

Finding an adequate response to the challenges posed by (un)sustainability is a major challenge for higher education institutions (HEIs). The aim of this paper is to discuss the barriers, or difficulties, that prevent HEIs from finding such a response and to suggest ways of overcoming them. We first look at the general meaning of sustainability and the related, but in some ways more contested, sustainable development (SD). We will argue that the inevitable impreciseness of sustainability and SD combined with the need to give it meaning in a specific context involving multiple stakeholders makes these concepts attractive from an educational perspective as they require joint meaning-making, co-creation of new knowledge, collaborative learning and, indeed, critiquing. Education in the context of sustainability is briefly explored to contextualize the challenges faced by HEIs in this emerging domain of research, education and science and society in general. The second part of the paper presents the main findings from a study on barriers and solutions identified in two GUNi polls and discussed in parallel workshop sessions at the Fifth International Barcelona Conference on Higher Education. The last part summarizes and reflects upon the barriers in addressing sustainability challenges faced by HEIs and offers some possible solutions to overcoming these barriers.

## INTRODUCTION

In response to a growing environmental crisis and vast inequalities in global development, the international community and its political leadership adopted sustainable development as a leading development model by the end of the 20th century. Contemporary society considers it the best way to address the vast, complex and interrelated environmental and development issues for the sake of current and future human well-being and for the integrity of the planet (Waas et al., 2011).

Tilbury (2007) argues that to succeed in the transition towards a society that is more

sustainable begs the question of what sustainability and/or SD might encompass and whether we can identify any principles that describe and characterize these concepts.

The most popular definition of sustainable development comes from the report *Our Common Future* by the World Commission on Environment and Development (WECD). Sustainable development is defined as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (WCED, 1987). Some scholars have introduced ‘sustainability’ as a better alternative to SD in that, they argue, sustainable development might be regarded as conceptually flawed as it suggests that continuous development is needed while it can be argued that it is equally important to sustain our resources by stopping forms of development deemed unsustainable. In this view sustainable development can be seen as a contradiction in terms or an oxymoron (Jickling, 1992; Jickling and Wals, 2008).

There is considerable agreement among sustainability scholars and practitioners about some fundamental principles underlying sustainability or ‘rules of action towards sustainable development’. They represent the ‘sustainability arena’ or some kind of ‘common ground’ that anyone who justifies a line of action with an appeal to sustainability should respect and take into account (Hugé et al. 2011; Waas et al., 2011). Fundamental sustainability principles include (Hugé et al., 2011):

- Global responsibility (in tackling global socio-ecological issues), which refers to international cooperation in a spirit of ‘shared but differentiated responsibility’.
- Integration (of ecological, social and economic impacts and their interactions), which refers to the reconciliation and integration of environmental and developmental objectives.
- Inter- and intra-generational equity, which refers to the needs and preferences of current and future generations (inter-generational equity), and also includes

# III.1

## SUSTAINABILITY IN HIGHER EDUCATION: MOVING FROM UNDERSTANDING TO ACTION, BREAKING BARRIERS FOR TRANSFORMATION

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geographical (global North-global South) and social intra-generational equity.

- Precaution (in the face of uncertainty): the precautionary principle states that the lack of full scientific certainty shall not be used as a reason for postponing measures to prevent environmental degradation.
- Participation, which refers to the involvement of all concerned stakeholders in decision-making for sustainable development.

A complementary way to understand and operationalize sustainable development is through ‘mental models’ (Rosner, 1995) or metaphors (Scott and Gough, 2003). It is common practice to model sustainability in a number of pillars or dimensions, and most commonly there are three (economy, environment and social), depicted in the form of an equilateral triangle or as three intersecting, equally sized circles. Each angle/circle stands for one of the three dimensions with sustainability in the middle (Lozano, 2008; Waas et al., 2011). There is also the model proposed by Hart (2000) comprising concentric or nested circles. But, criticized alternative models are proposed, that is, those by Granados (2011), Lozano (2008) and Giddings et al. (2002). Granados (2011) proposes that sustainability can be metaphorically compared to a three-lens telescope (see Figure III.1.1). In this model, each lens represents a different dimension of sustainability: the environment, society and its institutions and the socio-economic dimension. Considering that we need to look at things from a new point of view, Granados (2011) suggests that we must reverse our viewpoint and look through the biggest lens first. Just as a telescope only functions well when each lens works in conjunction with the other, sustainability is only viable if these

three cruxes exist in equilibrium as they are interrelated and interdependent upon each other. Each lens affects and reacts to the others, and is also equally affected by the others, in simultaneous co-evolution, visualizing the principle of intergenerational equity (Lozano, 2008). The telescope metaphor also enables us to envision the dynamic time dimensions. Depending on how much we extend or contract the telescope we will put more emphasis on the present or in the future (short, mid or long term). Additionally, this model takes into account space and scale, so it allows us to look at the big picture of global sustainability while at the same time affording the opportunity to focus on the local context, where action comes easier (Granados, 2011).

Since the 1990s, universities worldwide have increasingly embraced sustainable development and the more recent and overarching sustainability movement. More than 1000 academic institutions worldwide have signed international declarations towards implementing sustainability through environmental literacy initiatives; curriculum development; research; partnering with government, non-governmental organizations and industry in developing sustainability initiatives; and ‘greening’ physical operations (Wright, 2004; Barlett et al., 2004). Such actions, however, are only a beginning. Much remains to be done for sustainability to become genuinely and fully implemented at universities and for universities to become true sustainability leaders (Waas et al., 2010). Catalysts towards this objective are the United Nations Decade of Education for Sustainable Development (2005–2014) (DESD) (UNESCO, 2011) and, related to the DESD, the establishment of Regional Centres of Expertises (RCE) (UNU, 2011). The objective of the DESD is



FIGURE III.1.1 The telescope metaphor for describing and interpreting sustainability (Granados, 2010)

to integrate the principles, values and practices of sustainability into all aspects of education and learning (UNESCO, 2011), including universities, whereas RCEs are networks of existing formal, non-formal and informal education organizations, mobilized to deliver education in the context of sustainability to local and regional communities (UNU, 2011).

