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Teaching Geography for a Sustainable World: A Case Study of a Secondary School in Spain*

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Abstract

Geography has a major responsibility in delivering education for sustainable development (ESD), especially because the geographical concepts of place and space are key dimensions for the analysis and pursuit of sustainability. This paper presents the results of a research that investigated how the teaching of geography in secondary education in Catalonia (Spain) contributes to ESD. For the development of this research it was explored what is involved in understanding and resolving issues about sustainable development and how geography teachers might best conceptualize and teach in this new domain. As a result of this theoretical reflection it has been defined a proposal or model for reorienting the geography curriculum from the basis of the ESD paradigm, which is based and structured in four groups of criteria and recommendations as follows: recommendations for defining competences and learning objectives; criteria for selecting geographical contents and themes; criteria for selecting geographical areas and for the use of scale; and finally, recommendations for choosing the most suitable teaching and learning approach.

Keywords: sustainable development, education for sustainable development (ESD), geography education, teaching geography, curriculum reorientation

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Introduction: The Sustainability Challenge

As Kofi Annan stated (UN 2001), our biggest challenge in this new century is to take an idea that sounds abstract 'sustainable development' and turn it into reality for all the world's people. We must conceive sustainable development and sustainability as a frame of mind (Bonnett, 2002) and it should be the organizing principle of all democratic societies, underpinning all other goals, policies and processes. Sustainable development is always a matter of active social commitment to designing pathways and strategies that can take advantage of opportunities and create perspectives for the future. It assumes that there is no long-term answer, as it is like a game that we can lose but can never win once and for all, because sustainable development is about the ability to "keep playing" or the ability to solve problems between us all, in a complex, uncertain and evolving context.

There are a number of explanatory models that try to clarify and facilitate the comprehension of sustainable development. By way of example, the IUCN (2006) puts forward the three bottom-line model and the interrelated circles (or Venn diagram). There is also the model proposed by Hart (2000) comprising concentric or nested circles, based on which Porritt (2005) proposed a division into five types of capital (natural, social, human, manufactured and financial). Taking into account the ideas and gaps behind these models and considering that we need to look at things from a new point of view, Granados (2010) suggests that sustainable development can be metaphorically compared to a three-lens telescope (see Figure 1), in which each lens represents a different aspect of sustainable development: the environment, society and the economy. Of these three aspects, which make up the whole of sustainable development, the environment is the basic life-giving support mechanism behind human activity, society is the organisational base of institutional structures and agents, and the economy comprises all goods and services. As is the case when one looks through a telescope, we must look at all three of these aspects at the same time in order to get a clear view of sustainable development, as they are interrelated and interdependent upon each other. However, we must reverse our viewpoint and look through the biggest lens first, the environmental one, and narrow our focus down towards the smallest, economic one. Just as a telescope only functions well when each lens works in conjunction with the other, sustainable development is only viable if these three cruxes exist in equilibrium. Thus, each motif affects and reacts to the others, and is also equally affected by the others, in simultaneous co-evolution. This idea of everything happening at once urges us to consider all environmental, social and economic aspects when we make any decision that we wish to be sustainable. The environmental lens brings the need for a healthy planet and the maintenance of a critical natural capital to the forefront, and

highlights the limits of the burden nature can bear as a result of social organisation and technological shortcomings. The social lens suggests that social development should be about global justice and equity, and takes us towards a deliberative democracy in which citizens wield the power. The economic lens proposes a new economic model based on efficiency, coherence and sufficiency (Linz, 2007). Eco-efficiency is the improvement of the productivity of our natural resources. Coherence is the development of new technologies that imitate nature (bio mimicry), thus becoming more compatible with it while reducing risk and uncertainty. Sufficiency is about living austerely within environmental limits. The telescope metaphor also enables us to envision the dynamic time dimensions. Depending on how much we extend or contract the telescope we will put more emphasis on the present or in the future (short, mid or long term).This model also takes into account space and scale, so it allows us to look at the big picture of global sustainability whilst at the same time affording the opportunity to focus on the local context, where action comes easier.

Figure 1. *The telescope metaphor for describing and interpreting sustainability* (Granados, 2010)

As Scott and Gough (2003, XIV) point out, "*sustainable development is a learning process through which we can, if we choose, learn to build capacity to live more sustainably*". It is necessary a metamorphosis of our current education and learning constructs (Sterling, 2007) and education for sustainable development (ESD) has to be identified as the new way for relearning on a grand scale. ESD first gained widespread attention during the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992. Chapter 36 of Agenda 21 (WCED, 1998) described ESD and identified the need to reorient current national educational

systems to it. In order to promote and achieve this purpose, the United Nations implemented the *Decade of ESD (2005—2014)* to help build commitment and skills across the world's education systems so that children and youth could develop an enhanced understanding of what it means to work for a sustainable future, a sense of responsibility for future generations, and a spirit of optimism and hope for a sustainable future.

