

# **Sustainable Development in Higher Education**

**A review of the literature and practice**

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## Summary

The U.N. Decade of Education for Sustainable Development has highlighted the need to incorporate sustainable development in teaching and learning. As a result, higher education institutions (HEIs) are increasingly focusing on sustainable development as a key component in their activities, while the Higher Education Funding Council for England (HEFCE) has adopted this approach and outlined a range of performance targets for universities.

Although there has been much research on teaching and learning in Education for Sustainable Development (ESD), there are few comparisons of current practice across higher education. This report summarises the approach to sustainable development in higher education, both in the curriculum and in estates and facilities management, with an emphasis on the former. While all of the universities evaluated showed good practice in incorporating sustainable development into estates and facilities management, limited progress was observed in terms of integrating ESD in the curriculum, with research-intensive universities particularly resistant.

There is evidently a need for stronger commitment to implement ESD and to implement the changes needed to achieve the performance targets set out by HEFCE.

## 1 Introduction

Sustainable development is becoming increasingly relevant in higher education. Enterprising universities are establishing links between policies on environmental protection, economic development and social justice, and offering their students learning experiences in these areas. In turn, student bodies are influencing practice through **students'** union politics and environmental activities.

The HEFCE consultation document [2008/18](#) and the [Sustainable Development in Higher Education report](#) noted that integrating sustainable development throughout higher education is crucial in order to meet increasing public concern about the environment, and to tackle climate change (HEFCE 2008, 2009). The [Future Leaders Survey](#) and [People and Planet's Green League](#) suggest that this has influenced the current and future generations of students to consider environmental factors when choosing universities (Cade 2008, Forum for the Future and UCAS 2008). Therefore, it is vital that sustainable development is at the core of all university activities to satisfy and address student expectations. Efforts will also lead to cost efficiencies and may provide opportunities for further funding. However, so far sustainable development initiatives have largely been aimed at estates and facilities rather than the curriculum itself (Tilbury 2004).

It is now recognised that it is necessary to embed ESD in order to impose sustainability on university culture (Scott & Gough 2004). Education raises awareness among young people and provides the sustainable development skills which employers are seeking (Dawe et al. 2005). Universities are a key contributor towards a sustainable society, through both:

- teaching and the exchange of knowledge between business and the community and
- by engaging in public policy (HEFCE 2009).

Unfortunately, while ESD is valued at many institutions, an effective interdisciplinary learning process has yet to emerge. Many researchers attribute this to insufficient funding, time and commitment (Pittman 2004) which may result from a piecemeal approach to integration (Dawe et al. 2005). Altering perceptions of sustainable development in universities requires a holistic strategy.

While there has been much research on teaching and learning, limited literature exists assessing current practice in ESD. The aim of this report is to help fill this omission by critically evaluating the existing approaches to ESD and sustainable development in estates and facilities in several universities, across the U.K. and internationally. Furthermore, the report will emphasise the importance of ESD and make recommendations for future directions.

## 2 Background

Sustainable development was first recognised by the [Our Common Future](#) report (WCED 1987), commonly referred to as the Brundtland Report. It became a key principle both nationally and internationally (Jacobs 1999) and since its publication, sustainable development has:

*‘drawn together a coalition of governments, non-governmental organisations (NGOs), industry and local authorities committed to finding ways of moving economic and social development onto more sustainable trajectories’*

(Grove-White 1996)

However, despite this consensus, the ambiguity surrounding sustainable development raises much debate (Wade 2002). Without a clarification of its definition, adapting policy objectives will be difficult (Jacobs 1999). Environmentalists are particularly concerned that its lack of clarity allows businesses and others to have false sustainability credentials, while vague definitions will result in a loss of meaning and public concern (Vedsmand 2001).

### 2.1 Defining sustainable development

**Brundtland’s** definition published in [Our Common Future](#) is the most widely accepted definition of sustainable development:

*‘Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs’.* (WCED 1987)

It can be illustrated as a model comprising three interlinked concerns: environment, social and economic (see Figure 1).

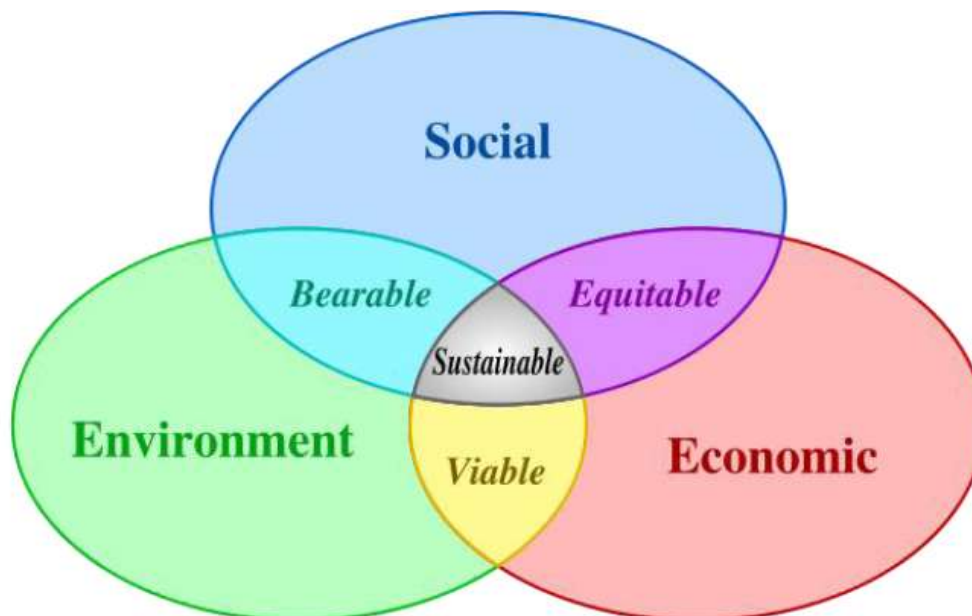


Figure 1 Sustainable development model (After OECD 2008)

Vedsmand (2001) describes each concern in the context of sustainable development as follows:

- *Social sustainability*: availability of good living and working conditions, justice, equal opportunities and democracy.

- *Environmental sustainability*: the natural environment has a tolerance level which should limit the use of resources and promote recycling.
- *Economic sustainability*: economic development and growth need to be in balance with the environmental and social dimensions.

These have been further delineated by Jacobs (1999):

1. *Environment-economy integration*: ensure that development and environment protection are integrated in planning.
2. *Futurity*: have concern for the impact of current activity on future generations.
3. *Environment Protection*: reduce pollution and environmental degradation and encourage more efficient use of resources.
4. *Equity*: meet the basic needs of the poor.
5. *Quality of life*: human well-being constitutes more than just income growth.
6. *Participation*: sustainable development requires the political involvement of all stakeholders in society.

## 2.2 Political progress

Sustainable development remains an important topic on the political agenda (Vedsmund 2001). Its importance has been highlighted by the recent [Intergovernmental Panel on Climate Change 4AR report which notes that global warming is “unequivocal”](#) and in which human activity plays an integral role (IPCC 2007). Reflecting this, the U.K. Government signed the Kyoto Protocol and Bali Agreement and introduced the [Climate Change Act](#) in 2008. The [Stern Review](#) highlighted the need for the environmental co-operation between sectors, stating that a proactive climate change response is more economically efficient than inactivity (Stern 2007). This section outlines the evolution of sustainable development in politics.

### 2.2.1 1970s – Foundations for change

The 1970s saw the foundation of environmental studies and management faculties across many Higher Education Institutions (HEIs). However, the disparity between the taught materials and the actual environmental practices of HEIs caused students to question the mismatch of theory and practice (Alabaster & Blair 1997). The growing support of key institutions raised the profile of environmental concerns. Internationally, The Stockholm Conference in 1972 reflected the rapidly growing interest in and concern for the environment, which led to the establishment of the [United Nations Environment Programme](#) in 1975 (Palmer 1998). However, U.K. universities were slow to embrace sustainable development in education (Roberts 2007).

### 2.2.2 1980s – Resource conservation

In the 1980s, the World Conservation Strategy stressed the importance of resource conservation, and the inter-dependency of conservation and development (Palmer 1998). Coupled with the influential [Brundtland Report](#) (WCED 1987) discussed above, a series of developments began to shape university activities. These included an increase in environmental courses and improved management of university estates (Alabaster & Blair 1997). However, there were criticisms of the [Brundtland Report](#) for not considering the values of sustainable development or the regional differences associated with the concept and its failure to address strategies for introducing sustainable development (Kasimov & Mazurov 2007).

