

Ecocentric emphasis in environmental education subtopics (Ecosystems, Pollution and Use of Resources) in textbooks of 14 countries

344

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ABSTRACT

Two views of Human-Nature relation can be found: anthropocentrism and ecocentrism. In order to understand how school textbooks refer the human's position in nature we analysed how the axis of analysis "Human as guest *versus* Humans as owners of nature" is present in the three topics of environmental education – *Ecosystems*, *Pollution* and *Use of Resource* – in textbooks of 14 countries from Europe, Africa and Middle East. A specific grid of analysis, which was constructed in the context of a European Project BIOHEAD CITIZEN was used in this study. Results show that this axis of analysis is present in the majority of textbooks addressing the above three topics but not in the "Biodiversity" topic. Textbooks for 12-15 years old pupils were the ones having more occurrences than those for 6-11 or 16-18 years old. The textbooks present mainly an ecocentric position, whereas the aesthetic, ethical and cultural aspects are limited and inadequate, limiting the full perspective of education for sustainable development.

Keywords: *Environmental education, Human-Nature relation, Textbooks.*

INTRODUCTION

The understanding of the Human-Nature relationship affects strongly people's worldviews (Rehmann-Sutter, 2000) and differences in worldviews determine the way people conceptualize the need for addressing solutions of the existing environmental problems. As Esteves (1998) defends it is necessary to develop, in each of us and also in the Humanity, the sense of responsibility and solidarity through the environment.

Two perspectives of Human-Nature relation can be found: anthropocentrism and ecocentrism (Almeida, 2007). The former focuses in the relations between Humans and the Universe (Esteves, 1998) and confers humans' dominance over nature, where they, in the ecosystem, occupy the top of an alimentary chain. The latter aims at the ecosystem itself, where the humans are seen as elements of the biotic community having an attitude of respect for all the elements of that community (Almeida, 2007). It is easy to understand that these questions are not easy to solve but we have to have in mind ethical positions in order to solve the different environmental problems. It is also required a moral, ecological and economic perspective in the relation Human-Nature. This is to say that we need a change of attitudes in order to obtain a better world. In the sense of changing attitudes through the environment that surround us, in the sense of constructing a better world, it is pertinent the intervention of educative actions to make children and young people aware of environmental problems and promote positive attitudes and behaviours.

Textbooks analysis is seen as a major element in the evaluation of how the educational goals (at the legislative level of national programmes) are implemented at the school level where pupils must acquire knowledge, competences and develop appropriate values towards a sustainable environment (ME,1988). These textbooks are used by teachers with a double function: as a national programme (or syllabuses) guideline and as a didactical resource (Carvalho *et al.*, 2009). Thus the textbook analysis turns out to be a relevant tool for studying socio-cultural determinants of environmental problems, in particular the school-related ones.

In order to understand how school textbooks refer the human's position in nature we analysed how the axis "Human as guest *versus* Humans as owners of nature" is present in the following topics of environmental education: *Ecosystems*, *Pollution* and *Use of Resource*.

METHODOLOGY

This work was performed by using specific parts of the grid of textbook analysis on the topic "Ecology and Environmental Education" constructed by the European FP6 STREP project BIOHEAD-CITIZEN (CIT2-CT-2004-506015) (Carvalho & Clément, 2007; Caravita *et al.*, 2008). For the design of the grids of textbooks analysis, precise subtopics being exemplar of interactions between Science and Society, and challenges in Citizenship were chosen. They were: *Pollution*, *Use of Resources*, *Ecosystem and Cycles* and *Biodiversity*.

The corpus of this study was composed of 128 textbooks containing the topic *Ecosystems and Cycles*, *Pollution* and the *Use of Resources* in 14 countries involved in the European project FP6 BIOHEAD-CITIZEN CIT2-CT-2004-506015 (Carvalho, 2004): Cyprus, Estonia, Finland, France, Germany, Hungary, Italy, Lebanon, Lithuania, Malta, Morocco, Portugal, Romania and Senegal.

The above three topics were analysed in each country textbooks by the respective project teams by looking specifically to the axis "Human as guest *vs* Humans as owners of nature" in *Pollution*, *Use of Resources* and *Ecosystems and Cycles* (Tracana, 2009). The textbooks analysed were the ones more used in each country, and in some countries they only one textbook was used in schools. We looked for images and textual occurrences by using the grids of analysis. For each indicator we registered the images occurrences that appeared in the textbooks (Tables 1, 2 and 3). The problem of subjective interpretation in this kind of qualitative analyse, was controlled by having two analysts separately applying the grids and cross-checking the findings afterwards.

