Breaking Organizational Barriers for Greening Australian Campuses

Luo Huyuang[1]

Jay Yang[2]

[1] PhD Candidate, School of Civil Engineering and Built Environment, Science and Engineering Faculty, Queensland University of Technology, Brisbane, Australia, hu.luo@student.qut.edu.au
[2] Professor, School of Civil Engineering and Built Environment, Science and Engineering Faculty, Queensland University of Technology, Brisbane, Australia, j.yang@qut.edu.au
[3] Susan Loh, Lecturer, School of Design, Creative Industries Faculty, Queensland University of Technology, Brisbane, Australia, susan.loh@qut.edu.au

Summary

Sustainability is an issue for everyone. For instance, the higher education sector is being asked to take an active part in creating a sustainable future, due to their moral responsibility, social obligation, and their own need to adapt to the changing higher education environment. By either signing declarations or making public statements, many universities are expressing their desire to become role models for enhancing sustainability. However, too often they have not delivered as much as they had intended. This is particularly evident in the lack of physical implementation of sustainable practices in the campus environment. Real projects such as green technologies on campus have the potential to rectify the problem in addition to improving building performance.

Despite being relatively recent innovations, Green Roof and Living Wall have been widely recognized because of their substantial benefits, such as runoff water reduction, noise insulation, and the promotion of biodiversity. While they can be found in commercial and residential buildings, they only appear infrequently on campuses as universities have been very slow to implement sustainability innovations. There has been very little research examining the fundamental problems from the organizational perspective.

To address this deficiency, the researchers designed and carried out 24 semi-structured interviews to investigate the general organizational environment of Australian universities with the intention to identify organizational obstacles to the delivery of Green Roof and Living Wall projects. This research revealed that the organizational environment of Australian universities still has a lot of room to be improved in order to accommodate sustainability practices. Some of the main organizational barriers to the adoption of sustainable innovations were identified including lack of awareness and knowledge, the absence of strong supportive leadership, a weak sustainability-rooted culture and several management challenges. This led to the development of a set of strategies to help optimize the organizational environment for the purpose of better decision making for Green Roof and Living Wall implementation.

Keywords: sustainability, organizational environment, project delivery, Green Roof, Living Wall, decision making

1. Introduction

In order to respond to the challenge of increasing environmental problems, sustainability has been recognized as a paradigm for decades. It is generally accepted that sustainability should involve all parts of the society. Higher education institutions have been called upon to act as pioneers in pursuing sustainability because of their social responsibility, outstanding advantages and influential power. Historically, universities have the responsibility for analyzing and challenging ideas and conventions, conducting research, developing new technologies and educating future leaders and citizens (Bakker, 1998). When approaching sustainability, universities are placed in an ideally advantageous position due to their academic freedom, diversity of skills and knowledge, ability to comment on society, and engagement in experimentation regarding sustainable living (Cortese, 2003). As a "microcosm" of the society, universities have an incredible influence on the community and even the whole society because of their sheer size and large number of various activities happening on campus every day. Their influence goes far beyond the environmental aspect, for example, of just reducing the ecological footprint of the natural environment, as it also emphasizes the social impact of raising the public awareness and knowledge about sustainability. By exploring sustainability issues in the classroom and serving as living laboratories and role models of sustainable practices (Mcnarama, 2008), universities are able to prepare students as future professionals and leaders to improve the society at large. Therefore, higher education institutions are conveniently positioned in the ideal role of leading the way to sustainability.

Accordingly, a growing number of universities have recognized their social responsibility and ethical role by responding to the sustainability challenge during the last few decades. More than 430 university presidents and chancellors in over 40 countries have signed the Talloires Declaration which is the first official statement of a commitment to sustainability in higher education since 1990, and the number is increasing in an "upward" trend. However, the rate of translating promises into sustainability practices is still not satisfactorily high. In Australia, universities have been slow to implement sustainability policy and practice, even slower than industry in many instances (Burgman et al., 2003). In many cases, universities known for cutting-edge thinking, often times hesitate to adopt sustainability innovations. As Thomas and Bakel (1995) indicated, "despite this leadership imperative, most universities fall behind the private sector in implementing innovative environmental stewardship practices on their own campuses." The report of "Campus Environmental Survey" discovered that universities have done better in conventional operational measures such as recycling or waste management (Shriberg & Tallent, 2003).

