

# Sustainability and Changing University Culture and Curriculum: Grand Valley State University Case Study

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## **Abstract**

In the past two decades the higher education cultures in many countries have embedded significant changes in understanding the role of sustainability. While many universities and colleges in the United States have embraced this concept as the major driver of environmental, social, economic and technological progress, only a few programmes offer undergraduate or graduate degrees in sustainability studies or sustainable development. Recently, however, interdisciplinary scholarship on the role of sustainability in higher education has been boosted by research and public debate on global climate change, globalisation and free trade. Nevertheless, some US universities still do not consider sustainability as a serious priority in scholarship and curriculum, focusing primarily on campus operations and facilities. This paper contests this simplistic approach and argues that it represents only the first step in building a truly sustainable community on campus.

Grand Valley State University (GVSU) believes that sustainable campus facilities and routine campus operations can be effectively used as powerful resources for interdisciplinary research and hands-on problem solving education. In 2004 GVSU created a Sustainability Initiative which aimed to bring together student, faculty, facility and community groups to create awareness and gain momentum in campus and community sustainability. This paper outlines the engagement of groups and their activities. Student activities include: the production of a student sustainability guide for all first years, living centre energy conservation competitions, student internships with businesses interested in sustainability, campus sustainability week and a host of student activities. Facility activities embrace a wind energy study, energy efficiencies, recycling practices, food service sustainability and LEED buildings. Faculty and curriculum goals cover research, outreach service, teaching sustainability in the classroom and academic programmes such as environmental studies, the sustainability certificate and establishment of a faculty sustainability consortium. Furthermore, community partnerships have been nurtured where the university serves as a catalyst. In all cases, GVSU seeks to demonstrate enhancement in value arising from engagement with the framework of sustainability.

**Keywords** United States, sustainability, curriculum, campus culture, higher education

## **Introduction**

The Talloires Declaration (signed in France in 1990) agreed to increase awareness of environmentally sustainable development, create an institutional culture of sustainability, educate for environmentally responsible citizens, and foster environmental literacy for all. Over 315 universities world-wide, including more than one hundred in the United States, have subscribed to The Declaration that claims

that 'universities educate most of the people who develop and manage society's institutions. For this reason, universities bear profound responsibilities to increase the awareness, knowledge, technologies, and tools to create an environmentally sustainable future'.

Grand Valley State University (GVSU) mission is educating students to shape their lives, their professions and societies. As a leader of higher education in West Michigan, the university bears profound responsibilities to increase the awareness, knowledge, technologies and tools to create an environmentally sustainable future. However, like many other US campuses, the conscious awareness of sustainability is a relatively recent phenomenon at Grand Valley. Since 2004 GVSU has been actively engaged in building its new Sustainability Initiative and published the first Sustainability Report in October 2005. That report addresses all the three areas of the triple bottom line (TBL), including social, environmental and economic indicators of sustainable development and utilises 64 sustainability indicators or metrics:

The university is a microcosm of the larger community, and the manner in which it carries out its daily activities is an important demonstration of ways to achieve environmentally responsible living. By practising what it preaches, the university can both engage the students in understanding the institutional metabolism of materials and activities, and have them actively participate to minimize pollution and waste. (Talloires Declaration, 1990)

Driven both by student and faculty demands, the past three years have been a time of dramatic changes in understanding of the role of sustainability in GVSU curriculum, campus culture, research policies, operations, student life, and community outreach. This paper summarises some major steps in this direction, success stories, lessons as well as some major challenges presented to the creation of a truly sustainable campus model at GVSU.

## **Importance of Sustainability for Grand Valley**

Grand Valley State University is situated in Allendale, Michigan, home to Grand Valley's main campus, established in 1960, and situated on 1,237 acres, 12 miles west of Grand Rapids. Classes are also offered at the University's Pew Campus in Grand Rapids (15 miles away), Meijer Campus in Holland (20 miles), and through centres at Muskegon (40 miles) and Traverse City (150 miles) established in cooperation with local community colleges. Enrolling 23,500 students, it has been the fastest growing comprehensive university in the state for over ten years. Located in west Michigan, near Lake Michigan, it enjoys access to water resources, agriculture, and recreation and within a regional population in excess of one million.

As the university grows, its social, economic and environmental impact on the region is substantial. Six hundred million dollars (US) of economic value is attributed to the university, and over 80% of the graduates remain in the region. Like any community, Grand Valley seeks to create lasting value to the region, students and environment. Sustainability becomes an essential part of the mission of: 'Educating students to shape their lives, their professions, and their societies. The university contributes to the enrichment of society through excellent teaching, active scholarship, and public service'. Grand Valley, therefore, seeks to become a model community of sustainability through its actions and role in education.

## **Development of Sustainability at Grand Valley State University**

In July of 2004 Grand Valley began to engage in the development of sustainability across a wide range of campus activities. The Sustainability Initiative was launched; a programme headed by Mr. Norman Christopher, and was given the directive to produce Grand Valley's first Sustainability Indicator report. This report outlined the key markers for sustainability performance on the campus. Compilation of the report provided the impetus to bring together Deans, facility managers, food services and other key players in campus activities. Following the completion of the report in 2005, several teams were created. First, an advisory group of Deans, managers and key faculty began to meet quarterly to discuss strategic planning. A smaller tactical team comprising the Sustainability Director, Facilities Director, Student Senate President and the Associate Dean of Interdisciplinary Studies met to plan key strategies. Lastly, a group of faculty form an 'education for sustainability' team charged with piloting curricular changes through the faculty review process. Future plans include curriculum development, campus events, online and real time indicator reports, and a published strategic plan covering the next two years.

Sustainability in the design of all new campus buildings has become a leading topic. GVSU has made a commitment to energy efficiencies in newly-constructed buildings. Adhering to LEED (Leadership in Energy and Environmental Design) standards, and within the constraints of space (university founded in 1960), construction this year will exceed US\$100 million. New construction using green building materials and striving for LEED certification includes:

- (i) The Michigan Alternative and Renewable Energy Center - a LEED certified building, self- powered through the use of biofuels and solar. It is an incubator for alternative energy research
- (ii) Lake Ontario Hall - a LEED silver building for classes and offices uses the most up to date energy and water efficient designs
- (iii) Kennedy Engineering - a LEED building that incorporates rooftop gardens to reduce water run-off and help insulate the building
- (iv) New Construction - Indoor practice facility for sports; New Honors living centre (classes and living spaces for 1,000 students); building additions which use LEED design methods

## **Partnerships**

Grand Valley has worked closely with the city of Grand Rapids (population 300,000) drawing organisations, businesses and other educational institutions into a partnership dedicated to promoting sustainable practice. The Community Sustainability Partnership ([www.grpartners.org](http://www.grpartners.org)) which holds quarterly summits to discuss sustainable practices related to the Triple Bottom Line is making progress towards purposeful change in the region. Partnerships are now forming in other communities and the intention is to develop a west Michigan regional partnership serving the million-plus population. The university has committed both to Education for Sustainability, by the President's signing of the Talloires Declaration, and carbon neutrality, as evidenced by the signing of the ACU President's Climate Commitment in 2007.