Table 1: Part of the *Pollution* grid related to *Human as guest vs Humans as owners of nature*

| Content (Themes, topics) | Indicators | Page number of Images | Figure number of Images | Occurences in text |
|-----------------------------|---|-----------------------|-------------------------|--------------------|
| IMPACTS of POLLUTION | | | | |
| | Impact on humankindkind (<i>only benefits and risks for humans</i>) | | | |
| | Economic consequences | | | |
| | Social <i>risks</i> | | | |
| | Aesyhetic values | | | |
| | Ethic, moral and cultural motivations (<i>e.g. future generations</i>) | | | |
| | Impact to ecosystem | | | |

Table 2: Part of the *Use of Resources* grid related to *Human as guest vs Humans as owners of nature*

| Content (Themes, topics) | Indicators | Page number of Images | Figure number of Images | Occurrences in text |
|------------------------------|--|-----------------------|-------------------------|---------------------|
| RESOURCE AVAILABILITY | | | | |
| | Finite (limited) availability of resources | | | |
| | Infinite (unlimited) availability of resources | | | |
| | Renewable or non renewable resources, including food | | | |
| SUSTAINABILITY | | | | |
| | Ecological sustainability | | | |
| | Social sustainability | | | |
| | Economic sustainability | | | |
| | Ecological-social-economic sustainability | | | |
| EQUITY | | | | |
| | Resources distribution | | | |
| | Differences in distribution | | | |
| | Relevant factors for equity of distribution | | | |
| | Ecological conditions | | | |
| | <i>Cultural conditions</i> (knowledge, technology, education,..) | | | |
| | <i>Ethical, moral norms</i> | | | |
| | <i>Economic conditions</i> | | | |
| | <i>Political decisions</i> | | | |
| | International agreements | | | |

Table 3: Part of the *Ecosystems and Cycles* grid related to *Human as guest vs Humans as owners of nature*

| Content (Themes, topics) | Indicators | Page number of Images | Figure number of Images | Occurrences in text |
|--|--|-----------------------|-------------------------|---------------------|
| CONSERVATION and MANAGEMENT of NATURE | | | | |
| | Motivation for Conservation (<i>Only if explicitly mentioned in the text</i>) | | | |
| | To preserve a source of aesthetic pleasure for humans | | | |
| | To prevent exhaustion of natural resources important for economy | | | |
| | To prevent ecological dis-equilibrium | | | |
| | To respect nature and all living beings | | | |

A qualitative approach was used for textbooks analysis but quantitative analysis was also used wherever possible in order to be able to compare items among countries.

RESULTS AND DISCUSSION

The analysis of the textbooks showed that the axis “Humans as owner’s *versus* Humans as guests of nature” appears in three subtopics of environmental education *Pollution, Use of and Ecosystems*, but not in *Biodiversity*. This absence can be due to the fact that this axis in *Biodiversity* is not considered so important. In other studies (Tracana, 2009) it was also found that little importance was given to *Biodiversity* in all textbooks as compared to the topic *Pollution* or the *Use of Resources*. It seems that textbooks refer the problematic of species extension but not in a deep manner. This is a curious aspect because today the media address constantly these problems and the school should also take these matters into account in order to contribute for a better citizenship.

This axis “Humans as owner’s *versus* Humans as guests of nature” is present in the majority of textbooks. Those books for 12-15 years old pupils are the ones having more occurrences than those for 6-11 or 16-18 years old, in all the subtopics *Pollution, Use of Resources* and *Ecosystem and Cycles* as it can observe in Tables 4, 5 and 6.

In Table 4 we observe that the item “*Impact to ecosystems*” is the most referred one, followed by the “*Impact on humankind*”. This occurs, perhaps because they are the ones that have more impact in human life. The “*Aesthetic values*” and “*Ethic, moral and cultural motivations*” have residual presence, which means that the textbooks do not give importance to these issues.

Table 4: Textual occurrences of the *Human as guest vs Humans as owners of nature* in the subtopic *Pollution* in 40 textbooks

| Textual occurrences | Pupils' age | | | Total |
|--------------------------------------|-------------|------------|------------|------------|
| | 6-11 | 12-15 | 16-18 | |
| Impact on humankind | 21 | 39 | 31 | 91 |
| Economic consequences | 4 | 6 | 14 | 24 |
| Social risks | 2 | 14 | 5 | 21 |
| Aesythetic values | 2 | 2 | 5 | 9 |
| Ethic, moral and cutural motivations | 0 | 7 | 2 | 9 |
| Impact to ecosystems | 51 | 72 | 67 | 190 |
| Total | 80 | 140 | 124 | 325 |

