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Developing a Whole-of-University Approach to Educating for Sustainability

Linking Curriculum, Research and Sustainable Campus Operations

JENNIFER MCMILLIN and ROB DYBALL

Abstract

Institutions of higher education are poised to play a significant role in the search for a more sustainable future. Most universities are tackling sustainability issues in a compartmentalised manner, sustainability education is confined to specific courses, education is often isolated from research, and neither is likely to be linked to sustainable campus operations. Universities can optimise their role as agents of change with regard to sustainability by adopting a 'whole-of-university' approach to sustainability. This approach explicitly links research, educational, operational and outreach activities and engages students in each. By encouraging a collaborative space within the curriculum for students, academics and managers to critically reflect on university's performance with regard to sustainability, many positive benefits ensue, including raising the profile of university's sustainability initiatives; providing solutions to sustainability problems; building trust among students, managers and academics; and providing meaningful learning experiences for students.

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INTRODUCTION

Institutions of higher education play a significant role in the search for a more sustainable future. In recent years, they have given increasing consideration to sustainability in the realms of campus operations, curriculum and academic research. Sustainability education in most universities is generally confined to specific courses, education is not necessarily linked to research, and both education and research are separate from campus operations. This fragmentation squanders an opportunity to leverage improved outcomes from the time and resources invested in sustainability initiatives.

Universities can optimise their role as agents of change for a sustainable future by adopting a whole-of-university approach to sustainability. This approach explicitly links the research, educational and operational activities of an institution and, importantly, engages students in each, rather than confining their education solely to the classroom.

Using an action research methodology, this article explores the teaching, learning and operational benefits stemming from student involvement in campus sustainability initiatives at the Australian National University (ANU). Through an iterative process of collaboration and transparency, the *Integrating Sustainability* programme at ANU encourages students across a number of disciplines to conduct research into the ANU Sustainability and Environmental Management Programme. This programme is run by 'ANUgreen', the Sustainability Office of the Facilities and Services Division of the university. This successful collaboration has had far-reaching effects, including raising the profile of university sustainability initiatives; providing solutions to sustainability problems; building trust among students, managers and academics; and providing meaningful learning experiences for students.

A WHOLE-OF-UNIVERSITY APPROACH TO SUSTAINABILITY

Given the complex nature of sustainability issues, it is imperative that education for sustainable development (ESD) pursue an integrative approach in modelling sustainability in the core functions and systems of the university. Universities as a whole are just beginning to attempt to model what a sustainable system might look like. As institutions which prepare future leaders, it is imperative that they demonstrate environmentally responsible action. By explicitly linking the core functions of the institution, a whole-of-university approach to sustainability demonstrates to students a real-world application of the sometimes vague concept of sustainability.

A number of higher education institutions have taken steps to integrate sustainability into the university community by signing the Talloires Declaration, a 10-point action plan for incorporating sustainability into the institution (ULSF 1999). A whole-of-university approach addresses the Talloires commitments to sustainability by explicitly linking research, educational and operational activities (see Figure 1).

A systems approach recognises that a university operates with the complexity of a mini-city, and all its interdependent parts must be considered if it is to develop in a

