Implementing the sustainable development goals at University level

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Abstract

Purpose – The purpose of this case study is to explore the principles and practices of sustainable development (SD) in the university curriculum.

Design/methodology/approach – To explore the principles linked with the sustainable development goals (SDGs) and the learning and teaching practices in sustainability at the International University of Catalonia (Universitat Internacional de Catalunya, UIC, in Catalan), an empirical study was carried out by using a mixed methodology for data collection. Indicators related to SDGs found in the University curriculum (quantitative analysis) were measured using Excel, combined with in-depth semi-structured interviews to the deans of different faculties (qualitative study), which were analysed using *Atlas.ti*.

Findings – Several visions, difficulties and challenges were identified in this mixed-method study around the concept of sustainability, which allowed the authors to describe and portray a specific starting position in relation to the SDGs at the UIC.

Research limitations/implications – The presence of dimensions linked to the SDGs in the University curriculum were analysed by means of a quantitative study. However, global competences related to education for sustainable development were not studied.

Practical implications – Special emphasis was given to the challenges and opportunities for training future graduates and the whole University community in SD.

Originality/value – This paper shows a methodological exploration of the principles related to the SDGs and the learning and teaching practices in sustainability in higher education.

Keywords Higher education, Implementation, Sustainable development goals, Sustainability curriculum, Transforming teaching and learning

Paper type Research paper

1. Introduction

The first decade of the twenty-first century has been characterised by major changes making the world a less sustainable, less secure and more violent place. The greatest

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challenge and responsibility facing higher education today is to contribute to fostering peace, cooperation and sustainability so as to guarantee the safeguarding of human rights.

Sustainable development (SD) and education for sustainable development (ESD) are concepts used on a daily basis. However, they are often understood in a reductionist way, as environmental and economic perspectives are considered separately rather than together (Bond Alan and Morrison-Saunders, 2011; Fien and Tilbury, 2002; Pérez *et al.*, 2005). The social aspects of SD or the relation between environmental degradation and social problems (Sachs, 2012; Francis, 2015) are hardly ever taken into account.

In the preamble of *Transforming our world: the 2030 Agenda for Sustainable Development*, the following is said about the goals and targets of *SD for the coming years*: "They are integrated and indivisible and balance the three dimensions of SD: the economic, social and environmental" (UN, 2015). This holistic vision of sustainability is present in the ESD documents published at the beginning (UNESCO, 2005a; UNESCO, 2005b) and at the end of the DESD 2005-2014 Nagoya Declaration on Higher Education for Sustainable Development (UNESCO, 2014a) and in the final report: Shaping the Future We Want (UNESCO, 2014c). It also appears in the final document of the United Nations conference on SD entitled "The Future We Want" (UN, 2012b) and the *Peoples' Sustainability Treaty on Higher Education. Draft for Rio + 20* produced by the Copernicus Alliance (Tilbury, 2012).

This paper presents research carried out at the Universitat Internacional de Catalunya (UIC) on key concepts linked with the sustainable development goals (SDGs) and the learning and teaching practices related to ESD in all the degree programmes offered. Recent studies show that efforts have been made to implement sustainability at various universities (Albareda Tiana and Alférez Villarreal, 2016; Barrón Ruiz *et al.*, 2010; Calder and Clugston, 2003; Disterheft *et al.*, 2012; Ferrer-Balas *et al.*, 2008; Geli de Ciurana and Leal Filho, 2006; Leal Filho, 2010, 2011, 2015a, 2015b; Lozano, 2009, 2011; Michelsen, 2016; Müller-Christ *et al.*, 2014; O'Byrne *et al.*, 2015; Ramos *et al.*, 2015; Wals, 2014; Wals *et al.*, 2016). However, as sustainability and ESD are novel concepts in the higher education system, criteria related to curriculum content linked to the SDGs and adequate educational methodologies for its implementation have been found wanting.

The resolution of the UN General Assembly declaring a Decade of Education for Sustainable Development (DESD) (2005-2014) invited all educational institutions to contribute to education for sustainability. The DESD includes issues such as environmental protection, reduction of poverty, gender equality, responsible consumption, human rights, climate change, etc. to construct a world in which the basic needs of each person can be met (UNESCO, 2005b).

Transformation is a complex and long-term ambition. It must start by recognizing the SD agenda calls for a paradigm shift in education. It is not only a matter of transforming institutional responsibility but also curriculum reorientation and teaching to better serve the needs of current and future generations. The process will take time, and adopting a resilient and inclusive approach to change is necessary.

From the 1990s onwards, the Declarations on Sustainability in Higher Education started to encourage sustainability in universities (Leal Filho, 2010; Lozano *et al.*, 2013; Michelsen, 2016). As stated in the Final Report on the UN Decade of Education for Sustainable Development Shaping the Education of Tomorrow: 2012, commissioned by UNESCO, by the first decade of the twenty-first century, the majority of scientific articles on the theme of sustainability in higher education (HE) deal with topics of environmental management, ecological footprint and making university campuses more ecologically friendly. To a lesser degree, sustainability has been introduced across university curricula (Wals, 2012). Higher

education institutions (HEIs) have made significant efforts to address sustainability in the reorientation of learning and teaching practices in sustainability (Thomas, 2016).

Within the Spanish university system (SUS), several universities are working on incorporating ESD into university degrees. The Conference of Rectors of Spanish Universities (CRUE in Spanish)[1] has drafted and approved documents that propose core competences in sustainability (CRUE-Comisión de Sostenibilidad, 2012). In May 2015, the CRUE Sustainability Commission adopted the teaching strategy of service-learning as an educational practice, which facilitates curricular sustainability (CRUE-Comisión de Sostenibilidad, 2015). It is considered to be a suitable methodology for educating about, for and from sustainability. Service-learning is an educational approach where students participate in community service related to their academic learning. Community service is thus combined with critical thinking (Aramburuzabala *et al.*, 2015). Students develop civic responsibility and interpersonal skills and demonstrate greater academic development (Hébert and Hauf, 2015; Gibson *et al.*, 2011). Its methodology educates students in real-world problems (Barth *et al.*, 2014), and according to the promoter of this methodology, Andrew Furco:

> [. . .] service-learning programs are distinguished from other service programs by their intention to equally benefit the provider and the recipient of the service, as well as to ensure equal focus on both the service being provided and the learning that is occurring (Furco, 1996).

Taking into account the UNESCO statements made at the end of the DESD Aichi-Nagoya declaration (UNESCO, 2014a), including the Roadmap for Implementing the Global Action Programme on ESD (UNESCO, 2014b) and the Rio +20 Treaty On Higher Education, the aim of this study was to explore the implementation of the SDGs (UNESCO, 2017) and the learning and teaching practices in sustainability in the degree courses offered at the UIC.