The reorientation of all subjects to ESD has been considered as an initial stage in the transition to this new educational paradigm, which is necessary for a later interdisciplinary way of teaching and learning. In the case of geography, the International Geographical Union Commission on Geographical Education (IGU-CGE) argues that it is unwise to seek consensus on a global geography curriculum because the curricula contains objectives and contents that relate to regional and national needs differing from region to region and from country to country. Therefore, a global geography curriculum would ignore or deny regional and national needs and differences (Haubrich, Reinfried and Schleicher, 2007).

Given the outlined circumstances, the aims of this paper are to present a proposal to reorient the teaching of geography from the basis of the ESD paradigm that is suitable for the context of secondary education in Catalonia (Spain) and to investigate if the main features of this model are carried out nowadays in the schools, as a sign of "schools in transition to sustainability".

A Proposal to Reorient the Geography Curriculum for ESD in Secondary Education in Catalonia, Spain

Why teach geography for a sustainable world? There are sound social and environmental as well as educational reasons why geography teaching should address sustainability. Many geography educators like Bardsley (2004) and Fien (2005) think that teaching and learning for sustainability is the prime concern of geographical education or *the raison d'etre* of geography teaching. McKeown and Hopkins (2007) consider geography as an integrating discipline that bridges natural, social and economic sciences, and its distinctive dimensions of place, space and scale and its capacity of synthesis are crucial for the analysis and pursuit of sustainable development. At the same time, a sustainable geography can contribute to a reflection on reunifying the discipline (O'Riordan, 2004).

An important feature of geography as taught in schools is the variety of approaches. Teaching geography for sustainable development must be considered as a new generation of critical geography education, a tradition that has variously been

labelled as "geography as emancipation" by Johnston, "geography for social reconstruction" by Walford, "radical geography" by Huckle or "socially critical geography education", by Fien. The features of the critical tradition are the critique of positivism, the importance of values, the use of critical social theory and the development of empowering pedagogy (Morgan, 2002).

There aren't many fully elaborated proposals for the reorientation of the geography curriculum to ESD. Morgan (2000) offered three concrete suggestions regarding the ways geography can contribute to teaching for a sustainable society: in understanding the changing nature of work in different parts of the world at different scales; in understanding the social divisions; and in investigating the complex social factors that create variations in social environments. For McManus (2004), the teaching of sustainable development in geography should involve specially the understanding that there is a variety of ways to conceptualize relationships between the environmental, socio-cultural and economic inputs into sustainability, and that the discourse of sustainable development emerged from specific power relations in response to particular concerns at an identifiable moment in history. The "*Teaching Geography Manifesto*" of Fien (1992) can be considered as the first whole proposal that defined the key contents, skills for action and attitudes of an environmentalist geography curriculum. McKeown (2002) proposes to reorient curricula towards ESD through five aspects: knowledge, topics, skills, perspectives and values. For this author, the knowledge needs to be linked to sustainability and its three parts: the environment, society and economy. The topics to be taught are those associated with the Agenda 21. The necessary skills are the ability to communicate effectively, the ability to think critically, the capacity to move from awareness to knowledge to action, the ability to think in time and to forecast, and the capacity to develop an aesthetic response to the environment. Also perspectives are important for understanding sustainability issues: every issue has a history and a future and it must be considered from the view of different stakeholders. To end with, she proposes that the values to be transmitted are those of the Earth Charter: the respect and care for the community of life and the ecological integrity, the respect of human rights and the social and economic justice, and of the culture of peace. The most detailed Geography curriculum reorientation proposal up to nowadays is the *Lucerne Declaration on Geographical Education for Sustainable Development* (Haubrich, Reinfried and Schleiter, 2007). This proposal offers criteria on how to find geographical objectives, how to select geographical themes, geographical areas and teaching and learning approaches. The declaration also highlights the importance of information and communication technologies (ICT) in the teaching of Geography for sustainability.

The above-mentioned contributions for the reorientation of the geography curriculum to ESD have a global perspective and give general directions. Even so, our specific proposal for the context of secondary education in Catalonia collects many aspects and ideas of them, but aims to be more detailed and focuses itself in the national needs and cultural singularities. The proposal identifies four groups of recommendations and criteria for guiding in the definition of competences and in the selection of contents, geographical areas of study and learning approaches.

