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## **APPLYING THE SUSTAINABILITY PARADIGM IN HIGHER EDUCATION: MERGING RESEARCH AND PEDAGOGY**

**ABSTRACT.** There is growing consensus among a wide variety of individuals, the scientific community and national and international organizations that current strategies to meet human needs are unsustainable. **The scientific problem** of this article is shaped in a series of questions: How then, do we create a society that allows all present and future humans to be healthy, have their basic needs met, have fair and equitable access to the Earth's resources, have a decent quality of life and preserve the biologically diverse ecosystems on which we all depend? To solve these questions, a **paradigm shift** is required in the relationship of humans to each other and the environment in a manner that is mutually beneficial and sustainable.

The larger goal of shifting the thinking, values and actions of all individuals and institutions worldwide demands a long-term societal effort aimed at making environmental and sustainability concerns a **central theme in all education**. If we are to achieve a sustainable future, institutions of higher education must provide the awareness, knowledge, skills and values that equip individuals to pursue life-long goals in a manner that sustains human and non-human well-being for all current and future generations.

Thus, designing a sustainable future requires a paradigm shift towards systemic perspective, which encompasses **the complex** interdependence of *individual, social, cultural, economic and political activities and the biosphere*.

**Keywords:** sustainability, higher education, research, pedagogy, complexity.

### **1. Introduction**

*Institutions of higher education bear a profound moral responsibility to increase the awareness, knowledge, skills and values needed to create a just and sustainable future.*

(Anthony D. Cortese, 1999, p. 1)

The 'marketing' of higher education can mean either selling goods and services that simply conform to existing social and environmental practices or ones that involve original thought, innovation, new perspectives, new approaches to managing change and new models of social, political, economic, scientific and cultural organisation.

If higher education is to be part of social progress, then it cannot avoid having to grapple with sustainable development; those who are being educated will have to deal with social and environmental legacies left by the current generation and will, in turn, create social and environmental legacies for the future.

UNESCO's emphasis on the academic community's 'role of service' was noted earlier in this document. Agenda 21, the Rio Earth Summit's Agenda for Change which was endorsed by 179 member states in June 1992, points to ways that the academic community can play such a role:

*A country's ability to develop in a more sustainable way depends on the capacity of its people and institutions to understand complex environment and development issues so that they can*

*make the right development choices.*

*People need to have the expertise to understand the potential and the limits of the environment. They will face difficult policy choices when dealing with such complex problems as global climate change and protecting biodiversity. This will require scientific, technological, organisational, institutional and other skills.*

Michael Keating (1993, p.58), The Earth Summit's Agenda for Change, Centre for Our Common Future.

It would be difficult to imagine how capacity could be created or skills, knowledge and technical know-how be transferred to developing areas of the world, if the academic community does not play its part in these tasks. The importance of education, training and public information is endorsed throughout Agenda 21, including its 2 UN conventions on climate and biodiversity. Chapters 31 and 36 are particularly significant for academics. Chapter 31 focuses on 'Scientists and technologists' to suggest that governments should: a) Decide how national scientific and technological programmes could help development to become more sustainable; b) Provide for full and open sharing of information among scientists and decision makers; and c) might find it a good idea to form national advisory groups to help scientists and society develop common values on environmental and developmental ethics, where it appear as **education and research priorities**.

Chapter 36 deals with '**Education, training and public awareness**' and advocates that environmental and development issues should crosscut all levels of the system over the next three years (1992-95). More specifically, countries should set up training programmes for school and university graduates to help them achieve sustainable livelihoods. Encourage all sectors of society, including industry, universities, governments, non-government organisations and community organisations, to train people in environmental management.

## **2. Sustainable development and social justice**

As might be expected from a programme of this scale, progress has been patchy. Although Jonathan Porritt has pointed out that though the Earth Summit can be regarded as being 'just another UN talk shop', a substantial number of international, national and local achievements have come about as a result of Rio. Porritt acknowledges that while the slowness of progress in relation to the urgency of the task creates frustration, an equally important tension stems from sustainable development and social justice not being given equal attention to specific environmental goals such as global warming and biodiversity.

Lawrence (1997) states that while this interpretation of events may or may not be accurate; the underlying issue to note is that the vast majority of Earth Summit outcomes have been orchestrated from a Northern environmental position rather than a global vantage point. In consequence, sustainable development as an integrative goal in which social and environmental tensions are addressed and reconciled in North-South terms, seems to have disappeared from the discussions. As long as social justice is rendered invisible in sustainability discourse, analyses and solutions can only be partial. If the general public remain hazy about how the North impacts upon the South, there will be no incentive to produce any change. Universities have a particularly important 'role of service' to play in giving prominence to social justice issues in sustainability debates.