## **Operations**

### Energy savings

As the fastest growing university within the state of Michigan, GVSU casts a large footprint and expends vast resources. Recent campus efforts are focusing on improving energy efficiencies to hold down cost increases. Purchasing bulk fuel and electricity has enabled Grand Valley to reduce natural gas costs per square foot whilst water consumption has remained stable. Bulk purchasing efforts are being expanded to include office materials, paper and other expendables.

To improve efficiency Grand Valley has installed, recently, a new boiler which re-uses heated air within the system. Cost savings will pay for the improvement within three years. GVSU has also recently completed a wind analysis project where wind velocity readings are obtained across the campus. The goal is to determine whether GVSU can augment its electricity use, specifically for edge-of-campus facilities that pay a higher rate for electricity. In 2007, Grand Valley is investing US\$1.0 million on various energy efficiency projects. Facilities is investing US\$25,000 to initiate a CFL bulb replacement programme where incandescent bulbs are exchanged for compact fluorescent bulbs. Energy savings should pay for the cost of the replacement within a few years.

With almost 90 campus buildings, a switch to 'green' cleaning products will further reduce environmental impact. Currently Facilities is testing floor polishes and cleaning solutions that are environmentally sound. Floor polishes have been adopted that are more durable and require less frequent stripping than conventional polishes. Grand Valley has formed a partnership with Nichols (<http://www.enichols.com/>), a supplier of cleaning products and member of the Community Sustainability Partnership (<http://www.grpartners.org/>) which has funded two scholarships in Sustainability for Grand Valley undergraduate students.

### Transportation

A bus ridership programme has been initiated as a joint venture between GVSU and the city of Grand Rapids. Grand Valley has two campuses, the Allendale main campus and a downtown Grand Rapids campus, 15 miles away. Buses run every six minutes, and use has grown exponentially since the programme began in 2000. Estimated gasoline savings in 2005 alone were 550,000 gallons costed at US\$2 million. Recently, the city and Grand Valley have purchased two hybrid buses which help to greatly improve energy efficiency and help meet the daily demand of over 7,000 riders. Additional savings both by students and GVSU reduced the demand for downtown parking passes (at a cost of US\$120) as well as negating the need to build additional downtown parking. Campus facilities have also purchased plug-in electric maintenance vehicles and more energy efficient lawn mowers in an effort to further reduce the carbon footprint. A preliminary study has been completed to examine Grand Valley's carbon footprint, with additional work scheduled in estimating transportation impact (air travel, commuting) and carbon offset by the natural surroundings (tree survey).

## Water

Water saving is very important to Grand Valley. Situated 20 minutes from the Great Lakes, water conservation and water quality is essential for maintaining a sustainable environment. New LEED buildings, with waterless urinals and low volume toilets reduce water use by over 70%. Grand Valley has a retention pond in the centre of campus to help capture storm water run off; however, water run off is a serious problem for Grand Valley, as it is situated along high ravines that line the adjacent Grand River. Increased run off has already contributed to local ravine erosion. Future plans to combat the storm water problem include additional holding ponds, rain gardens, porous pavement for parking lots, increased native plantings, rain meters on irrigation systems and a change in mowing practices along the ravine edges to reduce water run off.

## Recycling

Michigan lags behind the nation in its recycling efforts. Grand Valley also struggles with recycling participation, with only 24% of materials recycled. Efforts are underway to improve recycling on campus. Recycling locations are expanding and being made more visible. An area where Grand Valley is taking the lead is on the use of recycled materials. The bookstore has switched its paper purchase to recycled paper. While the initial cost is slightly higher, the environmental impact (water use) is reduced. Food service has now switched almost entirely to recycled products, including cups, napkins, utensils and other packaging. The shirts worn by employees are made from hemp, purchased from a local sustainable clothing vendor. Food services also purchase farm produce from local vendors. Future plans include composting and growing food on campus gardens.

Facilities is trying to encourage students on-campus to think more responsibly about discarded possessions at the end of the year. Project Donate is designed to allow students who would normally discard beds, appliances and other living items to donate via specially designated dumpsters for sorting and distribution to agencies and those in need. In 2007, over 25 metric tons of items were so donated.

## Community garden

Project planning has started for nearby farm land recently purchased by Grand Valley to provide for future overflow construction projects and joint community and campus use as a community garden. Facilities plans to use some of the land as a campus tree nursery while food services propose to grow food and develop a site for composting food waste.

## Students

Students at Grand Valley have become significant drivers of the sustainability agenda on-campus. They have a strong history of volunteerism and community activity. Sustainability is proving to be a cause uniting student groups around a common theme. This year the Student Senate will be hosting a series of meetings and dinners for over 20 student groups having a tie to sustainability. The Senate President's goal is to create a student coalition that pools resources to impact sustainability on-

campus. In addition, the Student Senate crafted a resolution in 2007 supporting the creation of a Sustainability Certificate programme which faculty will develop in the Fall.

#### Sustainability guidebook

In 2006, students and the Director of Facilities at Grand Valley teamed up to create the first Sustainability Guidebook. The small booklet described what sustainability is and how students might become involved. In 2007, students revised the booklet, added information on what can be done to reduce, re-use, and recycle. The attractive booklet was distributed at first year student orientation to 3,500 incoming freshmen. Orientation leaders were also provided with information on sustainability. The Guidebook continues to be successful and over 10,000 have been printed for 2007 (see [http://www.gvsu.edu/cms3/assets/1ACDDEF0-A15A-67B1-F268BE06B2416593/sustainability\\_guide/StuSustainFinal.pdf](http://www.gvsu.edu/cms3/assets/1ACDDEF0-A15A-67B1-F268BE06B2416593/sustainability_guide/StuSustainFinal.pdf)).