The aesthetic values are beauty values (Jeronen & Kaikkonen, 2002), and our results showed that they are poorly referred. Not only aesthetic but also ethic and cultural issues were found to be absent in the axis of *Human as guest vs Humans as owners of nature*, indicating that textbooks are not approaching appropriately the sustainability aim. This is a point which should be improved in the textbooks. According to Sachs (1993), to reach environmental sustainability it is necessary to consider simultaneously: *i) social aspects*, with the goal of reduce distance between life pattern of social groups; *ii) economical aspects*, made possible by an efficient allocation and management of the resources, much more under macros social criteria than micros social entrepreneurs and by regular

flow of public and private investment; *iii) ecological aspects*, involving measures to reduce the resources consumption, and residual production, measures to intensify research, to introduce clean and resource saving technologies, and to define rules that allow an appropriated environmental protection; *iv) spatial aspects*, looking into a more balanced configuration of the rural-urban issue; *v) cultural aspects*, in order to get endogenous conceptions of involvement that respect the peculiarity of each ecosystem, each culture and each place.

Renewable or non renewable resources (Table 5) are more referred (42 occurrences) in the textbooks than the other items. This demonstrate that the textbooks are preoccupied to pass the information to pupils that the natural resources are not infinite, and they should be economically and rationally used. Torres (2007) claims that is important understanding that humanity must not dominate nature but interact with it. This is to say that nature should be used to attend not only the needs of this generation but also the subsequent ones. This leads to the importance of environmental education for the sustainable development.

Table 5: Textual occurrences of the *Human as guest vs Humans as owners of nature* in the subtopic *Use of Resources* in 31 textbooks

| Textual occurrences | Pupils' age | | | Total |
|--|-------------|-----------|-----------|------------|
| | 6-11 | 12-15 | 16-18 | |
| Resources, availability | | | | |
| Finite (limited) availability of resources | 3 | 15 | 9 | 27 |
| Infinite (unlimited) availability of resources | 3 | 2 | 5 | 10 |
| Renewable or non renewable resources, including food | 10 | 17 | 15 | 42 |
| Sustainability | | | | |
| Ecological sustainability | 1 | 18 | 1 | 20 |
| Social sustainability | – | 3 | – | 3 |
| Economic sustainability | – | 5 | 2 | 7 |
| Ecological-social-economic sustainability | 1 | 9 | 7 | 17 |
| Equity | | | | |
| Resources distribution | – | – | – | – |
| Differences in distribution | 14 | 11 | 1 | 26 |
| Relevant factors for distribution equity | – | – | – | – |
| Ecological conditions | – | 3 | 3 | 6 |
| Cultural conditions | – | 3 | 2 | 5 |
| Ethical, moral norms | – | 3 | – | 3 |
| Economic conditions | 1 | 3 | 13 | 17 |
| Political decisions | – | 3 | – | 3 |
| International agreements | 12 | 1 | – | 13 |
| Total | 45 | 96 | 58 | 199 |

For the analysis of humans in nature position as far as *resource availability* and *sustainability* are concerned, we observed that the textbooks transmit mainly an ecocentric position. However when looking at *equity*, the economic conditions is the most referred item, suggesting the societal importance given to economy in the goods distribution.

Table 6: Textual occurrences of the *Human as guest vs Humans as owners of nature* in the subtopic Ecosystems in 28 textbooks

| Textual occurrences | Pupils' age | | | Total |
|--|-------------|-----------|-----------|------------|
| | 6-11 | 12-15 | 16-18 | |
| To preserve a source of aesthetic pleasure for humans | 4 | 7 | 2 | 13 |
| To prevent exhaustion of natural resources important for economy | 1 | 12 | 3 | 16 |
| To prevent ecological dis-equilibrium | 2 | 21 | 2 | 25 |
| To respect nature and all living beings | 35 | 9 | 3 | 47 |
| Total | 42 | 49 | 10 | 101 |

In the case of the subtopic *Ecosystems* we observed that the respect of nature and living beings was the item more referred. Once again the aesthetic aspect is the less considered. These results show that textbooks in this analysis consider men as invited and not as owner of nature.

In conclusion, we can say that the textbooks from 141 countries, tend to defend the ecocentric perspective, where humans are seen as guest of nature and not its owner. Results also show that, in respect to this axis – “Humans as owner’s vs Humans as guests of nature” – the aesthetic, ethical and cultural aspects are inadequate, limiting the education for sustainable development. To reach the sustainability, it is necessary to look all together social, economic, ecological, spatial and cultural aspects (Sachs, 2001; 2004).

Further studies are going on to find out whether textbooks from groups of countries (Western or Eastern European countries and non European countries – African and Middle East countries) show specific tendencies in the way environmental education deals with the issue “Humans as owner’s vs Humans as guests of nature”.

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