In this paper, Green Roof and Living Wall (GRLW) are used as examples to specifically look into this discrepancy. GRLW are emerging technologies which are which are widely recognized for their multiple benefits such as storm water reduction, alleviation of "heat-island" effect, better air quality and so on. These multiple beneficial features provide a metaphorical link with sustainability on campus. In addition, the wider application of GRLW in residential and commercial buildings than it in on-campus buildings results in another impetus for this research. Leal Filho (2000) also suggested that "going into specifics" to deal with specific issues and themes is one possible way of addressing the task of transforming universities into green institutions. The specific component of greening process is a starting point to stimulate more detailed information for decision makers in university to increase their confidence in dealing with sustainability challenge.

As a result, this research project aims to explore and determine what the organizational barriers are to implementing GRLW on campus. It also seeks answers to how such barriers can be reduced or possibly overcome to optimize the organizational environment to better facilitate decision making for sustainability innovations. It is hoped that the findings from this research can contribute to the knowledge of "sustainability in higher education" from the perspective of organizational issues. In practice, the research results will provide an applicable tool to assist decision makers and practitioners to deal with sustainability challenges, and even stimulate other research to produce more specific frameworks for various components of the greening process.

2. Theoretical Framework

2.1 Universities' Efforts to Go Green

2.1.1 Driving factors for universities to turn green

As learning institutions, universities have the social responsibility for creating a sustainable future. There is a natural and essential connection between sustainability and universities. Orr (1992) states that "no institutions in modern society are better able to catalyze the necessary transition to a sustainable world than universities. They have access to the leaders of tomorrow and the leaders of today…consequently, what they do matters to the wider public." Universities are the logical loci for experiments in sustainability because they are inherently learning centers where new ideas can be heard and different interacting actors can advocate for change (Edelstein, 2004). Due to the large physical size of many universities, they have the opportunity and ethical responsibility of tackling the environmental issues at home base. It has been suggested that the greenhouse gases, wastewater and hazardous waste that universities generate from their operations may have a negative impact to society by contributing to urban sprawl and environmental injustice (Kellyn, 2001).

Universities leave a tremendous footprint on the natural environment, and they are becoming significant players within society for addressing many of these issues (Hignite, 2006). Barlett and Chase (2004) remark that: "how we maintain and build our physical plant, engage in buying practices, dispose of waste, and consume energy is critically important to the environmental health of the broader society". Not only do universities have an obligation to enhance the performance and operational efficiency of their own facilities in "demonstrable sustainable ways" for educational purposes, but their pursuit of sustainability can reward them with benefits. There are many environmental and economic benefits for universities to "turn green", with opportunities to save money, while demonstrating new ideas or technologies (Dahle & Neumayer, 2001) and improve their image to attract more staff and students (Abell, 2009).Thus, implementing sustainability in universities is a prevailing trend throughout the world as it is increasingly recognized as an operational strategy that brings in beneficial returns in many ways.

2.1.2 Visualizing sustainability on "green campus" in an innovative way

Sustainability in universities can be implemented in a systematic method which would include reforming curriculum, refining environmental management and adopting sustainable facilities and operations on campus. Uhl (2004) proposes that an audit of the campus in relation to environmental sustainability is the first important step. Due to its environmental responsibility and educational mission, campus greening has been gaining momentum among universities and is on top of the agenda for "sustainable universities". University campuses are linked to cities with respect to transportation, land use, landscape design, storm water runoff, energy use, and operational activities which are subject to scrutiny from a green perspective (Kirk, 2003). Reducing the huge footprint left on the natural environment by campus performances can significantly help solve environmental problems. Through greening their campuses, universities can teach and demonstrate the principles of awareness and stewardship for the natural environment (Creighton, 1998). Universities with vibrant environmental programs can use the campus as a learning laboratory, connecting students to nature through campus field trips, discussions of environmental values and hands-on projects (Barlett & Chase, 2004).

Also, it is worth mentioning that the campus environment is one of the most influential factors in how students evaluate a university nowadays. A survey among 16,000 freshmen discovered that the sustainability concern of a campus has become a very important factor impacting on potential students' choices of universities (Princeton Review Inc, 2009). For the purpose of building a healthy and attractive campus environment, there is a rationale for delivering sustainability features on campus.

It is also interesting to note that while many projects and programs in education, research, outreach and partnership have been in operation since the early 1970's, sustainability initiatives on campus, also called "greening the campus", began to flourish only just a decade ago (Velazquez et al., 2006). Making the consequence of the actions for sustainability "visible" is of great importance in order to demonstrate sustainability in a direct way to staff and students – this can also be thought of as "service learning". There is a strong need for a visible sign of an institution's commitment to the environment.