### 2.2.3 1990s – The Talloires Declaration and The Earth Summit

The Talloires Declaration was signed by the [University Leaders for a Sustainable Future](#) (1990). This was the first official statement of a commitment to environmental sustainability in higher education made by university managers (Roberts 2007). The British government panel on sustainable development, first report recommended that U.K. universities subscribe to the Talloires Declaration and since 1990, numerous universities have signed the agreement (Alabaster & Blair 1997).

The Earth Summit in Rio de Janeiro in 1992 produced two key documents for the inclusion of environmental education as a cross-curricular theme in the curriculum; [Agenda 21](#) and the [Rio Declaration](#) (Palmer 1998). Agenda 21 describes the actions required by nations to achieve sustainable development in the twenty-first century. The Rio Declaration is a statement of 27 sustainability principles which provide a blueprint for the programmes in Agenda 21. The targets of the Rio Declaration included the establishment of regional centres of excellence in research and teaching, and to create partnerships with businesses and NGOs (Reid et al. 2002). The Earth Summit marked the beginning of the proliferation of sustainable development in education (Calder and Clugston, 2003 in Roberts 2007) and influenced activities across central government, local authorities and NGOs (Scott & Gough 2004).

Following the Earth Summit, the U.K. national curriculum was amended to integrate sustainable development across all key stages. However, important subjects such as literacy, numeracy and information technology still maintain their dominance (Reid et al. 2002; Chalkley 2002). Its integration in the curriculum has also been hindered by a lack of understanding and support amongst teachers, local governments and NGOs. Unfortunately, this meant that sustainable development was often ‘bolted’ onto existing programmes at unnecessary expense (Reid et al. 2002).

These developments have been mirrored in HEIs. While sustainable development has been expanded to disciplines such as architecture, economics and civil engineering, the great majority of students do not encounter it in their studies (Chalkley 2002).

#### 2.2.4 The Toyne Report

In 1991, the U.K. government created an advisory committee to review and make recommendations on environmental education practices in universities which produced the Toyne Report (Toyne 1993, Roberts 2007). This gave sustainable development official credibility and improved perceptions of the contribution of several underrepresented traditional universities. The Toyne Report recommended that universities sign up to environmental management standards and expressed the importance of engaging students in the principles of sustainable development and citizenship (Scott & Gough 2004). While the Toyne Report marked the acceptance of environmental responsibility by senior management of HEIs, a review three years later noted only modest progress. The [Parliamentary Select Committee on Environmental Audit](#) in their sixth report (2003) **stated their disappointment at “the dismal response” by the government and most further and higher education institutions to the Toyne report and the 1996 Khan Review** (Environmental Audit Committee 2003). Even so, the Toyne Report marked the first attempt by government departments, agencies and funding councils to cooperate in promoting sustainability and institutional change (Roberts 2007 and Scott & Gough 2004).

Following from the Toyne Report, in 1997, the Forum for the Future began its Higher Education 21 project (HE21) (Scott & Gough 2004) This aimed to highlight areas of best practice and helped establish Higher Education Partnerships for Sustainability (HEPS) in order to produce and distribute sustainable development objectives (Scott & Gough 2004). However, HE21 failed to increase interest in sustainable development in the curriculum and much of the momentum gained by the Toyne Report was lost (Reid et al 2002). In addition, while the Higher education Funding Councils supported research into sustainable development in HEIs, there is little evidence of an overlap between the research and changes in the curriculum (Scott & Gough 2004, Reid et al. 2002).

### 2.2.5 The U.N. Decade for Education

Since 1998, the U.N. Commission on Sustainable Development has been developing an emphasis on education. In their 6<sup>th</sup> session, seven priority areas were agreed:

1. Clarifying and communicating sustainable development concepts.
2. Reviewing national education policies and reorienting practices.
3. Incorporating education into national sustainable development strategies.
4. Promoting sustainable consumption and production through education.
5. Promoting investment in education.
6. Identifying and sharing innovative practices.
7. Raising public awareness.

The development of these areas is reinforced by the U.N. **General Assembly's** designation of 2005-2014 as the '**Decade of Education for Sustainable Development**' (Scott & Gough 2004). The U.N. Decade of Education for Sustainable Development 2005-2014 states that 'universities **must function as places of research and learning for sustainable development**'. The Decade aims to promote public understanding of the principles of sustainability and the development of mainstream education for sustainable development. In order to achieve this, it will monitor and evaluate the progress of activities undertaken by U.N. agencies, governments and NGOs to incorporate sustainability into educational policies ([U.N. Decade of Education for Sustainable Development 2008](#)).

### 2.2.6 Sustainable development strategy in the U.K.

The U.K.'s **sustainable development** strategy - [Securing the Future: delivering U.K. Sustainable Development strategy](#) (2005) - emphasised the role of education in raising awareness and implementation of sustainable development among young people. The aim of the then Department for Education and Skills was to ensure that sustainable development was embedded in the core education agenda across all education and skills sectors (HM Government 2005).

### 2.2.7 Higher Education Funding Council for England (HEFCE)

In 1992, the HEFCE was established with four strategic aims (Gough & Scott 2007):

- enhancing excellence in learning and teaching,
- widening participation,
- enhancing excellence in research and
- enhancing the contribution of higher education to the economy and society.

In July 2005, the Council published [Sustainable Development in Higher Education](#). This incorporated the strategies from *Securing the Future* **and described the council's approach to promoting sustainable development**. HEFCE has also made sustainable development a key theme of its 2006-11 strategic plan. However, [HEFCE's 2008/18](#) consultation report stresses that while universities have promoted sustainable development, they must continue to do this at a higher rate in order to maximise their role in this area. The consultation report produced six new objectives to aid HEIs:

1. Continue to raise the profile of sustainable development with the aim that it should become a mainstream part of HE activities.
2. Seek opportunities to identify sector-wide business cases and benefits for individual institutions.
3. Promote sustainable development by integrating it into policy-making.
4. Demonstrate to stakeholders that HEFCE and HEI are making efforts to promote sustainable development and to extend good practice.
5. Support sector-led capacity building to pursue this agenda across all of an HEI's functions.
6. Facilitate a carbon reduction culture to reduce carbon emissions significantly across the sector.

The consultation report 2008/18 aimed to create a baseline of practice relating to sustainable development in the sector. Following this report, HEFCE produced an update document in 2009 ([HEFCE 2009/03](#)). Feedback showed that there was a high level of commitment towards sustainable development, and **HEIs welcomed HEFCE's non-prescriptive approach**. However, concerns were raised that HEFCE did not sufficiently support and encourage institutions to incorporate sustainable development. The key revisions in the 2009 update document are:

- An increase in research, business and community engagement.
- Revisions of **HEFCE's objectives** to reflect its leadership role in inspiring developments.
- A deadline on implementing all actions by the end of 2010.
- Recognition of the student body as a valuable partner: HEFCE will collaborate with organisations such as the National Union of Students to promote behavioural change and support environmental initiatives.

### 3 Education for sustainable development

#### 3.1.1 The need

The national curriculum defines education **for sustainable development as 'enabling** students to think creatively and critically to solve problems and to make a difference **for the better'** (Department for Education & Employment 1999 in Wade 2002). Education must also support the ethos of sustainability as students' attitudes to the environment are difficult to change (Wade 2002). Traditionally, academic interest in sustainable development has developed as a result of professional or personal interest rather than from requirement, while overcrowding in the curriculum has inhibited the spread of topics related to sustainable development. The mandatory inclusion of sustainable development can also be counterproductive, perceived as a disruption rather than a contribution to the teaching of a module. Despite this, a 2003 survey of 18 HEI websites based on **the words 'sustainable development' or 'sustainability'** revealed a considerable quantity of teaching and research on the topic (Scott & Gough 2004).

Unfortunately, the survey found little evidence that universities were linking their teaching and research with business and community projects. The study is necessarily limited by the size of sample and reliance on the accuracy of individual universities' search engines. Knowing the identities of the universities studied would also aid comparison with other reports. Nevertheless, the survey highlights the need for leadership in integrating existing knowledge and best practice within HEIs, businesses and the community. Reid et al. (2002) also identified the need for research into the relationship between sustainable development and life-long

learning. Further research resulting from a 2007 meeting in Amsterdam on the implementation of education for sustainable development within HEI curricula in Western Europe supports the earlier findings (Dawson 2008). Of 30% of English university websites surveyed:

- 65% contained sustainability information
- 31% had a campus sustainable development policy and
- 28% had formal documents to support their policies.