Within this general framework, the specific objectives were as follows:

- to identify the curricular implementation of topics linked to the SDGs using the degree reports and official University degree documents;
- to analyse the mission statement of the University with respect to sustainability;
- to discover the difficulties of putting sustainability into practice;
- to know which learning and teaching strategies are used most frequently; and
- to recognize the challenges and opportunities of ESD in University education.

2. Methods

The methodology applied in this case study is of a descriptive and empirical nature. Non-parametric qualitative and quantitative analysis techniques were used.

As a methodological precedent for curricular research on ESD in this case study, the study performed at the *Universitat de València* (UV) (Aznar Minguet *et al.*, 2013, 2014) was used as a starting point. As it is an SUS University, its academic system and University curriculum are similar to the ones applied at the UIC[2].

Degree reports are official university degree documents which the different Spanish HEIs present to the Ministry of Education. They include information on the curricular content, the methodologies used and the evaluation system for each subject of all the degree programmes on offer in Spanish universities. The National Agency for Quality Assessment and Accreditation in Spain (ANECA) is in charge of assessing and validating them. Any modification to current degree programmes requires justification and a new approval.

In the study performed at the UV (Aznar Minguet *et al.*, 2013, 2014), the research was two-pronged. It was partly carried out through analysing the degree reports, looking for terms related to environmental, social or economic sustainability, following the DESD proposals (UNESCO, 2005b) and partly through interviewing all the academic staff at the UV by using the SWOT (strengths, weaknesses, opportunities and threats) analysis technique.

To explore the implementation of topics linked to the SDGs and the learning and teaching practices in sustainability, this case study used an empirical mixed methodology similar to the one used at the UV. Indicators related to the SDGs found in the degree reports (quantitative study) were measured using *Excel*, in combination with in-depth semi-structured interviews to academic staff from all the University faculties (qualitative analysis), which were analysed using *Atlas.ti*. We then examined the difficulties and challenges encountered in implementing sustainability at the University and the learning and teaching strategies most often used. This mixed-method study was carried out during academic years 2012-2013 and 2013-2014.

Assumptions and interpretations regarding the SDGs, the difficulties of putting sustainability into practice and the learning and teaching strategies used were aspects that emerged during the interviews.

The methodology described in this paper followed the quality standards for case study research in accordance with the quality criteria established by Dr Kyburz-Graber (2016):

- It is founded on the *theoretical basis* of implementing SD at University.
- *Triangulation of data collection* was performed by comparing the data analysed in the quantitative study and exploring the topics linked to the SDGs in the reports and in the qualitative analysis of the interviews in which difficulties, pedagogical strategies and the challenges for implementing SDGs in HE appeared.
- Evidence of the findings is provided through *a traceable chain of evidence* detailed in the results section.
- The case study research includes relevant references *documenting* the data and their interpretation. An *inter-subjective validation* was carried out.
- It is compiled through an *iterative review and rewriting process.*

2.1 Quantitative study

The aim of this quantitative study was to find the priority areas and dimensions mentioned in the University's degree reports, as promoted by UNESCO in the DESD. The 2005 priority areas are directly related to today's SDGs. Justification, objectives, general competences and specific competences were the sectors selected for analysis.

The areas selected as SD dimensions are presented in Table I.

A correlation exists between these priority areas for the DESD and the SDGs (UN, 2015) (Figure 1). The recent UNESCO publication on the SDGs includes a lot of suggested topics and examples of learning approaches and methods for SDGs. For each SDG, learning objectives are described in the cognitive, socio-emotional and behavioural domains (UNESCO, 2017).

Four categories of analysis were established in this case study: integral sustainability (SOSTENB), the socio-cultural dimension (SOCIOCULT), the environmental dimension (ENVIRON) and the economic dimension (ECONM), each with its own key items. The conceptual contents of each of the items analysed (Aznar Minguet *et al.*, 2013):

(1) *SOSTENB*: It is a concept that includes the search for environmental quality, social justice and a fair economy, which is viable in the long term (CRUE-Comisión de Sostenibilidad, 2012). The word sustainability and its derivatives (sustainable, unsustainable, etc.) found in the analysis of the degree reports fall under this concept. It also includes the three dimensions (environment, economic and social) when they are referred to simultaneously, even if the word sustainability or analogous terms are not mentioned explicitly.

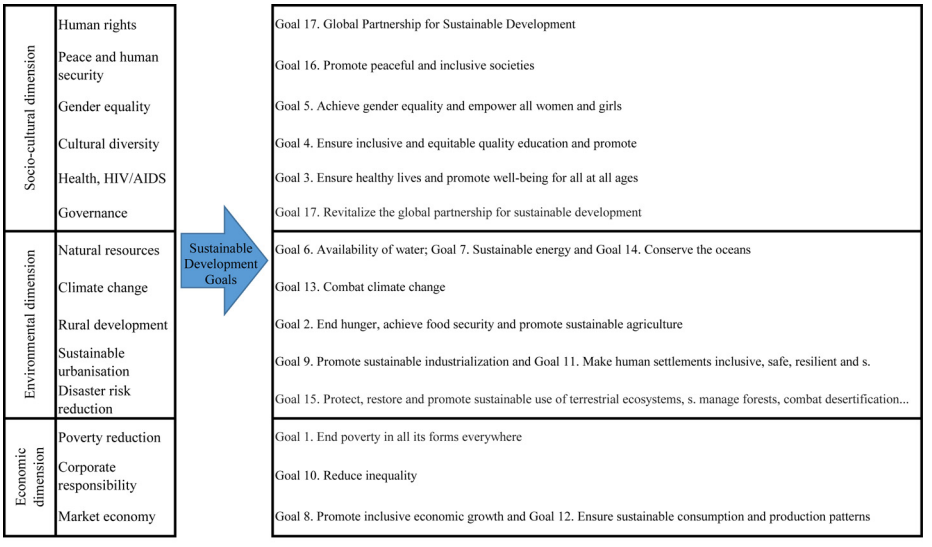
(2) *SOCIOCLT*: It refers to the socio-cultural dimension and includes the following priority fields/spheres:

- *HR*: It refers to human rights.
- *CULDIV*: It refers to cultural diversity and intercultural understanding, peace and security. It includes intercultural education and inclusive education.

