



A comparative study of education for sustainable development in one British university and one Chinese university

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Abstract

Purpose – The purpose of the paper is to identify learning points and inspirations from two different approaches by examining how education for sustainable development (ESD) initiatives are delivered in the University of X in the UK and Tongji University in China.

Design/methodology/approach – Through comparison of case studies, the pros and cons of each approach are made clear. The paper adopts semi-structured interviewing among staff and group interviewing among students as its main data collection methods. A snowball sampling strategy is employed to select potential interviewees in addition.

Findings – Learning points are drawn from each institution which could be useful in informing the strategy of other higher education institutions. The main learning points for UoX are: first, engage as many students as possible through linking extra-curriculum activities back to the curriculum and offer opportunities for students to take part in campus operations. Second, a project-oriented approach could be employed to enhance interdisciplinary cooperation. The main learning points for Tongji are: pedagogic changes are required to realize a transformative education and additions of more active learning into the curriculum are needed. Third, policy support is necessary to promote the ESD agenda but only when the top-down approach mixes with a bottom-up approach significant changes will happen.

Practical implications – ESD is transformative education rather than traditional education. It will guide students to study and live in a more sustainable way, which is promoted in both the formal curriculum and informal areas (including campus greening and extra-curriculum activities) in UoX as a model for developed countries and Tongji as a model for developing countries. As a dynamic whole, both of them comprise students' learning and living experiences in a microcosm of a pilot sustainable community through inter-disciplinary approaches.

Originality/value – Little comparative and international research has been done in the field of educational ESD. The research seeks to address the deficiency by comparing the ESD approaches in one British and one Chinese university.

Keywords China, UK, Education for sustainable development, Extra-curriculum activity, Formal-education, Top-down-bottom up

Paper type Case study



1. Introduction

Education for sustainable development (ESD), to put it simply, is used to mean that learning promotes sustainable development. The relationship between education and sustainable development is complex as education appears to be both a promise and a paradox with regards to sustainability. More highly educated people consume more resources and leave deeper ecological footprints than poorly educated people who tend to have lower incomes (McKeown, 2002). ESD, unlike other education movements advocated by people inside the education community, was the initial concern outlined in Chapter 36 of Agenda 21 following the Earth Summit of 1992 (McKeown, 2002). The term “reorienting education” in this chapter best describes the challenge to existing education systems to address sustainable development. In this regard, ESD is not just an add-on agenda, rather it is based on the view of universities and schools as agents of change. Meanwhile, ESD provides an opportunity for universities to scrutinize their curriculum, pedagogy, policy as well as organizational change and ethos critically and then to take action accordingly (Sterling, 2004).

Universities, in the face of the unprecedented crisis in resources and environment, play vital roles towards sustainability or un-sustainability through their education, research, outreach and their own operations. University leaders for a sustainable future (ULSF) (n.d.), the organization of the signatories of the Tallories Declaration, has envisioned what comprises a sustainable university and has emphasized the contribution of universities through education. The Higher Education Funding Council for England (HEFCE) also strengthened that point, in its consultation in 2008 to update its strategic statement and action plan. It states:

The greatest contribution HE can make to sustainable development is by enabling students to acquire the skills and knowledge that allow them to make a lasting difference. What they learn and what they are taught are therefore critical (HEFCE, 2008, p. 15).

Therefore, this research focuses on education (teaching and learning, the formal curriculum), campus operation and extra-curriculum activities (part of the “shadow curriculum”, or informal curriculum) in the higher education sectors. The research looks at how sustainable development agendas are promoted in both formal and informal areas. The reasons for examining both areas instead of one of them are because both of them comprise students’ learning and living experience in the universities and both of them are interrelated and have a mutual influence on each other. Joined-up thinking or whole system thinking demand us to shift focus on the relationship of things and treat them as a dynamic whole (Sterling, 2001; Tilbury and Wortman, 2004).

There exist two main strands of research on ESD in higher education sectors. The first strand of research is about theories of ESD, the aims and characteristics of ESD, etc. The second strand of research is about process review in the UK and issues facing higher education sectors when implementing the sustainable development agenda (Cotton *et al.*, 2009).