The research highlighted several positive trends such as an increase in the number of sustainability centres and newsletters within higher education, including the University of Cambridge and the Sustainability Readers Digest.

However, it is argued that challenges with management and planning are preventing the incorporation of **sustainability education and that 'innovation not integration is the core of environmental education for sustainability'** (Tilbury 2004). In particular, for incorporation to be successful, a holistic approach is required. As Sterling (1996) has previously stated, reform is needed in education, and sustainability education could be the catalyst for this change.

Meanwhile, there is a growing employer demand for sustainability knowledge and skills in graduates, and an increase in the number of graduates seeking environmentally responsible employers and universities (Cade 2008). **While HEFCE have announced a 'Revolving Green Fund'**, providing £30-40 million over three years, none of these funds is directed towards the curriculum, potentially depriving graduates of sustainability learning. Instead, they are aimed solely on cutting HEI greenhouse gas emissions. However, there have been a number of ESD-focused events which have attracted large numbers of attendees (Dawson 2008). HEFCE also aims to continue to work with the Higher Education Academy to support the work of the ESD project and to encourage the Academy and its Subject Centres to recognise ESD as a priority (HEFCE 2009).

### 3.1.2 Barriers and strategies

Unfortunately, those HEIs without sustainability strategies place little emphasis on ESD and often do not publish their 'green' credentials. Moreover, future funding for Centres for Excellence in Teaching and Learning (CETL) projects is uncertain (Dawson 2008), while understanding of the need for ESD is low compared with the need for other environmental topics such as environmental management. For ESD to be embedded into HEIs, it must be portrayed in meaningful and motivational contexts: career paths, institutional status and funding.

Dawe et al. (2005) investigated the implementation of ESD in HEIs across the U.K. Aiming to provide guidance on incorporating sustainable development into Higher Education and identify good practice, this report was one of the first to evaluate the varying practices in teaching and show the links between many disciplines and ESD. Using literature review, focus group meetings and a questionnaire, the report concluded that sustainable development was not fully incorporated within any discipline. Typically, Philosophy, Mathematics and Performing Arts were the worst offenders, while Engineering, Environmental Studies and Geography were the best. Dawe et al. (2005) agree with Scott and Gough (2004) that overcrowded curricula present barriers to incorporating sustainable development, while a lack of understanding by staff and minimal institutional drive compound the issue. It is suggested that teaching materials and staff development would help increase staff motivation and understanding, while institutional policies can be influenced by producing a credible business case.

Dawe et al. (2005) have several novel suggestions for embedding sustainable development. These include:

- using tutors in a role model based approach,

- using experimental learning such as role plays, field trips and community projects,
- encouraging walking to, from and around campus and other interactions with surrounding areas to increase empathy and connection with the environment.

Above all, Dawe et al. (2005) advocate holistic learning, in particular increasing the ability of graduates to evaluate the broader environmental implications of subject matter.

Finally, Clugston and Calder (1999) suggested seven criteria for successfully embedding sustainable development into a curriculum:

1. Ranking integration efforts, particularly the concept of **“champions of sustainability”**.
2. Making support for sustainable development prevalent at all management levels.
3. Ensuring full disclosure of the advantages and disadvantages for each department.
4. Promoting an ethos of sustainability throughout the institution and its culture.
5. Openly sharing analysis of the successes and failures.
6. Creating academic legitimacy.
7. Raising recognition from national and international parties by attracting research grants and contracts from external sources.

#### 4 Education for sustainable development in primary and secondary schools

While the focus of this report is higher education, the foundations of ESD should be impressed on the younger generation and continued at university. Schools are beginning to integrate sustainable development throughout education and estates with projects such as Eco-Schools which aids schools in conducting environmental activities and increasing environmental literacy.

Loughland et al. (2003) researched the factors influencing the perception of the environment of primary and secondary school students in Australia. This is an interesting study as little research has been undertaken on the environmental awareness of children. The research discovered that environmental science is more integrated in Australian primary schools as it is easier to introduce into the curriculum. Interestingly, while boys have a greater knowledge of the environment, girls have stronger feelings about it. This result supports research conducted on gender differences to the environment. However, this study is unique in showing that concern for the social and environmental concepts of sustainability are linked with environmental consciousness. Although this study concerns schools rather than HEIs, other research such as Fien et al. (2001) and Stables (2001) suggests that an interdisciplinary approach is essential to an effective environmental approach in higher education.

#### Case study: Wales

The Welsh Assembly Government in Wales has made a statutory commitment towards promoting sustainable development. This is demonstrated particularly by [Education for Sustainable Development and Global Citizenship](#) (ESD & GC) covering all levels of education which was initiated by the Welsh Assembly in 2006 (HEFCW 2008). The ESD & GC approach involves the entire school curriculum and management. Arising from existing environmental and development education, ESD & GC aims to educate the students on the interdependencies between society, economy and the environment, and between the lives of people around the globe (ESD & GC 2008c). In further education, ESD & GC teaches students the skills and knowledge to promote a sustainable society and encourages students to be active participants

in their local and global communities. Implementing ESD & GC also provides economic savings and increased reputation for the institutions (ESD & GC 2008b).

HEFCW has produced an action plan to address ESD & GC in higher education institutions. The first steps include an examination of the teaching on ESD & GC and the identification of areas where ESD & GC can be voluntarily introduced. For example, University of Bangor has achieved this to a great extent by the introduction of interdisciplinary teaching. Funding has also been allocated to facilitate the development of environmental management systems and promoting good practice as demonstrated by Swansea University (ESD & GC 2008a).

## 5 Student involvement

Higher education plays a key role in producing professionals and influential figures in future society and ESD can provide students with advanced skills, increased cultural awareness and a rounded viewpoint on ethics and the environment (Dawe et al. 2005). The potential of students to contribute to sustainable development within their institutions is not fully exploited (Alabaster & Blair 1997). However, involving students is crucial to the success of education for sustainable development in HEIs.

HEFCE's updated document in 2009 recognises that the student body can play an important role in promoting sustainable development and encouraging behavioural change. For example, the National Union of Students (NUS) and National Union of Students Services Limited run a number of innovative environmental programmes including [The Carbon Academy](#). Funded by the [Carbon Trust](#), it aims to reduce the collective carbon footprint of student unions.

In 1995, the National Students Union (NUS) began promoting green products to union shops and bars and produced a Student Environmental Declaration for a Sustainable Future (Alabaster & Blair 1997) parallel with the Talloires Declaration ([University Leaders for a Sustainable Future](#) 1990). The NUS suggests that students have a key role in four areas:

1. Making informed decisions about the environment and their community.
2. Influencing producers and suppliers of products and financial services.
3. Conducting proactive action and collaborating towards an environmentally responsible global community.
4. Acting with others through student organisations.

## 6 Education for sustainable development in HE

This section illustrates a range of examples from Universities across the United Kingdom and internationally who are addressing education for sustainable development. The cases are not exhaustive but illustrate a range of approaches.

### 6.1 HEFCE pilot sites

As part of their strategic commitment to sustainability, HEFCE have supported a number of pilot sites.

#### University of Gloucestershire

The [University of Gloucestershire](#) has held the position of the Environmental Association For **University's and Colleges** (EAUC) member of the month and was ranked 1<sup>st</sup> place in the Green Gown Awards in 2008 (People & Planet 2008). It was the first English university to achieve ISO 14001 across all activities, including its sustainable development curriculum and has run courses explicitly aimed at environmental issues since the 1970s (Greening Spires 2008). However, in 1996 a review of its strategic plan suggested that the environmental curriculum needed strengthening. As a result, sustainable development is being embedded into several

interdisciplinary modules (Roberts 2007). Gloucestershire has also published a book - Greener by Degrees (Roberts & Roberts 2007) which aims to encourage ESD in other universities by highlighting sustainability in Gloucestershire's undergraduate and post-graduate curricula (Greening Spires 2008). Roberts' review (2007) highlights the **University of Gloucestershire's** good practice in promoting education for sustainable development in its curriculum while acknowledging the difficulties inherent in incorporating sustainable development across the curriculum (Roberts 2007; Tilbury 2004; Sterling 1996). One example of where sustainability has been incorporated into a non- environmental discipline is a Language and Ecology module. This module was deemed necessary after it was recognised that literacy for sustainability was neglected (Stibbe 2007). The module examines the media portrayal of sustainable development issues and has received positive feedback from students (EAUC 2008d). In particular, students had enhanced critical awareness and greater interest in changing personal behaviour (EAUC 2008d). However, Stibbe (2007) **suggests that although awareness increased, student's** behaviour remained unchanged.

