

Future is due: reflecting on local and global practice to discover effective sustainability.

Tatiana Diniz and Alison Glover

Centre for Excellence in Learning and Teaching, University of Wales, Newport, Lodge Road, Caerleon, South Wales, NP18 3QT. Email: tatiana.diniz@newport.ac.uk; alison.glover@newport.ac.uk

Abstract

Education for Sustainable Development and Global Citizenship (ESDGC) demands an interdisciplinary approach and is calling for attention in all disciplines, from the social sciences to engineering. It should act as a common room where expertise can be shared in order to identify future practice that is beyond the specific knowledge within each field. Furthermore, its relevance has been acknowledged by both government and funding agencies and it already figures as a key element of concern for shaping future policies within higher education. This paper explores the concept of sustainability and its boundaries, drawing on current practice led by universities in different contexts, the United Kingdom and Latin America. Recent research findings from Brazil and Wales will be presented via a virtual journey illustrating how universities are approaching sustainability in different global contexts. This aims to demonstrate that sustainability can mean different things and that there are various ways of engaging with students and staff. This work is part of an empowerment workshop which includes the use of images, allowing participants to explore personal interpretations of sustainability and determine the importance and relevance of presented concepts to their department and institution. The intention being for participants to decide on the possible paths their department and institution could engage in towards sustainability by reflecting on priorities for effective action within their institution.

Introduction

This paper focuses on approaches to Education for Sustainable Development and Global Citizenship (ESDGC) which have been applied in higher education institutions in Brazil and Wales. Currently the United Nations Decade of Education for Sustainable Development (2005-2014) is underway and endeavours to integrate sustainable development into all education sectors. The case studies presented here form part of a workshop, aimed at raising awareness of practices already underway in higher education. The intention is also to encourage

critical thinking regarding understanding and interpretation of the terms 'sustainability' and 'Education for Sustainable Development and Global Citizenship'.

Loeber et al. (2007) define sustainable development as 'an essentially *contestable* concept, in the sense that no authoritative, universally valid definition can be formulated. There is no way of determining what is 'really sustainable' other than through processes of collective and contextual deliberation and mutual learning' (Loeber et al. 2007, p. 84). Also according to these authors, the concept claims '*normatively*, to offer desirable directions for action. Hence, the learning

processes implied in the first characteristics are more than mere 'joint fact finding' exercises, and involve processes of value judgement. From both characteristics, it follows that the sustainable development concepts need to be elaborated in an 'action-oriented' way, in which a balance is found between what is deemed desirable and what may be made feasible, given a particular context.' (Loeber et al. 2007, p. 84)

Higher education has been singled out as producing people who contribute to unsustainable practices (Orr, 1994; Martin and Jucker, 2003; Blewitt, 2004b). It is time for higher education to lead by example in engaging completely with its 'responsibility to be a place where new answers can be sought, choices widened and thinking encouraged' (Blewitt, 2004a, p. 32). However, it has been suggested that a major problem facing higher education is the limitation presented when trying to create a sustainable university in an unsustainable society (Clugston, 2004, p. x). Nevertheless Clugston continues by suggesting the way forward needs to involve not only 'deep reflection on the nature of the educational transformation' but 'practical examples of how institutions in diverse cultural settings have successfully reoriented their teaching and research, outreach and operations to embody their own forms of sustainability' (Clugston, 2004, p. x).

These aspects of sustainable development should be embedded in any discussion about the case studies presented by this paper, as none of them should be accepted as ideal, but as an effort towards action within a specific context and, therefore, as inspiration for diverse action-oriented efforts. To begin with overviews of the higher education sectors in Brazil and Wales are presented, including key elements of the ESDGC journey for the countries. This is followed by the practical examples from the diverse cultures of Brazilian and Welsh higher education. By studying existing action individuals and institutions may be assisted in reorienting and innovating activities both within the campus and the curriculum, which

in turn will be valuable as they drive for effective sustainability.

Higher Education in Brazil

Brazil is a country with an estimated population of 183.9 million (IBGE, Brazilian Institute for Geography and Statistics, 2009). Politically, it is divided into 27 States spread over five geographic regions; north, northeast, southeast, central-west and south. There are 12 main urban centres, listed by relevance: São Paulo, Rio de Janeiro, Brasília, Manaus, Belém, Fortaleza, Recife, Salvador, Belo Horizonte, Curitiba, Porto Alegre and Goiânia (IBGE, 2007).

