ENVIRONMENTAL CITIZENSHIP AND PARTICIPATION.
THE ROLE OF EDUCATION PROGRAMS.

A. P. Martinho[1,2], P. Bacelar Nicolau[1,3], S. Caeiro[1,3], F. Amador[1], C. Oliveira[1,4]

[1] DCeT, Universidade Aberta; Lisbon, Portugal
[2] UIED, FCT/UNL, Monte da Caparica, Portugal
[3] IMAR, Coimbra, Portugal
[4] CQE, IST/UTL, Lisbon, Portugal

Abstract

Promoting effective environmental citizenship is one way to achieve sustainability - people should be encouraged to act to preserve the environment and the common good. The citizen's qualities and attitudes will determine the evolution of our society at all levels. Individuals must develop a cultural capacity that in modern society turn them into knowing, knowledgeable, competent and participatory actors.

The first aim of this work is to reflect about the evolution of environmental citizenship in recent decades, analyzing the legal instruments, plans and strategies that have been published at the European level for its effective implementation. Secondly we intend to present a set of criteria related with higher education, providing a knowledge base for the necessary responsibilities and effective behaviour change towards sustainability. Finally a case study will be presented related to the b-learning Master in Environmental Citizenship and Participation at the Distance Learning University, Portugal, where the courses and the educational methods is rooted in problem solving and collaborative methods. Based on the results of a questionnaire survey applied to the master's students for the past 3 academic years, there is a link between the knowledge acquired and changing attitudes and behaviours towards sustainability.

Keywords

Environmental Citizenship; Sustainability; Higher education; Europe.

1. Introduction

Today's environmental problems are structurally anchored in our societies and our ways of life. Solving these problems requires fundamental changes at the societal as well as personal level, which is why education in school must strive to help students become better at making decisions about their own lives and influencing their surrounding environment.

We must invest in environmental citizenship with a sense of human community, which involves a commitment to a more universal nature.

Citizenship has been a hot topic of debate within the green literature since the 1990s. Concepts like environmental citizenship capture the linkage between green politics and theories of citizenship. Although a significant number of contributions to the meaning of environmental citizenship have been made, their practical implications still remain under-explored (Melo-Escrihuela, 2008).

Education for sustainable development thus have an fundamental role, since is based on ideals and principles that underlie sustainability, such as intergenerational equity, gender equity, social tolerance, poverty alleviation, environmental preservation and restoration, natural resource conservation, and just and peaceable societies (UNESCO, 2005).

This paper first aim is to reflect about the evolution of environmental citizenship in recent decades and analysis of the legal instruments, plans and strategies that have been published at the International and European level within Education for Sustainable Development (EDS) for effective implementation of environmental citizenship and participation. Secondly we intend to present a set of criteria related with higher education, providing a knowledge base for the necessary responsibilities and effective behaviour change towards sustainability. Finally a case study will be presented related to the b-learning Master Degree in Environmental Citizenship and Participation at the Distance Learning University Portugal.

2. Environmental citizenship and participation as a status

The concept of environmental citizenship currently tends to be used in one of two main ways:

In the first, it refers to the teaching of values and practices appropriate to the achievement of sustainability. Already familiar from the writings of the environmental movement, the governmental policy discourse that emerge in the wake of the first Earth Summit also tends to follow this meaning, so that, for example, householders need to be encouraged to switch off lights, insulate their homes, conserve water and increase their recycling rates. The assumption animating such interventions is that progress toward sustainability is achievable through incremental shifts in everyday personal behaviours. Here, environmental citizenship is an individualized project, and its discourse is primarily disciplinary (Horton, 2006). Whether through governmental programs or the pronouncements of environmental organizations, people need to be

made more aware of environmental problems and become environmentally responsible citizens; they need to be disciplined into "good," "green" behaviours.

In the second main contemporary use of the concept, environmental citizenship refers less to environmental responsibilities and much more to environmental rights. Specifically, the language of citizenship is used to name and critique the uneven spread of putative environmental rights. Particular groups, for example, are said to lack the right to clean air, a safe environment, or healthy working conditions (Bullard, 1990, Harvey, 1996). Such discussion are obviously connected to the global politics of gender, class, "race," and ethnicity. Here, environmental citizenship is a way of talking about differential risks to specific human bodies, and the ways in which governments and corporations often trample on the environmental rights of specific peoples. This, then, is primarily a discourse of (the struggle for) social justice (Horton, 2006).