#### Web page

In 2005, students working with the Director of the Sustainability Initiative (Mr. Norman Christopher) created a sustainability web page (<http://main.gvsu.edu/sustainability/>). The page, updated by student interns, contains information about sustainability-related courses, campus events, news articles, and opportunities for student participation. A faculty page has recently been added (see [www.gvsu.edu/cois](http://www.gvsu.edu/cois)).

#### Student projects

Since sustainability is a new topic for local communities and businesses, Grand valley students have been given rare opportunities to become involved in high level planning for some businesses. Recently, for example, when a local hospital wanted to produce a report on its sustainable practices and track key indicators it turned for assistance to Grand Valley. A senior business student, completing a two semester independent study, researched, interviewed key staff, and created an indicator report for the hospital. The hospital recently hired a sustainability coordinator to maintain the hospital's sustainability momentum. Other projects include assistance given to an area High School for underprivileged students in mathematics tutoring, mentorship and curricular help with art and design. Meanwhile, the university's Service Learning Centre has partnered local communities in need to help and linked students to sustainability-related projects. In addition, students are: assisting Campus Operations to establish the extent of the university footprint; conducting audits on transportation costs for the hybrid buses; and calculating estimates for campus-wide green house gas emissions. Facilities will continue collaboration with students in the collection of data related to energy conservation. In addition, students from the School of Nursing work with low income and disadvantaged school children whilst nursing students visit schools and provide, on-site and free of charge, basic health care services.

Students are widely involved in promoting sustainability across the campus. Working with Campus Operations, Food Services, and the Sustainability Initiative students are helping to host Campus Sustainability Week. Held during October and immediately prior to Make a Difference Day, the three day event hosts speakers, music, fair trade food and demonstrations such as a 'green' living space. Each day focuses on one of the three aspects of the 'Triple Bottom Line' (environmental stewardship, economic prosperity, social justice). The event is designed to involve faculty and their classes.

In addition student living centres are becoming more involved with sustainability. Energy competitions were held across campus during 2006 and 2007. Buildings were told to reduce electricity use as the competition goal. Living centres reduced usage in one month by 120,000 Kwh, enough energy to power 234 homes for one month. Cost savings exceeded US\$15,000. Future activities will be extended to faculty and staff buildings.

## **Faculty and Staff**

### Getting Faculty together

In the spring of 2007, the Associate Dean launched a faculty listserv for sustainability and invited the campus community, faculty and community members to join. Faculty identified on campus as participants in any event or activity relating to sustainability were targeted. To date, 30 members comprise the listserv, with 20 more faculty identified as having an interest in sustainability. In the spring information was sought from faculty about personal research related to sustainability. As is often the case, many faculty are unaware of the activities of colleagues in other departments. The intention is to encourage sustainability research across disciplines that provides greater value to the university community.

Starting in the Fall 2007, an internal grant has funded a 'teaching circle' to promote discussion on teaching sustainability in various classroom settings (disciplines). The goals of the teaching circle are to:

- (i) increase familiarity with sustainability
- (ii) generate case examples of sustainability issues that cross disciplines
- (iii) identify and gather interested faculty to underpin the development of a Sustainability Certificate programme
- (iv) compile material for an introductory text on sustainability

As part of an internal grant to promote the teaching of sustainability, Faculty are expected to read *147 Tips on Teaching Sustainability*, and a website has been launched (see [www.gvsu.edu/cois](http://www.gvsu.edu/cois)).

### Faculty research

Sustainable development has become an important focus of faculty research at Grand Valley. Efforts have been made to facilitate communication among faculty and students and promote multidisciplinary collaboration. Faculty have been surveyed to devise a database of current research activities as the basis for stimulating collaborative work (see <http://www.gvsu.edu/cois/index.cfm?id=41BD8AA3-9683-8B58-805E66FBB2188DF6>).

## Curriculum

The 2005 Indicator Report listed courses that covered aspects of sustainability. That list was expanded in 2007 to over 200 courses, including a hard core of 60 that were heavily focused on sustainability. These courses span a variety of disciplines. Many are part of the General Education curriculum while others are concentrated in specific majors. For guidance, students have been given access to a dedicated web site ([http://www.gvsu.edu/cms3/assets/1ACDDEF0-A15A-67B1-F268BE06B2416593/NEW%20revised%20sustainability\\_Courses2007-08.xls](http://www.gvsu.edu/cms3/assets/1ACDDEF0-A15A-67B1-F268BE06B2416593/NEW%20revised%20sustainability_Courses2007-08.xls)).

In the summer of 2006, a group of GVSU faculty conducted a pilot study on the role of sustainability in the higher education curriculum in the US and Europe to identify best practices and criteria-based, bench-mark institutions. Faculty surveyed sustainability initiatives in the UK, Belgium and Spain and established preliminary network for collaborative research on sustainability indicators.

Across campus, faculty are coming together to form interdisciplinary programmes that involve sustainability. An Environmental Studies Minor is being approved by the university curricular committees. In the Fall 2007, faculty will begin to work on a Sustainability Certificate programme and the possible inclusion of sustainability as a part of general education.

The Business College has seen the need for sustainability within its curriculum. Working with the Director of Sustainability, the College Dean co-taught a topics course 'Sustainable Business and Organizations' for MBA students. The class was very well-received and the business student advisory group has requested the College to develop coursework for undergraduate students. Discussions are underway between the Business College and the College of Interdisciplinary Studies to coordinate development efforts.

Engineering has identified a substantial need for training in sustainability. Engineering faculty now teach sustainable design practices in many classes. Students have helped design and build a 'green' home for a low income resident as a class project and have participated in design competitions related to energy efficiency and sustainable design. Student research projects in alternative energy (solar, wind), energy use tracking (i.e. bus system) and efficiency design now revolve around sustainability. A recent extension to the engineering building recently received LEED Silver rating for environmental design.

Initiatives for sustainability now arise spontaneously from faculty and staff. For example, information staff are pursuing best practices in sustainable printing and use paper and printing supply chains certified by the Forestry Stewardship Council (FSC). Another example is the campus bookstore selling re-usable shopping bags with half of the profit directed to the Sustainability Initiative. The international programme is initiating a tree planting programme to offset carbon use from air travel by the study-abroad programme. These examples demonstrate clearly the on-campus expansion of a stakeholder ownership of sustainability and growth of a positive culture.



Clearly, the momentum for education in sustainability is taking shape and accelerating in growth. The Sustainability Initiative, housed in the College of Interdisciplinary Studies, is uniquely positioned as the 'dot connector'. It provides the link between different disciplines making possible an integration of sustainability education across the university.