One of the aims of HEFCE is to develop curricula and provide students with environmental skills that will promote environmental behaviour in order to expand the employer engagement agenda. Gloucestershire fulfils this requirement and has been classed as a Regional Centre of Expertise (RCE) in ESD (HEFCE 2008/18). As an RCE, Gloucestershire has strong public engagement in sustainability issues and collaborates with business, community and cultural organisations (EAUC 2008c) and thus **shows good progress in achieving HEFCE's aims to** engage with stakeholders to encourage sustainable development. Furthermore, **the University's** recently established [International Research Institute in Sustainability](#) seeks to strengthen the **University's research activities in sustainability. It offers PhD opportunities for students to** contribute to real change towards sustainability, through participation inquiry and critical action research (EAUC 2008c and Tilbury 2008 p.comm).

Finally, the University of Gloucestershire is supporting the National Future Vision students award scheme in 2009 which will judge students based on their sustainability ideas. Incentives include a chance to present ideas to over 500 leading sector and industry specialists (University of Gloucestershire 2008). This is a good opportunity for students to drive sustainability solutions and shows that the university is engaging in the views of students, thereby fulfilling a further HEFCE aim of working with the student body.

#### University of Plymouth

HEFCE supported two Centres for Excellence in Teaching and Learning (CETLs) which emphasise sustainability. One of which was the University of Plymouth which established a CETL for [Education for Sustainable Development](#) (ESD) in 2004. The centre aims to transform the University's profile in ESD by making major national and international contributions to ESD, and works in conjunction with the Centre for Sustainable Communities Achieved through Integrated Professional Education (C-SCAPIE) at Kingston University (Gough & Scott 2007).

#### Plymouth adopts a "4 C's" approach:

- Curriculum – improvements in teaching, learning and research.
- Campus – working towards carbon neutrality, waste minimisation, provision of green spaces and sustainable procurement.
- Community – cultivating links.
- Culture – supporting a sustainable ethos within the University.

In 1996, the University of Plymouth was the first to offer environmentally themed construction and surveying degrees, and has worked to 'green' all its degrees on these topics since. As a result, the University was congratulated for course content in the 2007 Green Gown Awards. To

achieve this status, the University of Plymouth evaluated its programmes, coursework, examinations and dissertation activities against a set of sustainability requirements. The areas where limited sustainable development was noted were addressed using workshops and by updating the course curricula. The workshops were a notable success with over fifty of the attendees recommending that they be incorporated into the curriculum. The University of Plymouth demonstrated its willingness to incorporate feedback by adding a project-based module for second year students in 2007 and modifying first and third year courses to include further content on sustainable development.

The outcomes of the sustainability audit process have been widely disseminated throughout academic papers and other publications. The changes have motivated lecturers to embrace sustainability personally and professionally and have made courses more attractive to female students (EAUC 2007). Furthermore, the University of Plymouth has introduced a Masters in Learning for Sustainability and Engineering while Geography and Design modules have been enhanced with sustainability content (Greening Spires 2008). This progress in incorporating good practice resulted in the University of Plymouth obtaining a 1<sup>st</sup> Class degree and 2<sup>nd</sup> place in the 2008 Green Gown awards.

#### University of Bradford

The [University of Bradford](#) has demonstrated its commitment to sustainable development by creating an environment policy and pursuing the ISO 14001 Environmental Management Standard. The University was awarded a £3M grant in 2007 to embed ESD across all disciplines. The UNESCO framework for ESD was adopted and a review is currently being conducted to identify opportunities for integrating ESD in degree programmes. To help promote sustainable development to students, the University aims to create a demonstration unit for use in its curriculum. Lectures and day schools will also be run to engage the local community in sustainable projects (University of Bradford 2005) suggesting **that Bradford is fulfilling HEFCE's** aim of engaging communities in sustainable development. In addition to the demonstration unit, Bradford has constructed the [Sustainable Schools Network](#). This is a resource for ideas and good practice in teaching sustainability, how to improve environmental management, and information on funding opportunities. Finally, Bradford is currently looking into projects such as EcoSchools (University of Bradford 2008a).

## 6.2 The Russell Group

The Russell Group are the major research intensive Universities in the United Kingdom.

#### University of Cambridge

The University of Cambridge is working towards fulfilling HEFCE's aims in relation to sustainable campuses and ESD. According to the HEFCE 2008/18 consultation report and the U.N. Decade for Education, the greatest contribution towards sustainable development from higher education is to give students the skills, knowledge and enthusiasm to promote sustainable development.

The [University of Cambridge's Environmental Initiative](#) supports environmental research as well as courses on sustainable design in disciplines such as architecture. The Department of Architecture also offers options in the MPhil Environmental Design course that include a period of placement with an architect helping to engage with local stakeholders as suggested by HEFCE (University of Cambridge Department of Architecture 2008b). The Department of Architecture has also co-ordinated The Regional Visions Integrated Sustainable Infrastructure Optimised for Neighbourhoods (ReVisions) project. In conjunction with the Universities of Aberystwyth, Exeter, Leeds, Newcastle and Surrey, each University contributes from its areas of expertise. The research aims to find evidence to help public and private stakeholders to plan infrastructure and regional developments (University of Cambridge Department of Architecture

2008a). This project is an example of incorporating **HEFCE's aim of** sharing learning and experiences.

Additionally, in 2005, The Electricity Policy Research Group was awarded funding from the U.K. research councils under their programme Towards a Sustainable Energy Economy (TSEC) (2005 - 2010) (University of Cambridge 2007a). The Sustainable Manufacturing Group is currently conducting a global survey amongst manufacturing firms to investigate the production and delivery of environmentally-friendly products and services (University of Cambridge 2008b). This module addresses the social aspects of sustainable development as well as the environmental factors.

A further example is Sustainability of Land Use and Transport in Outer Neighbourhoods (SOLUTIONS), a four year project from 2004 to 2008 funded by the Engineering and Physical Sciences Research Council EPSRC. The project focused on outer city areas likely to experience future growth pressures and examined spatial policy including design and transport systems. SOLUTIONS was composed of an interdisciplinary research consortium of the Universities of Cambridge, UCL, Leeds, UWE Bristol and Newcastle. The research involved partnership with local authorities and other stakeholders to evaluate the effectiveness of alternative design (SOLUTIONS 2008). The University of Cambridge is also developing an economic model of carbon trading in the aviation industry in conjunction with the European Union. This research will directly influence how and when carbon trading is implemented for aviation in the [EU's Emissions Trading Scheme](#) (Greening Spires 2008).

The rationale, methodology and barriers to embedding sustainable development into engineering courses have been described by Fenner et al. (2005). Research into interest in sustainability by U.K. construction contractors (Adetuniji et al. 2003), and consulting companies (Woodsworth 2003 **in** Fenner et al. 2005), shows increasing engagement. However, there is often a lack of understanding of sustainable development and its place in engineering. Parkin et al. (2004 **in** Fenner et al. 2005) suggest that ethics and non-scientific values need to be considered when integrating sustainable development into engineering.

In view of this, the engineering department at the University of Cambridge has listened to its students and delivers a co-ordinated rather than a command style course through the Centre for Sustainable Development. Sustainable development modules are available in undergraduate and post-graduate teaching. Sustainable development ideas are actively shared and are a key part of departmental strategy. Sustainable development is a unifying theme in both engineering and other disciplines such as ecology and earth sciences. By initially introducing sustainable development as an experimental course, student uptake and engagement can then grow with the course. However, the transition towards this approach has been slower in some areas than others.

The [Royal Academy of Engineering](#) has provided the backbone to introducing sustainable development in the undergraduate curriculum. As a result, a research community has been developed around sustainable development and course feedback from students has been favourable. Electronic course materials are being compiled into a web-based teaching resource for other academics (Fenner et al. 2005). Utilising electronic course materials reduces transport and waste **in line with HEFCE's aims. The centre also delivers a taught MPhil in Engineering for Sustainable Development** (University of Cambridge 2008a). Teaching is composed of team projects, seminars, role plays and an opportunity to enter People, Planet and Prosperity (PPP) entrepreneurial competitions (Fenner et al. 2005). However, there are two main problems in overcoming curriculum change; concerns with content and organisational and cultural barriers (Fenner et al. 2005). Some academics perceive that the integration of topics such as sustainability will dilute the curriculum, while others are unwilling to alter successful curricula. Additionally, overburdening staff and students with extra pressures is often a concern. It is suggested that successful engagement in sustainable development requires motivation among academics to embed the content into their courses and projects (Fenner et al. 2005). The experiences at the University of Cambridge mirrored that of Peet and Mulder (2002 **in** Fenner et al. 2005).