## **3. Higher education and the sustainable society**

The World Commission on Environment and Development (WCED, 1987) stressed

sustainable development, as linking present actions to the future, defining it as, *development that meets the needs of the present without compromising the ability of future generations to meet their own needs*. Since WCED, thinking has moved on apace. *Caring for the Earth: A strategy for sustainable living* (World Conservation Union, the UN Environment Programme and the World Wide Fund for Nature, 1991) put forward ‘a world ethic for living sustainably’, which deals with ‘third generation rights’ and introduces ‘fourth generation rights’ which assert the intrinsic value of all living things and our interdependence with the natural world (ibid, 1991, p.14):

- *Every human being is part of the community of life, made up of all living creatures. This community links all human societies, present and future generations, and humanity and the rest of nature.*
- *Every human being has the same fundamental and equal rights, including: the right to life liberty and security of person; to the freedom of thought, conscience, and religion; to enquiry and expression; and within the limits of the Earth, to the resources needed for a decent standard of living. No individual, community or nation has the right to depend on another for its means of subsistence.*
- *Each person and each society is entitled to respect of these rights; and is responsible for the protection of these rights for all others.*
- *Every life form warrants respect independently of its worth to people. Human development should not threaten the integrity of nature or the survival of other species. People should treat all creatures decently, and protect them from cruelty, avoidable suffering, and unnecessary suffering.*
- *Everyone should take responsibility for his or her impacts on nature. People should conserve ecological processes and the diversity of nature, and use any resource frugally and efficiently, ensuring that their uses of renewable sources are sustainable.*
- *Everyone should aim to share fairly the benefits and costs of resource use, among different communities and interest groups, among regions that are poor and those that are affluent, and between present and future generations. Each generation should leave to the future a world that is at least as diverse and productive as the one it inherited. Development of one society or generation should not limit the opportunities of other societies or generations.*
- *The protection of human rights and those of the rest of nature is a worldwide responsibility that transcends all cultural, ideological and geographical boundaries. The responsibility is both individual and collective.*

It can be argued that, just as the exploration of first, second and third generation rights should be an essential part of university life, so too should be fourth generation rights. We are, however, a very long way from this state of affairs.

In 1993, the Toyne Committee produced a report on *Environmental Responsibility* in the further and higher education systems. The Report recommended that all further and higher education (FHE) institutions should produce and publicise environmental policy statements in readiness for the 1994/5 academic year. Three years later a review of progress was published. Most FHE institutions had still not developed environmental policy statements and in the Review’s preface, the chair of the Toyne Committee, Professor Peter Toyne, admitted that the Committee’s reluctance to be prescriptive had undoubtedly contributed to ‘very little progress [being] made in taking forward the agenda’. In an attempt to redress this, the Toyne Review drew out six ‘key recommendations’ from the original Toyne Report:

### **1. For Government**

**Key recommendation 1:** Responsible global citizenship should be recognised as a desired core learning outcome. ‘Enabling responsible citizenship’ should be recognised as a core business of learning institutions and a legitimate purpose of lifetime learning (para 1.8).

**Key recommendation 2:** Funds should be made available to establish a national programme to support the further and higher education sector's response to the challenge of sustainable development. This programme should be modelled on the highly successful Local Agenda 21 programmes run by local authorities (para 1.2).

### **2. For Further and Higher Education (FHE) institutions**

**Key recommendation 3:** Within three years all FHE institutions should be either accredited to, or committed to becoming accredited to, a nationally or internationally recognised environmental management standard, such as the eco management and audit scheme (para 1.5).

**Key recommendation 4:** Within three years all FHE institutions should have developed the capacity to provide all students with the opportunity to develop defined levels of competence relating to responsible global citizenship (para 1.6).

### **3. For Standard Setting Bodies**

**Key recommendation 5:** Those responsible for defining national standards relating to industrial and professional practice, and associated qualifications standards, such as industry lead bodies and professional bodies, should ensure that appropriate reference is made to sustainable development issues (para 3.10).