Recently, another way of analysed the concept of environmental citizenship was developed, it considers environmental citizenship as a nonterritorial form of citizenship, developing not in the institutions of the nation-state but within the cultural and political spaces of contemporary environmentalism (Horton, 2006). Such a citizenship is in many ways consistent with then "postcosmopolitan ecological citizenship" articulated by Andrew Dobson (2003). In the context of a deeply unequal world with sustainability as a key objective, Dobson claims that responsibility for action is asymmetrical. Consequently, for Dobson, citizenship ought to be rooted in "identifiable relations of actual harm", thus limiting nonreciprocal and unilateral obligations to those implicit in those harmful relations. Correspondingly, privileged groups in the most affluent societies bear the greatest responsibility for taking action to combat the negative effects of their unsustainable lifestyles.

Discussions of environmental citizenship are explicitly based on notions of participatory democracy, rights, responsibilities and entitlements (Moffatt and Phillimore, 2003). According to Delanty (1997), citizenship is a multilevel concept that involves rights, responsibilities, participation and identity. The meaning and practices of citizenship are not universal and vary across time and space. It is crucial to deepen the current understandings of environmental citizenship to explore the practices of environmental citizenship. As Jelin (2000) argues, "The conceptual discussion of environmental citizenship requires grounding in empirical work, the concrete scenarios and actors where they take place, which is where the content and meaning of environmental citizenship becomes relevant".

Justice emerges as an important part of the concept of ecological citizenship (Dobson, 2003). Ecological citizens "do good" because it is the right thing to do rather than for

the economic rewards or punishment. For Dobson (2007), environmental or ecological citizens make a commitment to common good and consider their behavior in the context of justice and injustice. Agyeman and Evans (2006) argue that the concept of environmental citizenship should "be more broadly linked to environmental justice, and set within the wider context of first the sustainability discourse and second the current debates on governance", and they conclude that environmental justice has a better chance of mobilizing people to achieve the kinds of change required for wide-ranging sustainability.

But what kind of qualities the environmental citizens should have to promote sustainability? Connelly (2006) reflect about what are the key environmental citizenship virtues and defend that virtue cannot be legislated, although the state can encourage it indirectly through the appropriate use of sanctions and incentives. The "do-it-yourself" approach to environmental citizenship will only take us part of the way there; an environmental citizenship also requires an active state. The potentially eco-virtuous life is characterized by a need for reminding. It is in the gap between minding and being reminded that encouraging the virtues of environmental citizenship can make an important difference (Connelly, 2006).

Environmental citizenship can be saw as a contested concept and as closely related to the notion of action competence, and for further operational environmental citizenship the education research and evaluation should be carried out.

The different approaches to citizen participation can be mapped into the six participation prototypes described by Renn (2008): (1) functionalist, where participation is seen as a way of getting all the problem-relevant knowledge and values incorporated into the decision-making process; (2) neo-liberal, whereby stakeholder and citizen participation focus primarily in the collection and representation of (well-informed) public preferences; (3) deliberative, oriented towards the determination of common good through the rational competition of arguments; (4) anthropological, that relies in involvement of the 'model' citizen, through an independent jury system consisting of non-interested laypersons who are capable of employing their common sense for deciding on conflicting interests; (5) emancipatory, whereby the less privileged groups of society are given an opportunity to have their voices heard and participation is seen as the means to empower them to become more politically active and finally (6) post-modern, where the main function of participation is to enlighten the policy process by illustrating the diversity of factual claims, opinions and values. Despite these developments, reviews of recent assessment processes still show that effective

participation is difficult to implement in practice. Consequently, participation only achieved lower impact levels, such as public information and consultation.

Schools should have a sense of their place and role in society as political agents for transformation, rather than as transmission belts for society's reproduction. All this is important because the ability to "take action" – understood as an activity than has been consciously been taken rather than as an instinctive response – is a prerequisite for acts of environmental citizenship (Carlsson and Jensen, 2006).