Socio-cultural dimension	Environmental dimension	Economic dimension
Human rights	Natural resources	Poverty reduction
Cultural diversity and intercultural understanding, peace and human security	Climate change	Corporate responsibility and accountability
Gender equality	Rural development	Sustainable consumption and production
Health, HIV/AIDS	Sustainable urbanisation	
Governance	Disaster risk reduction	

Source: UNESCO (2005b)

Table I.
Priority areas for the DESD



Source: Authors' own elaboration

Figure 1.
Relation between the priority areas of Sustainable Development UNESCO, 2005 and the Sustainable Development Goals United Nations, 2015

- *GENDER*: It refers to gender equality. There is no gender discrimination and includes defence of women's rights.
- *HEALTH:* It refers to promotion of health, factors that determine quality of life health-wise, conditions which harm physical and emotional health and prevention of HIV/AIDS.
- *GOVR*: It refers to governance and includes social democracy, transparency, freedom of speech, civic participation, ethical responsibility, ethical principles and values.

(3) *ENVIRON*: It refers to the environmental perspective of the DESD 2005-2014 and includes:

- *NR*: It refers to natural resources and includes protection and sustainable use of the natural resources that are necessary for life, environmental degradation, responsible use of water, biodiversity and conservation, care of nature and protection of the environment in general.
- *CLIMCH*: It refers to climate change associated with global warming and includes understanding of the phenomenon and measures necessary to mitigate climate change and use of renewable energies and energetic efficiency.
- *RURALD*: It refers to rural development and includes awareness of needs in rural communities.
- *URBSOST*: It refers to sustainable urbanisation.
- *DRR*: It refers to disaster risk reduction and includes disruption caused by natural disaster, human impact on nature and its social and economic consequences.

(4) *ECONM*: It refers to the economic perspective of the DESD (2005-2014) and includes:

- *POVERTY*: It refers to poverty reduction.
- *CR*: It refers to corporate responsibility and accountability and includes social responsibility at University and corporate social responsibility.
- *SCP*: It refers to sustainable consumption and production and includes sustainable economy, harmonising market needs with care for the environment and social equity, social and environmental effects of consumerism and evaluating the environmental and social impact of economic activities.

2.1.1 Quantitative study sample. To explore the curricular implementation of topics linked to the SDGs using the degree reports of the University, all the curricula of this University approved by ANECA were analysed. There are 14 degrees organised in the following eight faculties:

(1) Faculty of Law – Law and Political Science;

(2) Faculty of Economic and Social Sciences – Business Administration;

(3) Faculty of Dentistry – Dentistry;

(4) Faculty of Medicine and Life Sciences – Medicine, Nursing and Physiotherapy;

(5) Faculty of Humanities – Humanities;

(6) Higher Technical School of Architecture– Architecture;

(7) Faculty of Communication Science – Audiovisual Communication, Advertising and Public Relations and Journalism; and

(8) Faculty of Education – Primary Education and Pre-School Education.

2.2 Qualitative study

Interviews were carried out with academic staff from the faculties analysed in this case study so as to explore the values and the learning and teaching practices in sustainability that are invisible in the University curriculum. The interviews conducted were in-depth focused semi-structured interviews.

2.2.1 Qualitative study sample. Academic staff from the following eight faculties were included in the population analysed:

(1) Law;
(2) Economic and Social Sciences;
(3) Dentistry;
(4) Medicine and Life Sciences;
(5) Humanities;
(6) Higher Technical School of Architecture;
(7) Communication Science; and
(8) Education.

Each Faculty offers a minimum of one and a maximum of three degrees. The participants interviewed were the deans, and in one case the vice-dean, of the above-mentioned faculties. The interviews contained four open questions about SD and the integration of ESD in the degree(s) offered by the faculty in question.

2.2.2 Interview format. The format of the semi-structured interviews held with the deans of the respective faculties was as follows:

The objective of this interview is to find out what is being done in the different degrees taught at the UIC to implement policies of sustainability and university social responsibility (USR). We appreciate your collaboration and assure you that the information you provide in the recorded interview shall be kept in strict confidence by the SIRSU research group in charge of the analysis:

(1) How would you define the concept of "sustainable development"? Do you think this concept contributes to integral human development?
(2) Do you think the University should encourage education in sustainable development (ESD) and social responsibility (SR)? Why?
(3) Do you think that education for sustainability and social responsibility are related to the mission & vision of the University? Why?
(4) In 2005, the Talloires Declaration about the development of programmes of citizenship and social responsibility in Universities was signed, after which the United Nations celebrated the Rio+20 Conference on Sustainable Development (2012), in which many Rectors, Deans and Directors of Higher Education Institutions signed a treaty of sustainable practices for the institutions they work at. Bearing this in mind, could you answer the following questions:
    - Do you think sustainability should be introduced into the University curriculum? Please give reasons for your answer.
    - How do you envisage Higher Education contributing to fostering sustainable behaviour? Do you think the University should foster such behaviour?
    - Do you think Higher Education can and should contribute to behaving in a way that encourages solidarity? Why? In your opinion, would this be done best through the curriculum or through voluntary work?

- Do you think University Social Responsibility (USR) should be introduced into the University Curriculum? Please give reasons for your answer.
- Do you know if any area of S, ESD or USR is being taught in the degree(s) offered at your faculty? In which degree? Who teaches it?
- Do you think sustainable behaviour is particularly important in the 21st century? Why?

The interviews were conducted by two members of the research group, authors of this article, in such a way that the interviewees could talk freely and openly. There was no need to stick to the prepared set of questions, as the questions were merely used as a guide. The interviews were held in the form of a two-way dialogue in eight sessions of approximately 90 min. To ensure confidentiality, the name, gender and faculty of the interviewees were not revealed.

2.2.3 Interview analysis. The qualitative aspect was based on the analysis of the content of the eight interviews held with academic staff. The interviews were filmed and transcribed, after which they were submitted to a process of conceptualisation.

To group, classify and analyse the data collected from the interviews, the content was initially coded and then categorised by applying the Grounded Theory (Glaser and Strauss, 1967). The process of analysis and coding was summarised in three phases: categorisation, conceptualisation and theorisation. The computer programme *Atlas-ti* was used for this purpose.

3. Results and discussion

By using a mixed methodology, different visions, difficulties and challenges with respect to teaching contents and strategies and education for sustainability were identified. Addressing those concepts enabled describing and presenting the initial outline of this study.

The present paper first analysed the terminology related to the SDGs in the University degree reports (quantitative analysis), which enabled describing the learning content. In the second part of the research, the study explored teaching contents and strategies and education for sustainability in depth by conducting interviews with the academic staff from different faculties to observe their views on ESD and its relationship with the mission of the University (qualitative analysis).

3.1 Results of the quantitative study (degree reports)

The global results of the quantitative analysis of key words related to the SDGs in the sectors of justification, objectives, general competences and specific competences in the degree reports are shown in Figure 2 and Table II. A comparison of the results from the eight faculties is provided.

In the Humanities degree, HR, SDG 17, is only mentioned once. Gender identity (GENDER), SDG 5, does not appear in Humanities, Advertising and Public Relations, Primary Education, Pre-School Education and Architecture.

