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Environment and environmental awareness: how university students conceive and act

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ABSTRACT. This exploratory study had the objective of analyzing issues concerning environmental themes among students coming from four different areas of knowledge, at a public university in the State of Minas Gerais. By the use of drawings, the students' environmental concepts were identified. Global environmental and campus problems, as well as actions towards minimizing them, were investigated by using an open questionnaire. Independent of their performing area, a high number of students presented a reductionist view of the environment. Those from the areas related to natural sciences identified a higher number of problems at local and global levels than those from the areas known as humanities and math. The obtained data suggest the need for environmental education programs, which angle for greater student awareness in the search for sustainability and foster them to think about the current social model that we live in.

Keywords: environmental education, higher education and sustainability.

RESUMO. Meio ambiente e consciência ambiental: como concebem e atuam discentes universitários. Este estudo exploratório objetivou analisar questões referentes à temática ambiental entre discentes, provenientes de quatro diferentes áreas do saber, de uma universidade pública do Estado de Minas Gerais. Por meio de desenhos, identificaram-se as concepções destes estudantes sobre o meio ambiente. Os problemas ambientais globais e do campus universitário, além das ações voltadas para minimizar estes últimos, foram investigados utilizando-se um questionário aberto. Independente da área de atuação, um elevado número de estudantes apresenta uma visão reducionista do meio ambiente. Aqueles das áreas relacionadas às ciências da natureza identificaram maior número de problemas em nível local e global que os discentes das áreas ditas humanas e exatas. Os dados obtidos sugerem a necessidade de programas de educação ambiental, que visem uma maior conscientização e atuação dos estudantes na busca da sustentabilidade e que os levem a refletir sobre o atual modelo de sociedade em que vivemos.

Palavras-chave: educação ambiental, ensino universitário e sustentabilidade.

Introduction

Very often, the definition of environment is reduced to nature, in other words, an environmental view which leaves out men, women, cities and slums. This is a type of restless reasoning which arouses, especially, those who work with environmental education and consider a narrow connection between society and nature amongst environmental issues and human actions. We refer to an environmental education originally conceived by ecological movements, as an awareness practice to draw attention to shortages and ill distribution regarding the access to natural resources as well as citizen engagement in adequate environmental actions, and at a second moment, as an educational proposal, which dialogues with the educational field, with its traditions, theories and knowledge (CARVALHO, 2004). From this perspective, the environment starts to be seen as a determined or noticed place where natural and social elements meet themselves under interactive and dynamic relations. These relations involve technological and cultural creational processes, social and historical transformation processes of the natural and constructed environment (REIGOTA, 1995). Thus, understanding the environment in this way makes it easier to understand the problems that many times, lead to environmental degradation and to an eventual loss of life quality by inadequate housing conditions, pollution, destruction of natural habitats and reckless interventions to the mechanisms that

support life on earth (DIAS, 2003). Such problems originate from a model of society in which the idea of development stands on the increase of unrestrained consumption and on the waste of the natural resources, not accounting for sustainability of our future generations (PALOS; MENDES, 2004). To get out of this situation, the sustained development leaves an utopia to assume the surviving role for the human race and environmental education plays out an important component of this strategy in the search for a new paradigm, for a new way of life (DIAS, 2003).

It is worth considering that the sustained development was born as an increasing desire from part of society by alternative forms for human development that would contemplate criteria for the rational use of natural assets and would not generate social inequity (BORGES, 2008). It can also be added that, in a sustained society, progress is measured by life quality, that is, health, longevity, psychological maturity, education, clean environment, community spirits and creative leisure, and not only pure materialist consumption (FERREIRA, 2005).

Thus, the environmental dimension increasingly installs itself as an issue that involves a group of actors and actresses from the educational universe, empowering various knowledge systems, the professional capacitation and the university community on an interdisciplinary perspective (JACOBI, 2003). However, the non-existence of a permanent environmental education policy in higher education may make it difficult to encourage a broader view of environmental issues by university students as well as creating troubling the social model that we live in.