What people learn and how they learn it have been important focuses in the literature of sustainable development, environmental citizenship, and wider democratic theory.

3. Instruments for ESD

Sustainable development was first endorsed in 1987 with *Our Common Future*, the Report of the Brundtland Commission. From that the United Nations General Assembly explored the parallel concept of education to support sustainable development. Since 1987 to 1992, the concept of sustainable development matured as committees discussed, negotiated, and wrote the 40 chapters of Agenda 21. Thoughts concerning education and sustainability were initially captured in Chapter 36 of Agenda 21- "Promoting Education, Public Awareness, and Training". This Chapter identified four major thrusts of education to support a sustainable future. 1. Improving access to quality basic education; 2. Reorienting existing education programmes; 3. Developing public understanding and awareness of sustainability and 4. Providing training. In addition, education as an enabling or implementation strategy was embedded in each of the 40 chapters of Agenda 21 and each of the negotiated Conventions arising from the Earth Summit. As well, every one of the nine major United Nations Conferences of the 1990s that further addressed and refined sustainability issues, identified education in its broadest terms as crucial in implementing the Conference action strategies. The Johannesburg World Summit on Sustainable Development (WSSD) in 2002, proposed the Decade of Education for Sustainable Development (DESD), signalling that education and learning lie at the heart of approaches to sustainable development. In December 2002, the United Nations General Assembly (UNGA) adopted the resolution 57/254 to put in place a United Nations DESD, spanning from 2005 to 2014. The DESD promotes a set of underlying values, relational processes and behavioural outcomes, which should characterize learning in all circumstances within a set of partner from sub-national to international levels. The Decade is a commitment that should be implemented by Member States according to their priorities and approaches. It also represents a common understanding, as outlined in the relevant UNGA resolutions, to work towards common goals and objectives. Within the DESD it were identified some

common milestones that should be addressed by all actors. These include (UNESCO, 2005):

- clearly identifiable plans and/or activities in place in Member States;

- identified focal points in Member States with reporting responsibilities;

- regional plans or strategies. These may also be present at subregional levels;

- indicators of progress and mechanisms for monitoring their achievement;

- identified sources for technical assistance and examples of good practice;

- information sharing on relevant research, development and innovation;

- modalities for fostering partnerships;

- provision of guidance in key areas;

- mid-Decade and end-of-Decade reports to the UNGA.

The DESD is related with other international Initiatives. In particular the Millennium Development Goal (MDG) process, the Education for All (EFA) movement, and the United Nations Literacy Decade (UNLD) have close links with aspects of the DESD. All agree on the central importance of basic education and the need to extend and enhance its quality (UNESCO, 2005).

The published Millennium Ecosystem Assessment (2005) states that action about EDS taken at that date is insufficient at best. More informed and strategic measures are needed to address the goals of poverty and hunger alleviation, improved human health, and environmental protection (UNESCO, 2005).

At European level, Europe Union's environment policy has developed over the last two decades and ESD (with a first approach in terms of environmental education) can be considered to be part of its effective implementation. The role education has to play within environment policy was made explicit in the Resolution adopted by the Council of Ministers in 1988, which argued that the objective of environmental education is:" to increase the public awareness of the problems in this field, as well as possible solutions, and to lay the foundations for a fully informed and active participation of the individual in the protection of the environment and the prudent and rational use of natural resources". In 1993, the European Parliament reinforced this approach in a Resolution which called on Member States and the Commission to: 'include the environmental dimension in all aspects of education at all levels' and to 'emphasise the fundamental role of schools and their teachers in the development and implementation of policy'. In addition, the Fifth European Community Environment Programme sought to integrate the environmental dimension in all major policy areas as a key factor in bringing about the behavioural changes required for sustainability. In this framework,

information and education have become important components, complementing legislation and market-based instruments, in a drive to alter environmentally damaging behaviour and move towards sustainability (Stokes *et al.*, 2001).