## **Outreach**

Connecting Grand Valley to the local community is an important role of a regional university. In addition to its economic impact, Grand Valley offers an intellectual capital and service resource that can greatly benefit west Michigan. One key resource for the region is the Annis Water Resources Institute (AWRI) (<http://www.gvsu.edu/wri/>). AWRI is a research and education arm of Grand Valley, located on the shores of Lake Michigan. Conducting water quality studies for local communities as well as larger, grant-funded initiatives, AWRI is a vital resource for the Great Lakes region. In addition to research activities, AWRI maintains a fleet of two vessels and a laboratory for educational purposes. The boats take school children onto Lake Michigan to collect water samples for analysis in the laboratory. AWRI also provides training for educators on water quality experiments for the classroom. The Institute provides services to government and often testifies on water quality issues. It has received grant funding to host 'Café Scientific' sessions for the local community to discuss sustainability among interested community members and business owners.

The Lake Michigan shoreline is a unique resource for GVSU. The Michigan Alternative and Renewable Energy Center (MAREC) is the first fully-integrated demonstration facility for distributed generation of electricity using alternative and renewable energy technologies in the United States. As a LEED building, it is fully self-sufficient in energy generation. This energy Centre will create and attract new business to the region. MAREC is positioned to establish west Michigan as a leader in the application of alternative energy technologies - technologies that can be widely employed globally. In addition, MAREC ensures that Grand Valley State University will be a leader in developing interdisciplinary alternative energy education and product development programmes.

A 30 kW Capstone micro turbine has been installed and integrated with MAREC's advanced electric generating technologies that have operated continuously in the past 14 months: a 250 kW molten carbonate fuel cell (Fuel Cell Energy), a 30 kW photovoltaic solar roof tiles (Unisolar) and a nickel metal hydride battery (COBASYS). A Kane heat exchanger was integrated for exhaust gas heat recovery. In addition, in November 2007, MAREC will be hosting an Energy conference for local business to create strategies for business becoming involved in wind energy production.

From the perspective of social justice and education, Grand Valley has been active in establishing relationships with schools and non-profit organisations. The Sustainability Initiative, for example, was contacted by a local Alternative School, a school for students who are well below the margin in reading and mathematics. Moving these children towards graduation is a difficult task, and often the schools are under-funded. This school needed assistance in mathematics tutoring, visual and graphics arts instruction and creating a model for sustainability in practices. A partnership was created and key resources to assist the school were identified at Grand Valley. This partnership model can be extended to other schools and local colleges. Another example involves partnership with a school where 95% of

the students come from families living in poverty and without access to health care and personal transportation. In partnership, students from the nursing programme at Grand Valley benefit from visiting the school where they provide free basic health care and treatment. In addition, the College of Interdisciplinary Studies which houses the sustainability initiative has chosen poverty and economic justice as its theme for 2007-08, linking this initiative to broader programmes offered across campus.

## **Summary and Conclusion**

Sustainability efforts at Grand Valley are becoming more visible with each passing year. Efforts are widespread and involve multiple entities. Rather than a top down management, the GVSU Initiative seeks to draw together stakeholders who will work in partnership to achieve its goals. Future plans include an analysis of the feasibility of achieving carbon neutrality, receiving a LEED Campus designation and enhancing green energy use. Grand Valley aims to be a model that communities and other Universities can look to for sustainable practice. With sustained links to the community and region, Grand Valley intends to become a centre of excellence in sustainability, one to which communities can look for guidance and achievement.

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## Campus Greening at the University of Plymouth: Some Highs and Lows in a Two Year Collaborative Experience

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### **Abstract**

The greening of university campuses is becoming more common, yet there is a paucity of research about this process, institutional learning and the connection of campus greening to staff and student experience. This paper explores a capital spend project with a £2 million budget which aimed 'to establish an infrastructure which directly impinges on the students' life on campus and overtly models a 'green' outlook and sound sustainability policies' (Dyer and Selby, 2004). The paper looks at the dynamics of collaborative working within the project activities, the benefits and difficulties of drawing together a very disparate team, the opportunities afforded by such cross-boundary work and the lessons learned. The main lessons learned were that a growing understanding and development of shared objectives amongst a diverse group (with different backgrounds and specialist knowledge) has proved successful in the stimulation of a more holistic, inclusive approach while completing projects to time and budget. Local circumstances, and the pressures of pre-existing policy on the physical development of the Plymouth Campus over the same time period, have led to both synergies and frustration. There is evidence of institutional learning at several levels with links to core policy issues already agreed and other significant changes in process. The paper concludes with some recommendations for others developing university campuses which aim to be a valuable resource for learning and teaching (about, in and through) sustainability.

**Keywords** Education for Sustainable Development (ESD), sustainability, campus greening, collaboration

### **Introduction**

Campus greening is becoming more common but there are few, if any, examples of a comprehensive commitment by a university that has been carried forward into action (Walder and Clugston, 2002). The Centre for Sustainable Futures (CSF) has a mandate to transform the University of Plymouth to be a model of education for sustainable development, and for its campus to 'overtly model a "green" outlook and sound sustainability policies' (Dyer and Selby, 2004). Two years into a five year project the university has spent over £2 million on campus greening projects that have reduced the university's ecological footprint, engaged a range of stakeholders and connected with curriculum development in innovative ways (Gray-Donald and Selby, 2006). Building on the success of the capital spend and relationships built with chancellery, CSF has put in place what is likely the most holistic sustainability policy and action plan yet seen for a university.

This paper investigates some of the reasons for the success of the capital spend project, as well as frustrations, lessons learned and recommendations. It is based on interviews with eight key people in the university, including academics, estates managers, students and a procurement officer. Following an explanation of why the research is needed, the background to the project and the research methodology, six main themes from the research are presented:

- (i) 'We were doing this all before the CETL ESD arrived'
- (ii) 'We didn't achieve as much as we might have done'
- (iii) Continuing confusion over the university decision making processes and plans
- (iv) Problems with capital expenditure timescales
- (v) Setting clearer agendas for consultants
- (vi) Academics talking to administration and support staff

The paper concludes with recommendations for each of the themes identified.

## **Need for Research**

In *Greening the University Curriculum: Appraising an International Movement*, Martin Haigh states that 'There now seems to be growing agreement that HEIs should equip all their students with "environmental literacy" and that sustainability should be central to concerns both in HEI curricula and operational practice'. This is echoed by a wide array of academics and policy makers including the more than 100 university presidents and vice-chancellors who have signed up to sustainability declarations (Tilbury, 2004).