## **4. Sustainable research initiatives in higher education institutions**

Particularly critical to transforming American higher education is making sustainability a major research and scholarly focus. Sustainability-oriented research is increasingly funded in the sciences, but initiatives are also underway to bring the social sciences and humanities into the research dimension. The academic community has seen a rise in peer-reviewed publications focused on sustainability in higher education and on sustainability generally: the *International Journal of Sustainability in Higher Education* (Publisher - Emerald) was launched in 2000; and *Environment and Sustainable Development* (Publisher - Inderscience), online and paper format <http://www.environmental-center.com/magazine/inderscience/ijesd/> was out in 2002. According to NWF's 2001 survey, 23% of colleges and universities support research centers that focus on "environmental" issues. The level of support for these centers, however, and the degree to which they focus on issues concerning sustainable development is unknown. The following are some notable examples of efforts underway.

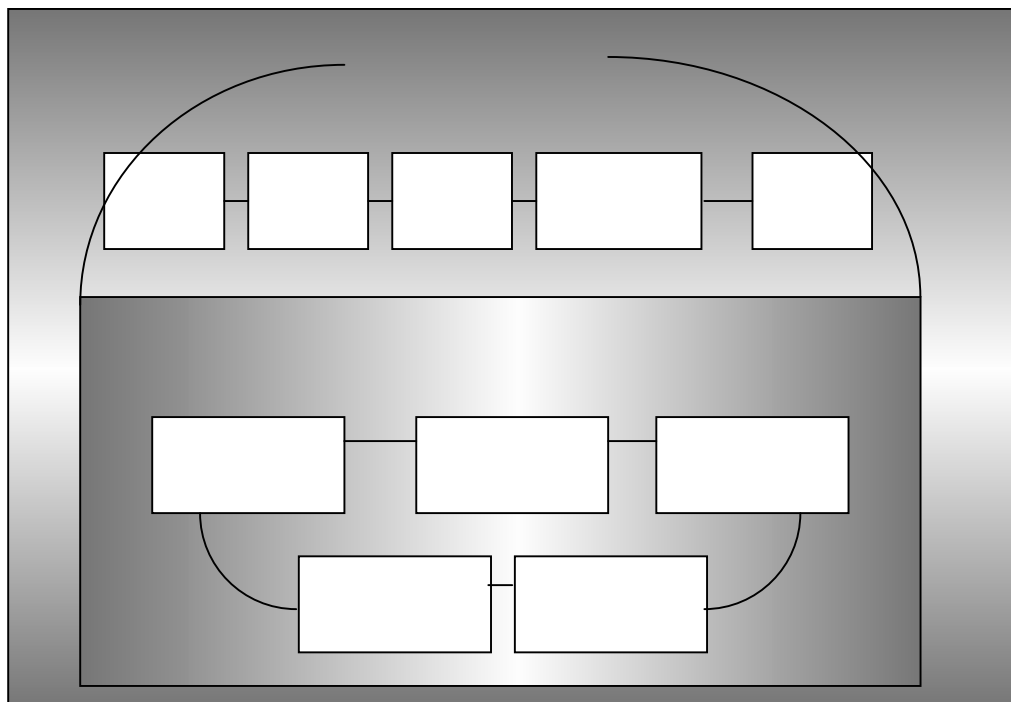
Numerous institutes of technology in the United States are turning their research toward sustainable technology. Georgia Tech, a leader in this area, hosts the Institute for Sustainable Technology and Development (ISTD), now the campus advocate for sustainability in curriculum, research, and operations. Recent research has focused on ozone pollution, fuel cells, diagnosing traffic gridlock, air pollution, and urban sprawl in U.S. cities. Georgia Tech also supports the Environmentally Conscious Design and Manufacturing Program, which integrates a long-term research agenda in environmentally conscious design and manufacturing with on-going economic development activities in Georgia. Furthermore, sustainability is a key theme in a new multi-disciplinary building complex designed to support "research neighborhoods," which break down traditional disciplinary barriers by co-locating faculty from different departments who share research interests.

The same pattern is observed at Kaunas Faculty of Humanities, Vilnius University Lithuania, where the merge of three scientific research streams is practised, namely the social sciences, the humanities and the physical sciences (IT science). The Centre of Socio-cultural Research at the Faculty is performing a co-ordinator's role in this process, achieving the goal that all three branches of scientific research at the Faculty would focus on the theme of a man in nature: a) the social sciences develop sustainable ideas for the economic environment; b)

the humanities focus on sustainable developed of languages and humanity; c) the physical sciences assist the two above-mentioned research streams in language development practices and financial modelling of security markets. Therefore, the Faculty publishes two world-established scientific journals “*Respectus Philologicus*” <http://filologija.vukhf.lt> (in the humanities) and “*Transformations in Business and Economics*” [www.transformations.khf.vu.lt](http://www.transformations.khf.vu.lt) (in the social sciences) since 1999 to encourage scientific achievements in inter-disciplinary field of research.