Recommendations for defining competences and learning objectives

Competences are the flair for mobilizing resources to act effectively. The definition of students' geographical competences for sustainable development and educational objectives should contain a balanced range of geographical knowledge, key concepts of sustainable development, geographical skills, interdisciplinary ESD skills, and sustainability attitudes and values. *Table 1* is a matrix that collects the selection of these main elements, and it helps at the time of defining the competences through the chosen combinations.

Criteria for selecting geographical contents and themes

As Wood (2009) points out, all subjects have core concepts upon which their knowledge base is founded, acting as a framework by which the subject is organised and understood. Following the renewed academic interest in core concepts (Holloway, Rice and Valentine, 2003), we consider that, at the time educators selects geographical knowledge for sustainable development they should consider sustainability and geographical core concepts to structure the contents and the relevant themes to work about.

Taking into account the contributions of Inman and Rogers (2009) and UNESCO (2002), our conclusion can be that the core concepts of sustainable development are: interdependence and co-evolution of the environment, society and economy; the spatial relationships and globalization; the context; change and transition; democracy; citizenship; human realization and well-being; diversity; sustainability; impact and conflict; risk, uncertainty and precautionary principle; and the temporary perspective.

Table 1.
Main elements or components for defining geographical competences for sustainable development

<table>
<tr><th>GEOGRAPHICAL KNOWLEDGE</th><th>SD CONCEPTS</th><th>GEOGRAPHICAL SKILLS</th><th>ESD SKILLS</th><th>VALUES</th></tr>
<tr><td>Human-nature relationships
Main biophysical and cultural systems</td><td>Interdependence and co-evolution (of the environment, society and economy)</td><td>Using, comprehending, analysing and drawing cartography (digital and printed)</td><td>Developing critical and complex thinking</td><td>Aesthetic valuation of cultural and natural heritage</td></tr>
<tr><td rowspan="2">Space and place
Space identity and significance</td><td>Context</td><td>Locating places and analysing the space distribution of phenomena</td><td>Comprehension of different situations and perspectives</td><td>Awareness of the world and concern for knowing about it</td></tr>
<tr><td>Human realization and well-being</td><td>Field work skills</td><td rowspan="2">Collecting, organizing, evaluating and interpreting information</td><td>Respect for the other and for other’s point of view</td></tr>
<tr><td>Geographical scale of phenomena and interrelation between places</td><td>Scale relationships</td><td rowspan="2">Developing spatial thinking through comparison, the influence between places, regionalization, transition, analogy, hierarchy, differentiation and spatial association</td><td>Compromise and responsibility</td></tr>
<tr><td>Change, dynamism and evolution</td><td>Change and transition</td><td>Personal initiative for introducing changes and improving trends</td><td>Intention to solve problems</td></tr>
<tr><td>Social conscience: agency and structure</td><td>Citizenship: rights, duties and responsibilities</td><td rowspan="2">Describing, explaining, justifying and arguing the management and operation of a territory-society</td><td>Communicating ideas</td><td>Democratic values: equity, freedom, justice and solidarity</td></tr>
<tr><td>Social and spatial organization</td><td>Democracy and politics</td><td>Evaluating alternatives</td><td>Respect of human rights</td></tr>
<tr><td>Diversity of cultures and landscapes</td><td>Diversity</td><td>Research and problem solving skills</td><td>Problem solving skills</td><td>Value of diversity and different kind of life and ways of living</td></tr>
<tr><td rowspan="5">Unsustainability and conflict</td><td>Sustainability and limits</td><td rowspan="5">Taking local and global actions for sustainability</td><td rowspan="3">Participating and cooperating in decision making and justifying and evaluating one’s own actions</td><td>Responsible use and management of resources</td></tr>
<tr><td>Impact and conflict</td><td rowspan="4">Cooperative and conciliatory attitude</td></tr>
<tr><td>Risk, uncertainty and precautionary principle</td></tr>
<tr><td rowspan="2">Perspective of time</td><td>Planning the future, forecasting</td></tr>
<tr><td>Evaluating alternatives</td></tr>
</table>

On the other hand, it can be considered that there isn't an agreement in the disciplinary debate about what are the relevant geographical core concepts (Benejam, 2005; Gardner and Lambert, 2006; Gersmehl, 2008; and Merenne-Schoumaker, 2006); even though, the discipline debate have led us to determine the following proposal of geographical core concepts: human-nature relationships, space and place, scale, change and evolution, and social conscience (structure and agency, Goldberg, 2009). When teaching about human-environment relationships it can be used the concepts of interdependence and co-evolution, quality of life and well-being, conflict, risk, sustainability and diversity. In the case of space, it is appropriate to focus in the context, in diversity and in the spatial relationships. Scale is also essential to understand the context and the interrelationships between places and phenomena. The concept of change entails teaching about dynamism, evolution, transition, context, future, risk and uncertainty. And the social conscience must let students find out the structures of the world and the place where they life and to reflect upon their agency. Social conscience is crucial for understanding the role of citizenship in the building of a better democracy.