This is especially true in England. In 2005, the Higher Education Funding Council of England (HEFCE) published a statement of policy *Sustainable development in higher education* which sets out their approach to promoting the sustainable development agenda (HEFCE, 2005). Sustainable development is now being promoted from the highest places. In addition, the Environmental Association for Universities and Colleges (EAUC) now has a membership of over 200 universities and colleges and is very active across the nation as an environmental and sustainability champion (EAUC, 2007). To complement these endeavours, HEEPI (Higher Education Environmental Performance Improvement) supports the work of energy managers, develops the capacity of environmental-related staff and runs yearly Green Gown Awards (HEEPI, 2007). It is therefore clear that there is a great deal of interest and action around environmental and sustainability issues at universities in the UK.

A study conducted by one of the most recognised and respected organisations in the field, University Leaders for a Sustainable Future (ULSF), concluded that 'While many campuses have begun to redesign their operations based on eco-efficiency, waste reduction and recycling, few schools have made a comprehensive commitment to such practices' (Calder and Clugston, 2002). This is in spite of the fact that such practices can lead to significant cost savings<sup>1</sup> (Calder and Clugston, 2002). However, while there has been a lot of campus greening, 'there is little guidance available for campus sustainability advocates and scholars' (Calder and Clugston, 2002, p.3). In light of this, Shriberg conducted a detailed study of US colleges and universities that have signed the Talloires Declaration

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<sup>1</sup> See also (Sharp, 2002), his conclusions and description of the Harvard revolving eco-loan fund.

in order to identify 'organisational factors which determine why and how some campuses are emerging as sustainability leaders while most campuses lag behind' (Shriberg, 2002, p.3).

He continues, stating that:

The results indicate that collaborative decision making structures, progressive/liberal political orientation, a collegial atmosphere, and image-seeking behaviour represent strong positive conditions for success in campus sustainability. Initiatives are most successful when driven by diverse stakeholders - with the support of top leaders - acting in a coordinated manner and capitalizing on or creating a 'spark'.

That same year, Leith Sharp published an excellent paper entitled *Green campuses: the road from little victories to systemic transformation* based upon seven years of experience at Harvard University and a study of thirty other universities. He provides very good advice on general principles of organisational management that help institutionalise a commitment to campus environmental sustainability. However, to the knowledge of the authors, neither Sharp, Shriberg nor anyone else have published papers about a particular university's comprehensive effort to redesign its operations (green their campus) looking, in particular, at decision-making and institutional learning. This paper aims to start filling that niche.

## **Project Background<sup>2</sup>**

The Centre for Sustainable Futures (CSF) at the University of Plymouth opened on 1 June 2005, following a successful bid by a group of academics representing several disciplines to HEFCE (Higher Education Funding Council of England) for initial capital and five-year recurrent funding for a Centre in Excellence in Teaching and Learning: Education for Sustainable Development (CETL ESD). In the bidding process with HEFCE, the Plymouth team had to demonstrate already-existing excellence in ESD curriculum and pedagogical development. Those 'excellent' Faculties and Schools from which the team was drawn were: Education, Law, Geography, Architecture and Design, Environmental Building Group (Engineering), Agriculture and Rural Management, and Earth, Ocean and Environmental Sciences.

The goal of CSF, as laid out in the bid document, is 'to transform the University of Plymouth from an institution characterised by significant areas of excellence in Education for Sustainable Development (ESD) to an institution modelling university-wide excellence and, hence, able to make a major contribution to ESD regionally, nationally and internationally' (Dyer and Selby, 2004, p.1). To that end, a core staff of seven was appointed and arrangements were made for the partial buy-out on an annual basis of academics as affiliated Centre Fellows. There were 24 Fellows in 2006/07 and a new cohort of 12-plus academics from other disciplines starting in the academic year 2007/08.

A programme of capital work totalling £2 million was developed with the CETL ESD bid authors and representatives of the Environmental Building Group and School of Architecture and Design. A condition of funding was that all the money had to be spent and projects completed within two years.

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<sup>2</sup> The next three paragraphs are an excerpt from Gray-Donald and Selby (2006) quoted with the authors' permission.

It was recognized that the expenditure of such a sum of money on capital works within the first two years of the CETL was a challenge in terms of typical project development, design, contract agreement and building programmes. For this reason, and a desire to model the sustainability principles of transparency and participation, a diverse team was brought together to move forward the CSF capital spend. The inclusion of academics within a capital spend project at the university was unusual. Indeed the inclusion of architecture and engineering faculty is unusual at an international level:

Sustainable design on campuses is perhaps the most exciting recent trend in the HESD movement. It is particularly critical since estimates indicate that our built environment will double size over the next 20 to 40 years. Ironically, the impetus for green buildings appears to be coming more from the liberal arts side of the academy (rather than the graduate schools of design)(Calder and Clugston, 2002).

The budget laid out in the CETL ESD bid document is presented as Table 1.

**Table 1 CETL ESD Sustainability budget**

<b>KIRKY LODGE</b>	
£250k	Conversion/upgrade to CSF
<b>GATEWAY : Rowe Street Project</b>	
£1,000k	BREEAM assessment
<b>ECO CAMPUS</b>	
£500k	(£460k) total
£200k	Energy efficiency measures
£40k	Eco-landscaping measures
£60k	External socialising areas
£30k	Waste reduction measures
£50k	Cycle storage/changing
£80k	Disab. and gender landscape
<b>VIDEO-CONFERENCING</b>	
£250k	Schumacher partner coll.
£45k	Thermal imaging camera

Source: Dyer and Selby, 2004, Appendix 4b

Students and staff representatives were included in the early discussions of each of the projects. Meetings typically included: The Project Manager, Estates liaison person, ESD CETL Deputy Director, academics from School of Architecture, Manager of the Student’s Union, President of the Student’s Union, Student’s Union Environmental Officer, Quantity Surveyor, Project Architect and Master-plan Consultant.

By early October 2005, it was becoming apparent that despite the urgency for day-to-day decision making to take place, there was a real need for a more integrated overview and discussion of the university campus as a whole. A campus forum began with its aim ‘To contribute to the development of the university campus in Plymouth as a rich resource for teaching and learning for Sustainability, and as a high quality environment in terms of the social, technical, cultural, biodiversity, and aesthetic aspects of the site and its buildings’. The campus forum met roughly once per month and had an attendance fluctuating from 15-30 drawn from across the university.

