SOCIO-ECONOMIC AND ETHICAL ISSUES IN POLLUTION: INDIVIDUAL OR SOCIAL RESPONSIBILITY? ANALYSIS OF TEXTBOOKS FROM 16 COUNTRIES

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Abstract

The goal of the present study was to analyse the progression of the Socio-economic and ethical dimensions within the topic pollution, in the textbooks of 16 countries, since the 1st level until the last one before university. Results showed that: i) this dimensions are completely absent in 6 of the analysed countries; ii) among the countries where both dimension are present (predominantly in the Western European countries), the *Socio-economic* dimension is consistently more present than the *Ethical* one. The results of the present study indicate that more emphasis need to be given to ethical controversies related to pollution problems. We also analysed the *Approaches to solve pollution problems*, within the conception *Individual vs social* associated to the topic of Pollution in textbooks of 16 countries involved in the FP6 European project Biohead-Citizen. Countries that highlight changes in technologies in detriment of changes in individual behaviour are also the same ones that give more attention to socio-economic and ethical controversies.

1. Introduction

Didactical transposition (DT) makes possible to analyse, in one way, which scientific contents are selected to integrate the school programmes and in which level of teaching (external didactical transposition - EDT) and also how these contents are treated in a classroom context (internal didactical transposition - TDI) (Clément, 2006). In this perspective, textbook analysis is a major element in the evaluation of how the educational goals (at normative level

of the national programmes) are implemented at school level, where the students must acquire knowledge, develop competences and become aware of appropriated values towards a sustainable development.

In the sequence of Tbilisi Conference, in Georgia, 1977, a new face is attributed to the "environment", becoming a larger concept, involving both natural as social concepts, where this last ones include cultural, moral and individual values, such as interpersonal, in a work context and outdoor activities (Velasco, 2005). This concern must be now directed to humans' relation with the planet, in a balanced way and, according to Gomes (2006), environmental education must be present at all levels and modalities of teaching, because environment preservation depends upon an ecological awareness, and this construction depends upon education, more specifically upon environmental education, so that: *"this* [the education] *is the most effective preventive way of environment protection"* Freitas (2002:66 – referred by Gomes (2006).

2. Methodology

This study was based in the analysis of 79 textbooks of Chemistry, Biology, Natural Sciences, Geology and Ecology of 16 countries (22 from Lebanon, 11 from France, 10 from Portugal, 9 from Italy, 5 from Hungary, 4 from Tunis, 3 from Germany, 3 from Morocco, 2 from Cyprus, 2 from Estonia, 2 from Lithuania, 2 from Malta, 1 from Finland, 1 from Poland, 1 from Romania, and 1 from Senegal), since the 1st year (5/6 years old) until the last year of school, before university (17/18 years old). The grids in Ecology and Environmental Education were conceived in the European Project FP6 STREP Biohead-Citizen (CIT2-CT2004-506015), but for this study only the theme pollution was used and within it we looked at the *Socio-economic and Ethical Dimensions*. Within this, it was made a comparative analysis of the number of occurrences of the *socio-economic* dimension with the frequency of the *ethical* dimension along the different countries textbooks.

We also analysed the *Approaches to solve pollution problems*, within the conception *Individual vs social* associated to the topic of Pollution in textbooks of 16 countries involved in European project FP6 Biohead-Citizen. Special attention was given to the progression since the first school year to the end of the secondary studies in these countries.

3. Results

3.1. Frequency of the topic *pollution* and the *socio-economic and ethical* dimensions

In a first analysis of the results shown in Table 1, it can be seen that: i) the socio-economic and ethical controversies are completely absent in 6 of the 16 analysed countries (Cyprus, Lebanon, Lithuania, Morocco, Poland, Romania); ii) in the textbooks of those countries were, at least, one of the dimensions is present, the socio-economic dimension is consistently more important than the ethical one, with the exception of Finland, were two ethical controversies were detected, against none socio-economic controversy. One of the ethical controversies in this country refers to the nuclear wastes issue:

> *"the wastes resulting from Finland nuclear factories are not transported to foreign countries, but they are putted in rock foundations. Despite this places were nuclear wastes are deposited are inspected through appropriated measures, some researchers have a very critical opinion about embedding nuclear wastes for dozens of thousands of years."*

In the 16 analysed textbooks, it was recorded an average of 0.7 occurrences per textbook about the socio-economic dimension whereas only an average of 0.2 about ethical issues (Table 1). This means that discussions around socio-economic issues are more than three times frequent than those that concern ethical problems.