The hypotheses that drove this study were: the universities as producers and socializing institutions form more critic citizens; university students have a less "naturalized" view of the environment, mainly those coming from courses in areas known as humanities, agricultural sciences and biological sciences; these present concrete attitudes concerning the planet's sustainability.

For what has been exposed, this study had the objective of analyzing issues concerning environmental themes among university students from a federal university in the State of Minas Gerais. As for the specific objectives, these were the goals: to identify the environmental concepts of students coming from four different fields of knowledge; diagnose if these students are aware of the environmental issues in regard to the university campus in which they study; verify if the students practice citizenship, by ways of solid actions that aim the reduction of such problems.

Material and methods

For the implementation environmental educational programs, it is important to previously know how people conceive them, feel and notice the environment in which they take part in. On the basis of these tenets, an exploratory study was adopted, that is, by the preliminary study which has the purpose of adapting the measuring instrument to a reality that is intent to be known (PIOVESAN; TEMPORINI, 1995). In other words, this modality of study objectifies knowing the study variable as it is presented, its meaning and the context in which it is inserted, on a qualitative viewpoint of investigation.

The participants involved had contact with each other during the last two terms (semesters) of their undergraduate courses. The samples were intentionally selected, one undergraduate course from each of the centers of the mentioned university: Math and Science Center (MSC) – 17 students; Humanities Center, Language and Arts (HCLA) – 25 students; Agricultural Sciences Center (ASC) - 19 students; Biological Sciences and Health Center (BSHC) – 30 students. All students enrolled in the selected courses were involved.

Drawings and open questionnaires were the two instruments used for collecting data. At first, it was asked to the university students to represent the environment by a drawing, which had the aim of knowing their concepts on the thematic. To view their conception, each individual's approach was analyzed. For purposes of result presentations, the most illustrated drawings were chosen, independently of the centers to which the students belonged to. The drawings were classified in comprehensive and reductionist, according to the classification adaptation proposed by Fontana (2002). The comprehensive definition covers the drawings that go beyond aspects known as natural, involving cultural, political, economical and social elements, that is, it focuses on the participation of the human being as an integral part of the environment. As for the category of the reductionist concept, the environment is seen as limited, for it only considers the natural aspects, since it excludes the human being from this relation.

Eventually, an open questionnaire containing three questions was used: 1 – Which environmental issues do you know or have heard about? 2 – Which environmental problems can you point out in the university campus? 3 – Do you act directly to

minimize any of these problems? How? In this situation, the students were individually approached as well.

Results and discussion

The students represented the environment in a comprehensive and reductionist way, as exposed on Table 1.

Table 1. Comprehensive and Reductionist Concepts of the Environment presented by the students. Percentage values of students' answers from each Science Center.

Concept	ASC[*1]	BSHC[*2]	MSC[*3]	HCLA[*4]
Comprehensive	52	60	29	44
Reductionist	48	40	71	56

[*1]Agricultural Sciences Center; [*2]Biological Sciences and Health Center; [*3]Math and Science Center; [*4]Humanities Center, Language and Arts.

Figures 1, 2, 3 and 4 represent examples of both conceptual categories, Comprehensive and Reductionist, according to drawings made by students involved in this study.

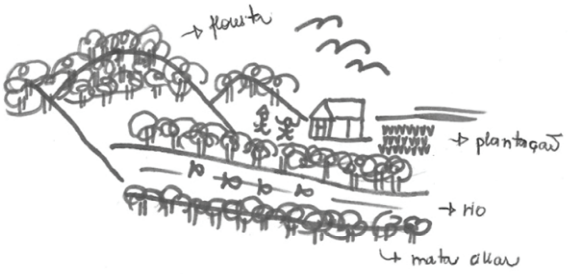

Figure 1. Environmental Representation – Comprehensive view.