GOVERN, which includes fostering ethical principles and values, hardly appears in the degree reports of the University and was only found in Law, Political Science, Humanities and Journalism.

Fostering the use of NR, preserving them and using them in a sustainable way gets practically no mention in the degree reports. The Law, Business Administration and Humanities degrees are encouraged to include NR in their reports. The term NR has been identified with SDG 6: Clean Water and Sanitation, SDG 7: Affordable and Clean Energy and SDG 14: Life below Water. Conserve and sustainably use the oceans, seas and marine resources.

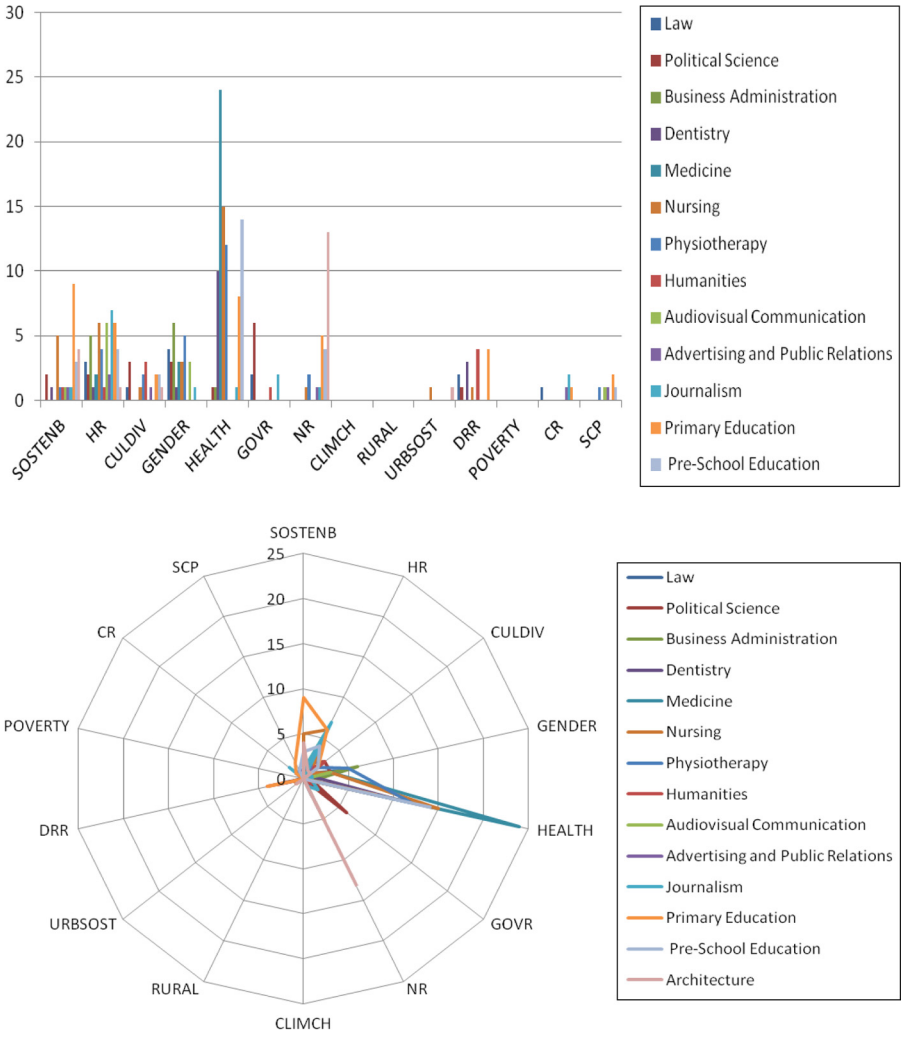


Figure 2.
ESD/SDG keywords present in the degrees analysed in this study

There are no objectives or competences linked to mitigating CLICHANGE, SDG 13, or POVERTY, SDG 1, in any of the degree programmes. Cultural diversity (CULDIVER), similar to SDG 4, which includes intercultural understanding, peace and security, intercultural education and inclusive education, is hardly worked on in the University degrees considered and does not appear in Business Administration, Dentistry, Medicine, Audiovisual Communication and Journalism.

3.2 Results of the qualitative study (interviews)

Once the interviews were transcribed, different families of codes were formed and put into categories. This was done by grouping the similarities and convergences of what was said in the interviews with academic staff. The results do not constitute direct

Table II.
Number of ESD/SDGs keywords in the degrees

Degrees	SOSTENB	HR	CULDIV	SOCIOCLT GENDER	HEALTH	GOVR	NR	ENVIRONMEN CLIMCH	RURAL	URBSOST	DRR	ECONM POVERTY	CR	SCP
Law	0	3	1	4	0	2	0	0	0	0	2	0	1	0
Political Science	2	2	3	3	1	6	0	0	0	0	1	0	0	0
Business Administration	0	5	0	6	1	0	0	0	0	0	0	0	0	0
Dentistry	1	1	0	1	10	0	0	0	0	0	3	0	0	0
Medicine	0	2	0	3	24	0	0	0	0	0	0	0	0	0
Nursing	5	6	1	3	15	0	1	0	0	1	1	0	0	0
Physiotherapy	1	4	2	5	12	0	2	0	0	0	0	0	0	1
Humanities	1	1	3	0	0	1	0	0	0	0	4	0	0	0
Audiovisual Communication	1	6	0	3	0	0	0	0	0	0	0	0	0	1
Advertising and Public Relations	1	2	1	0	0	0	1	0	0	0	0	0	1	1
Journalism	1	7	0	1	1	2	1	0	0	0	0	0	2	0
Primary Education	9	6	2	0	8	0	5	0	0	0	4	0	1	2
Pre-Primary Education	3	4	2	0	14	0	4	0	0	0	0	0	0	1
Architecture	4	1	1	0	0	0	13	0	0	1	0	0	0	0

answers to the questions asked in the interviews, but are extracts from the dialogue maintained to obtain answers to questions linked to the specific objectives of this paper. Figure 3 shows the views the interviewees have on ESD curriculum implementation at the University. Figure 4 presents the pedagogical strategies used most frequently in the degrees analysed. Finally, Figures 5 and 6 reflect the difficulties and opportunities involved in ESD implementation.

This part of the study shows that the academic staff clearly perceive the relationship between the mission of the University and ESD (Figure 3). The category stating the absolute necessity of ESD in the University appears 17 times in the analysis of the interviews, while on 9 occasions, it is said that ESD is directly linked to the University's mission. Similarly, the fact that the University should foster greater social justice is mentioned three times, and on four occasions, the academic staff affirm that the University is responsible for the future of the planet (integral sustainability). This clearly and indisputably indicates that the interviews point to the direct link between ESD and the University's mission, information that is not reflected in the degree reports.