However, there is little research aimed at identifying learning points for ESD by comparing two exemplary cases and looking at the formal and informal curriculum together, while even fewer comparisons have been made between the practices from a developed country (the UK) and a developing country (China). The only significant work in this regard is Feng’s (2010) research, which will be discussed in the conclusion. As sustainable development is an international challenge and ESD is not just a destination

but also a journey, which has no pre-ordained route and is a process of learning (Parliamentary Commissioner for the Environment (PCE), 2004), it is interesting to know how universities in the two countries response to the sustainable development agenda accordingly.

Although the theory of sustainable development is largely generated in Western countries, China's ancient philosophy has implications for sustainability, as shown in ideas such as "he who knows he has enough is rich" by Lao Tzu. Feng (2009) describes how the Taoist idea of "effortless action" provides a useful framework for sustainability since it maximises the use of freely available natural processes (ecosystem services) to fulfil human needs rather than the effortful destruction of nature which can fulfil needs only in the short term while undermining long term sustainability. Given the harmonious relationship with nature and simple way of life emphasized in Taoism, it is worthwhile examining how a Chinese university responds to the sustainable development agenda and whether those ancient philosophies are interpreted in a new way to help meet the challenges of this century.

The purpose of this research is to identify learning points and inspirations from different approaches to ESD by examining how sustainable development initiatives are delivered in the University of X[1] in the UK and Tongji University in China. By investigating the different domains of formal education, campus management and extra-curriculum activities, the research highlights good practices in each university. The similarities and differences of each approach are also addressed with respect to cultural factors. Although the findings are specific to these universities, the issues addressed are ones that concern all universities that are on a path towards sustainability, and there is much to learn from the experience of these two universities for the wider HE sector.

As there is no universal model of education for sustainable development (UNESCO, 2003), the purpose of comparison is not to copy patterns directly from the perceived "better" one. Rather, through comparison, the similarities and differences between two approaches are made clear, and the pros and cons of each approach are also manifested. The research, then, is trying to answer the following question: what lessons or inspirations for universities in general can be attained through comparison of the very different approaches to ESD across these two universities?

2. Methodology

2.1 Research approach

The case study method was employed in this research. The case study approach offers a strong grounding in reality, meanwhile developing detailed, intense knowledge about a topic so it was rich in context. In this research it could be conceived as an "instrumental" case study according to Stake (1995), for the cases were examined mainly to provide insight into an issue and develop inspirations to inform each other of the development of ESD. Stake points out that the first criterion of selecting cases should be to maximize what the research can learn (Stake, 1995). Based on this criterion, the University of X in the UK and Tongji University in China were selected because both could be regarded as exemplars for engaging in the sustainable development agenda in their respective countries. Thus, the opportunities to learn are to a great extent maximised. The following section explains briefly why the universities are outstanding, or at least were outstanding at the time of research.

University of X. The University of X has gained a high position in successive league tables of the environmental performance of universities and has won awards for its sustainability activities. At the time of the research it had the ambitious target of embedding sustainability within its course and had an active environmental science programme, a dedicated module in sustainability taken by a large number of students. Also, there was evidence that a number of teaching staff were engaging with the agenda, and the university was receiving praise for its sustainability efforts from a number of sources. After the research was carried out, a number of sustainability initiatives closed (like the module in sustainability) and a number of staff with expertise in ESD left, but the university continues to mention sustainability in its strategic plan and there have been a range of successful new initiatives.

Tongji University. Tongji University promotes the sustainable development agenda in its institution actively. In 2002, the UNEP-Tongji Institute of Environment for Sustainable Development (IESD) was established, guided by an agreement between the United Nations Environment Programme (UNEP) and Tongji University with the aim of becoming an important base of research, education and information exchange for sustainable development (IESD, n.d.). Also, Tongji University is engaged in advancing the decade of education for sustainable development (DESD). The national launch of the DESD in China was organised by Tongji University in collaboration with the Chinese National Commission for UNESCO (2005). Furthermore, Tongji University is one of the founding members of Promotion of Sustainability in Postgraduate Education and Research Network (ProSPER.Net) in the Asia-Pacific area. ProSPER.Net is committed to fostering environmental leaders in the region and addressing curriculum reform to integrate the sustainability agenda into postgraduate courses through collaborative education and research activities (Tabucanon, 2008).