Only recently have scholars attempted to define sustainability in higher education (SHE) research. For example, Glasser et al. (2005) define it as:

any research that is directed at advancing our ability to incorporate sustainability concepts and insights into higher education and its major areas of activity: policy, planning, and administration; curriculum/teaching; research and scholarship; service to communities; student life; and physical operations/ infrastructure. It also refers to research that treats higher education institutions as complex systems and focuses on the integration of sustainability across all of its activities, responsibilities, and mission.

SHE is an emerging field and up until now has mainly focused on the integration of sustainability in (1) education (curricula/teaching), and (2) physical operations/management, in particular the environmental management of institutions (Waas, et al., 2010). In this paper we explore the barriers or difficulties that prevent HEIs from achieving sustainability and offer some propositions to overcome them.

## BARRIERS AND SOLUTIONS FOR TRANSFORMING HEIS TOWARDS SUSTAINABILITY

One area in which GUNi works is to establish what barriers and possible solutions higher education institutions (HEIs) encounter when they try to implement sustainable development in their performance. For this purpose, participative channels have been created to involve all those experts interested in this transformation of HE. There are four working phases in the process:

- The GUNi First-Round Poll: Breaking Barriers for Transformation.
- The parallel workshops: Moving from Understanding to Action: Breaking Barriers for Transformation, held at the Fifth International Barcelona Conference on Higher Education, Higher Education's Commitment to Sustainability: from Understanding to Action (Fifth IBCHE Conference).
- The GUNi Second-Round Poll: Breaking Barriers for Transformation.

- The creation of a working group within the knowledge community that is being nurtured through GUNi's virtual platform. This forum enables a group of professionals invited from all over the world to discuss and share innovative ideas, experiences and knowledge regarding barriers to and solutions for the implementation of sustainable development in HE. Additionally, this virtual platform aims to provide a future open forum for professionals in the field for the continuous exchange of ideas on the most pressing issues facing HE in the world.

### THE GUNI FIRST-ROUND POLL: BREAKING BARRIERS FOR TRANSFORMATION

The rationale behind setting up the first poll was to identify the main barriers preventing HEIs from transforming so that they can contribute to the sustainability paradigm.

The poll consisted of a list of 14 proposed barriers (see Table III.1.1) that referred to the introduction of ESD; the centrality of technology vis-à-vis social knowledge; short-term market needs; unconscious unsustainability; the lack of sustainable ethics and values; compartmentalized thinking; overall system redesign; social responsibility; isolation; the pedagogical approach; diverse knowledge integration; HE's influence on governments; and breaking inertia.

The poll was distributed to different experts in HE worldwide. A total of 200 of them sent in their answers. The participants included 36% from Europe; 15% from Latin America and the Caribbean; 9.5% from Asia and the Pacific; 6.5% from Arab states; and 4% from North America. The rest, 22%, did not specify their nationality.

The methodology of the poll was the following: the participants were instructed to rate the level of relevance for each barrier (1 to 5, where 1 is not important and 5 is very important); they then had to mark the level of difficulty in overcoming each barrier (low, medium and high) and finally they had to choose the most relevant barrier according to their own context. Additionally, there was a space for the inclusion of other barriers that each participant could add. Table III.1.1 shows the results of the GUNi First-Round Poll.

One of the poll's main conclusions is that there was a general perception – among the 200 participants – that all 14 barriers are relevant given the fact that they all have an average rating of between 3 and 4. As can be seen from Table III.1.1, the highest rating was 3.93 whereas the lowest was 3.02. The results are a clear signal of a common ground regarding the relevance of sustainable development in HEIs and, thus, of the

TABLE III.1.1 GUNi First-Round Poll results: barriers to change according to their relevance and the difficulty in overcoming them			
Scope	Barriers to transforming HE towards sustainability	Average according to level of importance	Difficulty in being overcome
Introduction of ESD	It is difficult to identify what content should be introduced in a transversal curriculum at the HE level.	3.93	H
Technology-centred, socially ignored	High recognition of technology and instrumental knowledge to the detriment of human and social knowledge.	3.77	H
Short-term market needs	High pressure to orient HE activity (teaching offer, content and research) to short-term labour and market needs and to profitable activities.	3.70	H
Unconscious unsustainability	There is a hidden agenda of unsustainable practices.	3.64	M
Lack of sustainable ethics and values	There is a lack of analysis of the values that are transmitted in the educational process and a lack of reflection on the ethics and values that should be introduced in HE.	3.63	H
Compartmentalized thinking	Structures in HE strengthen compartmentalized thinking, leaving little space for integrative thinking and trans-boundary learning.	3.60	M
Overall system redesign	Sustainability continues to be seen as an 'add-on' rather than as a 'built-in' or as requiring a 'whole system re-design'.	3.57	M
Social responsibility	Greater emphasis is placed on science for impact factors in research than on science for impact (societal relevance).	3.52	M
Isolation	HEIs have become far removed from their communities' knowledge needs and are perceived as ivory tower institutions of experts.	3.46	M
Pedagogical model	The pedagogical model strengthens the separation of knowledge from experience.	3.41	M
Pedagogical approach	The pedagogical perspective is still one of transmission (knowledge transfer) rather than one of transformation.	3.22	M
Diverse knowledge integration	The mismatch between a mono-cultural model of knowledge in a multicultural and diverse society.	3.28	M
HE's influence on governments	There are no adequate bridges that allow the transfer of knowledge to political decision-making on local and global issues, such as the ones that exist to meet the needs of industry and the market.	3.20	M
Breaking inertia	The dynamics of academia make it difficult to deal with deep transformational needs.	3.02	M

implicit need for finding solutions. This could be explained because all participants were professionals involved in this field.