The campus greening initiative was noteworthy for its high level of consultation with students and stakeholders on the following projects:

- ensuring the high BREEAM rating of the new iconic seven-story Levinsky Arts Building
- refurbishing Kirky Lodge (which had been condemned) with minor structural work, eco-paints, eco-carpet, replacing the panes of old windows with double-glazing
- creating a Student Union garden with native vegetation offering one of the few useful outdoor social spaces on campus
- increased cycle storage
- infrastructure for the first ever University of Plymouth recycling scheme
- lastly, conducting a detailed analysis of opportunities and feasibility of alternative energy creation on two University of Plymouth campuses and surrounding areas

Each of these projects is making a significant contribution to reducing the carbon footprint of the university. Because CSF is mandated to promote education for sustainable development, we have worked hard to link each of the projects with the curriculum and with informal student learning on campus. Examples include:

- making the educational value of a building a criterion in design
- exhibiting leading edge digital artistic displays of resource use and sustainability issues on the outside and inside of various buildings
- consulting architectural and construction students on the design of new buildings and entrusting them with such changes
- involving other students in landscaping changes
- having an open and accessible archive of the campus greening project notes and designs
- establishing institutional spaces for participatory processes

## **Methodology**

This paper is overtly insider research. Almost all of the research at CSF is action based. This is no exception. The research is meant to provide insight into the operation of CSF and its efforts to promote ESD in all aspects of the university. Campus greening is not conceived of separately from curriculum development, community engagement or cultural change. They are all embedded within each other. As such there are nine overlapping strands of research and over 20 individual research projects at CSF related to sustainability at the university. In 2006, *Through the (not so) Green Door* investigated how CSF is connecting campus greening and curriculum change (Gray-Donald and Selby, 2006). The Environmental Building Group has published a series of articles looking at curriculum change and the student experience (Murray *et al.*, 2006). There is a forthcoming chapter in a book about campus greening based on a three week think tank at Schumacher College with international experts, university staff and regional representatives.

All this research complements, and is evidence of, the insider knowledge of the authors about the campus greening process at the University of Plymouth. There is an extensive documentary trail that has been reviewed which includes minutes of campus forum meetings, minutes of project meetings, project reports, emails and interviews for other lines of research. Semi-structured interviews were also

conducted with eight key people within the university who were involved in the CSF capital spend. These interviews lasted 15 - 45 minutes. They were then transcribed and circulated to the authors. The authors read the transcripts independently and identified key passages and themes. Very close agreement was found between the themes identified. These themes were then written up by different authors and edited by the remainder. Further information about CSF and the capital spend projects is presented at <http://csf.plymouth.ac.uk>, clicking on campus.

## **Key Themes**

‘We were doing this all before the CETL ESD arrived’

The original bid document confirmed that the university had already implemented sustainability in several academic fields and, after CSF began operating, it became clear that individuals in the Learning Resources Department/ Estates had defined environmental responsibilities and high levels of awareness. For example, Paul Lumley was highly commended in 2005 by HEEPI Green Gown awards for £1.6million in savings from water conservation. Several other respondents, including the Head of Procurement and the Head of Estates Planning, indicated that at the time of CSF’s initiation their existing practices had involved the consideration of sustainability. This included corporate social responsibility concerns and BREEAM assessment of building projects.

Others involved were less confident. A number of personnel having lower levels of responsibility indicated that they were able to use the CSF project to build on their existing knowledge and values by expanding their understanding of sustainability and education for sustainability.

Several areas of capital expenditure, such as the recycling systems, had been seen as important in advance of CSF’s involvement, and the university had already established a ‘Smarter Campus’ initiative which combined discussions on transport (particularly bicycle use and provisions), litter and bins, landscape and street furniture and lighting provision. Indeed discussions about recycling had been on-going for over a decade. Many of these initiatives benefited greatly from the Capital funding (and indeed provided a basis for the bid) which made possible, for the first time, the university-wide implementation of bicycle storage and high quality refuse sorting facilities. It is generally thought that the use of external funding was the key to moving forward agendas that did not fit into annual budget lines.

The two-year timescale of capital expenditure made it difficult to initiate building projects which could be wholly completed by the closing date. However, there was an opportunity to raise awareness and standards of buildings to which the budget could make a contribution. Even at a late stage in the project’s development, in the summer of 2005 whilst the site clearance work for the Roland Levinsky building was underway and the contract had been let, CETL requested that project managers undertake a BREEAM assessment of the design to explore opportunities for improvement of the specification and design decisions. The discussion (Mackie, 2005) raised several issues, principally why such an appraisal had not been undertaken earlier in the building design process.



So while many of the processes and procedures associated with different aspects of running the estates service and the commissioning and procurement of buildings and landscape designs and products were well established, it is clear that the additional funding encouraged key discussions to take place. Given that CSF management had to sign off on various budget items, they were able to raise the importance of sustainability in the decision making hierarchy. This meant that CSF had a significant impact on the way that such issues were considered.

What is clear is that the initial response of the Estates team, in particular, was enthusiastic and the subsequent assistance that was given in the development of capital projects was good tempered, thoughtful and extremely valuable. Estates staff were amazed at the spaces for discussion that CSF created, the way out-of-the-box thinking was encouraged and the public valorisation of sustainability principles that, previously, had been held in private.

‘We didn’t achieve as much as we might have done’

There is undoubtedly a sense of frustration in many of the responses, from fellows, managers and estates representatives. Initially, the clear ambition was to make a significant difference to the quality of the campus landscape, including projects which increased biodiversity, raised the profile of local plant species, used natural materials, and which created rich cultural and social environments full of opportunities for interaction, learning and teaching.

A real inhibition on such projects in practice was the university’s existing re-organisation agenda, initiated by the Vice Chancellor in 2001, to bring the staff and students from the three outlying campuses from Exmouth, Exeter and Newton Abbot, onto the Plymouth site. This wider project required the building of new Arts Faculty (Roland Levinsky), Education building (James Street) a Sports Hall, major extensions to four existing buildings (Scott, Davey, the Students Union and Portland Square) and total disruption during the 2005-2007 sessions to the pedestrian and built environments of the Plymouth campus.

The impact of these university-initiated projects on the developing CETL capital projects (for CSF and the Experiential learning CETL), including the provision of office space for all four CETLs awarded to Plymouth in 2005, was enormous. The impact on Estates staff was very heavy. They had to oversee a raft of developments which meant: co-ordinating building sites and access; scaffolding areas; protection for pedestrian routes; site access; and contractors’ site huts and stores. This work was in addition to their normal site maintenance, health and safety and utilities responsibilities. No extra staff were hired by Estates during this time.