To establish which topics are relevant for sustainable development in Catalonia, it has been analysed the policies and sustainability's indicators systems of all the institutions that affects it (the UN, Europe, Spain, Catalonia and the localities). The author also has included the UK Audit Commission's local quality of life indicators system to gain insight into the main aspects of a sustainable society. The result can be observed on *Table 2*, where the black and grey boxes indicate which topics are relevant and at what scale. Features at a glance are that there is an emphasis in environmental themes than those related to society and economy. The themes of air pollution and biodiversity are of interest in all the scales, whereas others are relevant just in one or two scales: cultural diversity and identity just matters in Catalonia and for the UN; population growth is just a global issue; natural hazards is of importance at local and global scale; and fisheries, safety at work and noise pollution just appear at Spanish scale. *Table 2* must be considered just a guideline for teachers at the time to choose scales and to contextualize the themes, but in any case it pretends to be normative.

Table 2.
Relevant themes for ESD and the teaching of geography in Catalonia

	THEMES	UN		EU		SPAIN		CAT	LOCAL IND.	
		P(1)	I(2)	P(3)	I(4)	P(5)	I(6)	P(7)	DIBA (8)	UK (9)
ENVIRONMENT	1. Air quality/pollution									
	2.Climate change									
	3.Biodiversity protection									
	4.Threat status of species									
	5.Desertification									
	6.Land use change									
	7.Deforestation and forest fire									
	8.Waste generation									
	9.Waste management									
	10.Generation of hazardous waste									
	11.Continental and marine water quality									
	12.Water resources used									
	13.Wastewater treatment									
	14.Ecological quality of rivers									
	15.Noise pollution									
	16.Natural hazards									
SOCIETY	17.Population growth									
	18.Life expectancy at birth									
	19.Poverty and inequality									
	20.Gender equality									
	21.Cultural diversity and identity									
	22.Access to primary health care facilities									
	23.National investment in health services									
	24.Living conditions and housing									
	25.Security and crime									
	26.Leisure and services									
	27.Mobility									
	28.Social welfare and quality of life									
	29.Literacy									
	30.Professional qualification									

	31.Investment in education and ICT access	■	■			■	■			
	32.Employment		▒			▒	▒			▒
	33.Safety at work						■			
	34.Participation in decision-making	▒					▒	▒	▒	▒
	35.Corruption		■							
ECONOMY	36.GDP		▒				▒		▒	
	37.Cooperation, technology transfer and global sustainability	■	■			■	■	■		
	38.Research and development		▒				▒			
	39.Sustainable public finance	■					■		■	
	40.Corporate responsibility						▒	▒		
	41.Energy use and consumption		■		■				■	
	42.Renewable energy production		▒	▒	▒	▒			▒	
	43.Transportation		■		■					
	44.Fisheries				▒					
	45.Sustainable consumption	■				■	■	■		
	46.Development of rural areas	▒								
	47.Management of biotechnology	■								

Sources: (1): (UN (2002), UN (2000) and UN (1992)); (2): (DESA-UN, 2007); (3): (COM, 2001); (4): (EEA-AEMA, 2007); (5): (OEPG, 2007): (6): (OSE, 2008); (7): (CADS, 2003); (8): (Diputació de Barcelona, 2000); (9): (Audit Commission, 2005).

Criteria for selecting geographical areas and scale

The selection of scale and areas for study must contribute to the development of a post-cosmopolitan identity (Dobson and Bell, 2006; Morin, 2009). After Bliss (2005) and IGU-CGE (2006), the criteria may include the following principles:

Balance of scale: the selection of scale should include the local, regional, national, international and global scales.

Spatial diversity: the themes and problems should be treated through the selection of contrasting places in terms of diversity (different natural environments, different socio-economic systems and stages of sustainability, cultural diversity), de-centrism (places should be chosen to know Catalonia, Spain and Europe but

avoiding geo-centrism), balance in size and location (the areas should be selected to show different geographical positions and types of territories), relevance (the area should provide relevant knowledge to be applied in public, private and vocational life) and responsibility (the area should be selected to enable learners to recognize and accept their responsibilities for action).

Regional sequence: the themes should present case studies from different regions in a sense of a view into the world.

Scale relationships: examples should show how most of the issues affect in different spatial contexts and how the areas are linked and interrelated.

Topographic coverage: this criterion aims at themes that help to grasp the idea that space can be seen thematically as a network of single topographical objects. It may be classified as systematic approaches (through physical and human geography), issues based approaches (problems and issues can be shown through the global scale or through the pertinent scale) and systems approaches (sustainable development may be investigated trough the study of the integration of human and natural systems within an ecosystem or in the whole world).

