

Biodiversity in school textbooks of 13 countries

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Synopsis

1. Biological topic: This work concerns the topic of “Environmental Education and Biology Education”.

2. Theoretical background and key objectives

The term biological diversity or *biodiversity* was first brought into the public domain in 1992 with the UN conference on Environment and Development in Rio. The Rio “Earth Summit” provided the opportunity for the states to become signatories of two policy statements: an action plan for the 21st century, known as Agenda 21, and the Convention on Biological Diversity (Young, 2001). The generally accepted perception of biodiversity is that it embraces all species of plants, animals and micro-organisms as well as the ecosystems and ecological processes where they belong to. This includes three biodiversity levels: intra-species diversity, species diversity and ecosystem diversity (Kassas, 2002). The study of biodiversity as a function of the variety of living things has been a component of students’ education at various grades, between 5 and 18 years old. Much of this education has been explicit through out the science curriculum (Gayford, 2000). The purpose of the present work is to analyse the topic biodiversity in textbooks from 13 countries, more precisely our key objectives can be formulated in the following research question: How biodiversity topic addressed in textbooks of 13 countries, especially concerning its *definition*, its *disturbance* and the “*local versus global*” aspect?

3. Research design and methodology

The corpus of this study was composed of 46 textbooks containing the topic “Biodiversity” in the context of Environmental Education in the educational system of 13 countries involved in European project FP6 Biohead-Citizen CIT2-CT-2004-506015: France (9 textbooks), Lebanon (8), Hungary (5), Germany (4), Italy (4), Portugal (6), Estonia (2), Finland (1), Lithuania (1), Malta (1), Morocco (1), Romania (1), Senegal (1). Table 1 shows the presence of the Biodiversity topic along the school years, from primary school (6 years old pupils) until end of secondary school (18 years old) in each country.

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.

Table 1: Presence of Biodiversity topic along the school years of textbooks of each country.

Years countries	6	7	8	9	10	11	12	13	14	15	16	17	18
Portugal	X	X	X				X	X	X			X	
France						X		X	X				
Germany	X	X	X	X	X			X	X				
Italy		X	X	X		X	X		X				
Estonia									X				X
Lebanon	X	X	X	X	X	X					X	X	
Hungary								X				X	
Lithuania					X					X			
Malta								X					
Romania									X				
Morocco					X		X			X			
Senegal												X	
Finlandia										X			

We analysed the issue *Definition of biodiversity*, *Disturbance of Biodiversity* (Table 2) and the axis *local versus global* (Table 3) in the textbooks by using a specific grid constructed by the Biohead-Citizen project.

Table 2: Conception: Complex vs linear

Content (Themes, topics)	Indicators	Page number of Images	Figure number of Images	Occurences in text
DEFINITION of BIODIVERSITY				
	Biodiversity applied only to biological species:			
	• Fauna			
	• Flora			
	• Other			
	Biodiversity as number of species (<i>Taxonomy</i>)			
	Biodiversity as richness of species and variety of interactions			
	Biodiversity applied also to ecosystems			
	Biodiversity applied also to ethnic and cultural groups Other definitions (<i>specify ..genetic diversity ..</i>)			
PERTURBATION of BIODIVERSITY				
	Pertubation affects species			
	Pertubation affects populations			
	Pertubation affects ecological relationships			

Table 3: Conception: Global vs Local

Content (Themes, topics)	Indicators	Page number of Images	Figure number of Images	Occurrences in text
MANAGEMENT of BIODIVERSITY				
	Description of emblematic cases			
	Local scale of events and consequences			
	From local scale to global scale			
	Description of problems			
	Focus on local aspects in terms of geographical location, time scale, cultural reference, sphere of action of policies			
	Focus on global aspects in terms of geographical location, time scale, cultural reference, sphere of action of policies			
	Interconnection between local and global aspects when dealing with geographical location, cultural reference, sphere of action of policies			

4. Findings

4.1 Biodiversity in Portuguese textbooks

In the Portuguese textbooks, the topic *Biodiversity* appears in seven textbooks and all the items analysed are present: i) *Definition of biodiversity*; ii) *Disturbance of Biodiversity* and iii) *Axis Local vs Global*. Of the seven textbooks, six are on Natural Science and one is on Geography.

The textbooks from early years (6, 7, 8 years old) present biodiversity as a variety of animals and plants, mainly related to agriculture and farms. It is interesting to notice that the textbook for age 13 is the one where more text occurrences related to the *definition of biodiversity* appear. In contrast, only few text occurrences can be seen in the last grade (17 years old). In the latter textbook no references to fauna or flora terms appear. Similarly, the item disturbance of biodiversity is less referred in this textbook. It is important to highlight that the *disturbance of ecosystems* is referred more often in the Geography textbook rather than in the Natural Science textbooks.

The analysis of the axis *local versus global* shows that the issue *management of biodiversity* is treated feebly, and when it is present it is usually in a descriptive way of emblematic cases, particularly from local to global aspects. So we may say that textbooks emphasise the local view of management of biodiversity instead of the globally oriented view of the biodiversity issue.

4.2 The analysis of Biodiversity in several countries.

The analysis of the textbooks from the 13 countries showed that although all refer the *Biodiversity* (see Table 2), not all explicit its *definition* or its *disturbance*. Table 4 shows that **Biodiversity definition** is the item most referred in the total of analysed textbooks (181 textual occurrences) followed by the local-global issue (129) and biodiversity disturbance (66). Furthermore, the three analysed items appear mostly in the textbooks of 12-15 years old pupils (182 text occurrences) rather than in the younger or older ones.

Table 4: Textual occurrences in the 49 analysed textbooks.

Textual occurrences	Pupils' age (years old)			Total
	6-11	12-15	16-18	
Biodiversity definition	61	69	51	181
Biodiversity disturbance	8	36	22	66
Axis Local-Global	13	77	39	129
Total	82	182	112	376

Out of all analysed textbooks, only one from Germany refers the microorganisms and only one from Lebanon presents the definition of biodiversity as also applied to ethnic and cultural groups.

Textbooks give more emphasis to the beauty of nature as compared to the preoccupation to preserve it. When the authors mention Biodiversity, they prefer to highlight the biological aspects rather than other ones like diversity of ecosystems and intra-species diversity.

The **disturbance of biodiversity** focused more often in the effects on species rather than on intra-species or on the ecosystem diversity (Kassas, 2002). According to the number of text occurrences and images, more emphasis is given to the preservation of species rather than ecological relationships.

The item *management of biodiversity* is little referred in all analysed textbooks, which reflects the low importance given to the preservation of the environment, which is in accordance with the results above. Similarly, the textbooks give no much importance to the description of **local** problems and their transposition to **global** issues. As Gottlieb and collaborators (1998) say the descriptions on regional flora and fauna never lead to the comprehension of nature function without this the sustainable development will stay like we see today: political issue without social retribution.

Altogether, these results show little importance given to *Biodiversity* in all textbooks as compared to the topic *Pollution* or the *Use of Resources* (Ferreira et al, submitted to ERIDOB 2008). 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. The weak importance given to the *management of biodiversity* is not in accordance with the sustainable development as it is in disagreement of the Article 13 of the Convention of Biological Diversity where a link between sustainability and education through biodiversity is expressed (UNEP, 1992). The education for biodiversity has been recognised as education not only for ecological sustainability but also education that integrates social values and economics through “real” planning processes (Young, 2001).

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