Historically, Brazil was a Portuguese colony between 1500 and 1822, mostly exporting crops and importing industrialised products. Higher education provision started by the end of this period, and it was initially designed for the needs of the local white European elite, who acted as a small group of decision-makers over a mixed, black slave and indigenous majority. In 1808, army and navy institutes for higher education were created, followed by the first courses of medicine, engineering, economy, chemistry, agriculture and law (Aranha, 2003, p.153-154).

According to recent data, a total of 2,252 institutions provide for higher education in Brazil, 236 public and 2,016 private. They are defined as universities, university centres and faculties. Public provision is funded by government at national (*federal*), estate (*estadual*) or city (*municipal*) levels. Over 5 million people are enrolled in higher education in Brazil, which represents less than a quarter of those of educational age in the country (MEC/INEP, 2009).

The origins of ESDGC in Brazil are deeply linked to the evolution of Environmental Education (EE) in the country. EE was introduced as a complementary tool to support the implementation of a national environmental policy. Therefore, it was placed on the government's agenda in 1988, when the new Brazilian constitution formally recognized the right for all Brazilian citizens to receive Environmental Education. This emphasised a commitment towards

“promoting EE at all educational levels and encouraging public awareness regarding environmental protection” (SECAD/MEC, 2007, p.19).

To a certain extent, a lack of reflection on the role to be played by higher education institutions has been one of the features of the evolution of Brazilian EE. Most of the legislation and debates focused on compulsory education. In 2006, however, a study analysed current practice within 22 higher education institutions (from which 14 were public and eight, private) situated in 11

different Estates. The aim was to obtain general information regarding actions, projects and internal bodies/structures related to EE as well as identifying difficulties, and catalysts for the implementation of EE in the studied universities (SECAD/MEC, 2007, p. 24). The results of MEC’s study illustrated that the bulk of EE practice carried out by Brazilian higher education was not initiated by official institutional policies but more often by spontaneous drives towards social responsibility. Figure 1 provides a timeline of ESD in Brazil.

Timeline: the Brazilian journey towards ESD

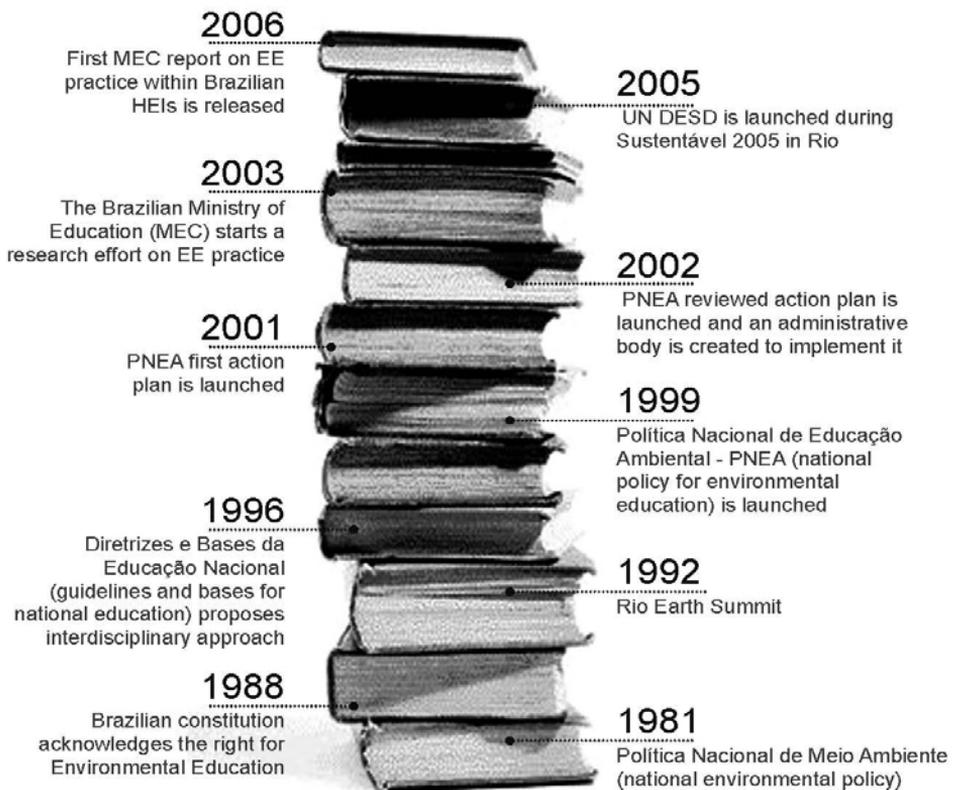


Figure 1. The Brazilian journey towards ESD.