The European Strategy for Sustainable Development, adopted in 2006 (first version in 2001), recognises the important role that education and training systems should play in order to achieve the objectives of sustainable development. Education and training should contribute to all three axes of sustainable development, namely the social, economic and environmental dimensions. Likewise, the Lisbon Agenda and the Education and Training 2010 Work Programme provide a coherent framework for Education for Sustainable Development at European level. But, according to the 2007 progress report, it appears that further coordination and exchanges among countries is necessary in order to strengthen and make education programmes and activities for sustainable development on European Sustainable Development Strategy more effective. Also, there is an information gap on how the concept of education for sustainable development has been translated into practices at Member States level. Furthermore, Member States could benefit from exchange of good and innovative ways of delivering education for sustainable development (GHK/DTA, 2008). GHK/DTA, (2008), developed a inventory of practices for the purpose of stimulating exchange of good and innovative practices in education for sustainable development. These practices (from content, delivery method, new partnerships and networks, to institutional level) present a wide range of examples of innovative ways to deliver formal, informal and non-formal education for sustainable development.

According to a study developed for the European Commission about how Member States of the European Union address environmental education in school, in addition to broad areas of knowledge in relation to environmental education, the importance of values, ethics, attitudes and behaviours in the curriculum emerges, thus giving the teaching of environmental education a perspective not always found in other areas of the curriculum. This approach suggests that general concerns about the environment and sustainability are being taken seriously by policy makers striving to inculcate attitudes and values that will result in environmentally responsible behaviour by young citizens of Europe. That study recommend several actions by the European Commission and/or other bodies/organisations within the EU like the dissemination of curriculum-related information across Member States of the European Union and the need to evaluate initiatives across Europe including the extent to which goals have been met and amend those goals to ensure that they are in fact attainable (Stokes *et al.*, 2001).

Environmental citizenship should be seen as a mechanism of inclusion and political participation. Stress is placed on rights of access to information and participation, as well as on democratic models that are more inclusive than representative democracy (e.g., deliberative democracy).Thus, Environmental citizenship is articulated as a status that would be guaranteed by virtue of enshrining environmental substantive and procedural rights in constitutions and laws (Melo-Escrihuela, 2008). In this respect, the 1998 Aarhus Convention is an important step. This Convention establishes a number of rights of the public (individuals and their associations) with regard to the environment. The Parties to the Convention are required to make the necessary provisions so that public authorities (at national, regional or local level) will contribute to these rights to become effective. The Convention provides for:

•the right of everyone to receive environmental information that is held by public authorities ("access to environmental information"). This can include information on the state of the environment, but also on policies or measures taken, or on the state of human health and safety where this can be affected by the state of the environment. Applicants are entitled to obtain this information within one month of the request and without having to say why they require it. In addition, public authorities are obliged, under the Convention, to actively disseminate environmental information in their possession;

•the right to participate in environmental decision-making. Arrangements are to be made by public authorities to enable the public affected and environmental non-governmental organisations to comment on, for example, proposals for projects affecting the environment, or plans and programmes relating to the environment, these comments to be taken into due account in decision-making, and information to be provided on the final decisions and the reasons for it ("public participation in environmental decision-making");

•the right to review procedures to challenge public decisions that have been made without respecting the two aforementioned rights or environmental law in general ("access to justice"). (EC, 2006).

National and International Agencies at European level are required to take public comments while considering new rules for the implementation of legislation and private and public sector have to take into account public opinions and decisions within plans, policies, and programs implementation.

Sustainable development as a principle and a practice, brings added value to the content and process of higher education. Higher education occupies a central position in shaping the way in which future generations learn to cope with the complexities of globalization. Here, universities are called upon to teach not only the skills students need to advance successfully in the labour market, but also to nourish in their students, faculty and staff a positive attitude towards cultural diversity and to help them to understand how people can contribute to a better life in a safer world. It is essential that the European universities mobilize all appropriate resources in a general context of sustainable development. It is urgently needed pro-active approaches on what universities could do to realize the Bologna reforms in order to face globalization, to serve the learners of the future and to contribute both to the DESD and the United Nations Economic Commission for Europe Strategy for Education for Sustainable Development adopted jointly by European Environment and Education Ministries in March 2005. Pro-active universities are of vital importance in the 'Europe of knowledge', particularly to contribute to sustainable development. COPERNICUS-CAMPUS as the European university network for sustainable development, is taking up leadership in the European Higher Education Area to mobilize universities and academia around the theme of sustainability and to support higher education institutions in the implementation in relation to the Bologna Process. COPERNICUS-CAMPU propose several guidelines for the incorporation of sustainable development into the Bologna Process, both on university and policy-making level (ministerial and national involvement), like: i) incorporating and implementing sustainable development into all teaching and research, as well as into degree requirements and research projects, ii) use of innovative practices of integrating sustainability into higher education, iii) physical operations at university campuses committed to sustainability and iv) sustainability assessments to monitor their behaviour, make improvements, and stimulate awareness of sustainability in the campus community (COPERNICUS-CAMPUS, 2007).