Students' places of interest and motivation: the preferences of the students should be kept in mind.

Recommendations for choosing the most suitable teaching and learning approach

Education for sustainability is of intrinsic value to education. It not only contributes to the improvement of the physical and social environment but also to the quality of the educational experience (Tilbury, 1997). Thus, the teaching and learning approach for a sustainable geography should consider social constructivism, methodologies of participative learning for a responsible action and service, and the use of ICT.

Social constructivism: The teaching of geography for sustainability must conceive learning from a social constructivist point of view. This implies that the didactic units should follow the four constructivist phases of exploration of knowledge, introduction of contents, the organization of the new learning and the final application of it. The degree of demand on learners should increase in difficulty, complexity and abstraction. The Anderson's (2001) taxonomy can help to guide at the time to implement different dimensions of the cognitive processes.

Methodologies of participative learning for a responsible action and service: There are many approaches in ESD and most of them present different but complementary aspects that, in our opinion, must be integrated in one in ESD. Faced with this reflection, we proposed the approach called participatory learning for responsible action and service (Granados, 2010), which is based on participatory learning (Mogensen, Mayer, Breiting and Varga, 2007; Reid, Jensen, Nikel and Simovska, 2008; Tabara, 1999; Wals and Jickling, 2009) and democratic education (Schnack, 2008), the change-based learning for sustainability (Tilbury, 2007), action competence (Jensen, 2005), responsible action (Jonas, 1976) and service learning (Puig, Batlle, Bosch and Palos, 2006; Ward , 1999). It can also be noted that authors like Standish (2008) disagree in this kind of approach as it consider that children must live and act as children and not like adults.

The use of ICT: Information and Communication Technologies (ICT) are introducing changes at social and at personal level in our everyday living. ICT literacy is becoming a major learning objective and, at the same time, ICT are an opportunity for new ways of learning that we have to benefit from as teachers. As Capel (2010: 2) points out, geography is one of the most affected disciplines by the digital technologies, because of the broad spreading of geographical information systems and the availability of maps, images and data in the internet. Another specific value and potential of ICT in the teaching of geography for sustainability is to acquire up-to date knowledge easily, to compare contradicting information, to look at things from different points of views, to visualize multi-dimensional environmental issues related to sustainable development and to enable interactivity and cooperation between people (Haubrich, Reinfried and Schleicher, 2007: 248). A sustainable geography teacher must contribute to what Prensky (2009) has called *digital wisdom*. A digitally wise person uses digital technologies and available techniques to enhance his or her mind, as well as other human capabilities. Within the lifetimes of our children, digital technologies will become more and more developed and sophisticated, and they will determine the human progress.

> *"Digital technology can be used to make us not just smarter but truly wiser. Digital wisdom is a twofold concept, referring both to wisdom arising from the use of digital technology to access cognitive power beyond our innate capacity and to wisdom in the prudent use of technology to enhance our capabilities".* (Prensky, 2009: 1)

It is of great importance to use the ICT in the teaching of geography for sustainability in its different range of didactic applications. *Table 3* identifies twenty-eight typologies grouped together in the following eight categories:

informational, educational/training, evaluative, instrumental, experiential, conversational, collaborative, and research.

Table 3.
Didactic uses of digital resources in geography teaching

DIDACTIC USE	TYPOLOGIES	EXAMPLES of TOOLS
Informational	Texts: webs, files, e-books	Database, e-books, digital newspapers
	Videos and TV	Documentaries, films, pod-castings, DVDs
	Digital images	Pictures, graphs and maps
	Music and sounds	Songs, radio programs, recorded conversations and sounds
Educational-Training	Presentations	PowerPoint
	Interactive tutorials	www.illsaron.com
	E-learning courses and portfolios	Portfolio
	Webquest	Earthquest, Geoquest
Evaluative	Interactive platforms	Moodle, Virtual Campus
Instrumental	Browsers	Google, Firefox
	Text, sound, video, web and image editors	Word, Adobe Acrobat, Garageband, Audacity, Picasa, Photoshop, Movie Maker, Imovie, Dreamwaver
	Web mapping and GIS	ArtGis, Artview, Mapinfo, Miramon, Google Earth
	Dictionaries and translators	Wordreference
	Calculators and spreadsheets	Calculi, Excel
Experiential	Virtual worlds	Videogames, Secondlife
	Scientific simulators	MOYSES V 3.0, Asynx Planetarium 2.61
	Virtual visits and routes	Virtual museums, landscape routes
Conversational	Instant messaging	Outlook, Gmail, Hotmail
	Blogs	Blogger, Wordpress
	Distribution lists	Google Reader
	Conferences and	Skype, Adobe Connect, Webex,

	video-conferences	Dimdim
	Forums	www.allforums.net
	Chats	Messanger
Collaborative	Social networks	Twitter, Facebook, Ning
	Wikis	Wikipedia, Wikimapia, Wikispace, Wetpaint
	Other spaces for cooperative and teamwork	Google Docs, Voicethread slidshare, YouTube, TeacherTube, Sharepoint, Synergeia
	Etwinning	www.etwinning.net
Research	All previous typologies	