Furthermore, according to the results of the poll, there is a clear relationship in the top three barriers between their level of importance and the difficulty in overcoming them. Thus, it could be said that respondents of the poll highlighted that the greatest barriers were those related to the content and knowledge that needs to be prioritized in curricula.

#### PARALLEL WORKSHOPS: MOVING FROM UNDERSTANDING TO ACTION: BREAKING BARRIERS FOR TRANSFORMATION

The results obtained in the GUNi First-Round Poll were used as a starting point for the discussions in the workshop sessions during the Fifth IBCHE Conference. The aim of the workshops was to offer a forum

for collective discussion and proposals for overcoming the main barriers in the transformation of HE systems towards sustainability. The discussions at the workshops were based on an interactive and participative methodology: the 115 participants from across the world were divided into seven groups and they were then asked to work on three barriers and to identify the solutions that they considered most important. Each workshop's facilitator and participants developed diagrams, tables and lists of the barriers to change, in which they identified the different links between them and outlined various critical reflections.

It is worth highlighting that there was an active exchange of ideas on the thematic areas in which the barriers could be classified during the workshops. The classification made could be summarized as follows: education; research; service and outreach; and management. However, after further analysing the barriers,

it was found that encapsulating them all in only four areas, instead of broadening their understanding, would limit and reduce their scope. Given the fact that barriers extend across several sectors and often fall into different areas, each barrier was assigned a thematic area (see Table III.1.2). It is acknowledged that the barriers are often transversal (that is, have an impact on one or more sectors), but for analytical reasons the classification described above was deemed useful.

Afterwards, the facilitators and participants were asked to choose three to five barriers that they considered the most relevant and to propose appropriate solutions. Largely based on the debates, and the sharing of ideas and experiences during the parallel workshops, the outcomes made it possible to reach a general consensus about the most urgent barriers that had to be overcome in order to properly implement sustainable development in HEIs. New barriers were added to the first proposal, and a final list of 21 barriers and 28 solutions was defined (see Table III.1.7).

However, it is worth mentioning that the list was based on general criteria and not on a ‘one-to-one’ principle. Thus, the list of solutions does not necessarily provide an ultimate answer on how to fit them in with the list of barriers. Rather, the two lists are a manifestation of a general understanding among professionals involved in promoting the pressing need to target sustainable development in HEIs, the most urgent barriers faced by them and finding feasible, adaptable and sustainable solutions. Nevertheless, the set of solutions covers most of the barriers, but three of them – barriers Ba2, Ba4 and Ba11 – do not have an associated solution. Table III.1.2 summarizes the possible relationship between the barriers defined and the proposed solutions, which are shown in Tables III.1.6 and III.1.7. It should be noted that some solutions can help overcome more than one barrier. This is the case of solutions So6, So11, So20, So24 and So25, which apply to three or more barriers. The barriers related to a common understanding of ESD, the integration of diverse knowledge, the introduction of ESD, new institutional set-ups, interdisciplinarity, research versus pedagogy and the influence of HE on governments are linked to just one concrete solution, whereas the following barriers are related to two solutions: the pedagogical approach, leadership, breaking inertia, avoiding unconscious unsustainability, the pedagogical model and government sustainability policies. For the rest of the barriers (short-term market needs, social responsibility, funding for ESD, isolation versus networking, training in ESD), three or more solutions were proposed.

Thematic areas	Barriers	Solutions
Common Understanding of ESD	Ba1	So1
Technological vs Social	Ba2	–
Integration of Diverse Knowledge	Ba3	So5
Frame of mind	Ba4	–
Pedagogical Approach	Ba5	So3/So5
Leadership	Ba6	So6/So11
Introduction of ESD	Ba7	So2
New Institutional Set-ups	Ba8	So8
Interdisciplinarity	Ba9	So8
Breaking Inertia	Ba10	So10/So11
Unsustainable structures	Ba11	–
Research vs Pedagogy	Ba12	So7
Short-term Market Needs	Ba13	So20/So23/So24/ So25
Avoiding Unconscious Unsustainability	Ba14	So2/So11
Theory vs Practice	Ba15	So5/So22
Social Responsibility	Ba16	So6/So7/So10/So20/ So22
Funding for ESD	Ba17	So16/So17/So18/ So19
Government Sustainability Policies	Ba18	So24/So25
Isolation vs Networking	Ba19	So22/So23/So24/ So25/So27/So28
Influence of HE on Governments	Ba20	So26
Training in ESD	Ba21	So4/So6/So11/So13/ So14

## GUNI SECOND-ROUND POLL: BREAKING BARRIERS FOR TRANSFORMATION

The GUNi Second-Round Poll was conducted based on the final list of barriers and solutions. The goal of this second poll was to evaluate the degree of relevance given to each of the barriers and solutions by all respondents. Furthermore, it aimed to shed some light on the general trends that lead to the inclusion of sustainable development in HEIs. The process for answering was similar to that of the first poll: each barrier and solution was rated according to its level of importance (1 to 5, where 1 is not important and 5 is very important) and then the respondents were asked to choose the five most relevant barriers and solutions they considered as a priority in their own particular context. The poll was redistributed to experts, of whom 201 completed it. By professional posts, the biggest group of respondents were professors. In second place were the group of researchers, directors and vice-

chancellors. Each of the three groups had about thirty respondents. There was a lower rate of participation by administrative staff, practitioners and students (see Table III.1.3).