## 5. Modelling sustainable development of higher education institutions

Sustainability is currently ill-defined. It is complex, interdependent, and very difficult to accurately divide into smaller parts. The ecosystem dimensions are air, water, land, materials, and energy. The people dimensions are knowledge, community, economy and wealth, governance and health and wellbeing. Each dimension is then further broken down into “elements” “elements” until the organizational level of indicators is reached (Figure 1).



**Figure 1. Merging ecosystem and people dimensions for sustainable development of universities**

**Context:** The global and local context will be set to help explain the importance of the issue at hand. Importance will be explained from a global perspective as well as in the context of the University.

**Indicators:** measurements of University’s sustainability are set according to the standard indicator framework used by the universities (Table 1).

**Recommendations:** each subsection will have a recommendation section that will highlight the require steps to be taken to get the University to the next level in sustainability. The recommendations are broken down into three categories “maintenance”,

“preventative”, and “innovative”. The maintenance recommendations are those practices that can be done on a daily basis that will help reduce any adverse impacts to the socio-biophysical environment. Preventative measures are those practices that stop an adverse effect from occurring in the future. Innovative practices are those that prevent any foreseen negative effects from occurring as a result from an accumulation of practices occurring presently.

**Feasibility Studies:** after the recommendations are made, feasibility studies should be undertaken. Each recommendation should be practical and therefore include an assessment of the economic, social and environmental feasibility.

Table 1

University/ Faculty Campus Sustainability Chapters and Subgroups

<b>I. ECOLOGICAL CHAPTER</b>				
<i>AIR</i>	<i>WATER</i>	<i>LAND</i>	<i>MATERIALS</i>	<i>ENERGY</i>
<ul style="list-style-type: none"> <li>• Indoor</li> <li>• Outdoor</li> </ul>	<ul style="list-style-type: none"> <li>• Consumption</li> <li>• Management</li> <li>• Storm and waste water</li> </ul>	<ul style="list-style-type: none"> <li>• Managed green spaces</li> <li>• Natural areas</li> <li>• Intensity of use</li> </ul>	<ul style="list-style-type: none"> <li>• Buildings</li> <li>• Food</li> <li>• Paper</li> <li>• Equipment</li> <li>• Solid waste</li> <li>• Hazardous waste</li> </ul>	<ul style="list-style-type: none"> <li>• Sources</li> <li>• Management</li> <li>• Intensity of use</li> </ul>
<b>II. SOCIO-ECONOMIC CHAPTER</b>				
<i>KNOWLEDGE</i>	<i>COMMUNITY</i>	<i>GOVERNANCE</i>	<i>HEALTH AND WELL-BEING</i>	<i>ECONOMY AND WEALTH</i>
<ul style="list-style-type: none"> <li>• Training</li> <li>• Research</li> <li>• Curriculum</li> </ul>	<ul style="list-style-type: none"> <li>• Envolvement</li> <li>• Diversity</li> <li>• Services</li> </ul>	<ul style="list-style-type: none"> <li>• Policy</li> <li>• Implementation</li> <li>• Monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Recreation</li> <li>• Food</li> <li>• Safety</li> <li>• Health service</li> <li>• Environment</li> </ul>	<ul style="list-style-type: none"> <li>• Individual</li> <li>• institutional</li> </ul>

## 6. The strategic thinking and policy formation of sustainability at universities

Where universities do not have a comprehensive environmental or, preferably, internationally-focused sustainable development policy, this can be pursued with local associations and/or through academic structures. ‘Sources and further information’ at the end of this section provides reading on such topics as university–local authority partnerships, curriculum guidance, North-South perspectives on sustainable development and information on education for sustainability. Local Authority Eco-Management and Audit (LA-EMAS) and International Standards Office (ISO 14001) schemes provide models of good practice. ISO 14001 enables universities to sign up to internationally recognised standards in environmental management and auditing.

### CASE STUDY

A university/ college has neither environmental or sustainable development policy nor any environmental management and audit system. Within the college there are academics, who are either keen to implement or are already implementing elements of environmental education, development education and education for sustainability in courses. Such work has, however, been patchy, piecemeal and lacked proper investment. Also within the college there

is a new and exciting futuristic learning centre being established which is expected to demonstrate new educational directions. But, rather than being focused upon a range of teaching and learning futures, the staff charged with developing the centre have so far focused almost exclusively upon computer-related learning because this is what will attract funding. A number of the staff in the college believes that its education for sustainability and sustainable development profile should be stronger and more coherent and that the college should become a centre of excellence in this field.