This idea of informality as an action-driver within Brazilian institutions may contribute to a better understanding of how projects within higher education can often be triggered by elements other than well-structured policies. Indeed, different university-led ‘hands-on’ approaches related to ESD have been described in the recent literature, as presented in the next section of this paper, even though the Brazilian governmental approach around ESD is still budding. The next section presents a sample of sustainability projects supported or led by higher education in Brazil. Figure 2 illustrates their location.

Brazilian Case Studies

Solar Power for Low Income Population

In the city of Sao Paulo, in the southeast of Brazil, SoSol (*Sociedade do Sol*, the Sun Society) is the name of a social enterprise initiative incubated by Cietec (the University of Sao Paulo’s technological business incubator). It is an independent initiative supported as a “resident project”, which means having a low cost equipped office and relying on technical support from the university enterprise incubator. SoSol delivers short training programmes on renewable energy. Its most popular course teaches how to make a low cost solar water heater system to supply home showers and has been attracting brick layers to post graduate students from different fields, including construction industry managers and government housing officers (SoSol, 2009).

Fees are charged for the training, they are not expensive and a small number of bursaries are offered to colleagues from Cietec. Parallel to the courses, SoSol acts as an independent research lab for renewable energy, concentrating efforts on developing new applications for solar water heating, such as more complex models to be installed in hotels, hospitals and social housing building projects. The technology is intentionally not registered and its use is free of charges and patents. The scheme generates a network of learners and facilitators who exchange

information amongst themselves and contribute to innovation within the project. The innovation has spread worldwide, with self-made tutors taught in Brazil now applying skills in countries such as Mexico, India and Germany, always as a “social technology” (SoSol, 2009).

Other programmes addressing wind power, photovoltaic energy, rainwater collecting systems and environmental education to schools can be delivered by SoSol depending on demand. Furthermore, donations are collected to build up small models of the solar water heater, which are donated to local schools, with a short training for the teachers. In schools, the models are applied to help students learn different disciplines, from science to mathematics (SoSol, 2009).

Recycling and Income Generation

In the central-west, a partnership between the Universidade Católica de Goiás (Catholic University of Goiás) and Dom Fernando Institute (IDF), a local charity, implemented a university extension course that empowered members of 31 poor families living by the Meia Ponte River to run a waste recycling cooperative named Cooprec. The initiative provided environmental education and income generation, and the average amount of waste collected and recycled by the cooperative has been approximately 50,000 kilos per month (Borges and Teixeira, 2005). Five years after the initial training with the community, Cooprec is a national reference on recycling and produces innovative products such as eco-friendly roof material made from recycled card.

Nevertheless, in an analysis of the extension programme led by the Catholic University of Goiás and the IDF charity, Borges and Teixeira (2005, p. 25) recognized that although being trained to work in recycling, the members of Cooprec failed to perceive that people are responsible for the waste they produce, and do not make the link between waste, consumption and lifestyle. The priority appeared to be the urgent need for income

generation. Therefore, even though the community was receiving training, delivered by higher education, to join an up-to-date

green activity, community participants were not always educated to create meaning to their own sustainability experience.

Case studies in different Brazilian regions



1. Monções – Looking after Biodiversity

UFMA - staff and students from the Biological Science Department are involved in community education, community training and actions towards environmental protection.

2. São Paulo – Solar Power for Low Income Population

Cietec/USP - a social enterprise delivers short training programmes on renewable energy, teaching how to make low cost solar water heaters to supply home showers.

3. Goiânia – Recycling and Income Generation

UCG - an extension course empowered members of 31 poor families living by the Meia Ponte River to run a waste recycling cooperative.