With respect to the pedagogical strategies used, or those that could possibly be used, in ESD (Figure 4), a variety of activities and approaches are reflected in the interviews. They are grouped into those strategies linked to ESD and those related to a holistic view. There was only one case in which an interviewee said that the best methodological strategy was the master class, which could be classified in another category: traditional knowledge.

Regarding the challenges and opportunities ESD offers University education, they are inferred from the results presented in Figure 6, which shows that despite the implementation difficulties, the majority considers ESD to be an educational opportunity for University students.

3.3 Discussion of results

GOVERN hardly appears in the degree reports of the University, which is worth mentioning because it is explicitly referred to in the institutional documents of the University analysed in this study:

> An essential requirement for the appropriate service the University wishes to provide humans with is that the people who make up the University community and the University work itself are

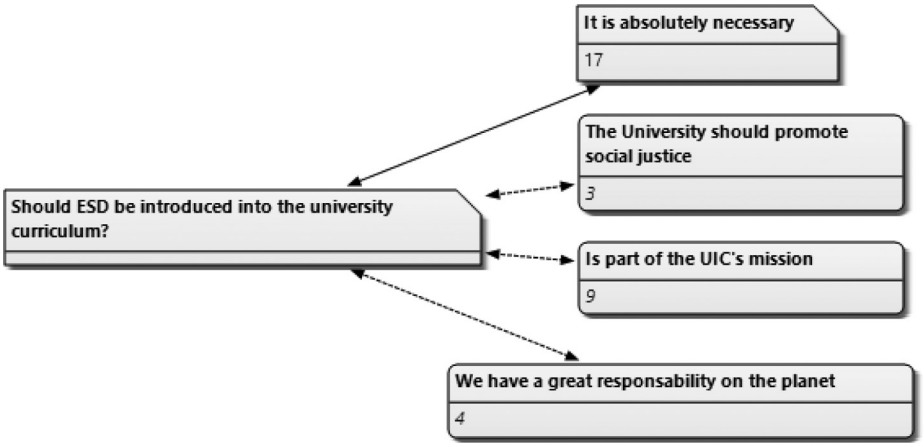


Figure 3.
ESD curriculum implementation at the University

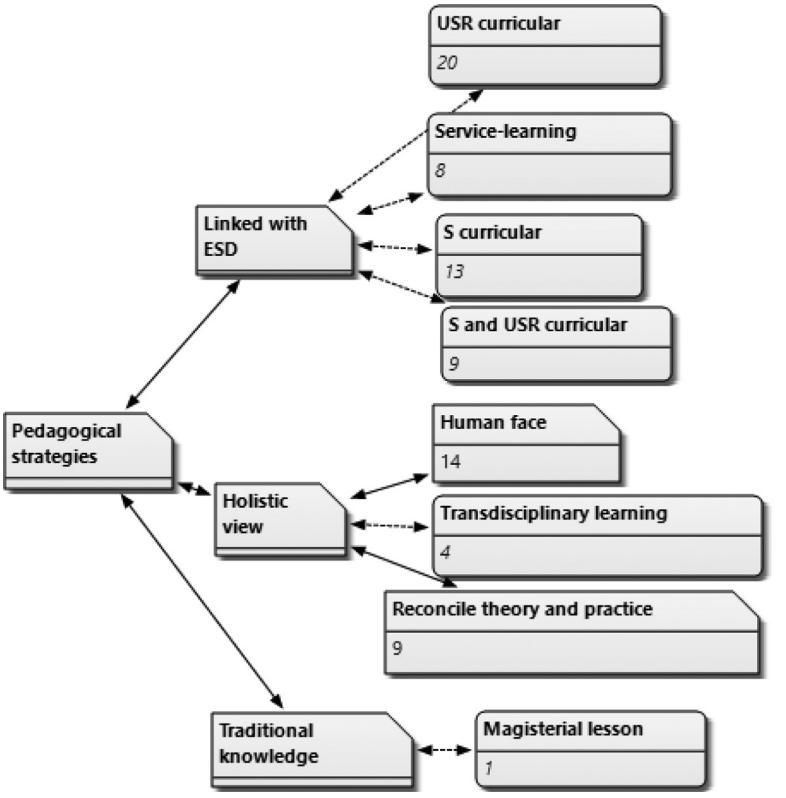


Figure 4.
Pedagogical strategies used or possibly used in ESD

> guided by the concept of utmost dignity of people, including full respect for human rights. (UIC, 2006, p. 1)

Promoting the sustainable use of NR is hardly mentioned in the degree reports. Law, Business Administration and Humanities degrees are encouraged to include NR in their reports.

With regard to the absence of implementing SDG 13 "Climate Action" or CLICHANGE, there are different proposals related to Education for Sustainable Development Goals in all the degrees; Learning Objectives (UNESCO, 2017). Although the University analysed in this study is not a university that offers technological degrees, it is important for degrees such as Business Administration to include aspects of eco-economy and ways of wealth creation without using fossil fuel. Similarly, in the Architecture degree, which includes subjects related to sustainability and which organises lectures on energy efficiency, mitigation of Climate Change has been excluded from the degree reports. Introducing the suggested topics for SDG 13, such as "Energy, Agriculture and industry-related greenhouse gas emissions" (UNESCO, 2017) into the degree reports is advisable. Including "Ethics and climate change" or related topics (UNESCO, 2017) in Law, Humanities and Primary Education degrees is recommended.

Not a single degree explicitly mentions reducing poverty (POVERTY), SDG 1, which makes this element invisible. In a society undergoing an economic crisis and a crisis of