TABLE III.1.3 Number of participants		
Number of participants according to professional posts		
Professional posts	Number of participants	%
Vice-Chancellor/Rector	27	13.4
Director	30	14.9
Professor	73	36.3
Administrative Staff	18	8.9
Researcher	36	17.8
Practitioner	11	5.5
Student	6	2.9
<b>Total</b>	<b>201</b>	<b>100</b>

The poll was not intended to be proportionally representative of all regions, but rather to engage experts from all around the world and gather their professional views on sustainable development in HEIs. However, an analysis of participation by regions (Table III.1.4) shows that specialists from Europe predominate in the total number of respondents. Asia-Pacific and Latin America and the Caribbean are other regions whose contribution was significant, while in the case of Africa, the Arab States and North America, the participation was lower.

TABLE III.1.4 Participants by region	
Regions	Number of participants
Africa	18
Arab States	14
Asia and the Pacific	37
Europe	80
Latin America and the Caribbean	33
North America	19
<b>Total</b>	<b>201</b>

From the GUNi Second-Round Poll, it can be concluded that the overall rating given to all the barriers during the Second-Round Poll was higher than the First-Round Poll. Additionally, the difference between the highest- and the lowest-rated barrier was narrower in the second poll than in the first one, and thus all barriers considered for this analysis have

been taken as relevant. This could be explained by an increase of awareness among participants as a result of their participation in the First-Round Poll, the workshop and the Second-Round Poll. However, given the fact that participation during both polls was anonymous, this explanation cannot be said to be conclusive.

As can be seen in Table III.1.5, there appears to be a relationship between the barriers that were voted a highest number of times as priorities and the mean response they received on the level of importance in overcoming the barrier. Thus, there seems to be a general agreement among the participants about the barriers that most urgently need to be broken down.

The priority barriers, as shown in Table III.1.5, are difficulties in attaining integrative thinking; transdisciplinary learning and interdisciplinary cooperation in universities; sustainable development is felt to be an 'add-on' to education, not as a built-in aspect of HE; the lack of vision and prioritization of sustainable development at the leadership level of HE; the lack of a common understanding of ESD in HE; and lack of coordination and vision to change sustainability policies and education at government level.

In the case of the solutions, given that the results are similar to those of the barriers, the same process of classification used with the barriers was followed. The top five solutions considered a priority as a starting point at the respondents' institutions are: developing an institutional understanding, vision and mission on sustainable development in HEIs taking into account faculty, students, and external parties, and engaging in open dialogues with all of them; changing the incentive system and quality indicators for encouraging and promoting multidisciplinary work, interdisciplinary teaching, theses and projects; building a culture of sustainability by involving and engaging the local community, universities, families, schools and other stakeholders in sustainability issues and projects, including active learning courses and action research with local community projects that take students out of the classroom; involving internal stakeholders in a way that leads to ownership, empowerment, participation and willingness to contribute to and be responsible for change by communicating and sharing more information (for example through team-building, coffee breaks, awareness-raising of ESD issues, and so on); and promoting sustainable development in universities, monitoring the design and implementation of sustainable development content in curricula, offering awareness-raising and/or training programmes on

sustainable development for all university academic and administrative staff.

TABLE III.1.5 Priority barriers			
Priority barriers			
	Barrier	Number of votes	Mean response
1	<b>Ba9:</b> Difficulties in attaining integrative thinking, transdisciplinary learning and interdisciplinary cooperation in universities.	78	3.92
2	<b>Ba4:</b> Sustainable development is felt to be an 'add-on' to education, not a built-in aspect for HE.	73	3.98
3	<b>Ba6:</b> Lack of vision and prioritization of sustainable development at the leadership level of HE.	67	3.87
4	<b>Ba1:</b> Lack of common understanding of ESD in HE.	59	3.67
5	<b>Ba18:</b> Lack of coordination and vision to change sustainability policies and education at government level.	54	3.92

In Table III.1.5 and Table III.1.6, it can be seen that both the priority barriers and the priority solutions match the five most rated barriers and solutions on the level of importance in overcoming or applying them.

If we compare the relationship between the priority barriers and the priority solutions, it can be seen that they more or less focus on the same issues, the first of which is related to the transformation of HEIs through leadership. Such leadership should introduce and monitor sustainable development as a priority by reaching a common understanding and facilitating interdisciplinarity and transdisciplinarity. The second priority is related to policy change at the government level that would encourage and promote the transformation of the way HE works.

TABLE III.1.6 Priority solutions			
Priority solutions			
	Solution	Number of votes	Mean response average
1	<b>So1:</b> Developing an institutional understanding, vision and mission on sustainable development in HEIs taking into account faculty, students, and external parties, and engaging in open dialogues with all of them.	82	4.21
2	<b>So8:</b> Changing the incentive system and quality indicators to encourage and promote multidisciplinary work, interdisciplinary teaching, theses and projects.	74	4.19
3	<b>So22:</b> Building a culture of sustainability by involving and engaging the local community, universities, families, schools and other stakeholders in sustainability issues and projects. Including active learning courses and action research with local community projects that take students out of the classroom.	56	4.15
4	<b>So4:</b> Involving internal stakeholders in such a way that leads to ownership, empowerment, participation and willingness to contribute to and be responsible for change. Communicating and sharing more information.	55	3.85
5	<b>So11:</b> Promoting sustainable development in universities, monitoring the design and implementation of sustainable development content in curricula, offering awareness-raising and/or training programmes on sustainable development for all teaching, research and administrative staff.	51	3.92