Source: Granados and Lamagrande (2010)

Methodology

This research investigated how the current teaching of geography in secondary education in Catalonia contributes to ESD. This initial question led us to develop a theoretical framework which justified and supported a suitable and contextual proposal to reorient the teaching of geography from the basis of ESD. After this first stage, the aim of the investigation was to find out if the main features of the model are carried out nowadays in the schools.

This research was based in an interpretative methodology. The used method was the case study, which focus on the teaching of geography in a secondary school in La Garriga (a small town near Barcelona, in Spain). The unit of analysis was constituted by the three geography teachers in this school and the study entailed to know the opinions or perceptions of the teachers, as well as the main features of the didactic materials they use and of the compulsory curriculum. The instruments of the research were the documentary analysis (curriculum and textbooks), personal and group interviews and the observation of the teachers' practice. The data collection included an extensive period of time: it started on April of 2006 and concluded in July of 2009. The process started with a focus group interview which overarching purpose was to gain greater insight into how education for sustainable development is perceived in this school, the difficulties geography teachers find in incorporating this perspective in their subject and the way it might be supported in the classroom. A second phase was to analyse the curriculum and the textbooks. The next phase consisted in developing two didactic units to put into practice by the teachers, with the purpose of observing how the teachers dealt with geography and ESD and, at the same time, it was the way to put them into context so they could

give better answers during the personal interviews that took place just after their interventions. The last phase of the research involved developing a final focus group interview with the teachers to discuss about the whole experience and the first outcomes.

Findings

This case study was carried out through the analysis of the official curriculum, the didactic materials and the opinions of the geography teachers. The main findings are presented following the theoretical model presented and its four groups of recommendations and criteria which relate to competences, contents and themes, the use of scale and space, and the learning approach and the use of ICT.

The geographical competences for sustainable development that foster the didactic materials coincide with those established by the official curriculum. But it has been noticed that some components of the competences are not accomplished throughout the educational stage, especially the one related to taking action in community projects. Also the geographical concepts, the principles of sustainability and the geographical skills do not appear much in the competences. On the other hand, the most frequent elements appeared in the competences are the skills of ESD and the values for sustainability, especially those of problem solving and the development of critical thinking.

The treatment of the key concepts of sustainable development in the teaching units varies according to the concept. *Interdependence* turns up very little and when it does its meaning has more to do with *interrelation* and not with co-evolution. The concept of *spatial interrelation* or *scale relationships* mainly appears following the concept of *globalization*. Said this, the idea of global-local connections predominates upon other scalar relationships. The concept of *context* appears in the curriculum connected to the relativism of knowledge. Although the textbooks do not consider nor work the concept, the teachers affirm contextualising all contents. *Change* is a frequent concept that appears above all linked to the idea of transformation and adaptation to new realities. Nevertheless, change is not interpreted in the sense of *evolution* and *transition*. The notions of *democracy* and *social organization* have a great importance in the curriculum as well as in the didactic materials and for teachers. This conceptual set is approached from three main ideas: the importance of the democracy as a political system and its inherent values; the second idea is civic consciousness; and the third one is based on the structures that allow the organization of every society. Even though these three ideas are of importance and appear frequently, its treatment in the classroom is very descriptive and does not guide on how democracy and social structures work. *Citizenship* also has an extensive prominence, specially linked with the

development of the pupils' territorial identity. The concepts of *human realization* and *well-being* are not relevant for the curriculum but still they are fully covered in the didactic materials when speaking about human needs and the countries' level of development. Textbooks describe natural, social and cultural *diversity* but they don't explain its intrinsic value. The concept of *sustainability* is quite common in the curriculum and is almost always linked to the use of the resources and the environmental protection. The didactic materials use a range of obsolete conceptions of sustainable development and an old vocabulary such as "sustainable growth" and it is noted that their development has been made by different authors with different perspectives and sensitivities, what shows a lack of coordination and homogenization of the language. *Risk, uncertainty and the precautionary principle* are the forgotten ideas because they are not mention at all. On the contrary, the most used concepts in the teaching materials are those of *impact* and *conflict*, because the relationship between humans and the environment is always presented under a pessimistic and catastrophic way. The last analyzed concept has been that of *temporary perspective* and we can state that future, prediction and projection are treated in a tangential way, and *prospect of the future* is not worked throughout all the secondary geography education.