In addition, Tongji University set out the initiative of “constructing economising and a sustainable campus”, as the “Tongji Manifesto” in 2003 and put it into practice. Since then, large-scale refurbishing projects aiming at saving energy are under way. The Tongji Manifesto also became an action plan and guidelines for other universities in China.

2.2 The research methods

In abiding by the principle of fitness for purpose (Cohen *et al.*, 2007), semi-structured interviewing and group interviewing were employed as the main methods of data collection in this research.

The primary research method was semi-structured interviewing, which was used to collect information from academic and administrative staff. In-depth semi-structured interviewing has the capacity of yielding rich insight into the research question as knowledge is generated between humans and an interview is a process of interchanging views between two persons conversing about a common theme (Kvale, 1996). Moreover, one of the major advantages of the method of interviews is its adaptability, according to Bell (2005). This was useful since it allowed the interviewer to clear up ambiguities around terms such as “sustainable development” which may not be clear to informants. It was also useful since the roles the interviewees play in their institutions vary largely. Interviewees answered the questions from an institutional level to departmental and course level depending on their positions, so the questions also changed accordingly. Also, as the research is exploratory, some questions were generated from what the previous interviewees had said and what the interviewees had just said.

Group interviewing was employed to collect information among students in Tongji University. Group interviewing can be time-saving, but the distinct advantage of it is that more than one interviewee present can provide several versions of events. It is a cross-check, and one can complement the other with additional points, leading to a more complete and reliable record (Cohen *et al.*, 2007). Questionnaires were used to gather data from University of X students since students were not available at the time the research was carried out.

The sampling strategy for selecting participants was snowball sampling (Drever, 1997). That is, a small number of individuals were identified in each institution on the basis that they were senior staff with extensive knowledge of ESD in their institution, and they were asked to provide names of other staff who also had extensive knowledge. Lecturers were asked to select students to take part in the research groups and questionnaires. In total, nine staff from UoX and seven staff from Tongji were interviewed, and two groups of students from each institution took part in the focus groups/questionnaires.

3. Analysis and discussion

This section draws out the most significant points related to ESD from interviews in both universities and summarizes them in three parts: sustainability in the course routes, sustainability in the campus operation and student engagement.

3.1 Sustainability in the course routes

The interviews revealed that many changes took place in both universities in terms of embedding sustainability into the curricula but the extent and reasons vary. In the following section, the authors will summarize those changes, using UoX to refer to the University of X and Tongji to represent Tongji University. Participants were anonymised and assigned an ID number which is given after each quote, and the quotes have been edited slightly for brevity and fluency.

Change 1. Contents and course structure are more focused on sustainability in Landscape Architecture at UoX, while in Tongji, new contents are added into the current curricula spontaneously by teachers because of the needs of the discipline's development.

At landscape architecture in UoX:

I think it has created more focus. For example, previously we would have teaching about "construction technology" and "planting technology", but now instead of calling it that, we call it "sustainable technology". So we focus teaching in construction and planting to emphasise sustainability. It's actually manifested itself in changing the meanings of modules (UoX-2).

At urban planning in Tongji:

It's still under discussion about how to make changes to the current course structure as there is no consensus among staff [...] Actually, sustainability has already been represented in many modules we offer, but sometime not under that name (TJ-5).

Interestingly, this is a comparison of similar disciplines between two universities, landscape architecture and urban planning. Both of these are closely related to sustainable development as sustainable design and planning represent the cutting-edge of the disciplines. In landscape architecture in UoX, ESD is at its heart of content and substantial work has been done towards that, including adding new modules (e.g. permaculture, sustainable urban drainage) and making changes to the existed modules to be more

focused on sustainability. Such changes in content were also perceived by students, as one student wrote: “when I first arrived in 2004 there was much less of an emphasis, but now every module is focused towards achieving the most sustainable solutions (UoX-11B)”. The incorporation of sustainability within modules at UoX has overcome one of the barriers identified in the literature “over-crowded curricula”, however, one problem accompanying it is that it needs staff commitment, as one tutor revealed: “Any change to any courses is not free, it takes time, takes staff resources [. . .] Changes cannot be made without any resources. That’s always the challenge for people (UoX-4)”.