Current anecdotal evidence and case studies show increased interest in adopting innovations for sustainability in addition to the traditional ways of recycling or waste management. Recognizing this growing interest in addressing environmental problems through new and innovative methods, this paper specifically points to these technical innovations.

2.2 Linking Green Roof and Living Wall with Visible "Green Campus"

The term "Green Roof" refers to roofs covered with a layer of impervious membrane, which is topped with soil and vegetation in order to optimize the site-specific and community environmental benefits (Pecks et al., 1999). Similar to a Green Roof, a Living Wall is vegetation that either partially or fully covers a building façade or other vertical structure (Binabid, 2010).Living Wall has environmental and aesthetic benefits which are particularly effective for buildings with small roof area but large amounts of vertical facades. The perfect integration of these green and innovative technologies can the unsightly grey concrete into a green oasis for - "it allows man to re-create a living system very similar to natural environments. It's a way to add nature to places where man once removed it." The multiple benefits brought by GRLW have been proven by worldwide research and with several practical cases in residential and commercial buildings, including storm water runoff reduction, noise attenuation, "urban island heat" effect alleviation, energy saving, increased aesthetic value and so on. These benefits have the potential to make a significant contribution to "campus sustainability". In addition, due to their high visibility, the implementation of GRLW on campuses can be successful in showcasing a university's commitment to sustainability. Thus the incorporation of GRLW in universities can be seen as an important parameter for sustainability implementation on campus. Figure 1 illustrates the linkage between GRLW and sustainability in higher education.
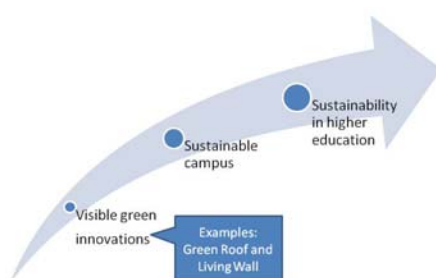

Figure 1The linkage between GRLW and "sustainability in higher education"

3. Research Design and Approach

The research was carried out during the period March 2011 to May 2011. Data was collected through a series of in-depth semi-structured interviews conducted with 24 participants from 24 universities in Australia. This type of interview was chosen to obtain in-depth and detailed information about our research topic. The aims of the interviews employed in this research were to understand the general situation of sustainable development in the universities, to explore the relevant factors with organizational resistance to innovations and to seek strategies for promoting GRLW. Semi-structured interviews were particularly chosen because they were more likely to evoke the interviewees' viewpoints (Kohli, 1978). Starting with a few general open-ended questions around pre-determined themes, the flexibility of the open framework of semi-structured interviews allowed interviewees to voice their opinions freely during the interview process followed with any subsequent questions raised. Based on the interviewer's perception of what seemed most appropriate, the order of pre-determined questions were modified and question wording changed, omitted or added to obtain a clearer understanding (Robson, 2002).

Out of 38 Australian universities, 24 universities were involved in this empirical survey. This a high participation rate of 63.2%. The sampled interviewees were practitioners with years of experience of working in the area of sustainability and include senior management staff, sustainability officers, environmental managers and facility managers. Because the interviewees all occupy key positions of dealing with sustainability on a daily basis in universities, their responses can be considered to be credible and reliable. All the interviews were conducted over the phone due to geographical limitation and financial budget. They are recorded for transcription with the participants' consents. In accordance with research ethics, the interviewees will be anonymous in this paper. Qualitative data was analyzed with Nvivo software, involving coding and categorizing. The statements provided by interviewees were grouped into several categories under different themes.

4. Findings and Results

4.1 The Overall Situation of Adopting Sustainability Innovations in Universities

The first set of interview results provided an overview of the greening process in Australian universities-this refers to the various sustainability initiatives carried out on their campuses. According to the results of the survey, it was discovered that Australian universities were not at ground zero with respect to the incorporation of green features on campus. 18 universities positively answered that they had taken actions on implementing green technologies. On the other hand, the other 6 universities admitted that they still had not embarked on using green technologies though they realized the significance of green technologies to campus sustainability. It is worthwhile to mention that they agreed that the "eye-catching" feature of green technologies can enhance the function of "action learning" which in turn could promote increased environmental awareness in an obvious way.