TABLE III.1.7 List of barriers and solutions	
Barriers	Solutions
<b>Ba1:</b> Lack of a common understanding of ESD in HE.	<b>So1:</b> Developing an institutional understanding, vision and mission on sustainable development in HEIs, taking into account faculty, students, and external parties by engaging in open dialogues with all of them.
<b>Ba2:</b> Supremacy of technological/instrumental knowledge versus human/social knowledge.	<b>So2:</b> Designing a management mechanism for organizations as a whole to create a comprehensive vision of sustainable development, based on which experts (teachers) will be able to work on projects to develop competences in interdisciplinary, integrated social relationships.
<b>Ba3:</b> Absence of culture-specific knowledge, indigenous knowledge and knowledge of traditional ecological systems.	<b>So3:</b> Encouraging analysis, synthesis, process and critical thinking as well as action-oriented competences by using sustainable development tools for learning and communication on issues from a problem-solving perspective.
<b>Ba4:</b> Sustainable development is felt as an 'add-on' to education, not a built-in aspect in HE.	<b>So4:</b> Involving internal stakeholders in such a way that leads to ownership, empowerment, participation and willingness to contribute to and be responsible for change. Communicating and sharing more information (for example through team-building, coffee breaks, awareness-raising about ESD issues, and so on).
<b>Ba5:</b> Pedagogical processes focused on the transmission perspective (knowledge transfer) rather than on the 'transformation' perspective.	<b>So5:</b> Opening up the learning process to base sustainability on different cultures and perspectives. Knowledge of native, indigenous and marginalized cultures. Integrating alternative courses (drama, arts, yoga); introducing service-learning activities and running accredited extracurricular activities for students.
<b>Ba6:</b> Lack of vision and prioritization of sustainable development at the leadership level of HE.	<b>So6:</b> Having educated and selected leaders at all management levels to facilitate and support collaborative and democratic dialogue processes on the social responsibility of HE.
<b>Ba7:</b> Lack of consensus in HEIs about the way to introduce education for sustainable development.	<b>So7:</b> Carrying out volume-based research into sustainable development education, focusing both on processes and outcomes.
<b>Ba8:</b> HEIs are too compartmentalized. Lack of departmental autonomy and coordination, and too many offices and units.	<b>So8:</b> Changing the incentive system and quality indicators to encourage and promote multidisciplinary work, interdisciplinary teaching, theses, projects, and so on.
	<b>So9:</b> Developing institutional policies to appraise the approach to sustainability in HEIs by means of compulsory indicators.
	<b>So10:</b> Reviewing the mission and vision statements of universities.
<b>Ba9:</b> Difficulties in acquiring integrative thinking, transdisciplinary learning and interdisciplinary cooperation in universities.	<b>So11:</b> Creating leadership units to help reduce bureaucracy and its processes; create common physical and intellectual spaces where interaction becomes possible; act as an expert and consultancy unit; help integrate sustainable development in universities; monitor the design and implementation of sustainable development content in curricula; offer awareness-raising and/or training programmes on sustainable development for all university teaching, research and administrative staff.
<b>Ba10:</b> The dynamics of academia hinder change, which gives rise to gaps between mission and vision and reality.	<b>So12:</b> Overhauling selection criteria and the recruitment of senior managers/leaders in universities; recognizing transformative leadership in a global context using the global interconnectivity of technology in such a way that injects new blood into institutions.
	<b>So13:</b> Having an 'active institution—good ESD practices' assessment mechanism or indicator to evaluate universities. Promoting good practice institutes.
<b>Ba11:</b> Difficulty of sustainable processes in non-sustainable civilizations, institutions and organizations.	<b>So14:</b> Having scheduled sustainable development meetings at universities (for example, starting working days with project presentations, holding an annual meeting of university faculties to discuss the development of sustainable development at the university).
<b>Ba12:</b> The educational system tends to make teachers prioritize research and publications over education and pedagogical practices.	<b>So15:</b> Running new programmes on sustainability that include extra-curricular activities.
	<b>So16:</b> Linking research to sustainability.
<b>Ba13:</b> High pressure to focus HE activities on short-term labour and market needs and on profitable activities, thus making HEIs factories for degrees and publications.	<b>So17:</b> Applying for government funding.
	<b>So18:</b> Making research grants available for cross-disciplinary research.
<b>Ba14:</b> Unconscious introduction of unsustainable practices in curricula.	<b>So19:</b> Securing financial resources from the business sector that can be earmarked for HE activities related to sustainability.
<b>Ba15:</b> The pedagogical model strengthens the separation of knowledge from experience.	<b>So20:</b> Offering services that are beneficial to society and at the same time generating financial resources to invest in sustainability projects at the institutional level.
	<b>So21:</b> Ensuring the proper management and use of financial resources at the institutional level.
<b>Ba16:</b> Science for impact factors places more emphasis on research than on science for impact.	<b>So22:</b> Building a culture of sustainability by involving and engaging the local community, universities, families, schools and other stakeholders in sustainability issues and projects. Including active learning courses and action research with local community projects that take students out of the classroom.
	<b>So23:</b> Creating academic programmes that help the interrelationship between society and HEIs.
<b>Ba17:</b> HE has been confined to devoting financial support to science and technology, thus making it difficult to finance ESD.	<b>So24:</b> Submitting policies on sustainable development to governments and organizations through university research and partnerships with local communities.
	<b>So25:</b> Developing joint initiatives and having direct communications at the national, international and local level (NGOs, HEIs, civil society, RCEs, other universities, and so on).
<b>Ba18:</b> Lack of coordination and vision to change sustainability policies and education at government level.	<b>So26:</b> Drawing up guidelines for governments and organizations for developing policies and programmes that promote the role of universities as change agents for sustainability.
<b>Ba19:</b> Isolation between universities and between universities and their communities.	<b>So27:</b> Having international agencies and committees to implement and monitor national levels of ESD accreditation and that also have an influence on national governments.
<b>Ba20:</b> Absence of HE stakeholders who influence governments on development and innovation.	<b>So28:</b> Sharing knowledge with other HEIs and with the government on which they depend.
<b>Ba21:</b> Absence of professional resources and pedagogical training.	

## CONCLUSIONS

Given that thus far HE has contributed to the generation of knowledge and actions that have led to the crisis situation we are currently experiencing, we must start to reconceptualize our understanding of universities in a way that will bring about sustainable development in society. This alternative way of doing things must integrate changes in internal organization, knowledge creation, educational models, information technologies, social responsibility and knowledge transfer.