The approaches in Tongji could be called “bottom-up”, which result from the needs of the market and social change, and leading academic staff bring that into the curricula spontaneously. It is optional rather than a concerted effort to place sustainability at the heart of the course.

Change 2. A previous review of ESD in HEIs has revealed that curriculum change is an intractable area and there exist concerns that when embedding sustainability into the curriculum, more focus is on curricular content instead of pedagogic change (Sterling and Scott, 2008). In UoX, however, there are examples of staff who have transformed their pedagogical approach. One lecturer at UoX in the English language area gave the following response:

My aim as a teacher is to encourage students to be critically aware of how language and visual images shape the world around them – how they underpin an unsustainable society. Together we explore discourses of consumerism, advertising and economics to show how they encourage people to recklessly destroy the planet’s resources, and also nature poetry and lyrical science writing as examples of discourses which encourage more sustainable behaviour. The result is a general critical awareness that can be applied in a range of situations rather than fixed list of ‘facts’ about environmental issues. (UoX-8).

Exploring realities/discovery/active learning/critical thinking, all of these features make the learning process transformative, which is envisioned by ESD advocates. This helps revise habits of mind and points of view through critical reflection (Moore, 2005), so it has the potential to change learners’ attitudes and behaviours.

The subject group of landscape architecture in UoX has recently been commended in the vice-chancellor’s excellence awards for promoting sustainability (UoX-2). Pedagogical approaches put active learning at the heart of learning. As one tutor argued, the most effective methods of teaching sustainability are “Exposure, awareness, technique information and critique (UoX-4)”, and he further stressed the importance of peer group and tutor review: “The process of discuss, debate, question the design and interrogation[. . .] You can’t do design in isolation [. . .] We have to have critique (UoX-4)”. The other tutor focuses on system approaches and helping students understand how things interact with each other by asking them to find links in a broader context of natural systems and cultural systems: “I get students to look at the world as a fluid system, as a moving and changing system (UoX-6)”. In face of a complex and interrelated world, this system thinking approach helps shift focus onto processes, dynamic status, wholes and patterns rather than on separate things, static status and detail (Tilbury and Wortman, 2004; Sterling, 2001).

In Tongji, several staff used the expression “instil the brief of sustainability into students (TJ-2)”, “teach them the knowledge of sustainable development (TJ-7)”, which to some extent reflects the fact that lectures are still the main teaching approach in universities in China. Also, most academic staff lack educational backgrounds and

theories related to sustainability. Direct lecturing which imparts lists of facts is unlikely to have an impact on students' attitudes or skills development. As one student said:

I can recite the definition of sustainable development several years ago from the module of Current Policy Study, but I wasn't aware of it until my supervisor asked me what are the deep-rooted problems of unsustainability. Then I began to ponder on it and carry out my research on ecological assessment systems (TJ-1A).

This also reminds us of the relationship between learning and thinking. Confucius, the ancient philosopher and educator, once said: "learning without deeper thinking makes one confused, and thinking without further learning gets one into perilous state". ESD, as essentially for a transformative education, puts critical thinking at its very heart.

However, transformative education could always be a challenge to both students and staff. One staff member complained that:

When I tried to make some interaction with students in the classroom, the students said "Please tell us the right answers directly, we are not in the mood for interaction, we feel pressure from the dissertation and employability" (TJ-3).

This may well illustrate the gap between real situations and ideal ones. The awkward situation when promoting sustainability with pedagogical change is that both teachers and students are not accustomed to it. Many students feel comfortable with traditional lecture approaches and alternative models may make them feel uncomfortable (Moore, 2005). Teachers, as most of them are not trained as educators, may also feel discomfort when they give up the positions of power in the classroom and may feel it difficult to facilitate the learning processes as the transformative teaching approach is complex and requiring a lot of time and energy from teachers (Moore, 2005).