Fenner et al. (2005) provides a good example of how Cambridge has introduced sustainable development into its engineering department and makes a sound argument for the benefits of introducing sustainable development into engineering. This study could be reproduced in other departments and universities. However, given that it originates from a University of Cambridge source, its content must be treated with caution. Other reviews outside the centre of engineering and the university would be helpful to determine how successful the process was in Cambridge.

Evidently, the University of Cambridge has incorporated sustainable development into the curriculum. However, barriers are still apparent and a shift in attitude towards the concept of sustainable development is needed for the incorporation to be wholly successful.

#### University of Edinburgh

The University of Edinburgh has incorporated sustainability into its environmental curriculum through establishing a [Centre for the study of Environmental Change and Sustainability](#) (CECS) (University of Edinburgh 2008a) where Masters and PhD courses focus on sustainability issues (University of Edinburgh 2008c). The MSc in Environmental Sustainability offers a flexible and interdisciplinary approach to the study of environmental sustainability and sustainable development (University of Edinburgh 2008c). Additionally, the MSc in Environment and Development examines sustainable development in developing countries, and considers how the Millennium Development Goals are linked to national strategies for sustainable development (University of Edinburgh 2008c). Similarly to HEFCE, the CECS aims to promote research and teaching through collaboration with stakeholders. For example, the Moray House School of Education is promoting school-focused programmes for sustainability in education with the Institute of Education at Manchester Metropolitan University. This provides training and materials for teachers to develop programmes in their schools and is funded by the Sustainability Education in European Primary Schools Project (SEEPS) (The Moray House School of Education, The University of Edinburgh 2008).

#### University of Glasgow

The University of Glasgow has signalled its support for including sustainable development in the curriculum by signing the [Talloire Declaration](#) (University of Glasgow 2008e). Its sustainable development policy includes: increasing awareness amongst students and staff, encouraging integration into teaching and research and creating partnerships and contributing towards **national and global discussions**. The **University's Strategic Plan (2002-2006)** states that it

*'will provide an education whereby students at all levels benefit from studying in a research environment and so develop graduates, well equipped for employment, further study and making a useful contribution to society'*

(University of Glasgow 2008d)

The plan clearly describes the principles of sustainable development and outlines measures of implementation. In particular, it aims to

- involve professional and accreditation bodies.
- work with the council to realise the cultural goals in the National Cultural Policy.
- establish workshops on the relevance of sustainability for forward investment in business (University of Glasgow 2008c).

However, progress to implement sustainable development in estates and facilities is markedly more profound than in the curriculum, supporting authors such as Scott and Gough (2004).

#### London School of Economics and Political Science (LSE)

LSE has a [Centre for Environmental Policy and Governance](#) which covers environmental problems such as climate change mitigation. Environmental studies are integrated across the social sciences, employing quantitative and qualitative research methodologies for both the developed and developing world. This is a good example of where sustainability has been incorporated throughout disciplines (LSE 2009). The Centre also hosts the Energy, Water and Environment Community Programme which looks at environmental cooperation in areas such as the Middle East and North Africa. Projects under the programme include a solar energy powered desalination plant and a Water Economics Project (LSE 2008f). One popular course at LSE covers Environmental Economics and Sustainable Development which applies standard microeconomic analysis to sustainable development (LSE 2008d). Finally, an Environmental Change and Sustainable Development course focuses on the importance of environmental change and the dilemmas which it raises in practical environmental management (LSE 2008c).

#### University of Southampton

The [University of Southampton](#) has the highest number of staff and PhD students engaged in sustainable development research in England, giving it the potential to become a key leader in supporting the culture of sustainable development. Despite this, the opportunities to embed ESD across the university have not been fully exploited in comparison to the efforts of other universities.

The [School of Ocean and Earth Science](#) offers modules such as Climate Change and Sea Level Change and Sustainable Consumption and Sustainable exploration modules are available in the [School of Geography](#). Social and environmental sustainability is offered by the [School of Social Sciences](#) and the politics of sustainable development are discussed in Politics and International Relations. The [School of Civil Engineering and the Environment](#) provides sustainable energy and waste resource management modules. Recently a postgraduate training course in sustainable development has been initiated which is offered to students across all disciplines. The course allows participants to explore the relevance of sustainable development to their research and for applications in business and society. The course comprises lectures, workshops and **discussions. Skills developed from the course will help strengthen the University's reputation in education for sustainable development.**

Table 1: A summary of the reported performance of the Russell Group Universities in implementing ESD (Shading indicates action)	Cambridge	Edinburgh	Glasgow	LSE	Southampton
Signed national and international environmental agreements					
Education in sustainable development offered in non-environmental disciplines					
Courses offered specifically for sustainable development					
Active research and PhD opportunities in sustainable development					
Voluntary workshops offering sustainable development training					
Active student involvement in sustainable development activities throughout the institution					
Active environmental Students' Union					
Engagement with the local community and stakeholders in sustainable development activities					

## 6.2 International universities

### Australia

Environmental education has been prominent in Australia since the 1975 [UNESCO](#) seminar Education and the Human Environment, and a national professional association was established in 1980 (Robottom 1998). However, while sustainable development is popular across higher education, it is not co-ordinated effectively (Jones 2002) and courses that examine environmental issues are rare (Robottom 1998). Nevertheless, many institutions offer environmental science courses (Robottom 1998) and sustainability can be linked to topics such as sustainable tourism (Jones 2002).

Additionally, the Australian Research Council funded three environmental education projects in 1998, and an increasing number of PhD projects cover environmental education (Robottom 1998). Robottom's (1998) overview of the education for sustainable development in Australia although good is now out-dated.) Finally, Jones (2002) notes that traditional disciplines in Australian universities are in decline and that along with a growth of environmental interests, an increase in education for sustainable development courses will emerge.

### The University of Sydney

The University of Sydney actively pursues sustainable development in education and research as demonstrated by its [Institute for Sustainable Solutions](#). The Institute aims to increase cross-disciplinary research, develop community and stakeholder involvement and coordinate teaching of sustainability at the University of Sydney. The Institute also works with the centres for Integrated Sustainability Analysis (ISA), International Security Studies and the United States Studies Centre (University of Sydney 2008c). The ISA uses a variety of sustainability indicators in Sustainability Reporting schemes such as the Triple Bottom Line (BL-3) Reporting Tool (University of Sydney 2008d). The BL-3 allows a valid comparison between companies' sustainability performance, provides realistic benchmarks and allows a great level of detail in results. Wiedmann and Minx (2007) praise its ease of use and ability to accept the direct and indirect impacts inherent in businesses.

### Sweden

Sweden established the MINT programme in 1992 to review higher education and promote the greening of the Swedish curriculum. Sammalisto (2002) suggests that student co-operation has been essential for the MINT group activities. In one activity under the MINT programme, twenty five Swedish teachers studied the experiences of sustainability teaching in Holland. This shows that Sweden is encouraging sustainable development knowledge sharing, similar to the British **government and HEFCE's aims**. Other activities include a "Greenspiration" conference and the publication of a handbook on sustainable development (Sammalisto 2002).

Clearly, the MINT programme has advocated greening activities. Yet, evaluation of these efforts showed that while students were aware of the greening input in their study programme, it did not necessarily result from the MINT programme (Sammalisto 2002). The same research also found that while the Greenspiration conferences have attracted around 40 participants annually, the conference has not succeeded in attracting a larger audience. While Sammalisto (2002) provides a good overview of the Swedish efforts to green the curriculum, outlines the MINT project, and critically evaluates its success, a more recent source for evaluating the Swedish effort would be useful.

### Russia

In many ways, Brundtland's **concept of sustainable development** (discussed earlier) can be seen as the Western version of the 1960s Russian concept of 'rational nature management' (Kasimov & Mazurov 2007). Since the 1992 Earth Summit, Russia has taken steps towards a sustainable development transition (Kasimov et al. 2002). However, despite support for sustainable development, the concept failed because attempts to design a mechanism for sustainable development were based on traditional methods. As such, fundamental changes in science and education need to occur before sustainable development can be achieved (Kasimov et al. 2002).