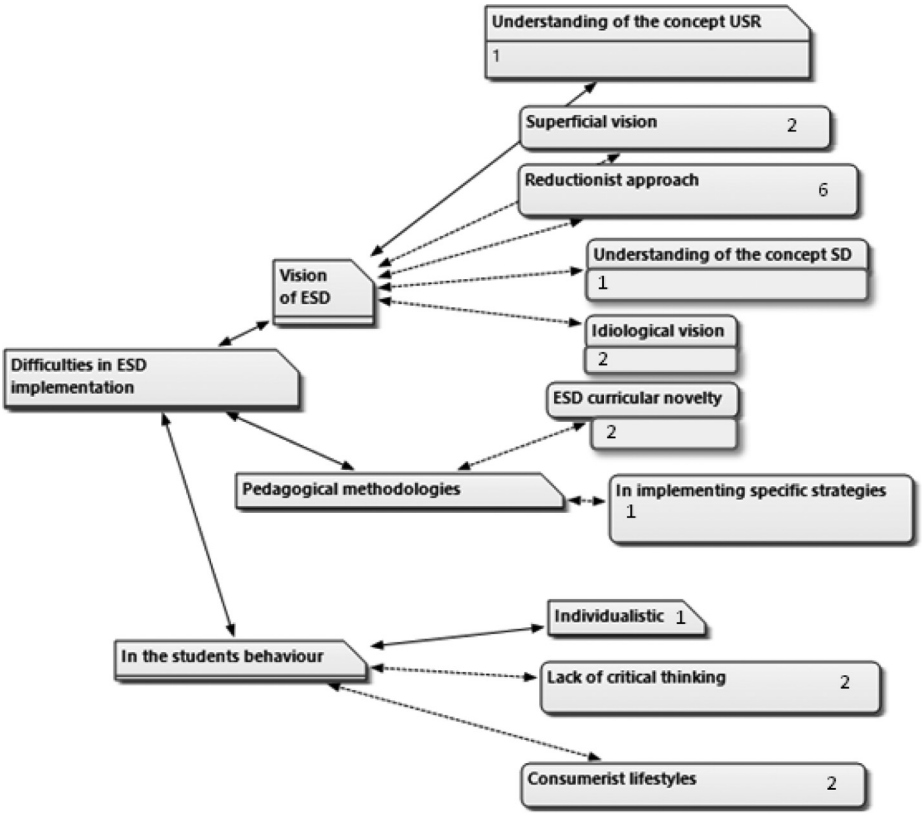


Figure 5.
Difficulties in ESD implementation

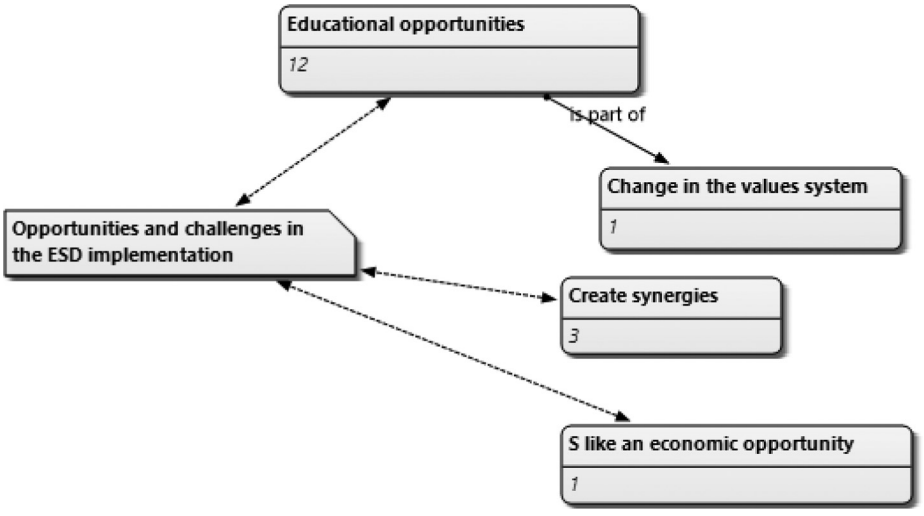


Figure 6.
Opportunities and challenges in ESD implementation

values, it is important for university institutions to train those who will soon be joining the workforce to be committed to creating a more just and fair society. This will only be possible if theory is related to practice (Ryan and Tilbury, 2013a, 2013b) and students carry out tasks of cooperation and service (Godfrey *et al.*, 2005; Papamarcos, 2005). The suggested topics for SDG 1 "No Poverty", such as "Global, national and local distribution of extreme poverty and extreme wealth and their reasons" or "The interrelation of poverty, natural hazards, climate change and other economic, social and environmental shocks and stresses" (UNESCO, 2017), will be included in most degrees. At the University analysed in this study, opportunities to engage with the poor to empower them and reduce their vulnerability to different hazards are offered in all the degree programmes in collaboration with non-governmental organisations (NGOs) or community groups (UNESCO, 2017), but in most cases, these activities are not curricular objectives.

CULDIVER, which is similar to SDG 4, is hardly worked on in University degrees, despite the fact that it is an emerging need directly linked to human dignity.

The results confirm that the degree reports hardly mention the priority dimensions of SD (UNESCO, 2005b). This contradicts the institutional documents of the University analysed in this study (UIC, 2006, 2015), which state that sustainability is explicitly linked to the University's mission. In a university community imbued with a sense of ethics, based and focused on human dignity, the rights of people and service to society, the Mission of the University considers the priority dimensions of SD an absolute priority. These priorities are the same as some of the priority dimensions of the DESD (UNESCO, 2014b) and the UN and UNESCO SDGs (UNESCO, 2017). All of them are related to ethical attitudes, and the competences for SD are often more closely linked to ethical and moral attitudes (Lambrechts *et al.*, 2013). The analysis carried out shows that said priority spheres of ESD are not present in the degree reports. This supposes re-thinking the institutional mission and restructuring the courses (Wals and Jickling, 2002; Yarime *et al.*, 2012).

In the qualitative study, on the contrary, the academic staff explained which pedagogical strategies they use the most in their teaching and what they think should be done. Suitable methodological strategies were divided into eight coded groups (Figure 4) categorised as follows:

- *Methodological strategies which are directly linked to ESD*: This group also includes the service-learning teaching strategy, which is directly linked to USR and more broadly to ESD (CRUE-Comisión de Sostenibilidad, 2015; Aramburuzabala *et al.*, 2015). Sustainability requires taking responsibility (Wals and Jickling, 2002), and the service-learning methodology enabled students to apply it to real-world problems (Barth *et al.*, 2014; Brundiers *et al.*, 2010) and to work together with stakeholders (Steiner and Posch, 2006); and
- *Holistic strategies which facilitate the connection between theory and practice* (Cortese and Hattan, 2010; Ryan and Tilbury, 2013a, 2013b).

These strategies need to be implemented across the board by teachers who are aware of the human dimension of teaching and of the importance of implementing human rights education in the curricular content of the subject matter taught. Holistic strategies need to try to ensure that what is taught in the classroom is not reduced to mere numbers. In the words of one of the academics interviewed, teachers are trying to discover the "human face" of the information provided in the different subjects.

In Figure 5, the difficulties expressed by the academic staff were categorised in three groups: first, the conceptual difficulties (Vision of ESD) experienced, which include ideological aspects, as fostering sustainability has historically been linked to certain

political parties or to a certain ideology (Wals and Jickling, 2002). This is because of a lack of information, disagreement with the concept and confusion (Lozano, 2006; Murga-Menoyo, 2015). The concepts of sustainability, SD and University social responsibility – together with features of these concepts – are not always understood, as they are novel concepts in the University environment. Deeper knowledge is required through study and interdisciplinary dialogue (Tilbury, 2011; Scholz *et al.*, 2006; Zoller, 2015); The second group consisted of difficulties encountered regarding pedagogical methodologies, which were divided into the following:

- difficulties in the implementation of new curricular content, which needs robust and global academic training (Ryan and Tilbury, 2013a, 2013b); and
- difficulties related to the students' assimilation of content, as the teachers found that the student population had difficulties in reflecting problems linked to SD that required thought (Cebrián *et al.*, 2012; Wals, 2009, 2011).