Change 3. The opportunities of interdisciplinary communication have increased considerably in the process of promoting the sustainable development agenda in both UoX and Tongji.

In UoX, the Centre for Active Learning (which subsequently closed) played a vital role in enhancing interdisciplinary dialogue around ESD issues and disseminating good practice: "one of the roles of the Centre for Active Learning is to put people in touch with each other across the institution (UoX-7)". The centre involved a large number of staff across disciplines reflecting on the relevance of ESD for their discipline and co-writing a book.

In Tongji, at the department of urban planning, although there are fewer changes in the course structures and pedagogic methods, a lecture series plays an influential role in promoting the profile of ESD and creates an arena for introducing, discussing, exchanging and developing new ideas from various disciplines:

Our course team organized Sustainable Salon. It has been held on Friday afternoon on a monthly basis since 2006. We invite domestic and international experts from all disciplines, such as architecture, urban planning, ecological, art design, etc. to introduce their understanding of sustainability. It is very welcome among students and staff. It helps exchange ideas, brings new perspectives. It is very successful and has spread the brief of sustainability to the whole department (TJ-5).

In Tongji, at the department of environmental engineering, a new institution (UNEP-Tongji IESD) has been established to cultivate elite professionals in the areas of

sustainable development, which implements the action plan of China's Agenda 21: enhancing international cooperation and training specialists in this area:

At first Tongji offered some training programmes for the domestic political leaders and leaders from the Asia-Pacific area. We also organized some international conferences on sustainable development. Now IESD recruits students (both from domestic and other countries) independently. Tutors in IESD are not only from our department, but many others, such as planning, transport, even economical and management departments, also external experts as well. Through the platform of IESD, our students have access to many international seminars and conferences (TJ-7).

Given the complex issues involved in sustainability, interdisciplinarity is key. For Isaacs (1999), the spirit of conversation needs to be re-kindled and sustained in modern culture as it represents an art of not just talking together but of thinking together. The second step is about action, the integration of separate disciplines (Bosselmann, 2001). Disciplines piled on top of one another have not reached the essential nature of interdisciplinary collaboration; the pedagogy of sustainability is about creating spaces where disciplines are integrated in new ways (Moore, 2005). The interdisciplinary nature of sustainability offers universities chances of new research areas and new disciplines, but also poses a threat: the complexity of interdisciplinary collaboration. As some staff responded: "If you want to do things separately, this won't be education for sustainability. It is incredibly important that we work together over disciplinary barriers, but it's very hard (UoX-8)". "So within the university, it's been quite difficult to do interdisciplinary work (UoX-6)".

Change 4. UoX has been increasingly embracing sustainability as a strategic priority. The university has a target of including education for sustainability in a wide range of courses, while Tongji has not got such a clear target for action, particularly in teaching and learning area.

In UoX, staff showed confidence in their policy and emphasised the importance of policy structure by using a metaphor:

We have a system of change: target, process, timeline, vision, aiming for. We have structure of linkage. We talk about the type of picture, the Renoir picture, the impressionist picture made of dots. You can look at the beautiful pictures from far away. When you come close, just little little dots. We here got the big picture, we now need to make sure the dots are being placed. (UoX-1).

This metaphor has great potential in terms of whole institution change, although if the "big picture" consists only of strategy documents and existing areas of excellence (the "dots") are not recognised and start to fade then there is the danger that nothing remains. Clearly top down strategies need to be combined with inclusive bottom up participation in ESD for results to be achieved.

By contrast, in Tongji, there was willingness from the "bottom up" to embrace sustainability but the staff expressed regret at the lack of policy structure at the university level:

Although each department has laid emphasis on sustainable development, we don't have the vision from the institutional level. Just like picking peaches, we now pick peaches without jumping, but if promotion from the top comes, we could pick more peaches with jumping (TJ-8).