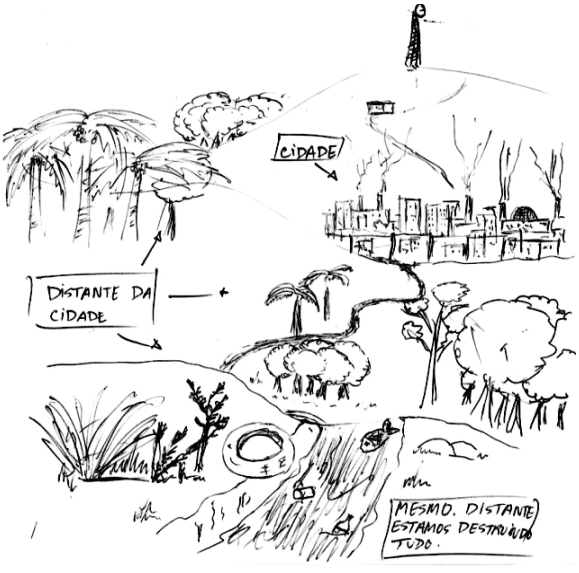

Figure 2. Environmental Representation – Comprehensive View.

Independently of the different knowledge areas which the students came from, comprehensive and reductionist concepts were found. However, It is worth highlighting that the reductionist concept was predominant within representations of students coming from Math and Technology Centers. Such result may be due to centrality in the logical values developed in this area of knowledge (SARAIVA, 2008). Carvalho (2004) safeguards that the environment which surrounds us is constantly interpreted and reinterpreted by us and this interpretation is mostly determined by historical and cultural conditions, in other words, by the context which will set the subject, and at the same time, make meanings available so that the interpretation becomes possible as well as plausible.

Figure 3. Environmental Representation – Reductionist view.

Figure 4. Environmental Representation – Reductionist view.

On an interview with 2000 people, with the objective finding out what Brazilians think about the environment and sustained development, verified that more than half of the interviewees had left out the human being factor in their answers (MMA; ISER, 2001).

On Table 2, the general environmental problems in the perception of university students were listed.

Table 2. General environmental issues in the perception of university students. Percentage values of student's answers from each Science Center.

Problem	ASC*1	BSHC*2	MSC*3	HCLA*4	Average
Litter/pollution	24.4	20.6	24.5	31.4	25.2
Deforestation	13.8	15.4	19.3	18.6	16.8
Global warming/greenhouse effect	10.6	16.1	17.5	22.0	16.6
Pollution/river erosion silt	17.0	13.5	14.0	0.0	11.1
Illegal animal trade	7.4	3.2	8.7	10.4	7.4
Soil contamination/erosion	15.9	8.3	1.7	0.0	6.5
Forest fires	3.1	7.1	5.2	6.9	5.6
Ozone layer destruction	2.1	3.8	1.7	4.6	3.1
Water waste	1.0	0.0	1.7	4.6	1.8
Extinction of animals and plants	0.0	7.1	0.0	0.0	1.7
Acid rain	2.1	0.6	1.7	1.1	1.4
Electrical energy waste	0.0	0.0	3.5	0.0	0.8
Mining	0.0	3.2	0.0	0.0	0.8
Disrespect to environmental laws	2.1	0.6	0.0	0.0	0.6

*1Agricultural Sciences Center; *2Biological Sciences and Health Center; *3Math and Science Center; *4Humanities Center, Language and Arts.

It was noticed that, in general, students know or have heard about current environmental issues, influenced, probably, by the media. The most recurrent issues pointed out by these students were related to litter and pollution, as well as, global warming, deforestation, and forest fires. It was verified that students from the Biology and Agriculture Centers identified a greater number of environmental issues than those from the Centers of Humanities and Math. The first ones drew attention to the improper use of soil and its consequences (contamination, erosion, and degradation) and the disrespect to environmental laws. This picture converges to the data obtained by MMA and ISER (2001), data in which the Brazilian population pointed out deforestation, the contamination of lakes, rivers and beaches as well as air pollution, as being the three main environmental issues which devastate the world today.