Looking more carefully at the results it becomes clear that in general the controversies are more present in European western countries. Indeed, it was noticed that the textbooks of Malta, Germany, France, Italy, Portugal, and Finland contribute, all together, with 35 of the 53 occurrences of the socio-economic debate, and with 10 of the 18 ethical controversies verified in the total of the 16 countries. Apparently, this seems to indicate that more democratized countries are, also, the most opened to self-questioning, to debate and controversy. In this way, textbooks are a reflect of the socio-political reality, becoming visible the differences between systems of values.

Table 1: Socio-economic and ethical occurrences in textbooks of 16 countries

Country	Analysed Textbooks (n)	Socio-economic dimension frequency	Ethic dimension frequency	Occurrences by textbook (n)	
				Socio-economic dimension	Ethical dimension
Malta	2	6	2	3.0	1.0
Tunisia	4	9	4	2.3	1.0
Senegal	1	2	0	2.0	0
Germany	3	4	1	1.3	0.3
France	11	12	2	1.1	0.2
Estonia	2	2	2	1.0	1.0
Hungary	5	5	2	1.0	0.4
Italy	9	8	2	0.9	0.2
Portugal	10	5	1	0.5	0.1
Finland	1	0	2	0	2.0
Cyprus	2	0	0	0	0
Lebanon	22	0	0	0	0
Lithuania	2	0	0	0	0
Morocco	3	0	0	0	0
Poland	1	0	0	0	0
Romania	1	0	0	0	0
Total	79	53	18	---	---
Average	---	---	---	0.7	0.2

3.2. The conception Individual vs social: approaches to solve pollution problems

Attending to the results of all the 16 countries, there is an average of: 2.2 occurrences per textbook concerning changes in technologies as a solution to pollution problems; 0.8 highlighting changes in individual behaviour; 0.7 regarding the social change as a way to solve those problems; and 0.4 occurrences per textbook regarding the interaction between the individual and social behaviour (Table 2). At a first glance, this belief in technologies – as a way to cope with pollution problems – is consistently more present in the Western European countries. For instance, we obtained average values of 7.5 occurrences in Portugal, 7.0 occurrences per textbook regarding this indicator in Finland, 4.3 in Germany, and 3,5 occurrences in Cyprus. An exception to this rule, seems to be France, since the changes in social behaviour seem to be even more valued than the changes in technologies as possible

ways to face pollution problems (with average values of 0.9 and 0.8, respectively). These results seem to indicate that there may exist some correlation between the development of a given country and its belief that science and technology will solve the pollution issues. On the other hand, it is hard to find some kind of interpretative regularity in the data regarding the presence of the indicator *Changes in individual behaviour*. In fact, countries with different socio-economic, cultural and political realities have approximate average values: 2.0 occurrences per textbook in Finland, 1.5 in Estonia, and 1.5 in Portugal (all of them above the global average of 0.8 for this indicator).. The same irregularity was found regarding the indicator *changes in interaction between individual and social behaviour*. Finally, and in contrast, the average number of occurrences related to the indicator *changes in social behaviour*, is stronger in developed countries such as Portugal, Italy, Finland and France (with 1.8, 1.0, 1.0, and 0.9, average occurrences per textbook respectively, all of them rating above the 0.7 global average).

Table 2: Frequencies of four indicators within "Approaches to solve pollution problems" in textbooks of 16 countries.

Country	N Analysed Textbooks	Changes in individual behaviour	Changes in social behaviour	Changes in interaction between individual and social behaviour	Changes in technologies	Nº of occurrences by textbook			
						Changes in individual behaviour	Changes in social behaviour	Changes in interaction between individual and social behaviour	Changes in technologies
Portugal	10	15	18	5	75	1.5	1.8	0,5	7.5
Finland	1	2	1	1	7	2.0	1.0	1.0	7.0
Germany	3	3	2	3	13	1	0.7	1.0	4.3
Cyprus	2	1	1	2	7	0.5	0.5	1.0	3.5
Italy	9	3	9	3	21	0.3	1.0	0.3	2.3
Lebanon	22	26	11	5	47	1.2	0.5	0.2	2.1
Malta	2	0	0	0	4	0	0	0	2.0
Senegal	1	0	0	0	2	0	0	0	2.0
Estónia	2	3	2	1	3	1.5	1.0	0.5	1.5
Poland	1	1	1	1	1	1.0	1.0	1.0	1.0
Romania	1	1	0	0	1	1.0	0	0	1.0
France	11	5	10	6	9	0.5	0.9	0.5	0.8
Tunísia	4	3	2	2	2	0.8	0.5	0.5	0.5
Hungary	5	1	2	0	0	0.2	0.4	0	0
Morocco	3	2	0	0	0	0.7	0	0	0

Lithuania	2	0	0	0	0	0	0	0	0
Total	79	66	59	29	192	---	---	---	---
Average	---	---	---	---		0.8	0.7	0.4	2.4

4. Discussion

Even in the textbooks of the countries where the debates related with pollution issues are more present, we verify an important preponderance of socio-economic controversies by comparison with ethical ones. France and Tunis textbooks are those with a major number of socio-economic occurrences.