This is a challenge for educators because it is not possible to develop competences in sustainability, such as critical thinking, in formal learning settings (Barth and Rieckmann, 2012). The third group included the students' resistance to changing their behaviour and to cooperation. The methodological difficulties and the difficulties of the students related to resistance to change can be overcome by using them as a challenge to find out how to surmount them. Research carried out at the University on individual ecological footprint shows how, by using different teaching-learning methodologies, students' consumer behaviour may be modified and the effectiveness of the methodologies used can indirectly be verified (Fernández *et al.*, 2016). Integrating sustainability in higher education is closely connected to the development of qualities in students (Wals and Jickling, 2002).

It is particularly significant that student behaviour is characterised as individualistic, thoughtless and consumerist. Those findings were obtained through the qualitative analysis of the in-depth interviews with academic staff. When grouping the codes related to the difficulties to implement ESD, student resistance to think of others was occasionally mentioned. This was a subjective perception of academic staff that came up in spontaneous conversations. Such judgment is comparable to attitudes reflected in the Executive Summary for the State of the Future 2015 "me-first" when referring to the Global Challenges: "How can ethical considerations become more routinely incorporated into global decisions?". The presence of such student behaviour, together with the social circumstances of an economic crisis and no peace, show that it is particularly necessary to equip future graduates with the training needed to resolve the problems they are faced with in a peaceful and fair way. The study "Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behaviour?" shows that "the biggest positive influence on pro-environmental behaviour [. . .] is achieved when internal and external factors act synergistically" (Kollmuss and Agyeman, 2002). Therefore, to achieve a behaviour change towards SD (Mogensen and Schnack, 2010; Rieckmann, 2012), it will be necessary to work on not only knowledge but also attitudes and perceptions, which implies the development of competences in ESD and motivations (Sipos *et al.*, 2008; Delors, 1996). The objective for ESD in HE is to ensure that graduates develop "competences in systemic, anticipatory, and critical thinking" (Rieckmann, 2012; Wiek *et al.*, 2011), "competences related to ethics and values" (Rieckmann, 2012; Sleurs, 2008; Wiek *et al.*, 2011) and "interpersonal competences" (Wiek *et al.*, 2011).

The content related to ESD, such as fostering human rights, poverty reduction, ethical values, care for natural resources, mitigation of climate change, sustainable economy, etc., contributes to the well-rounded education of students who will enter the job market soon.

After Transforming our world: the 2030 Agenda for Sustainable Development (UN, 2015) and its 17 goals that are similar to the priority areas for the DESD (UNESCO, 2005b) (Figure 1), the methodological strategies linked to ESD, including learning from real problems, anticipating and preparing for future sustainability challenges (Ryan and Tilbury, 2013a, 2013b; Wiek *et al.*, 2011), core methodologies and integrative thinking and practice including different disciplines, cultures and perspectives (UNECE, 2011), also work towards that same goal. They could be an opportunity for establishing synergies between university departments, between degrees and between society and the university (Müller-Christ et al, 2013; Wiek *et al.*, 2012). Those possible synergies would enable the change towards Higher Education for Sustainable Development through a participative process (Barth *et al.*, 2007) by bringing research into teaching, or vice versa (Posch and Steiner, 2006), as well as multi-/interdisciplinary research for SD (Fien, 2002; Waas *et al.*, 2010). Finally, it should be pointed out that sustainability could also be an economic opportunity (Hesselbarth and Schaltegger, 2014). In a society that is not sustainable, in which economic values are given pride of place, education in sustainability could contribute to economic progress and, at the same time, integral sustainability could be fostered. Cooperation between natural scientists and economists in identifying and assessing the loss of economic benefits caused by the decline in ecosystem goods and services (Barbier, 2011) is growing. Numerous possibilities exist to work on the concept of sustainable economic development (Barbier, 1987) linked to SDG 8: Decent Work and Economic Growth, such as alternative economic models and indicators, steady-state economies, common-welfare economies, degrowth or new technologies and local economies for SD (UNESCO, 2017).

4. Conclusions and future perspectives

In this study, the visions, difficulties and challenges related to the topics linked with the SDGs and the pedagogical strategies used to train active and critical citizens in this respect became apparent. This reality enabled defining and depicting a starting point for the implementation of the SDGs at the UIC. The research helped us describe and portray concepts documented in the degree reports regarding the SDGs, the reasons for implementing them and how to apply them, which represents the added value of this study. Special emphasis was given to the challenges and opportunities for training future graduates and the whole University community in the SDGs.

The following conclusions contribute to SDG implementation on the basis of exploring the principles and practices of ESD in this study. The conclusions drawn from the results related to the research objectives can be summarised as follows:

- The University, as an educational institution committed to respect for the human person and to foster and defend human rights, should promote a culture of sustainability, which contributes to integral human development. To make this commitment more robust, it is necessary to incorporate ESD and the SDGs into the curriculum of the University degrees.
- After reviewing the University degree reports, a lack of consistency with the University's Mission was observed. Curriculum modifications and a new ministerial approval of the degree reports are required.
- To implement ESD/SDGs, considerable difficulties related to deficient human values and reductionist conceptual approaches need to be overcome. This is a great challenge for a University that wants to serve society and gives priority to the value of each person and human rights.

- Holistic methodological strategies seem especially suited to train those who will soon be entering the job market. Such strategies relate theory to practice and inter-relate different elements of the same system. They clearly show the consequences of decisions made by human communities and therefore of interconnections between different dimensions of sustainability.
- ESD, and more particularly, implementing the SDGs in higher education, can be an opportunity for establishing synergies: synergies between University departments, between degrees and between society and the University.

This study provides evidence of the challenges and opportunities that exist around the concept of sustainability. Furthermore, it confirms the need to transform the teaching and learning practices related to the SDGs. Further research in this field is required in HE to overcome constraints regarding SDG implementation at University level.

5. Limitations of the study

The study presents certain limitations. The presence of spheres linked to the SDGs in the degree reports (in accordance with the DESD), using the methodological study conducted at the *Universitat de València* (Spain) as a reference, was analysed by means of a quantitative study. However, global competences related to ESD were not considered. Analysing the teaching programmes of each subject would provide a fuller picture of what goes on in every classroom, both in terms of content and the competences that teachers endeavour to develop in students. The teaching programmes set out in detail in the curricular content, the methodologies used and the evaluation systems for each subject are updated every academic year. An in-depth study on how to improve the implementation of the SDGs in the curriculum would need to be carried out. However, for further generalizability in research, it should be applied in other universities. This could be the subject of a future study.