A way to approach this problem would be for concerned staff to come together to press for an institutional policy which covers ethical and environmental practice and endorses education for sustainability as both a cross-curricular theme and an area of study in its own right. Concerned staff could press their institution to develop in conjunction with stakeholders, means by which ethical and environmental practice can be improved, and how to encourage and conduct a focused programme of research and development in education for sustainability and its related fields.

**Sustainability** is a process of ensuring the wise use of all resources within a framework in which **environmental, social** and **economic** factors are integrated. The University is committed to placing sustainability at the heart of its **mission**:

- making sustainability integral to the delivery of research, teaching and operational objectives;
- taking positive actions promoting continual environmental improvement; and
- setting and achieving clearly defined sustainable development objectives and targets.

The University seeks to build on its Environmental Policy and undertakes to:

1. Make **sustainability a corporate priority**:

- encourage students and staff to incorporate informed sustainability perspectives within their work;
- develop the capacities of academic staff to promote understanding of the principles and practice of sustainability;
- establish a corporate culture which seek to embed sustainability in all aspects of the university;
- recognise, celebrate and reward achievement in order to promote the university as a sustainable organisation.

2. Develop and deliver appropriate **teaching and research**:

- expose all students to the concepts of social, environmental and ethical stewardship;
- encourage students to consider sustainable issues in their academic work in order that they will become active advocates of sustainable development; and
- support and encourage interdisciplinary research into issues of sustainable development.

3. Take a **leadership role in sustainability**:

- set best practice standards, meet or surpass requirements of environmental legislation and commit to a process of continual environmental improvement;
- promote awareness, both within the university's and the wider community, of all legislative, economic, technical and market developments that assist progress towards sustainability;
- establish a university audit group to oversee implementation of this policy and associated programmes; and
- encourage and actively support the work of the Environmental Action Group.

4. Contribute to stable **community building**:

- build partnerships and create local information and learning networks for sharing experiences and knowledge of sustainability issues with all stakeholders;

- operate in ways that maximise social and economic benefit while minimising any adverse impacts to the local community; and
  - invest in staff development, value stakeholder involvement and promote social inclusion and equity.
5. **Maintain and develop the University in a sustainable manner:**
- promote continual improvement in maintenance practices and establish sustainability guidelines for internal and external design teams and contractors working on new build and refurbishment projects;
  - develop procurement procedures with all elements of the supply chain to ensure social, ethical and environmental criteria are integrated into programmes aimed at achieving best value;
  - develop accounting procedures which articulate clearly the benefits of sustainable development;
  - maximise the efficient use of energy and materials, continually improve pollution prevention measures and increase use of renewable resources;
  - minimise waste generation in research and teaching activity and encourage repair, reuse and recycling ahead of the responsible disposal of surplus materials;
  - promote practical measures to reduce the impact of travel to and between university sites; and
  - establish systems to facilitate data capture for benchmarking.
6. **Monitor and report on progress towards sustainability:**
- manage responsibly the social, environmental and economic impacts of all university policies and practices and assess potential improvements within the university's decision-making processes;
  - conduct reviews of all university policies, management performance standards and operations against internal sustainability targets and best practice standards;
  - make the results of social, environmental and sustainability audits and impact assessments carried out by or for the university available to all stakeholders; and
  - overall monitoring of this policy will be the responsibility of the university's audit group for Sustainability.

Referring to the suggestions, presented in Table 1, some adequate measures could be taken in all fields of socio-economic chapter of a University/ Faculty. Here, we present a sample of recommended knowledge (pedagogy and research) indicators and measurement units, which could be strategically planned and implemented on a University level and then transferred on a Faculty level as well (Table 2), considering short-term and long-term benchmarks. Application of sustainability paradigm on a University level should primarily start with the orientation of faculty members and students, which could be followed by training courses, research collaboration pacts and curriculum development initiatives.