We can conceptualize sustainability from different standpoints. Based on the reflections in this study and taking into account the different stages of sustainability (O’Riordan, 1996, 2004) and the ideas of the transition movement (Chamberlin, 2009; Hopkins, 2008), it is fair to say that the future of HEIs can be seen from three different perspectives: continuity, transition and radical change (see Figure III.1.2).

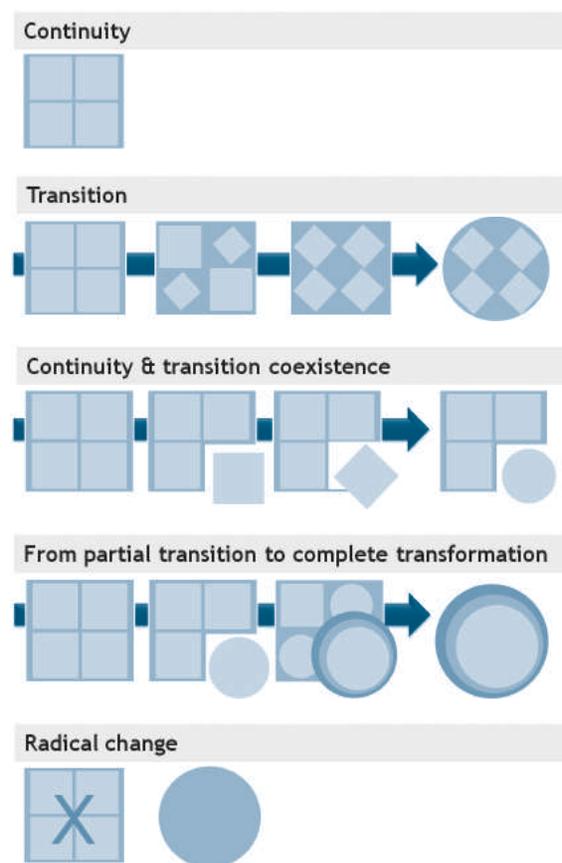


FIGURE III.1.2 Pathways towards sustainability (considering time, degree of change and level of institutional commitment)

Continuity refers to a situation in which the status quo prevails and things remain the same as they are.

Business as usual is the rule and ignoring the evidence of unsustainability is the mandate.

Radical or complete change, as its name suggests, is about the total restoration of how we conceive universities, namely, a situation in which their mere existence is not taken for granted. This *tabula rasa* would entail the reconceptualization of universities, the reformulation of their mission in current society, and the design of adaptable and malleable institutions that reflect changing contexts. A new start! However, such an approach would mean turning a blind eye to contextual factors and power relations, which makes it unfeasible.

In view of these two antagonistic scenarios, we are faced with a third approach consisting of a gradual reform of the current system. Thus, transition is about a process in which sustainable development is progressively included in HE, which seems to be the more plausible option. Given this situation, it makes sense to talk about the ‘transition university’ whereby universities are able to design their own sustainability strategies to suit their multiple needs. It also can be acknowledged that one or more of the three above-mentioned approaches can coexist in a single HEI. Thus, part of a university community may call for continuity, whereas another part may push for the introduction of changes (continuity and transition coexistence). In the case that a transformative part can influence and break resistances from the continuity part of the community, then the scenario moves to a change of the whole institution (from partial transition to complete transformation).

Spaces have opened up around the world to turn universities into more responsive institutions – more responsive in the sense of more in tune with pressing societal issues, with the local community and with the new direction taken by research and education in response to sustainability challenges. After responding to environmental issues in the 1970s through the launching of environmental engineering programmes and greening campuses in the 1990s and the turn of this century, a third wave can now be seen to be affecting some, although certainly not all, universities around the globe. This third wave (Wals and Blewitt, 2010) is a convergence of the environmental, social and economic spheres and the blurring of disciplines on the one hand, and the reconceptualization of teaching and learning, on the other. In sync with this, as was seen at the Fifth International Barcelona Conference on Higher Education, universities are repositioning themselves by becoming partners in knowledge co-creation with multiple societal actors in what some refer to as ‘hybrid learning configurations’. There is no longer one truth,

if there ever was one, but rather a socially constructed reality in which knowledge is co-created through dialogical interaction in specific contexts.

However, it appears that there are a number of barriers in HE that affect its ability to respond to the challenges posed by sustainability. Taking this as a starting point, this study falls within the transition approach. If it had focused on reimagining the sustainable university, it would lean towards the radical change approach.

This study, entitled *Breaking Barriers for Transformation*, has had the support of hundreds of professionals from all around the world. It had no intention of being proportionally representative of regions and the biggest group of respondents to the polls and contributors to the workshops and the knowledge-community working group were professors, namely, those who are already interested in advancing sustainability in HE.

In this study, 21 barriers and 28 solutions have been identified. There is no straightforward equivalence among them. Thus, different solutions may fall within more than one barrier, and one barrier may be linked to more than one solution (Figure III.1.3).

There seems to be a general consensus among participants on the relevance of sustainable development as well as the most urgent barriers, which are:

- Difficulties in acquiring integrative thinking, transdisciplinary learning and interdisciplinary cooperation in universities.
- Sustainable development is felt as an ‘add-on’ to education, not a built-in aspect of HE.
- Lack of vision and prioritization of sustainable development at the leadership level of HE.
- Lack of a common understanding of ESD in HE.
- Lack of coordination and vision to change sustainability policies and education at government level.