The qualitative analysis was carried out by interviewing only part of the academic staff, the deans of the faculties, but they may not have been familiar with all the pedagogical strategies used in ESD and the real implementation of the SDGs in the curriculum. In future research, a greater number of interviews with academic staff from different faculties of the University is recommended.

6. Proposals for making education for sustainable development more robust in higher education

The following proposals were made based on the results of ESD research carried out in this study, focusing on the five priority action areas of the Global Action Programme (UNESCO, 2014b), including the recent UNESCO publication on ESD and the SDGs (UNESCO, 2017). Examination of international sustainability in HE literature shows no study that specifically addresses the interaction between declarations on sustainability developed by the University sector (Grindsted and Holm, 2012). This paper intends to contribute to this significant gap in HE literature. From the findings obtained in the analysis carried out, the following questions need to be considered: What can be done? Which steps need to be taken to truly transform the University, making ESD more robust and implementing the SDGs in HE? The proposals put forward from the findings obtained in this research, together with reference documents on ESD in HE, may be the way forward towards an all-round transformation of University education. This paper refers to several documents on ESD in HE, especially the Peoples' Sustainability Treaty on Higher Education. Others are the draft for Rio + 20 (STHE) (Tilbury, 2012), the Sustainability Commitment, signed by Higher Education directors during the UN Conference on Sustainable Development (UN, 2012a), the

Guidelines for the inclusion of Sustainability in the Curriculum (CRUE-Comisión de Sostenibilidad, 2012, 2015) and the Roadmap for Implementing the Global Action Programme (GAP) on Education for Sustainable Development (UNESCO, 2014b).

6.1 Policy support

For the University to be a leader in promoting the SDGs, the first three points mentioned in the Conclusions propose to undertake the following measures:

- to include core competences in ESD in teaching and learning (STHE, action 3) in the different University degrees;
- to carry out a detailed review of the degree reports of all the degree programmes, including content linked to priority areas for the SDGs: human rights, poverty reduction, sustainable economy, mitigation of climate change, etc. (CRUE-Comisión de Sostenibilidad, 2012); and
- to include ESD in teaching; for this to be done, it is necessary to think about how to proceed. Teachers need continuous training and have to strengthen their teaching resources. Training sessions for University personnel would be convenient (GAP, priority action 1).

6.2 Whole-institution approaches

Given the difficulties and barriers encountered in this study (Figure 6) to implement sustainability in HE, University contributions to sustainability in whole-institution approaches seem to be essential (Müller-Christ *et al.*, 2014):

- An institutional context and University policies that guarantee the application and fulfilment of specific objectives in ESD implementation are needed (UN, 2012a). For this to happen, fostering sustainability at all levels is necessary and it should be included in the University's Strategic Plan 2015-2020 (GAP priority action 2-a);
- A way of evaluating ESD processes needs to be developed, and for this purpose, indicators need to be defined in the 2015-2020 Strategic Plan, facilitating the evaluation of SDG implementation (GAP priority action 2-b); and
- The whole University community, including teachers, students and administrative and service personnel, needs better training regarding the nature of the concepts of sustainability and university social responsibility (GAP priority action 3-a).

6.3 Educators

Extensive scientific literature is available on the key role of educators to transform teaching and learning models for future professionals to be able to address and solve the sustainability problems our planet is suffering from (Wiek *et al.*, 2011). In the fourth point mentioned in the Conclusions, methodological strategies are put forward connecting theory and practice with a holistic view. The following proposals are ways to put said conclusion into practice:

- The importance of using active teaching-learning strategies is highlighted so as to encourage reflection. Resolving real problems and the ability of students to see people behind the numbers should form part of this teaching model (GAP priority action 3).
- Actions and initiatives related to SD and social responsibility should be implemented using participative processes involving the whole University community. An example of such an initiative is the interdisciplinary workshop on

sustainability. This workshop has been in operation in the University since 2009 for the whole University community, and it would be beneficial to all if it could continue. It is an educational strategy that contributes to a change in the students' behaviour. It shows that learning is effective when students actively participate in a project and have to resolve problems in a real context (Albareda *et al.*, 2013). The workshop is an opportunity for teachers, administrative and service staff, as well as students from different degrees and years, to think together (Albareda Tiana and Alférez Villarreal, 2016). This activity was designed by the University Office of Sustainability and includes contributions from both teachers and students. The workshop encourages an interdisciplinary encounter between students from different degrees and constitutes an educational setting in which to acquire competences in sustainability (Albareda Tiana and Fernández Morilla, 2016) (STHE, action 4 and GAP priority action 3-a).

- Investing time and money in interdisciplinary research and offering incentives to researchers who work in an interdisciplinary way is essential (STHE, action 5 and GAP priority action 3-b).
- Including competences in sustainability in the teaching-learning processes should be done by using methodologies consistent with the principles inspiring sustainability in the University, i.e. those that are ethical, holistic, complex, global and interdisciplinary and foster University social responsibility (CRUE-Comisión de Sostenibilidad, 2012 and GAP priority action 3-d).

6.4 Empowering and mobilizing youth

In line with the previous proposal and the fourth point mentioned in the Conclusion, in which the urgent need for connecting theory with practice and the University with the world of work is obvious, service-learning is proposed:

The use of the specific innovative service-learning methodology is recommended, as it encourages the University and society to work together, not only to transform society but also to transform the whole University community. It is a suitable methodology for the participatory skills that empower youth to act as change agents in local SD processes (GAP priority action 4-b). It facilitates the integral training of students who perform a service to society by looking after and taking care of people and communities from disadvantaged or needy backgrounds or resolving local sustainability problems (CRUE-Comisión de Sostenibilidad, 2015). This methodology contributes to a bidirectional enhancement for students and the community without necessarily being charity work (Furco, 1996).

6.5 Local communities

To provide answers to problems related to SD and to promote SDGs, including contributions to all economic, social, environmental and cultural issues, in accordance with the fifth point mentioned in the Conclusions, it is necessary to carry out activities of knowledge transfer, environmental awareness or research in ESD. They represent an opportunity for establishing synergies between University departments and between the University and society through businesses, schools, NGOs or charities (GAP priority action 5-b).

Notes

1. CRUE is a non-profit organisation composed of 76 Spanish universities: 50 of which are public and 26 are private. It acts as the main interlocutor between universities and the central government and plays a key role in all the regulatory developments that affect higher education in Spain. For more information visit the website: www.crue.org/SitePages/Inicio.aspx
2. The ministerial protocol for the SUS is established in Law 4/2007 of 12 April for Universities (BOE, 2007).

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Further reading

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