Some staff interviewed in this research in UoX believed that top-down policy support is very important: “I think institutional commitment and drive is very important and we have that in this university (UoX-2)”. “UoX encourages staff to become aware of sustainability issues, so there are conferences, seminars, taught discussion [...] I think the University is making people very aware, which is good (UoX-4)”. “The Centre for Active Learning has been very successful in altering our curriculum. They work very well (UoX-6)”. However, some other staff think energetic enthusiastic staff are most central to incorporate sustainability into courses:

I think it’s the behaviour and enthusiasm of academic staff that has the biggest impact. Because you could have institutional policy, but they (staff) could find it difficult (UoX-3).

Nevertheless, vision is important, to borrow the metaphor of “picking peaches” from the Tongji staff, vision makes the targets clear and will stimulate more jumping to happen. Action without vision does not know where to go or why to go there (Meadows *et al.*, 1992). The realization of a sustainable education paradigm, according to Sterling (2001), requires vision, image, design, and action at all levels.

3.2 Sustainability in the campus operation

Both UoX and Tongji have made steps towards campus greening. UoX has gained a high position in successive league tables of the environmental performance of universities Tongji has a high profile in “building a resource-efficient campus” and has become the demonstration model nationwide since 2003. This section is not going to list point-by-point what has happened in greening the campus in both the two universities. Rather, it highlights the distinctive points in campus greening in these two universities.

Point 1. In Tongji University, the energy-saving target is reached not only through a technical approach, but also through a management approach with the participation of all staff and students and in every stage.

The statistical data shows a tremendous amount of money has been saved in 2006, since Tongji fully engaged in constructing a resource-efficient campus. At that year the financial saving from electric power and water consumption is more than 1 million pounds, of which 28 per cent of electric power saving results from the technical methods, 72 per cent from management approaches (Tongji University, 2008):

Management approaches include installing intelligent card faucets in the bathhouse and dormitories and the use of all-in-one cards for paying for water and electric power fee on campus. These methods have led to a decrease of electric power and water consumption by more than 40% and 30%, respectively. In addition to saving water, the bathhouse can receive over 4,000 people each day, 1.5 times increase as compared to its previous capacity of 1,700 people. Every office building is responsible for its own energy use by installing ammeters, some building even without any technical refurbishing, for example the library, has saved 10 per cent of energy use through a management approach (TJ-4).

The statistics also shows that management approaches are more effective than technical solutions. Although those behaviours of saving electric power and water consumption are largely from economic incentives, it proves the importance of reflecting on our patterns of living and consumption rather than solely relying on technical solutions.

Point 2. One distinct characteristic of the refurbishing projects on campus in Tongji is that they make full use of staff expertise. Those campus-based projects provide staff opportunities for applying their expertise into practice, but also provide platforms for creative innovation in technology. Furthermore, it offers real-place learning opportunities and enhances interdisciplinary cooperation:

For instance, the student bathhouse project has employed many technologies, first, solar energy collecting facilities on the roof. Secondly, when the waste water comes from bathing, some facilities collect the heat in the waste water and some facilities dispose the waste water for reuse. Here we involve the staff from environmental discipline for waste water treatment and recycling, staff from thermal discipline for thermal recollection, staff from architecture and landscape design for refurbishing the building and beautifying the surrounding [. . .] We have made full use of our staff expertise (TJ-4).

Those projects are in a circle of “implementing one project – spreading the brief of sustainability through more people – supporting from more people – implementing more projects”. Those projects have successfully spread the brief of sustainability, but what is more important, they have established broad cooperation between different disciplines, moving from single technology application of one discipline to technical integration and innovation among different disciplines (Tongji University, 2008). Furthermore, the staff did not neglect the potential educational role those refurbished buildings could play:

The whole campus is a platform of education. We made those technologies visible in part intentionally. For instance, the eco-refit for the historic building, the WenYuan Building, The staff (designers) make one small area of the wall transparent to let others see the internal layers. Many other examples exist. Now our campus becomes a base of education and demonstration of energy-saving projects. Many visitors come to Tongji University. Student volunteers guide visitors and explain those technologies to them (TJ-4).