Nowadays, debates of socio-economic nature seem to work within dichotomies that do not challenge the logic of the *modus operandi* of the mainstream social and economic system. As an example, one can read in a Portuguese textbook: "*the contrast in distribution of production and consumption of energetic resources, specially oil, arises economic problems.*". Such controversies in their essence do not challenge the expectations that the individual already has in face of himself and the society, nor challenge the more mainstream values, where is highlighted the importance that is given to the economic growing, consumption, competitively, etc.

In contrast, debates around ethical issues seem very often to be understood as uncontrollable by educational agents (O'Toole, 2002) since they create conflicts between such incompatible value systems, that could be demanded the abandon of a certain "way of life" as means to find a real solution to such conflicts. For example, we can say that "to use the car is more comfortable and less laborious than walking", as we also can say that "using the car pollutes and contributes to the green house effect, which, in the limit, can contribute to put at stake the existence of life in the planet". This creates an ethical dilemma with a difficult resolution to take between the nowadays individual comfort and the collective welfare of the future generations. When speaking about environment, ethics is an essential foundation for the human behaviour. Decisions about natural resources management must be taken into account, to the present and to the successors generations. (Mata e Cavalcanti, 2002).

The explicit presence of such controversies is a real challenge and it invites the individuals to assume a reflexive position that, in a final analysis, can lead to a breakthrough with the social order by questioning even the authority figures themselves (how could, for example, a teacher arise this ethical controversy, and in the next day appear in the school driving a car?), such as the case of teachers, parents, the state, etc. The discomfort that those

debates can generate seem to find a mirror-like reflection (for is absence or weak presence) in the textbooks of the 16 analysed countries, what shows that environmental education still has a long way to go, and several obstacles to overtake.

This way, the ethical debate goes to a second place, because socio-economic controversies dominate the neo-liberal matrix of developed countries. On the other hand, questions involving ethics and values are rarely simple, and, although an improvement of knowledge around this questions is not enough to lead to changes, it is, no doubt, an important factor, since it leads to the increase of the scientific literacy (Carvalho, 2002) giving the introspection that can lead to the fall of the values usually considered unchangeable (O'Toole, 2002).

At the same time, as we said before, there seems to be a strong belief expressed in the European western countries textbooks that technology will solve by itself the pollution problems. So, there may be two major negative consequences regarding this fact: a) pupils may put more hope in technology advances as a way to solve pollution issues than in the changes of their own individual behaviour; b) the almost unlimited faith in technology and science as the new saviours of the planet may ruin the very existence of ethical debates around the pollution themes. As a matter of fact, science is regarded as a morally neutral tool, which may throw the pollution issues to a non-ethical ground. So, the perception that individual changes may lead to global solutions may be threatened and, at the same time, the controversies generated inside the pollution debates may be emptied from its moral connotations.

References

Carvalho, G.S. (2002) "Literacia para a Saúde: Um contributo para a redução das desigualdades em saúde" *In* Saúde: As teias da discriminação social - Actas do Colóquio Internacional: Saúde e Discriminação Social (Org.: M.E. Leandro, M.M.L. Araújo, M.S. Costa). Braga: Universidade do Minho, pp.119-135.

Clément, P. (2006). Didactic Transposition and KVP Model: Conceptions as Interactions Between Scientific knowledge, Values and Social Practices, *ESERA Summer School*, IEC, Univ Minho, Braga (Portugal), (pp. 9-18).

Gomes, Daniela (2006) Educação para o consumo ético e sustentável. Revista Electrónica do Mestrado em Educação Ambiental, 16, 18-31

Mata, H. e Cavalcanti, J. (2002) A Ética Ambiental e o Desenvolvimento Sustentável. Revista Electrónica do Mestrado em Educação Ambiental, 22, 170-185

O'Toole, J. (2002) An Ecological Approach to Environmental Ethics. International Research in Geographical and environmental Education, 11, 48-52.

Velasco, S. (2005) Querer-Poder e os desafios sócio-ambientais do século XXI. Revista Electrónica do Mestrado em Educação Ambiental, 14, 49-59.