However, several key projects were initiated. The following three illustrate gains and losses:

- *Roland Levinsky*: the contribution to this building, although it came too late to revise major design decisions, ensured significant community use, and that the Gateway building also had high class building monitoring systems and data output opportunities. The Theatre, cinema, major exhibition and lecture rooms will provide a highly valuable on-campus resource for local, national and international sustainability events

- *The Vision Theatre*: a joint project with the experiential learning CETL which had reconditioned an existing small planetarium building on-campus to provide 360 degree, state of the art projection and acoustic environmental simulation. Our contribution was to design and fund the external building fabric and associated external social and display spaces. This proved extremely valuable in engaging designers and architects, but was severely curtailed by the unpredicted encroachment of neighbouring building works, and the late change in location of the Portland Square memorial sculpture site. The university asked us to allocate part of the budget to the project for upgrading the existing Drakes Park which was transferred to the university in December 2006
- *The Students Union Garden*: the subject of an additional funding bid in the Autumn of 2005, was perhaps the most successful so far. Owing to the timing of the Students Union rebuild contract, we were able to use the same contractor and take advantage of an existing programme of works and reduced overhead costs. The final design, selected from four sketch options by students and the Students Union Manager, was developed in terms of the materials specification (oak seating and planters), detailed design - to increase seating areas and opportunities for supporting day and evening events, and to improve access for disabled students, recycling storage capacity, and planting specification - through discussions with students and staff at the Campus Forum. The intention to engage students from Bicton College (a University of Plymouth partner College) in planting the area with local, native species has yet to be implemented

This unprecedented period of rebuilding with several contractors, architects and other building design consultants already working at full stretch was not perhaps the best time to initiate a sustainability debate about the university environment, very little of which was even visible. The impact on the visual and social landscape of the campus to date has been slight, and the interpretation initiatives are only now beginning to come together. However, the developing contacts within the Capital Spend Team encouraged the inclusion of several CETL ESD fellows as members of the University Strategic Plan: Urban Design Group chaired by Rob Score. This group created the landscape strategy for the university as part of the Strategic Plan draft, published in July 2006, which made significant proposals for the future of the campus as a whole, including many of the original CETL ESD objectives, and focused on the role of the buildings and landscapes as teaching and learning resources for sustainability in their own right. The recent Sustainability Policy Action Plan includes the setting up of a 'Campus as a Learning Resource Group', bringing together learning resource managers and academics and estates representatives in a body which can take forward many of the CETL's objectives in the coming years.

Continuing confusion over the university decision making processes and plans

The University of Plymouth is a hierarchical organisation. This is the norm for universities. There was some tension with the CSF capital-spend because CSF was trying to be open and transparent in its decisions while also encouraging participation of groups normally left out of decision-making processes. While CSF staff were praised for their ability to make compromises and adapt to university structures, restrictions and realities there was a further difficulty. Even senior members of estates and chancellery were not aware of how the university made decisions about capital projects and policies in general. Indeed, chancellery were unable to state when and how policies were being revised, updated or monitored.

Incomplete information was given to the Capital Spend Team. This was not malicious, but just the reality of a very busy university in the midst of closing down three campuses and undergoing significant structural changes. While the confusion over decision making processes can be explained locally, Leith Sharp points out that there is a prevalent myth of the rational university:

As a result of this cultural assumption [of a rational university], universities in general, persist in designing processes and structures that are based on assumptions of rationality, despite the inevitable dysfunction of such approaches, because it supports the greater goal of appearing rational. From personal experience, it appears that one of the most significant and prevalent forms of stress experienced by staff within universities is the stress of having to sustain the myth of organisational rationality while facing the reality of organisational irrationality....The myth prevents institutional analysis and reform as a response to dysfunction since the political payoff for accepting dysfunction is much greater than the payoff for dealing with root causes (Sharp, 2002, p.136).

The University of Florida provides a very good model of how to reach some clarity and transparency of reporting structures within a university. They have adapted the Global Reporting Initiative (GRI), a tool used by sustainably progressive cities around the world and many major corporations, for use by a university. A GRI report is created each year by a city/company/university. Each report clearly presents the operating budget, assets, decision-making structure, mission and vision statements and goes through a triple bottom-line accounting. The University of Florida:

...united the interests of the administration with those of campus greening and social progressive constituents and, in the process, established a baseline with which to compare future metrics...The University of Florida's publication of a GRI-consistent sustainability report is a first step in recognizing its role both within and outside the academic community. The university recognizes that using this system for sustainability measurement provides a baseline on which improvements can be made, identifying specific activities in need of immediate attention (Newport et al. 2003, p.357; pp.361-2).

Struggling through the decision making structures at the University of Plymouth has had some positive outcomes. It led to strong connections formed across disciplines, with support staff and senior management. Building on this network of relations the CSF Director drove forward a holistic sustainability policy and action plan that has been approved by chancellery and the Board of Governors (University of Plymouth, 2007).

#### Problems with capital expenditure timescales

Simply put, it is extremely difficult to design and execute a successful building project within two years of acceptance of a funding bid. The timescales which might be desirable for a fully sustainable project - by implication highly consultative, collaboratively designed (to consider all aspects of material, environmental, social and cultural requirements and impacts) and fully audited - were not available for the capital spend, within two years, of the £2+ million CETL budget. This challenge was both helped and hindered by the extensive on-going and forthcoming construction and refurbishment projects on the Plymouth main campus. It was helped because there were a number of projects that the estates team wanted to do but did not have the money. This included the Student Union Gardens and the Drakes Place Gardens. It proved very challenging because there were literally very few places on campus where work was physically possible due to the impact of the many projects associated

with the university reorganisation. An already dense urban campus saw existing landscapes, sites and pedestrian alleys closed off to provide working and storage areas for other projects.

A requirement of the HEFCE funding was to spend the whole budget in two years. Although this creates limitations, the pressures of the timescale meant that everyone involved had to learn more rapidly through having to implement the projects. Had we had additional time at the start of the projects we might have had less of a sense of urgency, and not travelled so far. Particularly useful for us was the concurrent activity of both other Plymouth CETLs, and the wide range of scales and types of projects supported (transport, refuse, building, landscape, interpretation, etc.) which meant that a large number of individuals were involved in at least part of the process. This involvement significantly improved communication and built a shared understanding in the team. CSF accomplished the originally budgeted projects as well as applying for roughly £300,000 of additional funds. This is credit to the amount of work put in by the Capital Spend Team on top of their teaching or management duties.