Reforms such as the introduction of a multi-level higher educational systems and the development of both private and public funded education has produced opportunities for ESD (Kasimov et al. 2002). Environmental education is now based on an interdisciplinary approach which is delivered on the boundaries between natural and social sciences at a multi-level federal and regional approach. The federal component is compulsory and requires knowledge of environmental education, while the regional components are aimed at specialists. Kasimov et al. (2002) provides an interesting insight into how sustainable development is incorporated **into Russia's** higher education institutions, while acknowledging that the successful delivery of sustainable development at universities requires a more complex approach. Although further work is necessary to embed sustainable development firmly into Russian universities, the Russian-British Conference in 2002, Environmental Education for Sustainable Development, was a step forward in developing education for sustainable development.

### Moscow State University

Moscow State University provides a sustainable development course linking socio-economic development and environmental issues. The course includes assessments of the criteria for sustainable development and the strategies to achieve it. It also analyses political factors which can influence the transition towards sustainable development such as state regulation (Bobylev 2002). Although Bobylev (2002) provides a good outline of a sustainable development module in Moscow State University, as the author is a member of the University, it may not be wholly objective.

## 7 Environment for the sustainable development

### 7.1 HEFCE pilot sites

#### University of Gloucestershire

Since 1993, the University of Gloucestershire has utilised green energy such as solar powered pay and display machine and photovoltaic cells for electricity production (EAUC 2008c). It has also invested in a free inter-site bus service and recycling initiatives (Roberts 2007). In addition, the 1996 strategic plan included the exploration of the relationship between businesses, local **authorities and voluntary groups. Students were involved in 'real' investigations and in auditing the University's waste, recycling and energy practices;** activities which are popular amongst students (Roberts 2007). These activities mirror those found in courses such as Environmental Science at the University of Southampton.

#### University of Plymouth

Estates and Facilities at the University of Plymouth have been praised for incorporating consultation and feedback from the student population and other stakeholders on four large projects:

- a feasibility study for energy generation across the campuses (Greening Spires 2008),
- the creation of a natively vegetated garden **for the Students' Union,**
- enforcing a high Building Research Establishment Environmental Assessment Method (BREEAM) rating for a new building and
- refurbishing a condemned building.

#### University of Bradford

Bradford aims to improve energy management, minimise water consumption and increase environmental awareness amongst staff and students (University of Bradford 2009). To achieve this, an ecoversity programme has been constructed which aims to embed the principles and practice of sustainable development across the institution. EcoCampus have awarded Bradford a Bronze medal for the completion of the first phase of the EcoCampus Environment Management Systems (EcoCampus 2006). Sustainable development has been incorporated into estates and management across several sectors.

Bradford developed a Better Buildings Policy in 2004 to ensure the sustainable development of its estate and commit to a minimum BREEAM rating of 'very good' in new buildings and refurbishments (University of Bradford 2005). In addition, Bradford is developing a sustainable student village as part of an ecoversity project. The village will partly consist of terraced housing reflecting the local area, helping to make the project socially as well as environmentally sustainable. To help ensure this, student ambassadors have been appointed to engage the student population in the project. It is hoped that the first phase will be completed by summer 2009 (Greening Spires 2008). Additionally, Bradford has constructed a database of sustainably and ethically managed suppliers for use in procurement. In 2007, the ecoversity programme helped Bradford to develop a pilot for a new recycling infrastructure. The pilot was expanded in 2008 and covers a wide range of waste streams. Under this system, desk bins were removed to help encourage recycling. This approach was adopted from the University of Leeds where recycling rates increased from 28% to 62% (University of Bradford 2008b).

Bradford achieved a first class honours classification in the 2007 [Green League](#) (People and Planet 2007) for a recent refurbishment programme. Old furniture was donated to the Community Housing Advice Service (CHAS) Housing Aid and Shires Removals organisations and distributed to charity shops and low income households. This resulted in the reuse of approximately 38 tonnes of furniture (EAUC 2009). Bradford has a carbon management scheme with a five year carbon reduction plan and annual carbon footprint audits. Additionally, Bradford is committed to purchasing green electricity and is investigating the feasibility of biomass fuelled combined heat and power (CHP) generation (University of Bradford 2009). Finally, Bradford are planning to automate and regulate energy use with a campus-wide building management system.

In 2003, Bradford conducted a staff and student travel survey (Figure 2). While car use and walking are the dominant modes of travel, the majority of walkers were students while the majority of car users were staff.

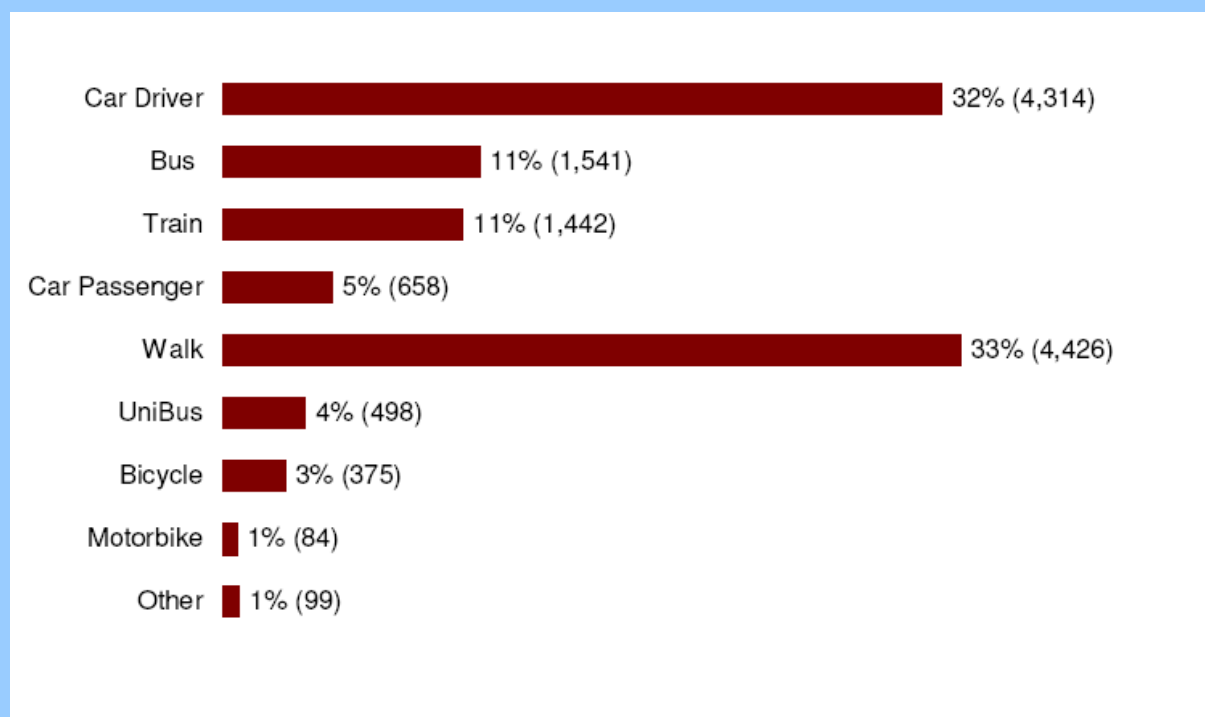


Figure 2 Bradford travel survey by mode of transport 2003-2004 (After Chart 3 Travel by mode, University of Bradford 2009)

The outcomes of the travel survey were used to identify ways to reduce the need to travel and encourage public transport. The objectives to achieve this included:

- Introduce home working practices thorough teleworking,
- Increase the use of video conferencing facilities,
- Increase UniBus service patronage by 10% by 2009,
- Increase cycling to 3.8% by 2009,
- Increase walking to 33.9% by 2009.

The University also introduced a SMART MOVE travel plan with information on travelling sustainability to and from university (University of Bradford 2009).

Video conferencing was introduced in 2001 to reduce staff travel and Bradford claim that emissions, congestion and financial savings are evident. Also, students and staff benefit from increased work time as less time is spent on travelling and students can virtually attend international interviews. However, disadvantages were noted including a loss of social structure and networking opportunities (van Winsum and Jones date unknown). Eastwood (2002) agrees and adds that virtual courses lead to space flexibility, suggesting that the lack of face-to-face interaction can be improved by the use of synchronous chat rooms. Eastwood (2002) further suggests that virtual courses have advantages to education for sustainable development by encouraging dividing courses into modules for specific purposes.

## 7.2 The Russell Group

### University of Cambridge

The University of Cambridge has publicised its environmental policy to increase awareness of environmental issues, help encourage sustainable behaviour and develop strategies to reduce **the University's carbon footprint (University of Cambridge date unknown)**. To help raise awareness, the University of Cambridge also produces Greenlines, a sustainability newsletter aimed at staff which informs readers of the University's environmental activities and gives recommendations on good environmental practice such as recycling (University of Cambridge 2007b). The University of Cambridge is a member of the International Alliance of Research Universities along with universities such as Oxford, Yale, Tokyo and the Australian National University. The International Alliance of Research Universities convened in 2007 to discuss a global campus sustainability standard in correlation with HEFCE, aiming to increase sustainable building design and operation and the creation of a carbon reduction culture (University of Cambridge 2007b).