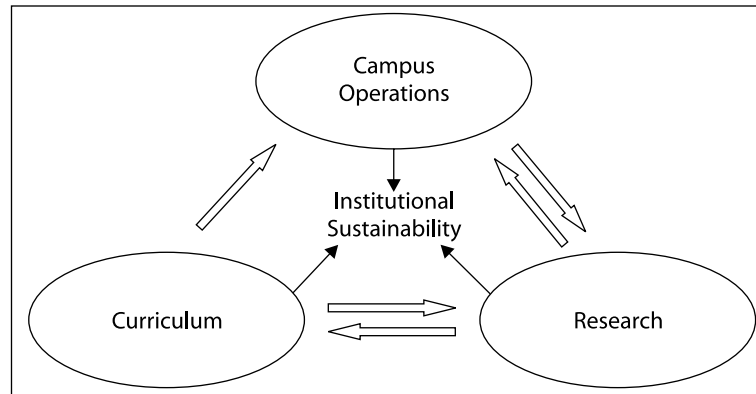


Figure 1 A whole-of-university approach to sustainability

sustainable manner. Such a unified and complementary whole-of-university approach is an aspirational target for most institutions, and this model provides a framework for implementing sustainability into the organisation. This approach seeks to break down currently existing barriers between functional units of the institution. For example, the university structure may not allow for research-led teaching or linking of academia to campus operations. Campus operations and facilities management are generally viewed as the physical operation of the university and as having little relevance to curriculum or research. A whole-of-university approach, however, recognises that all functions of the institution can benefit from sharing knowledge and that each influences the student learning experience. For example, a recent survey of ANU students' engagement with education for sustainability found that about half of the respondents had been exposed to the concepts of sustainability in their coursework. However, students were more likely to report exposure to the concepts of sustainability from the media and from ANUgreen, the university's corporate environmental management division with programmes covering biodiversity, energy, recycling, pollution and risk, transport, green offices, heritage and water. This finding is interesting because as a division of ANU Facilities and Services, ANUgreen has relatively little contact with students outside their internship programme. The visibility of ANUgreen to students demonstrates that campus operations and management can play a vital role in increasing students' awareness and understanding of sustainability.

THE IMPORTANCE OF LINKING CAMPUS TO CURRICULUM

Although many agree that an integrative approach is the best way to successfully teach sustainability (Capra 1994; Cortese 2003; Sterling 2004; ULSF 1999), many programmes about sustainability and the environment are discipline based, narrowly focussed and theory-bound. Good pedagogical practice in any degree programme involves demonstrating to students the connections between theory and practice so that they are able to recognise the relationship of their studies to the campus itself and to the broader world, which is especially important in ESD.

It is important to remember that the learning experience of students is influenced by more than what is taught in the classroom. Universities educate students not only via the ‘manifest’ or explicit curriculum of the classroom but also via a ‘latent’ or ‘shadow’ curriculum representing the university’s principles in administration and management of campus operations (Bloom 1981; Rowe 2002). Because of the lessons embedded within the physical space of the campus, Rohwedder (2004) refers to the structures and grounds of academic institutions as a ‘pedagogy of place’. The daily practices of an institution should reinforce the lessons taught in the formal curriculum and vice versa.

Sustainability is best taught not as a ‘grand abstraction’ or as an isolated management problem needing to be solved, but as a tangible concept relating to the places where we live our everyday lives (DeLind and Link 2004). How then can we at institutions of higher education make learning about ecological principles personally meaningful to students in their everyday lives? Carpenter and Dyball (2006) stress the importance of a reflexive learning practice in which students analyse their own behaviour and the systems that constrain their behaviour. This analysis helps students see that the environment is not something ‘out there’ and that their normal everyday actions affect ecological systems (Shove 2003). It is essential, then, to encourage students to reflect on the broader social and economic processes that influence their behaviour and then to give them the opportunity to engage in action-oriented environmental initiatives (Carpenter and Dyball 2006).

The campus is the most readily available laboratory for hands-on projects, and acts as a shadow curriculum for the students to apply to the campus what they learn in the classroom. Studies have demonstrated that student ESD is significantly enhanced when their studies are integrated into campus environmental initiatives (Bauer and Lewis 2000; Brunetti, Petrell and Sawada 2003; Karol 2006; Pike et al. 2003; Rohwedder 2004; Steinemann 2003). By engaging students in the operational aspects of the university, a powerful learning experience emerges from beyond the classroom.

DRIVERS OF THE INTEGRATIVE PROCESS

ANU established its environmental management programme in 1998 with a policy that articulated its philosophy and goals concerning campus sustainability and targeted water conservation, biodiversity, environmental risk management, emission reduction, transport, recycling and waste management.

The ANUgreen sustainability office—which has been charged with carrying out the environmental management plan—now has eight staff members, including an office manager and environment officers specialising in energy, water, waste and recycling, risk and pollution, sustainable transport, student outreach, green office programmes and biodiversity. It was established with one staff member and grew as its work with the university community built confidence in its ability to deliver practical environmental improvements. ANUgreen was placed in the Facilities division to foster a strong link between ANUgreen and operational departments responsible for grounds, utilities, building maintenance, transport and capital work.

A key aspect of the ANU's environmental management plan is the integration of academic and operational activities to allow an interchange of information that both improves campus environmental performance and facilitates a process of building ecological literacy in the university community. Thus, relationships were established between the facilities-management division and academic areas that teach and do research on sustainability. For example, the Associate Director of Facilities and Services is a board member of the cross-disciplinary research group, the ANU Institute for Environment. ANUgreen staff frequently are guest lecturers for courses that cover everything from environmental economics to greenhouse science; and lecturers routinely include applied project work with the ANUgreen office as part of course assessment. Academic-facilities relationships have been strengthened by a number of initiatives, including the Green Office programme, student internships and environmental training courses for staff and students.