All the relevant themes proposed by this research are covered in the curriculum and in the didactic materials. Even though, some in an extensive way and other in a very superficial way. The topics in the first academic year are mainly environmental; the second and fourth years are mainly social topics; the focus in the third year is on social-environmental problems (especially the ones originated by the use of the resources), the quality of life and the governance, the global economy and the technological production.

The need of a balance in the use of scale appears literally in the curriculum, and the teaching materials also maintain a certain balance in the use of the different spatial scales. The global, continental, national and regional scales are used practically in the same proportions. On the contrary, the local scale is kept marginalized. It is necessary to remark also that the use of the regional scale focuses on Catalonia in its totality. In the official curriculum, the interrelation of scales is tied to globalization, political organization and the relationships between the local and the global. The most evident territorial relationships, such as trade and the migratory flows are covered in the teaching materials. It is also taken into consideration the idea that everything is related to everything, when talking about the effects of the climate change. The territorial interrelation is presented as a consequence of the territorial division and the political organization. The urban nets and their areas of influence or hinterland are also treated. As a conclusion, it can be said that the four important aspects of the territorial relationships are analysed, but

the examples are very poor throughout the secondary education, and the pupils are not asked for a reflection on these relationships of dependence or spatial influence.

The diversity of spaces is manifested in the curriculum as an educational approach that avoids localism and ethnocentrism. But it doesn't go much in depth about what's the meaning or value of spatial diversity. The textbooks use pictures to show spatial diversity but their use is merely illustrative, because there is not an intention to investigate places in depth. As a conclusion we can state that a notion of territories typology is not acquired. There isn't a cultural vision of space, and at the most, what is introduced is a classification of the physical landscapes. In all the geography teaching in the secondary education, just some regional studies appear in theme 9 in the third year. In the rest of the didactic units there aren't case studies of different regions that are useful for illustrating realities of the world. Catalonia is the region that is described constantly but there is not comparison with other regions and contexts.

The curriculum does not mention the topographic coverage, which is, on the other hand, a resource particularly used in the didactic materials, since thematic maps come up in every unit. The work suggested with them is basically descriptive and it's not shown at any time how to create a thematic map.

The curriculum and the didactic materials do not give many opportunities for the pupils to choose spatial areas of study that are important and significant for them. It can be interpreted that the official curriculum takes this aspect into account when proposes the realization of cooperative projects within the community, but there is not a concrete statement about it. In the case of textbooks, they plan a very few number of activities that can be significant for the students (less than ten in the whole stage).

The Department of Education in Catalonia fosters the pedagogic autonomy. The curriculum does not promote the social constructivism, and the textbooks don't contemplate it neither as they don't follow the four phases for teaching and learning. Teachers are not familiarized with those theories of teaching and learning and they state that they don't take it into account when designing and planning their didactic units. Regarding complexity of knowledge, the curriculum manifests that the contents have to be organized from simple and concrete, to complex and abstract. The analysis of the didactic materials shows a small increase of the cognitive complexity starting at the third course, but this increase is proportionally little significant. The simplest type of activities (to memorize and to describe) is those that appear with more frequency and with high percentages during all the stage. In the case of participation and action, they have a principal importance in the curriculum, as it insists in the need to act and to have the initiative and

commitment to make proposals to improve the community in terms of sustainability. This intentionality disappears in the textbooks and in the practice (even though teachers manifest they do it).

The last analysed aspect has been the diverse use of ICT resources. The curriculum as well as the textbooks manifests the importance of the new technologies. In spite of this, the use of the new technologies they bring up is a web page 1.0 use, that is to say, they consider the use of internet for the research of information and the use of software for the creation of simple files. In the contrary, the teachers have manifested a highly use of the ICT in the classroom (using thirteen out of twenty-eight typologies of ICT resources). Teachers state that they use ICT a lot because they facilitate their educational tasks and because new technologies motivate the students.

Conclusions

The aim of this research was to investigate if secondary geography education in Catalonia is incorporating ESD. In order to value the steps forward done in this domain, it has been necessary to define a reorientation model for this context, and to analyse a case study taking into account the national curriculum, the textbooks and the opinion of teachers. As a general conclusion we can affirm that this case study contemplates some aspects of ESD and it neglects some others.

Sustainability is a frame of mind and it can be the guiding principle of Education. The current national curriculum does not mention ESD but its presence could be perceived in a transversal way in disciplines like geography. We understand that the national curriculum should be conceived from the paradigm of ESD and it should be explicit so teachers can understand and value its relevance and can incorporate it in their teaching. The teachers who have participated in this research don't conceive sustainability and ESD as the main purpose of Education. They think it is an important concept and content that must be taught but they haven't considered how it would be applied along the syllabus.