4. Set of criteria for higher education

Education should be seen as a continuous process through life and if we understand this then we will be able to perceive the world and ourselves as individuals who live in direct relationship with it. Aristotle in his Politics treaty, 2000 years ago, stated that there is disagreement about what the young should learn, either in, or on virtue, as a requirement to achieve a better life. Neither was it clear whether education should be more concerned with the structuring process of the intellect or of the character. These

issues are not very different from those currently asked before developing the curriculum for a new course.

The information and communication society that we live in introduced new requirements in the processes of curriculum development. Broadly speaking, individuals should be able to internalize and assimilate the culture in which they live, sharing the knowledge of art, science and technology, including its historical evolution, and, above all, developing skills that enable them to independently access these cultural products, enjoying them as much as possible, and continuously renewing them (Pozo & Gómez Crespo,1998). Beyond this challenge, we must also have in mind that the term "education" within the targets set by the Sustainable Development should involve the existence of reflective processes that lead to changes in lifestyles, provide information and tools that contribute to nature recovery, foster processes of social equity and cultural diversity, in short, encourage exchanges.

If the education act is not neutral we need to be aware when developing new courses, or analysing the existing systems, the needs to identify values that shape the various curriculum proposals, eventually expressed in the objectives and educational content, but also in modes of organization and management, and especially in praxis, where concepts take shape which often do not find clearly stated in official documents.

But reiterating the statements of Aristotle, still another question remains: should education focus primarily on providing life skills practice, or rather should focus on cultural and moral formation of individuals? According to this philosopher, all options have their supporters, and would even be possible to reconcile the various perspectives. We can say that this debate had several responses over time and societies, but today we need to rethink the role of current problems and we wonder about what kind of society we want to build.

In an attempt to provide some input into this discussion we tried to list a set of criteria, whose purpose is to serve as basis for analytical post-graduate programs (Master and Doctoral degrees) which aim to develop skills in the most of the term in the field of education for sustainable development. The criteria are presented at different levels: principles, practice and action, and in some cases a further subdivision is also considered (were organized by abstraction levels and areas, and to this latter sought to establish groups that may be associated with the identification of the same indicators).

Level 1 - "The principles"
Education concept

Education can be seen as a technique for providing instruction, and the processes of curriculum development regarded as exempted from any kind of theoretical and ideological contamination. However, if the curriculum is a means to achieve certain purposes, these should be discussed and analyzed before they articulate the goals, which in turn underlie the processes of curriculum development. At the other extreme, a critical curriculum theory articulated and framed within social contexts, seeking to reflect on how it establishes the interaction between education and our entire society. When the courses and programs are aimed at an Education for Sustainable Development matter, in our view, favoring the latter view, considering education as a transformative social practice. However, it is important to consider whether it is taken up and internalized that view.

Level 2 - "Practice"
Objective typology and suitability
The programs that address the ESD must be explicit at the objective's level that it seeks to contribute to the development of critical individuals who respect diversity, and to accept that knowledge corresponds to a process under construction. In a broader perspective we can cover all types of objectives aimed at an education process: citizenship, peace, democracy, intercultural, etc.
Moreover, it still remains to examine whether, and to what degree, the socio-cultural perspective, environmental and economic objectives are expressed in the course.