Among the 18 sampled universities which had taken these initial steps to the greening of their campuses, they also listed a few technologies which were used most frequently on their campuses. The responses echo the statement expressed in current literature that universities invariably focus on the areas of energy, water and waste most of the time. For example, some interviewees mentioned that they had upgraded their HVAC systems, installed storm water tanks, arrayed solar panels and used recyclable materials, etc. However, in terms of adopting GRLW, the percentage among universities was dramatically low. The statistics show that only 3 universities have applied (2 universities) or had been planning to apply GRLW (1 university) on their campuses.

4.2 Organizational Resistance to Green Innovations-a snapshot of GRLW

According to the interviewees' responses, the factors which contributed to organizational resistance to adopting sustainability innovations are grouped into the following categories as indicated in Figure 2. In this paper, GRLW were specifically picked as the objects for discussion.

Figure 2 The categories of factors contributing to organizational resistance

4.2.1 Lack of widespread awareness and knowledge
The lack of awareness and knowledge about green innovations was considered the most significant factor by 46% of interviewees. Some typical answers were: "people don't know what it (innovation) is or how to be innovative when they are faced with many choices" and, "there is a limited understanding of sustainability widely in universities".
People positioned in top management need to be familiar with the potential of green innovations and have a good understanding of their pros and cons, otherwise their misconceptions will result in their hesitance to implement green innovations. An interviewee described it in this way: "If someone says you've got to put on a green roof and they don't know what a green roof is, they are unaware of the potential impacts of the project with additional engineering, with additional load design, additional maintenance costs, and those things they just probably don't fully understand, and usually when people don't understand or comprehend things, they are very resistant to go there." In another instance, many interviewees thought the cost

impeded the application of GRLW and they were uncertain about the cost-effectiveness. In actual fact, there is evidence of return for this long term investment. Considering that most universities run their business for a very long time, maybe even over hundreds of years, investing in GRLW for the long-term payback can be justified. Thus, even the issue of cost can be seen as an awareness issue. The perceived risk has something to do with knowledge efficiency as well. Some interviewees reflected that their universities don't dare implement GRLW because they are worried about the "water leaking" or "ceiling penetration" problems. In reality, current technical information on GRLW shows that these technological issues can be prevented or solved. In general, staff should be made aware of current information on green technologies. Universities are faced with many objectives, and sometimes their intended investment in sustainable initiatives is trimmed off because of budget constraints. However, if management involved in the financial decisions for such GRLW initiatives have a high awareness about sustainability, then the possibility of implementing sustainability on campus will be much higher. Students and academics concerned about environmental awareness can influence universities' actions through declaring their support for sustainability innovations such as GRLW.

4.2.2 Lack of strong leadership in sustainability initiatives
It was widely recognized by the interviewees that obtaining support from top management was critical for the successful implementation of any sustainability initiative. Without leadership, sustainability would be difficult to achieve in any organizations. Sustainability is sometimes seen as a luxury. Since the incorporation of sustainable systems may require more upfront costs, it requires a leaders' political and financial support. Strong leadership is needed to ensure that sustainability is maintained as a key directive in mainstream activities particularly in universities where there are many competing missions to juggle. When discussing about support from top management, some interviewees gave positive comments that they believed the leadership in their universities was very supportive compared to years ago. They mentioned that their leaders were willing to provide resources and skills to implement sustainability. However, those interviewees also honestly admitted that leaders should do much more to voice their support for sustainability on campus. An interviewee lamented that sometimes: "They look warm and supportive, but they don't' necessarily actively support sustainability initiatives." In total, 22% interviewees agreed that the leadership was "not strong enough". In order to provide stronger support, leaders are expected to increase their knowledge and skills about sustainability, improve their communication and coordination with staff and students and increase collaboration with sustainability consultants.