It is considered that one of the priorities of ESD is the reorientation of the disciplines. The teaching staff has manifested that there is a lack of models of the teaching of geography from an ESD perspective, and they have found useful the model proposed in this research. According to the categories established by REID (2000), the teachers participating in this research can be classified as *inclusive*, since they consider geography as key subject in which ESD could be embedded, but they also think that the other subjects can, and should contribute to promoting ESD. Sustainability appears in the *ethos* and practical life of the secondary school studied,

but teachers confess that they don't have a proper school sustainable development plan, and they also admit that their actions are spontaneous and based in their intuitive and limited knowledge on it. It would be necessary a better interpretation of what a sustainable school means by defining their whole school approach to sustainability. The development of a sustainable plan should include a program which last many years and that set targets and actions taking into account the local community. It will function if it becomes an expectation and if it creates a sustainable learning environment where questions and actions about and for sustainable living acquire authenticity through real experiences. According to the stages defined by HICKS (2002), we can locate the secondary school of our study in the second scenario: "we are doing changes to introduce ESD", while the ideal scenario would be that of "sustainability is the main aim of our school, the main protagonist".

The current official curriculum favours teachers' initiatives and make it possible that ESD takes place. Teachers perceive the curriculum to be over-prescribed and over-full, but even though they identify opportunities in the delivery of the curriculum to develop interdisciplinary ESD projects, in spite of the lack that the textbooks show. The curriculum collects all the geographical competences for sustainability but the textbooks don't develop them in a fully way. The competences should be presented trough clear and specific learning outcomes to guarantee their fulfilment. Teachers stated that it is not their job to establish the competences or to define the geography teaching purpose. According with NIKEL (2005), we can consider these teachers as realistic, because their decisions about teaching and learning are based on what the experts and society say. In this aspect it seems that the teachers' thinking needs a change of perspective:

> *"To encourage the thought in teachers that they do not merely "deliver" the curriculum in the form of prefigured subject knowledge, but that they have an agentive role in making it (...) Teachers of geography need to be agile and inventive in order to respond creatively to this dynamic (the rapidly changing world). The curriculum, therefore, is best understood as in state of constant renewal, and it is teachers who are the developers".*
>
> (Morgan and Lambert, 2005: 1-2)

Sustainable development is an abstract concept, and there is a lack of clarity about what it is and how it should be taught. The key concepts of sustainability are addressed in different ways in the curriculum, the teaching materials and by the teachers. In short, it can be stated that concepts like context, interdependence, risk, uncertainty, precautionary principle and future perspectives are not worked much. However, concepts like spatial relationships, change, citizenship, democracy and

social organization appear frequently in most of the learning units. Some concepts like diversity are not explained by its value meaning and they are explained just as a feature of geographical distribution. The teaching materials show an obsolete geographical language and it can be identified different discourses. The language of sustainable development used in the textbooks is also old-fashion. Following Benejam (2005) and Kim (2007) it seems that it is necessary a critical reflection on the language and representation of the world which develops an alternative metageographic vocabulary and framework.

There is a balance in the use of scale. The global, continental, national and regional scale appears at the same proportion. It must be noted that the regional scale is almost focus in Catalonia, what constitutes an ethnocentric approach. The local scale is marginalized. The teaching of geography shows the spatial diversity of the physical world, but it avoids the cultural and social diversity. It can be stated that there is not a cultural interpretation of sustainability and it lacks case studies or examples. The units describe mainly global problems and reproduce the catastrophic view showed by the media. An ESD approach should be based in learning by doing and by knowing sustainable experiences that succeed.

The textbooks present a partial view of the world. Most school geography textbooks present data of all kinds as objective evidence to be accepted by pupils, rather than as something constructed and selected by people with different perceptions of the world. The social constructivist approach of teaching and learning is not taken into account by teachers. The complexity of the activities doesn't increase significantly during the secondary education: many classroom activities demand reproduction of textbook information, analysis and generalisation rather than interpretation of its meaning, and there are not quite options for the participation of pupils.

Teachers manifest the lack of proper teaching materials that would guide them to teach geography from an ESD point of view. They admit they haven't done any training on ESD. They also think that in-service teacher training courses don't show how to teach in a practical way. They feel disorientated about the teaching of geography and ESD and they state they act in an intuitive way. Teachers believe that the creation of teaching materials should be developed by editorials and the universities. Many valuable teaching materials and resources are unknown and it seems that networking is necessary as a way of communicating new developments and innovations in the field as well as to make visible those successful educational experiences.

Biographical statement

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