The project-orientated approaches in Tongji nourish the atmosphere of interdisciplinary cooperation and the result of some is truly interdisciplinary. One staff member from department of environment gave the example:

Everywhere we feel the importance of interdisciplinarity. Now the Undergraduate Innovative Scheme, issued by the university, encourages the students (by financial support) to explore problems and find solutions in an interdisciplinary way. It promotes students’ learning enthusiasm and research ability greatly (TJ-7).

Although interdisciplinary, it was primarily engineering and science students who were involved rather than a wider spectrum of students such as those studying art and humanities.

3.3 Student engagement

Getting students involved in the dialogue of sustainability in the classroom is important, but it is also important to get them involved in the campus operation or other extra-curricular activities. Those activities offer social-learning opportunities for students, but also have the potential to initiate wider change.

In UoX

we are finding [student engagement] really going hard. We are probably not very good at it. We try to learn how to do better [. . .] We don’t reach the large number of the students who are too busy with their courses and everything else [. . .] We need to improve on it (UoX-1).

In Tongji, students participate actively in the process of “building resource-efficient campus”. The ethos of the resource-efficient campus is “thrift is virtue, thrift is intelligence, quality and responsibility” (Tongji University, 2008) and it has become a driver for encouraging more sustainable behaviours. Students not only work out relative proposals but also supervise the campus management work themselves:

We encourage students to participate in and work with us. The first Energy-saving Supervisory Team was organized by students in May 2005. Every day the team members examine and supervise the usage condition of water, power, etc. They record and solve the problems in their supervision time, but also report those problems to us in our meetings. A series of theme activities of the students such as Water-saving Week, Power-saving Week, Food-saving Week, Green Week of Environment Protection has been held on campus. Several months ago, students proposed a programme “For our planet, please keep off the lights for one hour”, we accepted their proposal and turned off several buildings’ landscape lighting at that night (TJ-4).

As the authors can see from the above materials, students are more active in Tongji than in UoX. The main reason may be because most students in UoX have to work to pay their expensive tuition fees, they are busy and have no time and energy for the extra-curriculum activities. As one tutor revealed: “the students now, they all have to work, paid work. Because they can’t afford to do a course without the paid work (UoX-6)”. By contrast, such phenomenon is not common in Tongji. The majority of students do not feel financial pressure as their parents continue supporting their studies and pay course and living fees for them. If some students have their part time job, it is not because they have to work but because they would like to.

In UoX some staff gave suggestions on how to embed sustainability into the wider university context in an integrated way. “I think we need to give academic credit for projects that engage actively with community and sustainability issues in the real world (UoX-8)”. “I think if we believe it’s important, it should be part of the module, it should get credit points. Sustainability shouldn’t be an optional add-on, you could do it or not, it has to underpin everything (UoX-6)”. Whether to give students credits for attending extra-curriculum activities or put them into the module, the underlying issue is the same: students need an incentive to get involved. Actually, universities could also offer students “paid-work” opportunities to get students involved in university’s own “life support systems” in creative ways, which could not only foster a sense of active participation in a community and a sense of belonging, but also replace students’ often poor quality part-time jobs and provide valuable experience for their CV (Levett-Therivel, 2006).

Incorporation of sustainability in the curriculum had been achieved in UoX with the compulsory first year module skills for sustainability, although this module subsequently stopped running. This module had a problem-based learning approach based on making the university more sustainable. Students created proposals for combating unsustainable practices in UoX and gave advice for promoting sustainability, which culminated in a Green Dragon’s Den presentation (Turner *et al.*, 2007). This module rewarded the enthusiasm and innovative ideas among students, but that kind of enthusiasm needs to be supported by the university to turn into reality. One tutor stated that the winning ideas in the Green Dragon’s Den should be put into practice:

If it is not made real, students think that sustainability isn’t real, but it is just in order to get high marks and they leave their ideas on the table. If they thought their ideas might be created and might become real, suddenly you get students engagement in sustainability.

I think that's the most important thing in engagement. You can teach contents, skills, knowledge until you dead, but when people are engaged things change (UoX-6).