#### Setting clearer agendas for consultants

For many of those involved, one of the real successes of the project has been the greatly increased interaction between academic and support staff. The need for exploration of the agendas and brief requirements of the capital projects increased discussion with building and landscape design consultants, heating and ventilating engineers, sculptors, structural engineers and many specialist Energy and Communication contractors. The high level of discussions with people from different disciplines provided a rapid learning environment for those involved.

The university's building contracting process which appoints framework consultants (and contractors) for all key roles for a period of five years, made it possible to work with consultants who were familiar with the university's requirements, and the physical campus and buildings. This proved to be a double edged sword:

- saving time and costs which would have made normal bidding and tendering processes impossible within the two year window
- but meaning that in some cases it was difficult for the consultants to respond to the very different expectations of a sustainability driven briefing and design process

All consultants were very familiar with the university priorities for buildings to 'come in on time and on cost'. The idea that the CETL should invest additional fee costs in exploring options, widening the debate to include students (Students' Union Garden) and community members (Drakes Park) was initially very difficult for quantity surveyor and project management teams. However several of the consultants tried hard to rise to the challenge. The discussion did lead to some very innovative and experimental thinking, even though in several cases (e.g. geological sample cladding and geo-thermal energy supplies to the Vision Theatre) these did not go ahead for good technical or organisational reasons. What became apparent however was that although in some cases individual consultants were either enthusiastic or knowledgeable about environmental issues, their inputs were inconsistent and, to a certain extent, unpredictable.

As the two year project evolved, a more detailed discussion with Estates and Procurement staff emerged about the university processes of appointing and evaluating design consultants, and about the quality of the design briefing provided. The CETL has now been able to provide the Procurement Division with new sustainability criteria for use in the promotion and assessment of the Framework contracts for December 2006 - April 2007. The university can now reliably expect consultants to have good skills in a wide range of technical and process related areas of design development.

A sustainability brief had already been devised, prior to the CETL project, by the firm of Battle McCarthy, with funding secured from EAUC through the work of the energy and procurement managers. However the sustainability brief was only one of 20 sections in a University Design Brief which included everything from general instructions for design consultants to the specification of light bulbs in lecture theatres. The brief was therefore not given central importance. The design brief is currently in the process of reorganisation, in response to the university's new 'Sustainability Policy' (University of Plymouth, 2007) which was written with wide and deep consultation across the university and, in particular, with the help of Estates and CSF staff.

Academics talking to administration and support staff

A member of the estates team mentioned in an interview that 'I had never gone into an academic's office by choice before the CSF capital spend. I mean, of course I went in plenty of offices, but it was always for meetings. Now that I have met some lecturers I will actually stop in and say hi. That is a change'. Indeed estates staff started questioning their label as 'support' staff which had a pejorative tone within the university.

Academic staff, too, found that their view of the learning resources team changed with the much closer contact and improved understanding of the range of their colleagues' responsibilities which the capital spend process required. Initial suspicion on both sides was gradually modified by the trust which the collaboration built, allowing everyone to appreciate better the others', often complementary, strengths in what became a very integrated project.

## **Recommendations**

The following recommendations, drawing on the themes outlined above, may be useful for those setting out, like us, on the process of greening their own universities:

1. *Find out what everyone is already doing!*

This seems obvious but it was surprising how long it has taken to establish both the key roles and responsibilities for environmental, cultural and social aspects of sustainability within the university support and academic staff. Useful documents and policies continued to surface which we wished we'd known about earlier. Many incredibly valuable people are already well on the way in their own fields of expertise, and will be very useful and positive allies and collaborators in the project. Our Campus Forum which included students, academics, estate support, librarians, public relations staff and others provided a good point of contact for this discussion to emerge, and also helped link through informal networks those individuals who might otherwise have slipped through the net. We

recommend working within existing structures, meeting people through informal networks and creating a new space for green campus advocates to meet, discuss, strategise and support each other.

*2. Be realistic about what it is possible to achieve!*

Find out what the university is already planning, who is planning it and when they think it is going to happen. Then tailor your projects to take advantage of synergies, and to avoid major conflicts of space, time and energy. This sounds straightforward, but has proved to be one of the most intractable difficulties in the whole capital expenditure process. Universities are complex and many faceted organisms and even without the added burden of the upheavals that were going on around us in Plymouth they are often difficult to tie down. The university itself has many agendas that are not necessarily intended for public consumption, and commercially sensitive data may make it hard to understand the full picture. Even full support from the top (which we enjoyed) does not ensure that everyone in the organisation will wish to be completely open about their own agendas. Time, working together, making mistakes and learning from them are perhaps the only effective ways to build understanding and trust.

*3. Clarify the organisation's decision making processes and plans*

A great deal of time can be spent in discussions which will in the end have no influence on those taking decisions. The real, as opposed to theoretical, decision making responsibilities of individuals and groups will have a profound effect on how projects can be initiated, developed and completed. Identifying key people, committees and groups, and understanding their timescale and remits early in the process is essential. Finding appropriate levels of approach to such systems can be a subtle and challenging task, and will require a range of different points of intervention, to ensure that the best possible overview of the systems is available. The use of the Global Reporting Initiative shows great potential for helping a university become more transparent.

*4. Problems with capital expenditure timescales*

The difficulty of achieving anything truly sustainable within a two year capital funding timescale is debateable. However the pressure of the timescale does mean that everyone involved can learn more rapidly through having to implement the projects. Had we had additional time at the start of the projects we might have had less of a sense of urgency, and not travelled so far. However there is a real need for HEFCE timescales and briefing budgets which encourage whole life costing, proper environmental and social auditing, and ensure that post occupancy analysis are a fundamental requirement for every project.

*5. Setting clearer agendas for consultants*

Look carefully at the technical competencies of both in-house and external technical staff and consultants. It is difficult to achieve sustainability in either landscape or building projects working with designers who do not have congruent experience and abilities. Sustainability in the procurement process is becoming an increasingly significant focus for government attention (OGC, 2005; DEFRA,

2006; Addis and Talbot, 2001). Identifying key dates and opportunities for raising standards in Framework Contracts will be crucial.

#### 6. *Academics talking to administration and support staff*

Universities have a lot of formal and informal structures and boundaries. Education for sustainable development questions the value of these boundaries and the way the world is carved up into disciplines and support services. By challenging these assumptions and creating comfortable places for a diversity of people to come together, academics, administration and support staff began talking to each other in new and more trusting ways. People were able to understand the reasons for previous decisions and policies while also making recommendations for future changes. An atmosphere of conviviality and commitment to a common (but often quite general) purpose is key.

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