On Table 3, the environmental issues, related to the campus, on the students' view were listed.

Table 3. Environmental Issues at the university campus in the students' view. Percentage values of students' answers, from each Science Center.

Problem	ASC*1	BSHC*2	MSC*3	HCLA*4	Average
Scattered litter	20.7	29.3	28.5	32.6	27.8
Lake pollution	30.1	17.2	33.3	21.7	25.6
Destruction of green areas/Deforestation	5.6	12.0	9.5	4.3	7.9
Air pollution (by cars)	11.3	8.6	0.0	6.5	6.6
Visual pollution (outdoors)	9.4	12.0	0.0	4.3	6.4
I see no problems	0.0	3.4	14.2	2.1	4.9
Hazardous wastes from laboratories	3.7	13.7	0.0	2.1	4.9
Excessive usage of electrical energy	0.0	0.0	14.2	2.1	4.1
Water waste	0.0	0.0	0.0	10.8	2.7
Stray animals	0.0	3.4	0.0	6.5	2.4
Destruction of riparian Forest	5.6	0.0	0.0	0.0	1.4
Hydric pollution by excrements	5.6	0.0	0.0	0.0	1.4
Erosion	5.6	0.0	0.0	0.0	1.4
Excessive paper usage	0.0	0.0	0.0	4.3	1.0
Water scarcity	0.0	0.0	0.0	2.1	0.5
Absence of ecological corridors	1.8	0.0	0.0	0.0	0.4

*1Agricultural Sciences Center; *2Biological Sciences and Health Center; *3Math and Science Center; *4Humanities Center, Language and Arts.

In the students' perception, the most frequent environmental issues on campus were scattered litter, the pollution of the lakes and deforestation.

In relation to the litter, the students reported: "very few trashcans along the main strip on campus"; "there is too much litter on the ground, even with trashcans around"; "trash production due to excessive use of disposable products at the Multiuse cafeteria; paper, cigarette butts, gum underneath desks"; "absence of selective trash collection"; "lack of environmental education"; "lack of awareness, a lot of trash around the campus".

As for the lake pollution, a great number of students simply identified the issue. However, others went beyond, with comments such as: "very polluted lake"; "I've heard (I'm not sure!) that the labs' waste is thrown right into the lake"; "departments which don't treat their waste and send some of it down to the lake, an outrage". Even though, they highlighted that the lakes are areas of unique scenic beauty, giving special attention to the urban layout of the campus.

The students also identified less recurrent problems, such as: stray animals – dogs and capybaras; pollution due to excess of automobiles; visual pollution, posters and billboards at places of high pedestrian circulation; as well as energy and water waste. In the latter, some students denounced: "broken down drinking fountains"; "exaggerated water consumption at the dorms, class pavilion and at the departments"; "the automatic faucets at the class pavilion delivers too much water".

This way, it was observed that a great deal of students are critic to the environmental issues that they identified in their study and living environment. However, it is necessary to develop the observation, the perception and the sensitization of those who still cannot identify any kind of issue. This verification had been made mainly among students coming from the Mathematical Sciences Center (15%), Biological Sciences Center (4%) and the Humanities Center (3%). Reports like the ones that follow, confirm these statements: "in general, the campus is green and clean"; "I can't think of any environmental issue on campus, for it is well taken care of".

A possibility to justify these reports may be the fact that the university in question, in terms of its landscape, is very well assisted when compared to the city which houses the campus.

Finally, it was asked to the students if they acted out directly to minimize some of the environmental issues identified by them. The answers to this question are found on Table 4.

Table 4. How university students act to minimize the environmental issues identified on campus. Percentage values of students' answers for each of the Science centers.