When the extra-curriculum activity is infused into the curriculum, when it links learning with the real issues, then it makes learning happen at a deeper level as it is discovery rather than transferring knowledge. It is about experience rather than passively accepting "expert-determined" knowledge. Those activities, whatever forms they take, have an inherent opportunity to link actors from campus, curriculum and wider community (Lipscombe *et al.*, 2008).

On the other hand, extra-curriculum activities together with campus operations have a role to provide "space for social learning". According to Corcoran and Wals (2004), such kind of learning is essential in the processes of exploring and developing the potential of sustainability in higher education, as it involves multiple interest groups and regards diversity and conflict from people with different positions as driving forces for development. Such learning can be intensified and lead to change through discursive dialogue and cooperation between people and this kind of learning process is essential in the way of moving towards sustainability (Corcoran and Wals, 2004).

4. Conclusion

Sustainable development is not just another agenda added on to the current educational institutions, but a drive for transforming education. ESD is transformative education rather than traditional education, that will guide students to study and live in a more sustainable way, and is promoted in both the formal curriculum (teaching and learning) and informal areas (including campus greening and extra-curriculum activities). As a dynamic whole, it comprises students' learning and living experience in the microcosm of a pilot sustainable community. There are many possible ways that ESD can be approached, however, and this research found many differences between the two institutions. Similarly, Feng (2010), investigating ESD master degree courses in universities in England and China, discovered that:

The English courses engaged with the three curriculum perspectives [socially-critical, liberal-progressive and postmodern perspectives] in an open and theoretically-informed way, aiming to engender reflective and critical thinking about sustainability education in a range of geographical and professional contexts; whereas the Chinese course engaged with the three perspectives in a narrower, more grounded and practically focused way, aiming mainly to facilitate and disseminate sustainability education curriculum (Feng, 2010, p. 1).

Certainly, the practice in some areas of UoX encouraged critical thinking whereas the approach in Tongji was more practically orientated. There are many lessons that can be learned from the comparison between these two institutions, not just for the institutions themselves but for all universities that are on the path towards becoming more sustainable.

The first is about the interplay between top down approaches and bottom up approaches. At the time of the research the achievements at UoX were largely due to individuals with enthusiasm and expertise in ESD, working within a generally supportive atmosphere from the policy of the university. On the other hand, the achievements in Tongji were achieved despite a lack of overarching university policy, with the informants keen to have greater institutional encouragement. Clearly, getting the balance right between top-down and bottom up, in ways which staff feel supported, empowered and included is essential in institutional transformation.

The second lesson to be learned involves interdisciplinary, which can be achieved through campus based projects that draw on existing staff expertise across disciplines (Tongji) or through a dedicated pedagogical centre with a commitment to sustainability that brings staff together for projects (UoX). Pedagogical support from a cross-discipline initiative has the possibility of contributing to deeper pedagogical change rather than merely changes to content. It is important that campus based projects draw not just from engineering or environmental science but the full range of disciplines including humanities. Practical campus-based projects with tangible results are an excellent way of engaging students, which is an area that UoX struggles with. Other ways of engaging students include linking sustainability activities in the real world to the curriculum and offering students credit for their involvement.

It is important to clear up misunderstandings of ESD to reach a shared value among staff. The people the authors interviewed in the University of X were the ones who were most interested in sustainability, so had a clear idea themselves. However, several staff members have revealed the fact that there is still widespread misunderstanding of ESD by a very large number of staff.

Overall, this research discovered some fundamental building blocks that can come together to help universities become more sustainable: a cross disciplinary pedagogical unit that brings staff together to share insights into ESD, interdisciplinary project-based activities for engaging both staff and students in practical campus-based activities, top-down strategy to encourage whole-institution change, supporting existing staff who have expertise in ESD and nurturing existing areas of excellence, and pedagogies that encourage students to be active, creative and critical rather than just passive learners. Despite their international reputations for sustainability, neither university has managed to get all the blocks together into a strong enough structure to get near to being a sustainable institution, but there is much that can be learned from both of them and applied across the higher education sector.

Note

1. This university has been anonymised for confidentiality reasons.

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Further reading

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