Table 2

Rocommended KNOWLEDGE (pedagogy and research) indicators and measurement units

<i>No</i>	<i>Indicator</i>	<i>Measurement Unit</i>	<i>Short-term benchmark</i>	<i>Long-term benchmark</i>
K-1	New Faculty orientation	Total annual number of new faculty (by headcount) receiving at least 1 hour of in-person orientation to campus and local community environment/social issues divided by the total number of new faculty members arriving on-campus in that year, multiply by 100.	At least 50%	100%
K-2	New staff	Total annual number of new staff (by	At least 50%	100%



	orientation	headcount) receiving at least 1 hour of in-person orientation to campus and local community environment/social issues divided by the total number of new staff arriving on-campus in that year; multiply by 100.		
K-3	New student orientation	Total annual number of new students (by headcount) receiving at least 1 hour of in-person orientation to campus and local community environment/social issues divided by the total number of new students arriving on-campus in that year; multiply by 100.	At least 50%	100%
K-4	Faculty sustainability training	Total annual number of training hours dedicated to sustainability topics (including on- and off-campus workshops, seminars, conferences, etc.) for faculty members (by headcount) divided by the total number of faculty (headcount).	At least 24 hours per year per faculty member	At least 60 hours per year per faculty member
K-5	Staff sustainability training	Total annual number of training hours dedicated to sustainability topics for staff (by headcount), divided by the total number of staff (headcount).	At least 24 hours per year per faculty member	At least 60 hours per year per faculty member
K-6	On-campus Student Sustainability Jobs	Total annual number of on-campus student job postings (full- and part-time jobs adjusted to FTE) focused on sustainability issues, divided by total number of jobs posted; multiply by 100.	At least 10%	40%
K-7	Research Collaboration: On-campus	Total annual number of on-campus research projects involving two or more on-campus departments divided by the total number of on-campus research projects, multiply by 100. Note: collaborative projects that actively promote unsustainability should not be included as a collaborative project in this indicator.	At least 50%	Approach 100%
K-8	Research Collaboration: Non-Profit	Total number of research projects involving two or more partners (one of which is the university and the other being government, community, higher education, and/or not-for profit organizations) divided by the total number of all research projects; multiply by 100. Note: collaborative projects that actively promote unsustainability should not be included as a partnership in this indicator.	At least 50%	Approach 100%
K-9	Research Collaboration: For Profit	Total number of research projects involving the university with one or more businesses, corporations, and/or other for-profit organizations, divided by the total number of all research projects; multiply by 100. Note: collaborative projects that actively promote sustainability should not be included as a collaborative project in this indicator.	25% or less	Approach 0%
K-10	Courses with Sustainability Content	Total number of courses that have “substantial sustainability content,” divided by total number of courses; multiply by 100.	At least 25%	75%
K-11	Students Taking Sustainability Courses	Total number of students (headcount) having taken at least one course with substantial sustainability content upon graduation, divided by total number of graduating students in that school year; multiply by 100.	At least 25%	100%
K-12	Faculty Teaching	Total number of courses with substantial sustainability content taught by tenured or tenure	At least 50%	100%

	Sustainability Courses	track faculty, divided by total number of courses with substantial sustainability content; multiply by 100.		
K-13	Quality of Sustainability Courses	Number of courses with substantial sustainability content that received top marks (i.e. in the top ranking level or scale band) in their most recent external review, divided by total number of courses with substantial sustainability content; multiply by 100.	At least 50%	100%
K-14	Collaborative Course Development	Total number of courses that were developed using the input of more than one person in more than one department, divided by the total number of courses; multiply by 100.	At least 50%	100%

## 7. Conclusion

Universities should learn that sustainability is part of their core business and start to take action so that it is part of their mission and accompanied by an implementation strategy. Students should be provided with the broad concept of sustainable development and the different meanings and views on key concepts. Students should relate their scientific study and future profession to social issues, which constitute the justification of their study and profession.

*“Universities should stop talking about sustainability and start to act. Many universities are taking sustainability seriously, however, they remain dependent on a core of committed people. When the people leave so does the commitment. Sustainability needs to be part of the core business of universities, enshrined in mission statements and accompanied by an implementation strategy.”*

Kim Walker, Australia. ESDebate International debate on education for sustainable development. (2000, p.34).

Educators should discuss across disciplines to identify convergence and divergence. They should reflect about how education should prepare people for using their rights and responsibilities in society, education should empower people rather than teach them. Many participants reflected first of all on the role of educators not as the source of knowledge and moral admonition, but as a guide and process facilitator and a learner at the same time. Some participants would like educators to have more knowledge of principles of sustainable development and other content of ‘deeper ecology’. Educators should learn that the empowerment of individuals to participate effectively in the process of social change is the key purpose and that the participation relates to direct interventions that will impact on the direction, progress and dynamics of social, economic and environmental development. These interventions will include decisions and actions: as consumers; within their occupations; as employees/employers; as voters (or in other forums of social decision making; within their homes and communities).

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