4.2.3 Lack of sustainability-penetrated organizational culture
The majority of interviewees proposed that "organizational culture" is another important barrier to implementing GRLW. Without a formed culture to back up sustainability, difficulties would easily arise. 14% respondents stated that their universities established certain strategies, policies or commitments in some form of documentation which had a strong link to sustainability, though those implications might not have been explicit. It was claimed that the concept of sustainability was not deeply penetrated in the organizational culture yet, even the definition of sustainability was still ambiguous to staff and students. For instance, sustainability was sometimes treated as an "add-on" because there was a lack of connection between sustainability and their daily job description. As for adopting sustainability innovations, conventional thinking and embedded generational or personal values are believed to be hurdles to behavioral change. People generally feel comfortable with what they are familiar with and the way they have always done things, so there is a natural tendency to resist trying new things. An interviewee described in detail: "…a lot of the time the decision makers within institutions, particularly in engineering fields, don't like to go to leading edge or referred to as bleeding edge technology. They like to stick with something they get the guarantees for." Cultivating cultural shifts is recognized to be an essential though this could take many years to take effect. But the optimistic news is that the most universities in the survey were in the transitional stage and were cognizant of the direction which they had to take towards sustainability. Another issue which we identify that would require some attention is the diversity of cultures that exist in universities today where students and staff come from different cultural backgrounds. Understanding the inherent biases of diverse cultures to avoid possible conflict would be a positive strategy for enabling sustainability programs at universities.

4.2.4 Management challenge and other factors
Comments by interviewees on the current management process at their universities revealed several challenges to organizational change. After examining the broader context of their organizational

components, interviewees also gave further insight into the management process that is embedded in such hierarchical organizational environments. 10% of the responses indicated that adapting the management style to accommodate constantly emerging innovations is a great challenge. The following factors were identified in relation to this challenge: (1) due to the extremely large size and complex structure of a university, the communication between different departments about sustainability issues is usually not coordinated, thus having a negative impact on efficient management of such sustainability initiatives; (2) the frequent turnover of staff and ever-changing cohort of students present a challenge to management as this constant change in population is difficult to identify for setting real targets; (3) the cumbersome reporting process endemic to vertically structured organizations such as universities invariably contribute to slow responses, which usually frustrates the people who have initiated a new idea or innovative solution; (4) people involved in procurement or maintenance find it easier to sticking with conventional technologies which they are more familiar with. Besides all the factors discussed above, interviewees also mentioned that the lack of experience and professionals, the lack of good case studies, or lack of evaluation benchmarks were contributing factors to the organizational resistance to innovations.

4.3 Primary Strategies to Overcome the Organizational Resistance to GRLW

Universities are inherently complex organizational structures that also have to cater to a wide variety of concerns while dealing with people of diverse skill sets and work foci. This poses a great challenge to sustainability. From the various suggestions provided by interviewees concerning ways to reduce or overcome organizational barriers to GRLW, the following strategies have been identified:

- Provide continuous and appropriate education and training to staff and students to increase their awareness about GRLW, enrich their professional knowledge and increase competency in their skills;
- Conduct case studies to demonstrate cost-effectiveness and provide persuasive evidence to increase their familiarity with and even demand for GRLW;
- Seek more ways to ensure universities are equipped with update information on GRLW technologies by means of open lectures/seminars/workshops, conferences, research;
- Establish a new financial model to better facilitate the budget and provide adequate resources;
- Define a clear statement of sustainability with the organizational culture and ensure its direction is supported in any transitional stage;
- Eliminate culture clashes when planning and implementing sustainability innovations (e.g. taking culture differences into account when planning and designing GRLW);
- Strengthen top-down approaches of supportive leadership (e.g. policies, finance, ethics) to stimulate the sustainability initiative and bottom-up approaches to provide on-the-ground support;
- Adapt the current management system to the rapid development of innovative technologies (e.g. setting up a smooth and efficient communication system to form a feedback loop to involve key stakeholders; involving facility management department in the early planning stages to relieve their worries about future maintenance requirements.

5. Conclusions

While Australian universities have genuine intentions to promote sustainability through education, research and own operations, this study found that universities were just starting to capitalize on the potential for green campus development. Currently, most sustainability programs in Australian campuses focus on traditional technologies such as recycling, waste management and grey water treatment - the so called "low hanging fruit". As for green innovations discussed earlier in this paper, many still hesitate to adopt them. For example, only 3 Australian universities out of 24 sampled have implemented or were planning to adopt GRLW technologies. This study has identified several salient factors contributing to organizational resistance, such as a lack of awareness and knowledge, a lack of solid support from top management, difficulties in individual behavior change, an absence of a defined sustainability culture and several management challenges. Accordingly, a set of strategies embracing key actions to overcome these factors has been explored for promoting GRLW application on campuses. This on-going research will contribute to the limited literature available on evaluating organizational effectiveness for sustainability implementation, which is imperative to the success of greening university campuses. Future work will incorporate these strategies into a new framework for GRLW implementation for universities to seek more creative and effective ways of promoting sustainability.

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