The solutions considered as priorities on which work should start are:

- Developing an institutional understanding, vision and mission on sustainable development in HEIs, taking into account faculty, students, and external parties, and engaging in open dialogues with all of them.
- Changing the incentive system and quality indicators for encouraging and promoting multidisciplinary work, interdisciplinary teaching, theses and projects.
- Building a culture of sustainability by involving and engaging the local community, universities, families, schools and other stakeholders in sustainability issues and projects. Including active learning courses and action research with local community projects that take students out of the classroom.
- Involving internal stakeholders in such a way that

leads to ownership, empowerment, participation and willingness to contribute to and be responsible for change. Communicating and sharing more information (for example through team-building, coffee breaks, awareness-raising of ESD issues, and so on).

- Monitoring the design and implementation of sustainable development contents in curricula, offering awareness-raising and/or training programmes on sustainable development for all university academic and administrative staff.

If we compare the relationship between these priority barriers and solutions, it can be seen that they more or less focus on the same issues, the first of which is related to the transformation of HEIs through leadership. Such leadership should introduce and monitor sustainable development as a priority by reaching a common understanding and facilitating interdisciplinarity and transdisciplinarity. In her analysis of the status of sustainability in HEIs in Africa (Chapter II.1 of the *Regional Perspectives* report), Heila Lotz-Sisitka also states that leaders should be targeted to further the agenda of sustainable development in universities. The second priority is related to policy change at government level that would encourage and promote the transformation of the way HE works.

The continuity approach is a hegemonic movement in HEIs that tends to close spaces for dialogical interaction, cross-boundary learning and knowledge co-creation. Peters and Wals (2011) refer to this as ‘science as commodity’, which very much pushed universities to think more in business-like terms of efficiency, market shares, rankings, impact factors, profitability and productivity. As the survey clearly shows, it is quite a challenge for many HEIs to find innovative ways of teaching, learning and researching that require boundary-crossing, experimentation and creativity that lead to societal impact and a more sustainable world. A multi-stakeholder dialogue for creating an inspiring and energizing vision involving all actors in HE, including those who represent the communities of which the institutions are part, the changing of the incentive systems and the indicators used to judge performance and, indeed, building a culture of sustainability involving the local community, are strongly supported by the respondents. A transition from ‘science as commodity’ to ‘science as community’ or at least a strengthening of the latter is needed to allow for community building and a change in culture (see Table III.1.8).

The continuity and transition approaches will probably continue to coexist for a while, but for sustainability to become ingrained in HE in a meaningful way