The University of Cambridge participated in HEPS, devising a training module on sustainable development for use in their staff development program (University of Cambridge date unknown). Additionally, the University signed the Cambridge City Council Climate Change Charter in 2007 (University of Cambridge 2007b). The university is also working with the **Carbon Trust's Higher Education Carbon Management Programme** and aims to cut emissions by **10% over five years**. **These commitments show Cambridge's efforts to fulfil HEFCE's carbon reduction targets** and will ensure progress towards the government's carbon reduction targets of 60% by 2050. The University of Cambridge has also reduced water usage by 53% since 1988 and was highly commended for this in the 2005 Green Gown Awards. The University was also commended for its waste management strategy which included donating toner cartridges to charity and the introduction of composting and recycling facilities.

## University of Glasgow

The [University of Glasgow's Strategic Plan](#) sets out directives for the management of estates and facilities. These include setting an example of environmental responsibility and the provision of workshops on environmental legislation and best practice.

In addition, the University has adopted a waste minimisation and recycling policy to increase environmental awareness among departments (University of Glasgow 2005). Furthermore, the University was the first in Scotland to obtain energy efficiency accreditation and nearly 50% of its electrical energy is generated from green sources. The University's carbon footprint from energy consumed on campus is shown in Figure 3. Reductions have been achieved through reducing energy waste and increasing the use of renewable resources (University of Glasgow 2008a). These efforts have been recognised by several awards and grants including the Carbon Trust Low Carbon Building Award for the Scottish Centre for Ecology and Natural Environment (University of Glasgow 2008b).

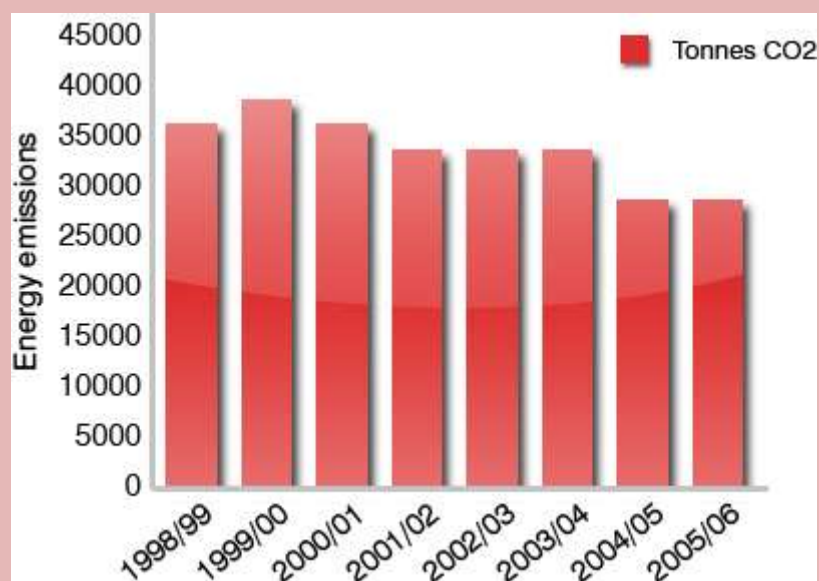


Figure 3 University of Glasgow's carbon footprint (After University of Glasgow 2008a).

## London School of Economics and Political Science (LSE)

LSE's environment policy aims to minimise the environmental impacts of its energy and material purchases. It has adopted the 'reduce-reuse-recycle' waste hierarchy approach and encourages the use of sustainable modes of transport (LSE 2008e). Furthermore, it has developed workshops to increase sustainability awareness (LSE 2007).

EcoCampus was run by HEFCE from December 2005 to December 2008 and recognised universities' efforts to address environmental sustainability (EAUC 2008a). In 2006, LSE were awarded a bronze medal for completing the first phase of their Environmental Management System (EcoCampus 2006).

During the summer term, LSE hosts a zero-waste scheme in halls of residence for students to donate unwanted items in a project funded by HEFCE. LSE worked in partnerships with universities such as Durham and Newcastle to evaluate their reuse schemes and establish local reuse networks (LSE 2008h). The experiences from the scheme are summarised in regional Reuse Implementation Guides and workshops (EAUC 2008e). This is a clear example of working with others and sharing experiences as suggested by HEFCE. The zero-waste project was recognised by the National Recycling Awards in 2008. LSE was the only higher education

institution to be short-listed and was commended for its leadership and effectiveness in waste minimisation (LSE 2008g). Additionally, following several water surveys, LSE is introducing more efficient water management systems such as water free urinals, push taps and shower heads with regulated flow (LSE 2008b).

LSE has conducted a travel survey among staff and students which has contributed to its Carbon Management Strategy and Implementation Plan. As a result, extra cycle parking has been introduced and the use of video conferencing as an alternative to business travel is being investigated (LSE 2008j). Energy surveys have resulted in energy reduction initiatives such as low energy lighting and an energy management system to control heating. Additionally, LSE have appointed an energy manager to implement energy savings. Green electricity is supplied to the majority of campus buildings with the potential for a reduction in carbon dioxide emissions of 6,400 tonnes (LSE 2008b).

**The Carbon Trust's Carbon Management Programme provides technical support to help HEIs reduce carbon emissions under their direct control.** The programme is tailored around 5 steps (see Figure 4). LSE joined Phase 2 of the Carbon Programme in 2006. During the programme, LSE established a core team to set baselines and targets and assess the viability and impacts of opportunities for emissions reductions. LSE found that participation in the programme created **a positive 'green' image, reduced energy costs and encouraged inter-departmental collaboration** (LSE 2008a).



Figure 4 The 5-step process in the carbon management programme (After Carbon Trust 2006)

To help engage students in sustainability, 'environmental champions' are appointed in halls of residence and events are held such as an inter hall energy saving competition (LSE 2008i). In addition, the **Students' Union** holds environment, climate change awareness and sustainability weeks. Students with an active interest in sustainable development can also join the Student Consulting Group - Sustainable Future - which undertook the first sustainability audit in 2006 and helped implement LSE's environmental policy (LSE 2006). The active engagement of the student body provides the students with real world work experience and transferable skills, while showing the willingness of LSE to include students in important decision-making processes. This demonstrates that it is responding to HEFCE aim of working with the student body to promote environmental behaviour.

### University of Southampton

The University of Southampton developed an Environment and Sustainability Strategy for the period 2005 – 2010 to manage the impact of the University on the environment (University of Southampton date unknown). The strategy commits the University to develop an environmental management system (EMS) to [ISO 14001](#) standard. In late 2008, ISO 14001 was implemented in the National Oceanography Centre. Following this, it is intended to extend this to cover the whole institution (University of Southampton 2007a). The University of Southampton was awarded a 2:1 classification in the 2007 [Green League](#) (People & Planet 2007). However, although Southampton retained its 2:1 classification in the 2008 league, its position in the league dropped indicating that other universities had made more progress in environmental performance (People & Planet 2008). To help reduce carbon emissions, the University of Southampton constructed a Combined Heat and Power plant in 2005 which won the Green Gown award for Energy Efficiency in 2006/2007 (University of Southampton 2007a). Additionally, the University has adopted a sustainable buildings policy which includes the use of recycled materials in construction and implementing construction and refurbishment to a BREEAM standard of at least 'very good' (University of Southampton date unknown).

The University of Southampton actively encourages staff and students to use more sustainable transport. For example, all students in halls of residence are provided with a free uni-*link* bus pass (University of Southampton 2007a). Moreover, the results from a 2007 travel survey are being used to develop an integrated green transport plan with Southampton City Council (University of Southampton 2007b). A future task is to develop a strategy addressing the issue of attracting overseas students, whilst reducing carbon emissions (University of Southampton date unknown). Finally, the University is part of a three-year EAUC/Department for Environment, Farming and Rural Affairs project to change the purchasing behaviour of staff and students by considering environmental and ethical factors (University of Southampton 2007a).

The University of Southampton **Students' Union** (SUSU) is actively involved in supporting sustainable development as demonstrated by its Environment and Ethics policy. SUSU runs an environmental champions scheme and hold regular environment weeks which promote environmental ideas to students. SUSU is also involved with the restoration of the Valley Gardens to restore and landscape a green open area in the University. Student volunteers are involved in gardening and local schools have been invited to use the gardens facilities. This reflects Southampton's **response to HEFCE's** aim of working with the student body to promote environmental behaviour amongst students.