Curricular structure and horizontal and vertical interactions
The study of issues relating with sustainability must be supported in several knowledge areas, able to jointly expand the intellectual and cultural horizons of students in master´s or doctorate. This view has implicit the recognition of the complexity of knowledge in this area and need to be able to pass from local to global and vice versa, without losing the perception of problems that are being analyzed.
Besides the previously mentioned aspects express themselves through the curriculum structure, must also identify the types of vertical and horizontal articulation programs to establish with the other educational offerings.

Consistency between the content and how it is communicated
While formulating this criterion we want to draw attention to aspects such as interdisciplinarity and transdisciplinarity, the importance of systemic views, which should not only set out in the early stages, but should express themselves through the

coherence and complementarity of the various programs in this course units as well as in the way they are communicated. That is, one should not appeal to the need and benefits of cooperative and collaborative work when it is not also applied in educational contexts.

Level 3 - or action

Action preparation

The transition to action must involve the existence of preliminary analytical procedures, which seek to recognize the cause and impact of certain situations, including environmental and social, but now also introducing a new perspective that allow the identification of economic, political, or other, interests, involved in the decision making process. This process should be followed by a maturation phase that allows students to build their own ideas and values, which thus makes possible moving into action (Hodson, 2003).

Increasing levels of resilience of individuals and groups

Developing the ability of anticipation and change the environment. That is, promoting skills of "nonviolent resistance and creative at the obstacles, pressures and influences of the surroundings to prevent a life in harmony with nature and peace among human beings", (New, 2007).

5. A case study of b-learning Master in Environmental Citizenship and Participation at Distance Learning University in Portugal

We presented a case of study of the Master degree in Environmental Citizenship and Participation, where it applied the set of criteria for higher education, presented in the previous section.

The Master degree in Environmental Citizenship and Participation has been on offer at the Universidade Aberta (UAb, Portugal) since 2006. It is a formal course, organized according to the European Credit Transfer and Accumulation System (ECTS), and taught in b-learning system. Curricular units (CU) are delivered online, on e-learning mode, except for one CU which includes a one day face-to-face module, although this may be attended online, via direct transmission, by the students who cannot be present. The number of students per class is fixed between 25 and 30. The programme has the duration of three semesters, the first two semesters being dedicated to the curricular units (60 ECTS) (Table 1) and the third semester being dedicated to the planning, developing, writing and defending of the Dissertation/Project (40 ECTS). The

semester is defined as a period of 20 weeks, the 5 final weeks being dedicated to the final evaluation. The open source Moodle (www.moodle.univ-ab.pt/moodle) software is used as the learning management system (LMS). The Master program articulates vertically with a 1st degree in Environmental Sciences and with a 3rd degree in Social Sustainability and Development, both in E-learning.

This programme was designed to prepare individuals who complete it for working on environmental policy making, as well as for improving their environmental citizenship, participation and planning abilities. The programme was also designed aiming at a public consisting of governmental workers, public and private environmental advisors, members of Environmental NGOs, teachers, researchers and individuals involved in environmental practices, policies, planning, training, participation and citizenship. Subjects, methodologies and the case studies developed/used in this programme are drawn from the Environmental Sciences, Sustainability and Social Sciences. The pedagogical model underlying the learning process was developed specifically for distance learning at the UAb. (Pereira, 2007).

Each CU has a virtual classroom in the LMS, which serves a similar purpose to the face-to-face lectures, being a privileged space where the learning process takes place, and where a series of attitudes and problems can be detected and solved.

Table 1 Curricular Plan of the Master degree in Environmental Citizenship and Participation offered at the Universidade Aberta (UAb, Portugal).

1st Semester – Fundaments (optative CU, from which students select 30 ECTS)

Opcional Curricular Units	ECTS
Land use management	6
Pollution and resources	6
Waste management	6
Instruments for support of environmental management	6
Biodiversity, Geodiversity and conservation	6
Alimentary consumption and environment	6
Elements for the analysis of the social conjuncture	6
Environmental impact evaluation	6
Promotion of health and environment	6
Sustainable management of marine resources	6
Open curricular unit (*)	6

(*)The Master's degree coordination through the offer of an optional 'Open Course Unit' (1st semester) offers a list of online 2nd cycle course units provided by Universities of the European Space. Students may select one course unit among this offer to make up their curriculum in the first semester. The teacher / tutor of the open course unit is always an external foreign teacher / tutor, from a University of the European Space. This open course unit is taught in English.