4. Altamira - Sustainable Honey

UFPA - beekeepers living along the Transamazônica road area, in the Amazon forest learn sustainable techniques of honey production.

5. Viçosa - E-learning for Green Enterprise

Free e-learning modules include green enterprise skills, as how to make eco-friendly soap by recycling used cooking oil

6. Porto Alegre - Green Bricks

FURG - community training in how to make bricks for construction, using sustainable material and techniques

Figure 2. Location of Brazilian case studies.

Looking after Biodiversity

In the northeast of Brazil, a university-based enterprise company (*empresa-junior*) called *Mutual* engages staff and students from the Biological Science Department of the Federal University of Maranhão (UFMA), in community education, community training and actions towards environmental protection. Current projects include developing a community-based ecotourism system in Moncoes, a region that holds a particularly rich biodiversity, and the efforts are to locally ensure both social and environmental sustainability (Mutual, 2009).

Green Bricks and Sustainable Honey

In the south, one of the extension courses offered by the Federal University of Rio Grande (FURG) in 2009 provided community training in how to make bricks for construction, using sustainable materials and techniques, in order to generate income and local jobs and allow better and greener popular housing (FURG, 2009).

In the north, an extension project of the Altamira's campus of the Federal University of Pará (UFPA) provides training for the beekeepers living along the Transamazônica road area, in the Amazon forest, teaching them sustainable techniques of honey production (UFPA, 2009).

E-learning: making soap with cooking oil

Overcoming geographical barriers to community education, the University of Viçosa (UFV) created a series of free e-learning modules developed by its researchers to be offered online to small/medium entrepreneurs as its main audience, although open to anyone interested. In July 2009, Dr Marisa Alvez Nogueira Diaz, a senior lecturer in Chemistry at UFV, launched an online course that applied some of her scientific discoveries in a method that teaches how to make eco-friendly soap by recycling used cooking oil (UFV/Portal do Produtor, 2009).

Higher Education in Wales

Wales is a nation with a population of 2.98 million (Welsh Assembly Government, 2010). The main urban centres are Cardiff, Newport and Swansea in the South of the country, and Wrexham in the North. Twelve higher education institutions employ more than 6,800 staff and educate over 120,000 full and part time students from Wales and further afield. The sector currently receives more than £356 million of funding from the Welsh Assembly Government, which is allocated to institutions via the Higher Education Funding Council for Wales. The nation is governed by the United Kingdom Government with some devolution of powers to the Welsh Assembly Government, established in 1999.

Section 79 of the Government of Wales Act 2006 Chapter 32, refers specifically to the functions of the Welsh Assembly Government promoting sustainable development. Section 60 of the Government of Wales Act states; The Welsh Ministers may do anything which they consider appropriate to achieve any one or more of the following objectives

- (a) the promotion or improvement of the economic well-being of Wales,
- (b) the promotion or improvement of the social well-being of Wales, and
- (c) the promotion or improvement of the environmental well-being of Wales.

(Office of Public Sector Information, 2006, p.35).

The Welsh Assembly Government is responsible for Education and training policies across the nation. It is also required to implement initiatives directly from the United Kingdom Government; relevant to this discussion is the adoption of the United Kingdom's shared framework for sustainable development (2005) quoted in Welsh Assembly documentation (Welsh Assembly Government, 2006, p. 30, 2008, p. 53, 2009, p. 51). However, the development and implementation of prioritising sustainable development within Wales is very much driven by the Welsh Assembly Government.