Many university environmental programmes are required to be self-funding, that is, staff salaries depend on the programme's dollar savings. These programmes are often narrowly based around energy and water savings, with limited involvement in areas such as biodiversity, transport and student outreach. For this reason, the ANU sustainability office is centrally funded, allowing ANUgreen staff to focus on achieving broadly based environmental outcomes. Funding for the ANUgreen office supports the integrative projects discussed here and also provides resources and financial support for student-driven research and initiatives within residential halls and colleges. Integrative projects are most successful when central funding and high-level commitment coincide, both of which serve to avoid the problem of isolated units acting in an uncoordinated fashion.

While ANUgreen looks for a return on investment, it recognises that the return is not always clear cut. Initially, the expectation was that any investment would be returned within three years. This, however, made many projects unviable. University business management helped shift that expectation and establish a Green Loan Fund from which departments could secure interest-free loans for projects that have a 10-year or less return on investment.

There has been a substantial increase in recurrent funding to finance ANUgreen staffing and associated integrative projects. Additionally, a central budget was established to cover campus-wide activities (such as waste management, recycling and utilities). Cost for some initiatives may not be recouped, but they are pursued in the spirit of good citizenship and stewardship. For example, the Australian Capital Territory's *No Waste by 2010* strategy has used annual increases in waste costs as a market mechanism to encourage recycling and reuse. As a result, the costs of recycling are now about that same as those of sending the waste to a landfill. However, recycling has significant environmental benefits, such as improved corporate environmental performance, enhancement in staff and student community esteem, and opportunities to use the campus as a learning tool.

INTEGRATING SUSTAINABILITY AT ANU

The ANU is building a whole-systems educational programme that links the principles of sustainability being taught in the classroom with the principles of sustainability

being implemented on the campus. The Integrating Sustainability programme was established to develop a more integrative and holistic whole-of-university approach to sustainability initiatives at ANU. It established an explicit link between ANUgreen, which had won a national reputation for its sustainable campus operations, and the Fenner School of Environment and Society (teaching and research on environment and sustainability). One of its major functions is to promote ESD in the curriculum and to expand opportunities for students to engage in practical sustainability related initiatives on campus by promoting experiential learning in the assessment of selected courses. Last year, an audit of the curriculum was conducted to identify courses addressing the concepts of sustainability and to evaluate linkages to campus projects. The Integrating Sustainability programme also evaluates and monitors the success of student engagement in sustainability initiatives through action research and is creating professional development opportunities for academics wishing to weave sustainability into their courses.

WHOLE-OF-UNIVERSITY COLLABORATION

A good example of linking curriculum, research and operations at the ANU involves the university's 12-month trial of an in-vessel organic waste composting unit, the HotRot. Operationally, this trial seeks to divert from landfill 90 per cent of the organic waste on campus, including food waste from residence halls and campus cafes. On the curriculum front, students are analysing the emissions offset by diverting this waste stream from landfill. In research, both students and academics are looking at the microbial communities in the compost to enhance understanding of the composting process and to improve the process itself. Although traditional academic research generally looks outside the university, this model of research is unique because it focuses on the institution's own functioning, which should ultimately lead to an improvement in its environmental performance and reputation. The convergence of education, research and operations around the composting trial also demonstrates an important link between the everyday practice of food consumption and actions that both the individual and the institution can take to achieve positive outcomes.

Two later year ANU courses ('Greenhouse Science' in the College of Science and 'Corporate Sustainability' in the College of Business and Economics) exemplify a linkage between curriculum and campus operations. Students in these courses are involved in a range of practical-based carbon emissions and mitigation projects including analysis of:

- the carbon footprint of an ANU student;
- greenhouse gas emissions produced through travel to campus;
- carbon abatement schemes;
- the benefits of on-site organic recycling;
- renewable energy generation at ANU;
- offsetting car fleet and air travel; and
- ANU's Greenhouse Reduction Strategy.

After getting preliminary data, students research their topic with the understanding that it will contribute to the work of the sustainability office. Students produce reports and present their results to relevant staff who then review their findings for accuracy and the possibility of implementation. Because each of the student research projects focus on ANUgreen priorities, they provide valuable assistance to the sustainability office. The academics involved in such assignments have responded enthusiastically as the applied projects meet key learning goals, save them planning time and generate student enthusiasm.

The following comments from the students involved in project evaluations reflect upon the learning experience from participation in applied sustainability initiatives:

- It made me think about my own lifestyle and my own ecological footprint.
- There was an obvious purpose for doing it (i.e., providing assistance to ANUgreen instead of just receiving marks).
- The learning experience replicated the sorts of things that we are likely to do in the workforce.