2nd Semester –Practical Methodologies and Techniques (30 ECTS):

Obligatory Curricular Units	ECTS
Ethics and environmental citizenship	6
Sustainability politics	6
Participation and interactive methods in environmental decision-	6

making(*)	
Methodologies of social intervention	6
Methodology of applied Investigation	6
Projects and methodology in environmental citizenship	6

* - curricular units taught in face-to-face lectures.

Virtual classrooms of the curricular units are organised into topics, each topic being developed for periods of one to three weeks, depending on the subject area. Each topic is generally associated to one learning activity. Learning activities (E-activities) are mostly based on the 'Moodle activities', and include lessons, mini-tests, glossaries, discussion *fora* (mostly involving group work), short written assessments, and blogs. Communication is mostly asynchronous, although some synchronous moments are used, *e.g.* to evaluate the learning progress or for evaluation. Support materials include books, e-books, research papers, internet sites, power point presentations and short films.

Adjustments have been made to the Master program, since 2007, regarding structure, content and functioning, in agreement with what was stated earlier (section 4) and with our experience.

The coordination team has evaluated the program, yearly, at two distinct moments throughout the course (end of first semester, end of second semester) using confidential questionnaire surveys, and a third optional evaluation moment using semi-structured personal interviews. This evaluation process aims at the motivation and satisfaction level of students, and for that a set of criteria previously identified were used (Gilbert *et al.*, 2007; Bacelar-Nicolau *et al.*, 2009). The student sample was composed of students who enrolled in the previous three program editions, since 2007. This evaluation indicates that students felt a very high level of motivation and satisfaction with the e-learning Master in Environmental Citizenship and Participation.

In global terms, the curricular plan was considered good and very good (93%) for the acquisition of a sustainable environment behavior. Contributing to this high satisfaction level were good support didactic materials, good learning activities, very good competence and support of the teaching staff, and good interaction among students. As a result students felt an increase in their knowledge acquisition (93-100%), as well as a modification of their attitudes (80-100%) and behavior (73-93%) in key concepts/matters for a sustainable environment. Most students (93-100%) also felt they improved their competences at the professional level, and that the developed tools for the acquisition of an active environmental citizenship were very good.

Moreover, at the end of the second semester, all students felt that the program increased their intention to alter the attitude and behavior of others, and 75% had started active collaboration in public participation for environmental sustainability.

6. Conclusions

Environmental citizenship should be institutionalized by reforming legislations and political processes. Although existence of different political strategies, conventions and plans at International, European or National does not necessarily imply any real changes of behaviours towards sustainability and more efforts are still needed. Within this process a continuous ESD is a fundamental issue. It is widely believed that there must be a connection between citizenship and learning, or at least between citizenship and education. Effective policies relating to sustainable development require an elaborate theory of change built on an understanding of the relationship between the environment, citizenship and learning. Learning is thus seen as integral to such a theory of change. In this work we propose tools related with higher education, providing a knowledge base for the necessary responsibilities and effective behaviour change towards sustainability. Furthermore by studying and analyzing the different documents and literature that has been published it is clear that the success of the sustainable development has been its capability to promote the collaborative work between those who are primarily concerned with environment, those who value economic development, and those who are dedicated to improving the human condition. It is our understanding that the way forward is precisely towards the sustainability, supporting and encouraging the inter and transdisciplinarity; only the active contribution of all the researchers of the different scientific areas will lead to a serious approach to the key issues facing this twenty first century society. To proceed the master degree on Environmental Citizenship and Participation (the case study presented), and continuing to applied the set of criteria for higher education, a doctoral programme on Social Sustainability and Development is just starting at the Universidade Aberta, Portugal, and one of its aims is to contribute to form a generation of leaders capable of understanding the different meanings and implications of changes in global, social, and human systems and who choose the path of sustainability in implementing policies on the basis of this understanding.

It is particularly crucial that concern with sustainability issues are brought to the agendas particularly when limits on energy and other resources and the global environment in general are predicted to reach crisis point.

