

Pollution in Portuguese primary and secondary textbooks of Biology and Geography

**Rosa Branca TRACANA^(1,2), Cláudia FERREIRA⁽¹⁾, Graça S. CARVALHO⁽¹⁾ &
Maria Eduarda FERREIRA⁽²⁾**

1. LIBEC/CIFPEC, IEC, Universidade do Minho, Portugal
2. Escola Superior de Educação da Guarda, Portugal

Graça S. Carvalho: graca@iec.uminho.pt

Abstract

The aim of the present study was to analyse the progression of the topic Pollution along the 12 years of Portuguese primary and secondary school, since the 1st year (5/6 years old) up to the 12th school year (16/17 years old), giving special attention to “Impact on humankind”, “Economic consequences”, “Social risks”, “Aesthetic values” and “Ethic, moral and cultural motivations”. Results showed that textbooks highlight the planet as a resource for humankind instead of a planet as a resource shared with other living beings. Moreover they give emphasis to the negative impact of Pollution in the ecosystems and humankind rather than point out the problems and how to solve them in order to contribute to a sustainable environment.

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Introduction

In Portugal, Environmental Education (EE) in schools has been implemented with the aim of pupils' and students' learning on environmental sciences and to promote attitudes and behaviours towards a better citizenship, based on the key issues of the Stockholm Conference, held in 1972 (Teixeira 2003). Only after the revolution of the 25th April 1974 for a democratic political system, the EE was introduced in both primary and secondary school National Programmes (syllabuses), with the purpose to implement students' attitudes towards a sustainable environment (Morgado 2000; Teixeira, 2003).

Several views on nature and environment can be identified (Clément & Forissier, 2001; Bogner & Wiseman, 2002): with or without human beings; preservation or utilization; spiritualist or materialist. From the deep ecology to the unlimited exploitation of nature, there are numerous perspectives for a sustainable development. It is therefore necessary a pluridisciplinary approach with competences in both ecology and human/social sciences in order to foster an understanding of the environment as a problem which has to be solved by people's management and action.

Global pollution problems, such as the greenhouse effect, the reduction of the ozone layer, the acid rains, the loss of biodiversity, among others, are not always sensed by the general population, as these problems have cumulative effects. In this perspective, Environmental Education has been seen as a basic tool to contribute to the change of values, mentalities and attitudes. Textbooks analysis is 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 students must acquire knowledge, competences and develop appropriate values towards a sustainable environment (ME, 1988).

In general, Portuguese textbooks have been conceived mainly to get the label "according to the new programme" (Tormenta, 1996) and teachers tend to use textbooks as their main source for their teaching (Sá & Carvalho, 1997; Teixeira, 1999). Therefore textbook analysis can give us an insight of the main issues taught and learnt in school.

The aim of the present study was to analyse the progression of the topic Pollution along the 12 years of primary and secondary school, since the 1st year (5/6 years old) up to the 12th school year (16/17 years old), giving special attention to the items "Impact on humankind", "Economic consequences", "Social risks", "Aesthetic values" and "Ethic, moral and cultural motivations".

Methodology

The corpus of this study was composed of 9 textbooks containing the topic Pollution. The textbooks analysed were for the grades 3, 4, 5, 8, 10 and 12 of Biology disciplines; and for grades 7, 9, 10-11 of Geography.

For the textbook analysis it was used a grid constructed by the European FP6 STREP project Biohead-Citizen (CIT2-CT-2004-506015) for the *Impact of pollution* within the conception *humans as guests of nature and environment versus humans as owners*, by looking at the items “Impact on humankind”, “Economic consequences”, “Social risks”, “Aesthetic values” and “Ethic, moral and cultural motivations”.

Results and Discussion

A preliminary analysis of the Portuguese School Programmes on Environmental Education showed that this topic is present since the 3rd grade (7/8 years old) up to 12th grade (16/17 years old) in disciplines or teaching modules of Biology and geography. In Biology disciplines, Pollution is taught at grades 3, 4, 5, 8, 10, 12th of Biology whereas in Geography it is taught at grades 7, 9, 10-11th (Table 1).

Table 1. Number of occurrences (images and text) on Pollution items found in Portuguese Biology and Geography textbooks along the Primary and Secondary school.

Grade \ Item	3		4		5		7		8		9		10		10-11		12	
	Biol		Biol		Biol		Geog		Biol		Geog		Biol		Geog		Biol	
	I	T	I	T	I	T	I	T	I	T	I	T	I	T	I	T	I	T
Impact on humankind	3	-	-	8	3	6	-	2	13	6	1	10	2	3	-	7	8	2
Economic consequences	-	-	-	-	-	-	-	4	12	-	-	-	1	1	-	-	3	-
Social risks	-	-	-	-	-	-	1	2	5	1	2	7	1	3	-	2	1	-
Aesthetic values	-	-	-	1	1	1	-	-	1	1	-	-	-	-	-	-	2	-
Ethic, moral and cultural motivations	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-
Impact to ecosystems	-	-	-	12	12	7	1	2	13	18	7	21	1	1	2	15	10	10

I: Image occurrences

T: Text occurrences

Results showed that since year 3 Pollution is taught in Primary and Secondary school with the exception of grade 6 (10/11 years old). Only the textbooks of grade 8 (12/13 years old) and grade 12 (16/17 years old) contain all the items analysed. The grade 8 textbook is the one showing more occurrences, which can be well explained by the fact that this book is totally devoted to ecology/environmental education. Nevertheless the items less referred (or not referred at all) in the other textbooks correspond to the also less referred in this grade 8 textbook.

As expected, the textbook of grade 3 (7/8 years old) is the one that refers the Pollution in a lower way as compared to the subsequent textbooks. Since grade 7 (11/12 years old) this topic Pollution is more relevant as more images and number of occurrences in the text could be found (Table 1).

The most mentioned Pollution items in the overall analysed textbooks are the “Impact on humankind” and the “Impact to ecosystems”, perhaps due to the fact that these issues are more interesting to pupils and to the general population as they can affect all of us in a direct way.

The items “Ethic, moral and cultural motivations” and “Aesthetic values” are the least referred items in all the analysed textbooks, followed by an increase in the items “Economic consequences” and “Social risks”. It is interesting to highlight that all analysed geography textbooks (7, 9, 10-11th) do not refer whatsoever either “Ethic, moral and cultural motivations” or “Aesthetic values”, and the “Economic consequences” and “Social risks” only appears at grade 7 with just a few occurrences (Table 1).

Grades 8 and 9 textbooks – the former of Biology and the latter of Geography – correspond to the period (12/13 and 13/14 years old) that “Social risks” appears more frequently (Table1).

This brief analysis showed that Portuguese Primary and Secondary school textbooks on the topic Pollution highlight the planet as a resource for humankind instead of a planet as a resource shared with other living beings. Moreover they give emphasis mainly to the negative impact of Pollution in the ecosystems and humankind rather than point out the problems and how to solve them in order to contribute to a sustainable environment.

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