Attitude	ASC*1	BSHC*2	MSC*3	HCLA*4	Average
I throw trash in carbage can	25.8	25.6	50.0	41.0	35.6
I do selective waste collection/ Recycling	12.9	28.2	7.1	15.3	15.9
I have no attitude	16.1	23.0	10.7	12.8	15.6
I avoid to waste water	6.4	2.5	14.2	15.3	9.6
I avoid to waste energy	6.4	0.0	7.1	7.6	5.3
I try to make people aware	3.2	2.5	7.1	2.5	3.8
I walk and/or bike	9.6	5.1	0.0	0.0	3.7
I go to ecological or environmental education events	9.6	5.1	0.0	0.0	3.7
I avoid to waste paper	3.2	0.0	3.5	2.5	2.3
I avoid excessive consumption	6.4	0.0	0.0	0.0	1.6
I buy "green products"	0.0	5.1	0.0	0.00	1.2
I avoid stepping on plants	0.0	2.5	0.0	0.0	0.6
I do not use plastic bags	0.0	0.0	0.0	2.5	0.6

*1Agricultural Sciences Center; *2Biological Sciences and Health Center; *3Math and Science Center; *4Humanities Center, Language and Arts.

As it could be observed, most students, despite their Science Centers, contribute to the environment in which they study, especially when it comes throwing trash in garbage cans as well as making it available for the practice of selective waste collection. Other attitudes, as avoiding energy, water and paper waste, appeared in a rather modest way in the reports. In this sense, Palos and Mendes (2004) point out that the representations of a great deal of the population mean "not dropping trash on the streets", " taking care of plants", "not wasting water", among other meanings. According to the authors, although these issues are of great importance, they can only work as environmental education if remitted to a broader discussion, with citizens' participation on the decisions regarding environmental issues, in which economical, political, social and cultural relations that decisively influence the relationship between nature and humanity, can be prioritized.

A worrying datum regards the answers given by students of the Biology Center (24%), Agriculture Center (16%), Math Center (14%) and Humanities Center (13%), who stated not taking any attitude towards minimizing environmental issues. One can attribute this position on the environment, to other possibilities, to the lack of a more consistent environmental education and to aspects related to an omission "culture". Such depending and uninterested populational behavior is due mainly to lack of information, to the lack of an environmental awareness and to a shortfall of community practices based on citizens' participation and involvement (JACOBI, 2003). If this could be worked out, a new "rights" culture, based on motivation and co-participation of environmental managing by communities, would surge.

Referring to a more critic environmental education, it is fundamental that it be concerned with educational proposals centralized on awareness, behavioral changes, competence development and student participation (REIGOTA, 1998), fostering knowledge increase, value changes and ability enhancement, basic conditions to stimulate a greater integration and harmony between individuals and the environment (DIAS, 2003; PÁDUA; TABANEZ, 1998). Students need to have an education that makes them feel connected to the society which they live in and not be at its service (BARCELOS, 2008). We still need an environmental education with the purpose of showing economical, political and ecological interdependences of a modern world, in which, individual behavior and decisions may have global consequences, giving the facts that sustainability would only make sense as long as it were for everyone. And that is due to the fact that one of the most important roles of schools is to contribute with ways that make its students grow up among values, living them, preferably, in community (BARCELOS, 2008).

Conclusion

This exploratory study on environmental issues, developed with university students, cannot be seen as conclusive, and yet as a diagnosis, a mapping for giving subsidies and deepening new studies.

In relation to the environmental concept, the sample of students coming from four great areas of knowledge revealed that these still present reductionist concepts when they leave out the human being and its constructions as being part of the environment. Paradoxically, students identified different environmental issues, at local and global levels, but act modestly to minimize these issues.

In view of the data, when it comes to identifying global and campus issues, students coming from courses related to natural sciences (ASC and BSHC) seem to present a higher awareness level than those coming from Humanities and Math Centers.

Finally, it can be inferred that there is need for investments on environmental education for university students, investments not only on the transmission of ecological knowledge, but on reflection strategies that lead to the questioning of the social model we live in.

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