### 7.3 Other U.K. universities

#### Kingston University

Kingston University adopted an environmental policy in 2006 and is preparing a strategy to embed sustainability within the running and management of the University (EAUC 2008b). Kingston University's environmental credentials are improving as indicated by its rise from 27<sup>th</sup> in the 2007 Green Gown Awards to 25<sup>th</sup> in 2008 (People & Planet 2007, 2008). The University was also congratulated for its work on sustainability in the community by the Kingston Green Guardian Awards and the University has recently joined the higher education carbon management programme (EAUC 2008b). Kingston University has a strong and improving reputation for sustainability and for producing graduates with a holistic understanding of sustainable communities, justifying its status as a C-SCAPIE (HEFCE 2008/18).

## 7.4 International universities

### University of Sydney

The [University of Sydney](#) has a sustainable campus project and a publicly available environmental policy which includes sustainable building designs, energy and water savings, sustainable transport and waste minimisation. **As part of the University of Sydney's** Green Building project, the University has collaborated with universities across Australia to customise the [Green Building Council of Australia's](#) Green Star Scheme which assesses the environmental performance of buildings. The University is piloting the Green Star Rating Tool for education facilities, and is currently applying it to the **University's** Campus 2010 project. The environmental aims of the project include minimal use of toxic materials and the utilisation of solar panels and natural ventilation to save energy (University of Sydney 2008b). The New South Wales State Government has mandated that the University audit its energy use and develop a 4 year Energy Savings Action Plan to be implemented in 2008. Therefore, 200 utility meters have been installed and opportunities to reduce electricity use are being explored (University of Sydney 2008e). Additionally, a Water Management Working Group has been developed to support good practice by initiating the use of water efficient equipment. Students have also studied water management challenges as part of their coursework including an assessment of alternative water filtration projects (University of Sydney 2008g). As a result of the working group, the University has reduced its water usage by 30%.

Sustainable Campus is also working towards a reduction in emissions from University-related travel. Following a transport survey in 2004, a bicycle map and information on cycling and public transport was issued to encourage sustainable transport. The university also encourages the use of video conferencing and provides workshops on the use of video conferencing in the teaching and learning process (University of Sydney 2008f). Finally, as a result of the 2004 campus waste audit, the university formed a Waste Avoidance and Minimisation Working Group. Many strategies have been implemented including an electronic waste and building material recycling program. Between 2006-2007 the electronic waste programme recycled 62 tonnes of material, and was extended to all campuses in 2007 (University of Sydney 2008a).

### Oberlin College, Ohio

In 2007, the [Adam Joseph Lewis Centre](#) (AJLC) in Oberlin College, offered an Environmental Studies programme providing an interdisciplinary approach to sustainability with an emphasis on the impact of technology on natural environments and society. The AJLC was designed to reinforce the sustainable ideas being taught. To reflect this, photovoltaic solar panels provide the majority of the building's energy and a wastewater purification system based on wetland ecosystems reuses wastewater in the toilets and landscape (Oberlin College 2007a). Furthermore, Oberlin is the first HEI in the USA to sign the American College and Universities **President's Climate Commitment** which provides a framework to reduce climate change and promotes carbon neutrality. Cycling is popular amongst students and a bike rental scheme has been implemented. The College engages students in recycling and resource reduction projects and employs ten students part-time to promote their waste management strategy (Oberlin College 2008). Students are also involved in sustainability projects such as a competition to reduce electricity use in halls of residence. This competition aims to motivate and educate students on electricity conservation (Oberlin College 2007b). Additionally, students are involved in the Environmental Policy Implementation Group (EPIG) where they assist in the development of the College's environmental policy. This level of student involvement in sustainability projects is encouraging and other institutions should adopt similar strategies to promote sustainable development. However, an interdisciplinary approach to greening the curriculum has still not been developed.

## 8 Recommendations for higher education delivery

In making recommendations to the Higher Education Academy, Dawe et al. (2005) suggested the need to strengthen education for sustainable development in the curriculum by:

1. Providing support and funding to promote and develop ESD across all subject disciplines in higher education including the dissemination of good practice,
2. Commissioning research to explore the connections between ESD and employability,
3. Commissioning research into whether career opportunities and choices of higher education graduates are being influenced by the sustainable development agenda,
4. Convening a stakeholder group to identify creative ways of implementing and supporting the integration of ESD to teaching, learning and the curriculum.

Universities play a key role in civic society, not only in the generation of new knowledge, but in translating that knowledge and educating individuals and society. The impact of climate change will be felt by the whole of society, and universities have the potential to play a key role in enhancing education and understanding to promote sustainable development. This highlights the need to consider ESD not simply as an isolated activity, but as an integral theme in all programmes.

One suggestion is to create a consortium of universities delivering joint courses for sustainable development, which will organise **'interested parties' (e.g. NGOs, business and academia) in an agreed teaching programme and course materials** (Eastwood 2002). Eastwood (2002) has produced a review of virtual learning in the field and how this strategy can be used to promote sustainable development.

## 9 Conclusions

Through both education and research, **HEIs play a significant role in society's drive towards sustainability**. The knowledge gained at university enables graduates to become responsible leaders who consider social, economic and environmental factors in making decisions (HEFCE 2009). Although the Green League 2008 shows that many universities are increasing their investment in sustainability, further progress is needed before universities can become exemplars of environmental good practice (People & Planet 2008). Furthermore, while the Green League provides a comparator for the environmental behaviour of universities, there are no key performance indicators for the areas examined. In simple terms, a larger university campus produces larger quantities of waste with a greater potential for recycling. As sustainability becomes a key component throughout the HE sector, a more sophisticated system is required to monitor performance.

Up until recently, HEIs have focused primarily on increasing sustainability through estates and facilities, partly driven by increasing environmental legislation. However, incorporating sustainability into education is more challenging, requiring a flexible approach to the teaching of academic disciplines (Dawe et al. 2005). Interdisciplinary teaching is an important factor in the success of ESD, and this may require a shift in the ethos of teaching structures in universities.

This report critically evaluates the success of U.K. and international universities in incorporating sustainable development into both the curriculum and into estates and facilities. It concurs with authors such as Scott and Gough (2004) and Dawe et al. (2005) in suggesting that ESD is difficult to achieve under existing university structures. Improved guidelines on incorporating sustainability from HEFCE and other related bodies would provide universities with a baseline. Interestingly, more success was observed in newer universities, such as the University of Gloucestershire, rather than the Russell Group universities, apparently resulting from the more flexible teaching structures in newer universities.

The limitations of this report result primarily from the small number of universities studied and the lack of 'inside information' on them. While access to insider knowledge might present a biased account, it would also provide access to information that is not readily available from public sources. Although universities have been contacted where possible, it is likely that some will have been under-represented.

Although ESD can help foster responsibility, critical thought and pro-activity amongst graduates (Wade 2002), it is not well-established. Collaboration between HEIs and stakeholders is critical if sustainable development is to be optimised, and universities are to provide environmentally literate graduates. It is likely that this will be achieved gradually in order to maintain the support of stakeholders (Scott & Gough 2004). Nevertheless, as sustainability becomes increasingly important in society, it is vital that universities begin to adapt their existing education structures to incorporate ESD.

### 9.1 Recommendations for consideration

Based on this analysis of policy, the literature and exemplars from across the higher education sector the following suggestions are made in order to encourage institutions to become leaders in ESD:

1. Will your institution become a signatory to the Talloires Declaration.
2. Establish a Sustainability Committee, involving representation from across the institution, local community members, local authority staff, and local businesses.
3. Explore synergy with the institutions research focus and activity.
4. Develop a central web directory linking all sustainability activities across the institution that can be used to promote the dissemination of emerging SD research and curriculum innovations.
5. Develop an institution-wide approach to embedding ESD in the curriculum to introduce basic concept and implementation of SD. The ambition should be to enhance the environmental literacy of graduates in what ever discipline area.
6. Include the issue of SD in the annual arrangements for strategic planning and agree specific outcomes with each school and professional service within the Institution.
7. Formally represent the Institution within local sustainability organisations.
8. Launch an annual sustainability conference with your City/Region involving sessions from academic staff and postgraduate research students to demonstrate the wide range of sustainable development work taking place in your institution, and its implications for the local and global environment. Involve local community groups local schools and sixth-form colleges, interest groups, and the business community.
9. Commit to achieve certification to ISO 14001 for the whole Institution.

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