Timeline: some important dates for Welsh ESDGC

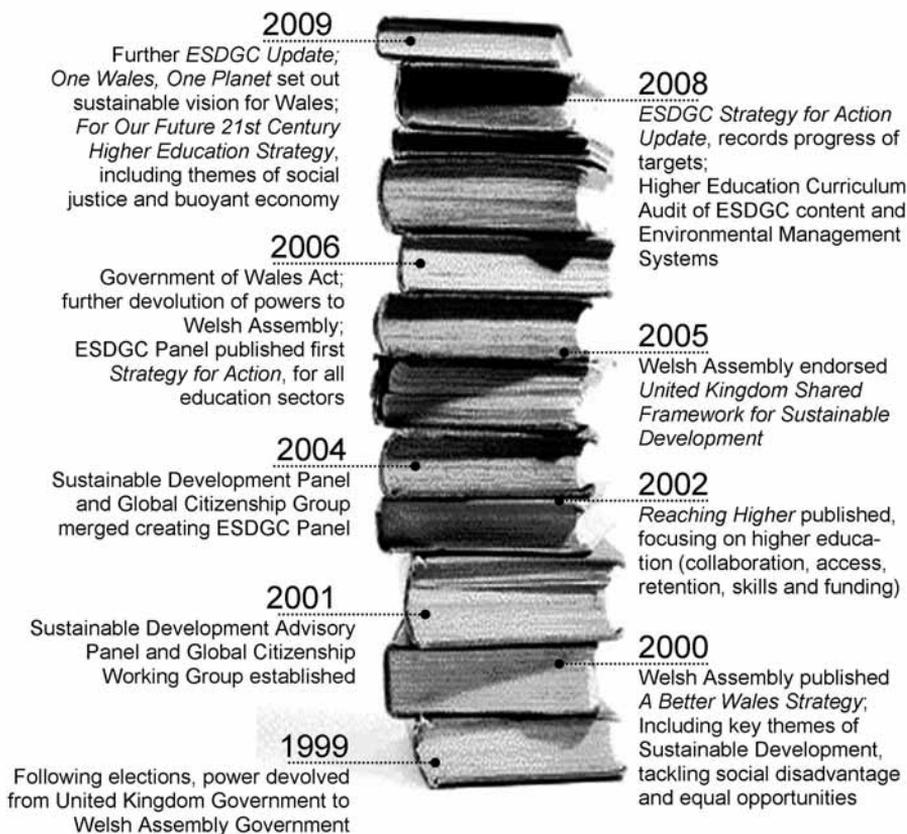


Figure 3. Key dates for ESDGC in Wales.

Since the establishment of a National Curriculum for schools in 1988, sustainable development and global citizenship has been included in the school sector curriculum and ESDGC now forms part of the inspection framework in Wales. Higher education is allowed autonomy of its curriculum, and coverage of ESDGC is currently not mandatory within the sector. However, in 2008 the Welsh Assembly Government funded audits of ESDGC curriculum content in higher

education and feedback concerning Environmental Management Systems. Such actions reflect some commitment to ESDGC and this is also evident in the succession of *ESDGC Strategies for Action* (Welsh Assembly Government, 2006, 2008 and 2009). Figure 3 illustrates key dates for Wales and ESDGC and Figure 4 identifies the location of the case studies, presented and discussed during the workshop.

Welsh Case Studies

PONT Community to Community

In 2005 a partnership between the South Wales town of Pontypridd and the Mbale region of Uganda was formalised. Initially partnership links were established between medical organisations, schools and churches. More recently staff volunteers from the University of Glamorgan have formed the Glamorgan PONT Board (PONT – Partnership

Overseas Networking Trust). Many projects have been undertaken, with the aim being to empower people to develop and realise ideas (PONT – Mbale, 2010). Key Non-Governmental Organisations in Uganda work with the PONT partnership in implementing new initiatives. Some of the United Nations Millennium Goals, such as better sanitation and secure tenure, provide underlying targets for the projects in Uganda (PONT – Mbale, 2010).

Case studies in Wales



1. University of Glamorgan: Community Links

Staff and students engage in linking their community with a region of Uganda; fundraising and providing assistance for development projects in Uganda.

2. Glyndŵr University: Energy Monitoring

Students use energy monitoring data in their studies; critically assessing areas of the campus and making recommendations for improvements.

3. University of Wales, Newport: Production of Biodiesel

Waste vegetable oil is processed on site into biodiesel and used in university vehicles on campus and on the public highway.

4. Swansea University and Swansea Metropolitan University: Living Sustainably Module

Collaboration between two institutions to deliver a 'Living Sustainably' module to students and staff.

Figure 4. Location of Welsh case studies.

Since the University has become involved with the initiative many staff and students have visited the Mbale region of Uganda and participated in projects, which include among many others; a payroll-giving scheme to PONT with staff deciding what projects to spend funds on; working in schools (teaching mathematics or as classroom assistants); testing water quality to assist engineers providing clean water supplies for local communities and a recently established research and development centre, at the University of Glamorgan, focusing on connecting communities. All visits to Uganda are self-funded, students organise fundraising events to support their trips, with several making return visits and some aiming to undertake longer work placements with future development projects. March 2010 saw the University PONT team, alongside other partners, awarded two 'United Nations Gold Star' Awards under 'livelihoods' and the 'environment' categories.