Such comments suggest that students appreciate the active learning experience of applied research opportunities over a passive one-way transmission of knowledge from teacher to student. In these two courses, students worked with the intent that their findings could lead to actual implementation in policy and/or procedure within the university, and this resulted in increased enthusiasm and a sense that their work was both relevant and appreciated.

The success of such initiatives relies on collaboration between facilities managers and academics, and a recognition that both groups provide unique expertise in relation to sustainability. Furthermore, this success lies in acknowledging that, given the opportunity and trust in their abilities, students are highly capable of not only participating but also advancing campus sustainability initiatives. At ANU, we have found this to be an excellent exercise in linking theory to practice, and we are exploring how ESD might be included in the core curriculum requirements for all students regardless of discipline.

BENEFITS OF A WHOLE-OF-UNIVERSITY APPROACH TO SUSTAINABILITY

The benefits arising from pursuing a whole-systems approach to institutional sustainability are threefold: pedagogical, operational/reputational and capacity building.

Pedagogical benefits of involving students in research and in campus management issues include promoting interdisciplinary knowledge, encouraging systems thinking and improving students' ability to put knowledge into action rather than accumulating skills for use at some later date. Such practical experience with sustainability initiatives builds problem-solving and critical-thinking skills. Furthermore, the development of knowledge of local issues provides a context for learning and a framework for an appreciation of global issues.

Benefits from the student involvement in campus operations including helping ANU improve its environmental performance, providing feedback and critiques of sustainability initiatives and thinking up new and innovative ideas, all of which enhance the university's 'green' reputation. Students provide high-level support and advice, and the time invested in supervising student projects is more than paid back in operational gains.

Finally, student involvement in campus initiatives is an important capacity-building feature of ESD. Student engagement in sustainability initiatives raises the profile of the projects and in turn helps raise awareness of campus sustainability amongst the broader student and academic population. By working with students to foster a more sustainable campus, the university also promotes environmentally responsible citizenship by empowering students to become agents of change. Orr (1992) stresses the importance of creating learning environments in which students can develop meaningful relationships with their immediate environment, as well as the skills to design and implement solutions to the problems they may encounter there. He describes the experience of finding workable solutions to campus issues as 'an antidote to the despair felt by students when they understand problems but are powerless to effect change' (Orr 1993: 5). By becoming involved in campus activities and practical sustainability research, students gain a sense of ownership and connection to the campus. Participating in campus-based projects makes students realise that they are stakeholders, along with faculty and staff, in making the campus a sustainable environment. Ultimately it is hoped that students recognise that they are environmental stakeholders wherever they choose to live and work (Clugston and Calder 1999).

Calhoun and Cortese (2005: 7) summarise the significant potential of higher education institutions in both demonstrating sustainable practices and promoting stewardship values:

The educational experience of students is a function of what they are taught, how they are taught, and to some extent by the way in which the university manages, conducts research, operates, purchases, designs facilities, invests, and interacts with local communities...All parts of the university are critical in helping to create transformative change in the individual and collective mindset. Everything that happens at a university and every impact, positive or negative, of university activities, shapes the knowledge, skills, and values of students.

Involvement in campus sustainability initiatives helps students not only to recognise that they are a part of an institution with an ecological impact but also that their individual choices and actions do make a difference.

CONCLUSION

Given the complex nature of sustainability issues, it is imperative that institutions of higher education pursue an integrative approach in modelling sustainability in their core functions and systems. A whole-of-university approach to sustainability ensures that core functions such as management and operations, which have traditionally been viewed as providing only logistical support to the academic mission of the institution, become an intentional part of the curriculum.

A whole-of-university approach not only encourages the institution to look at its own ecological footprint but it also recognises that students learn from the entire experience of their university career, not just from what is taught within the classroom walls. Students learn from how energy, land and water are used (or misused) on campus. By modelling a sustainable system and ensuring that students are exposed to the concepts of sustainability in their everyday lives, a whole-of-university approach encourages awareness and environmentally responsible action. Given the importance of the shadow curriculum as demonstrated by student awareness of ANUgreen, overlooking the lessons offered by the campus itself neglects an important component of a student's education. This is especially true if that student is a campus resident. Working to build a whole-of-university educational programme that links the principles of sustainability being taught in the classroom with the principles of sustainability being implemented on the campus is one of the most tangible ways to help students see the connections between theory and practice and the relationship of their studies to the campus itself and to the broader world.

Many universities are taking proactive steps towards reducing the environmental impact of their operations, and these initiatives can positively benefit from student input. By encouraging a collaborative space within the curriculum for students, academics and managers to critically reflect on university performance with regard to sustainability, many positive benefits can ensue including improvement in campus environmental performance and building the capacity of students to become agents of change.

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