**BARRIERS AND SOLUTIONS' LEVEL OF PRIORITY**

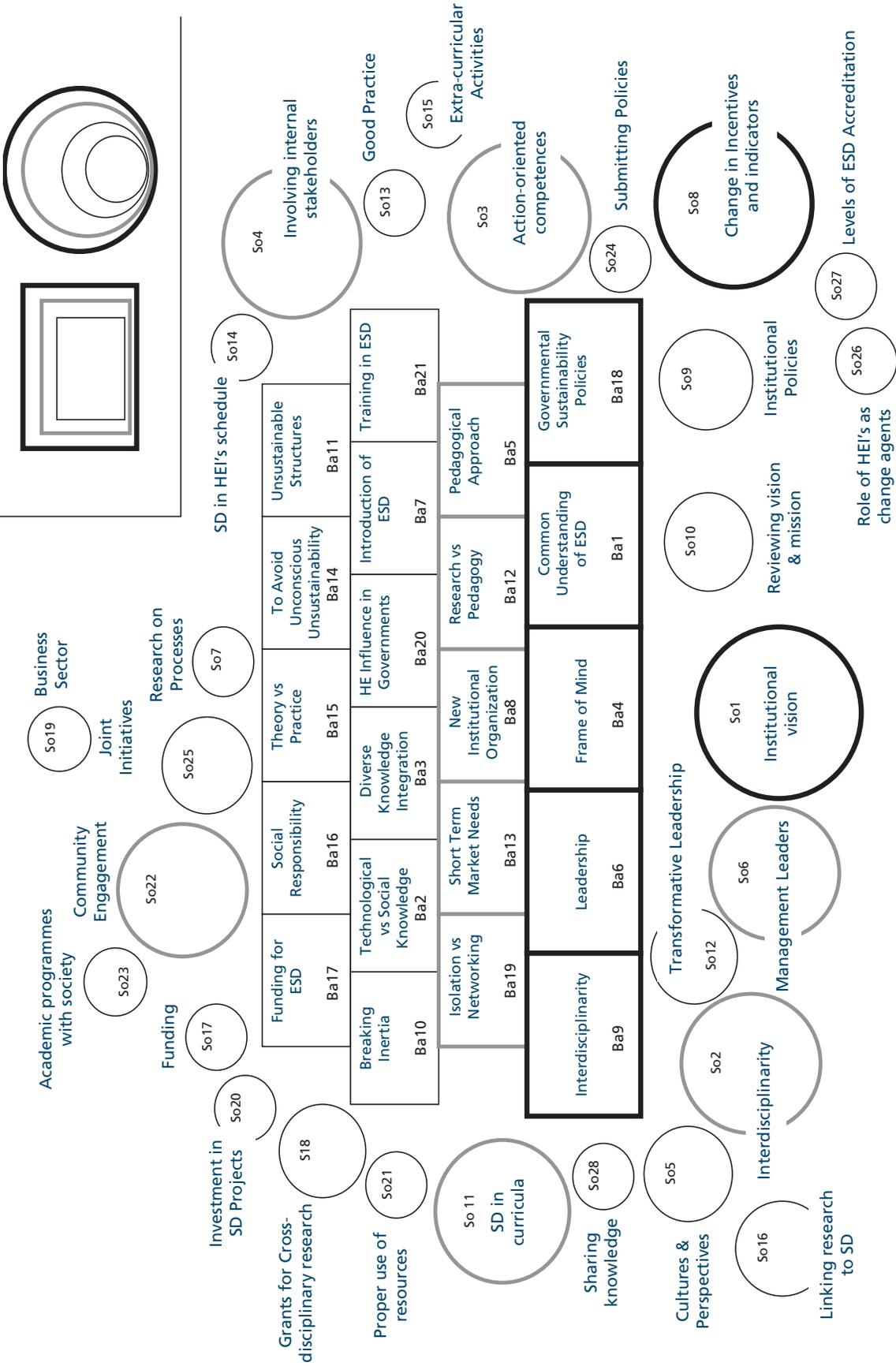


FIGURE III.1.3 The relationship between barriers and solutions

TABLE III.1.8 Juxtaposing two conceptualizations of science in the context of higher education (Peters and Wals, 2011)		
	Science as commodity	Science as community
Research orientation	Science for impact factors Strong emphasis on publication targets to be met by publishing in ISI journals, preferably with a high impact factor.	Science for impact Strong emphasis on societal relevance targets to be met by positive feedback from extended peers who include those who are to benefit from the research.
Educational orientation	Efficiency Students are viewed from an economic perspective as clients, input, throughput and output, who need to obtain their diplomas within the time allocated at a minimal cost. Instrumental – transfer of predetermined and relatively fixed outcomes.	Authenticity Students are viewed from a human development perspective as citizens who want to develop and engage in meaningful learning based on authentic educational materials. Emancipatory – high degree of self-determination, space for transformation, co-creation and emergent outcomes.
Business orientation	Focus on continuous growth The university wants or is forced (as governments withdraw public funding) to obtain more money from the market. Faculty is given acquisition targets and 'billable days' targets.	Focus on dynamic quality The university invests in community relations and community outreach, thus seeking to become an indispensable and integral part of the community, which in return is willing to support the university.
Epistemological orientation	Empirical rationalism Finding an objective truth. Establishing causality. Single truth exists and can be known. Maximizing predictability, management and control. Minimizing uncertainty.	Socio-constructivism Co-creation of knowledge, inter-subjectively validated. Pluralist. Not one single 'truth' but many subject to interpretation. Uncertainty as a given. Facts and values are inseparable.
Type of knowledge generated	Scientific and technical knowledge that can (allegedly) be generalized across contexts to inform attempts by various social actors to predict, control, and/or intervene for specific instrumental ends.	Not only scientific and technical knowledge, but also phronesis: ethically practical knowledge that is indispensable for the task of making context-specific value judgements about ends and means.

the science-as-community perspective will need to gain ground. Fortunately, there is evidence that this is happening: many exemplary practices are presented in this report that support this claim. In research, all kinds of niche journals have emerged that are transdisciplinary and cross-boundary in nature with sustainability as a normative guiding framework. An increasing number of students and academics are engaged in a range of innovative methods and new forms of learning that appear to be particularly fruitful for working on contextual sustainability issues. These methods include transdisciplinary learning (for example Klein, 2000; Sommerville and Rapport, 2000), transformative learning (for example Cranton, 2007; Mezirow and Taylor, 2009), cross-boundary learning (for example Levin, 2004), anticipatory learning (for example Tschakert and Dietrich, 2010), action learning (for example Marquardt, 2009; Cho and Marshall Egan, 2009), social learning (for example Pahl-Wostl and Hare, 2004; Keen et al., 2005; Wals, 2007), and participative learning (Reid, et al., 2008). These forms of learning show a high family resemblance in that they (Peters and Wals, 2011; Wals and Dillon, 2011):

- Consider learning as more than merely knowledge-based.
- Maintain that the quality of interaction with others and of the environment in which learning takes place is crucial.

- Focus on existentially relevant or 'real' issues essential for engaging learners.
- View learning as inevitably transdisciplinary, 'transperspectival' and trans-boundary in that it cannot be encapsulated in a single discipline or in a single perspective.
- Regard indeterminacy as a central feature of the learning process in that it is not and cannot be known exactly what will be learned ahead of time and that learning goals are likely to shift as learning progresses.
- Consider such learning as cross-boundary in nature in that it cannot be confined to the dominant structures and spaces that have shaped education for centuries.

Finally, further evidence comes from the emerging multi-stakeholder community-based networks around the world, which tend to have HE representatives among their members (students, staff or both). The revival of university science shops as conceptualized in the 1970s ([www.livingknowledge.org](http://www.livingknowledge.org)) is testimony to this, as is the birth of a number of new networks of community-engaged universities (for example Centro Boliviano de Estudios Multidisciplinarios, Commonwealth Universities Extension and Engagement Network, Global Alliance of Community Engaged Research, PASCAL International Observatory, Participatory Research in Asia). Likewise, this is reflected in the rapid growth of regional centres of expertise (RCEs) in which universities are partners

in a network of NGOs, civil society organizations, community groups, schools, and so on (Mochizuki and Fadeeva, 2008). Within these networks and centres, a range of participatory forms of research can be found, such as action research (Reason and Bradbury, 2007), community problem-solving (Stapp et al., 1996), and citizen science (Irwin, 1995). They also include different conceptualizations of science and scientific inquiry, such as Mode 2 science (Gibbons, 1994; Nowotny, 2005; Nowotny et al., 2001), post-normal science (Funtowicz and Ravets, 1993), sustainability science (Clark and Dickson, 2003; Komiyama and Takeuchi, 2006) and transdisciplinary research (Hirsch-Hadorn et al., 2008).

The question is whether these movements towards ingraining sustainability in HE and the strengthening of ‘science as community’ with its associated forms of teaching, learning, research and community organization will move from the margins to the mainstream. In times of accelerating change in which the science–technology–society relationship will inevitably need to be reconceptualized in order for HE to remain relevant and trusted, there may be a move away from the commoditization of knowledge towards a new vision and mission of HE that is more congruent with the challenges of our time. That is why this study must continue to lead the way forward and try to go into the proposed solutions in greater depth through concrete actions to be implemented in HEIs.

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