Energy Monitoring by Students

In 2008 the Higher Education Funding Council for Wales (HEFCW) allocated funds of £3.8million to permit the installation of integrated systems of sub metering to enable monitoring and targeting of 90% of energy and water consumption within Welsh Higher Education Institutions (HEFCW, 2007). Glyndŵr University, Wrexham received approximately £185,000 to fund the installation of hardware and energy improvements.

Students studying the 'Building Appraisal and Maintenance' module originate from several degree pathways and work groups are created ensuring a mix of students from different degree courses, during their final year. The piece of coursework utilising the monitoring data forms one of three pieces for this module, providing 30% of the module assessment. Approximately 15 – 20 students choose to take the module.

The aim of the coursework is to produce a critical appraisal of the energy consumption for a selected area of the campus. The reports receive a group assessment resulting from the final written report. The process includes monthly presentations to the other groups and a final presentation by each group with the Estates Department also present. The first cohort of students to critically appraise the real situation at Glyndwr regarding energy consumption took place in 2009. Their reports made recommendations, some of which Estates have addressed and some which have formed the basis for the appraisals by the next cohort of students.

Student feedback from module evaluation has been positive for example; 'nice to do a practical project of real benefit', with ex-students commenting 'it got me the job', 'at interview I was the only university candidate with real practical knowledge' (Jones, 2010). Much interest has been generated across the institution as a result of the students' work and other disciplines, for example Business and Information Technology, are incorporating the energy monitoring data into their courses, with other disciplines exploring the potential of using the information in the future.

Processing and use of biodiesel

Since 2007 the University of Wales, Newport, has processed and used biodiesel, utilising waste cooking oil from its catering facilities. A biodiesel processor and related equipment was purchased for £7500. The biodiesel is used in grounds maintenance vehicles, on campus, and in the post bus, which travels on the public highway between two campuses.

Between February 2007 and September 2009 the biodiesel project recycled 5200 litres of waste vegetable oil potentially saving 78% in carbon dioxide emissions compared to petroleum diesel (Pahl, 2008), with fewer sulphates, less smoke and particulate matter emitted (Bozbas, 2008). Manufacturing the fuel on site has meant cost savings of

approximately 75% compared to purchasing fossil fuels. It has been calculated that all initial costs have been recovered in the first three years of the initiative. Capital is being reinvested into the project aiming to continually improve the process and quality of fuel. The project was recognised in the Envirowise 2010 Public Sector Waste and Sustainability Awards winning the Innovation Award category.

Living Sustainably Module

Since 2004 Swansea Metropolitan University and Swansea University have worked in collaboration to deliver a module originally entitled 'Application of Sustainable Development Principles', more recently altered to 'Living Sustainably'. Delivery of the module takes place during the day time or evening at either institution, this means students from the two institutions work together. A Welsh Assembly grant for Education for Sustainable Development and Global Citizenship projects was used initially to market the module extensively. The module is 100% coursework and aims 'to give students an appreciation of sustainability in practice and, to enable them to apply sustainability to themselves; in their own study area, lives, job roles, families, local communities or organisations.' (May, 2006)

A total of 25 students enrolled for 2004-5 and numbers have gradually increased over following years. The module is optional resulting in a mixture of part-time and full-time students, from different disciplines studying it. Members of staff have also enrolled and the module is recognised within the staff development programme. The module was recognised with a Global Learning Award in 2007, presented by Cyfanfyd, an organisation funded by the Department for International Development.

Summary

The intention of this collation of case study material is to encourage the discussion of real possibilities to the approach of ESDGC within higher education. A broad spectrum of

examples has been considered; including those which target greening the university campus, embedding sustainability within the curricula and developing community links. The examples have involved collaboration between higher education institutions and across discipline areas as well as outreach initiatives, which has been the predominant approach in Latin America. It is anticipated that a developing appreciation of interpretations of sustainability continues to emerge as individuals assimilate and reflect on the issues raised.

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