting in some way," which corroborates his/her opinion. The separation between human beings and nature, as an ideological tool, is a way to place human beings outside of nature, because the human being is not nature and, consequently, does not suffer aggression. They are anthropocentric understandings of the relationships between society and nature (Kopnina, 2012). This notion is corroborated by Nogueira (2023), who states that the idea of nature outside the human being is an idea that man is not natural, which was consolidated by capitalism and the industrial civilization. The comprehension of students in this analysis unit could be associated with the sustainability view of EE due to its naturalistic approach, which does not consider social troubles, particularly how the economy deals with environmental

problematics (Nogueira, 2018). Here we see a disregard for an EE that would encourage reflection on environmental problems and show the contradiction of a production system focused on a market that does not treat basic human needs as a priority (Nogueira, 2018).

The last analysis unit, which emerged only in regular elementary school, is "*distortion of the understanding of the concept of labor. Labor is understood as either helpful or harmful to the environment.*" This comprehension does not consider human labor, in an ontological interpretation, as a relation between the human being and nature. In other words, labor is ontological because it is a characteristic of human beings in their process of interacting nature for their survival. This way of thinking in which labor can either help or harm the environment, is clearly shown in the comments made by RES 16, when asked how he/she understands the relation between the human being and nature:

> Well. It is actually halfway. Because there are people who do their labor and they want to help nature … there is the trash collector that helps to recycle things … and also those that pollute … there are also those … also the factory … factories that have too much labor and produce a lot of smoke, and then it interferes … cars that generate a lot of smoke and end up polluting the environment also interfere (RES 16).

Using TAP, the data is "*it is actually halfway,*" because the student's analysis will make two distinct points. The claims are "*Because there are people who do their labor, and they want to help nature ...*" and "*and also those that pollute ...*" These claims clearly show his/her idea that, depending on the type of labor, it can be helpful or harmful to the environment. The Warrants to corroborate his/her statement are "*there is the trash collector that helps to recycle things ...*" and "*factories that have too much labor and produce a lot of smoke and then it interferes ... cars that generate a lot of smoke and end up polluting the environment also interfere*". In this statement, the student exemplifies how he/she can give more coherence to his/her ideas.

According to Saviani (2013), the process of laboring produces human existence, and its warranty of subsistence needs anticipation and real goals. It is through laboring that the human being relates to nature, extracting from it what is necessary for survival, in an ontological sense. However, currently, labor is inserted in society primarily in relation to the production of consumer goods. The ontological sense of the relation turns out to be distorted and in some cases the subjects do not identify themselves as belonging to the relational process between humans and nature. It is an alienated understanding of the human labor process and its relation to nature (Trein, 2018). The focus on consumption that goes beyond human necessities is related to economic factors, mainly to the generation of financial profit, which does not consider the limitations of the planet. The same form of interpretation about the concept of labor is evidenced in the statement made by RES 17 when asked how he/she understands the relation between human beings and nature:

> Some can help, others can harm because … there are some whose labor is to cut trees to make wood, so he/she kind of ruins nature (RES17).

Using TAP, the data is "*some can help, others can harm,*" which clearly presents the student's interpretation about the concept of labor. The warrant is "*because ... there are some whose labor is to cut trees to make wood*", which illustrates that cutting trees is a type of labor that harms the environment. The claim is "*so he/she kind of ruins nature,*" which

emphasizes that, for him/her this kind of labor–(cutting trees) –ruins and harms the environment.

The present analysis unit and the student's statement oppose what Saviani (2013) states that labor is the essence of the human being. Still according to this author, the essence does not have origin in a divine gift or natural form and does not precede human existence. In contrast, human essence is produced by human beings themselves, because we become who we are through our labor, and this means that the human being needs to learn what it is like to produce his/her own existence, which is an educational process (Trein, 2018). The human being becomes human when he/she labors because it is through this labor that survival is ensured and the necessary transformation to warrant the existence of the species occurs (Nogueira, 2023). Without this understanding, the environmental issue expresses the conflicts generated from the relation between the human world and the natural world. This relation materializes the disruption of the relation between the industrial and consumer society and the biosphere (Layrargues, 2015).

The presented analyses show an understanding as if human beings do not belong to nature. This is demonstrated in the perception of nature as pure, clean, and natural. Although they have presented a clear understanding that human practices contribute to environmental degradation, they have also shown an understanding that separating and recycling is sufficient to solve environmental problems without understanding the dynamics of social and economic relationships. According to Leonard (2011), there is no understanding of a system that prioritizes environmental resources over economic issues. Regarding EE, the understandings are related to conservationist and preservationist approaches, in some cases describing only socio-environmental problems without a concern for a detailed explanatory analysis. Such analyses do not have the ability to understand and enable transformations in these issues (Nogueira, 2023). This possibly results in a way of maintaining the current patterns of socio-environmental relationships as they are.

CONCLUSIONS

The units of analysis show the possibility that EE conceptions related to students in the two schools are based on the understanding that the human being is separated from nature. Even when the students show an understanding that human beings participate in the degradation of the environment, through their practices, they do not show a comprehension about human being as nature itself. That is, the human being is like a living being that interacts with nature by transforming it through the labor process, and this transformed nature transforms itself again through a cyclical process. There are also distorted understandings of the relation between society and trash and consumption. The analysis does not show how the students understand the dynamics of the economic process, with its contradictions, conflicts and interests. Even distorted comprehensions about labor that emerged in regular elementary school corroborate the aforementioned interpretations. These comprehensions that human beings are separated from nature also can be associated with preservationist/conservationist conceptions of EE.

Our results show that there is not a significant difference in the three main analysis units for the two schools analyzed. For the students at regular elementary school, we had one more analysis unit, which was

related to a distorted understanding of the concept of labor. Thus, this research shows a significant similarity in the conceptions related to EE to both schools.

The results of our research suggest that EE in the context of the schools, where we carried out our study should consider student understandings. Also, this research provides information about line of thinking of students regarding nature, recycling, and waste. This which is a contribution to research regarding waste management and future undertakings in this field. In a broader sense, this research also suggests that the development and application of EE projects, in formal and informal educational contexts, should consider how subjects comprehend the relation between society and nature, leading to interesting outcomes.

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