References

Agyeman J, Evans B. (2006). Justice, governance, and sustainability: perspectives on environmental citizenship from North America and Europe. In *Environmental Citizenship*, Dobson A, Bell D (eds). MIT Press: Cambridge, MA; 185–206.

Bacelar-Nicolau, P., Caeiro, S., Martinho, A.P. and Azeiteiro, U.M. (2009). E-learning for the environment. The Universidade Aberta (Portuguese Open Distance University) experience in the environmental sciences post-graduate courses. International Journal of Sustainability in Higher Education, 10 (4): 354-367

Bullard, R. (1990). *Dumping in Dixie: Race, Class and Environmental Quality*. Boulder, CO: Westview Press.

Carlsson, M.; Jensen, B. B. (2006). Encouraging Environmental Citizenship: The Roles and Challenges for Schools *in* Environmental Citizenship, Dobson A. and Bell D. (eds). MIT Press: Cambridge, MA; 238-261.

Connelly, J. (2006). *The Virtues of Environmental Citizenship in* Environmental Citizenship, Dobson A. and Bell D. (eds). MIT Press: Cambridge, MA; 50-73.

COPERNICUS CAMPUS (2007). COPERNICUS-Guidelines for Sustainable Development in the European Higher Education Area. COPERNICUS-CAMPUS Sustainability Center. Carl von Ossietzky University Oldenburg and COPERNICUS-CAMPUS University Alliance for Sustainability. SOCRATES, European Commission.

Delanty, G. (1997). Models of citizenship: defining European identity and citizenship. *Citizenship Studies* **1**: 285–303.

Dobson A. (2007). Environmental citizenship: towards sustainable development. *Sustainable Development* **15**: 276–285.

Dobson, A. (2003). *Citizenship and the Environment*. Oxford: Oxford University Press.

GHK/DTA (2008). Inventory of innovative practices in education for sustainable development. Order 31 DG EDUCATION AND CULTURE. GHK in association with: Danish Technology Institute. GHK and Danish Technology Institute

Gilbert, J., Morton, S., Rowley J. (2007). E-Learning: the student experience. British Journal of Educational Technology 38 (4): 560-573.

Harvey D. (2004). Local Environmentalism and the Internet. *Environmental Politics* **13**: 735-754.

Horton, D. (2006). *Demonstrating Environmental Citizenship? A study of everyday life among green activists. in* Environmental Citizenship, Dobson A. and Bell D. (eds). MIT Press: Cambridge, MA; 127-150.

Jelin E. (2000). Towards a global environmental citizenship? *Citizenship Studies* **4**(1): 47–63.

Melo-Escrihuela, C. (2008). Promoting Ecological Citizenship: Rights, Duties and Political Agency. ACME: *An International E-Journal for Critical Geographies*, 7 (2), 113-134.

Moffatt S, Phillimore P. (2003). What does environmental citizenship mean living next to a petrochemical plant? The case of two producer towns in Scotland and Germany. Paper presented at Citizenship and Environment Workshop, Environmental Politics Conference, University of Newcastle, UK.

Pereira, A., Mendes, A.Q., Morgado, L., Amante, L., Bidarra, J. (2007). "Modelo pedagógico virtual da Universidade Aberta : para uma universidade do futuro". Lisboa : Universidade Aberta, 2007, p. 1-112.Pozo, J. I. and Gómez Crespo, M. A. 1998. *Aprender y enseñar ciencia.* Madrid: Morata.

Regulation (EC) N° 1367/2006 Aarhus Convention on A ccess to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters to Community institutions and bodies.

Renn, O. (2008). Risk Governance. Earthscan: London.

Stokes, E., Edge, A. & West, A. (2001). Environmental education in the educational systems of the European Union. Centre for Educational Research. London School of Economics and Political Science Synthesis Report. Commissioned by the Environment Directorate-General of the European Commission.

UNESCO (2005) United Nations Decade of Education for Sustainable Development (2005-2014). International Implementation Scheme. Section for Education for Sustainable Development (ED/PEQ/ESD). Division for the Promotion of Quality Education. UNESCO, France.