Realigning Practices in UK Built Environment Higher Education toward Sustainable Communities

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Abstract

Learning has been considered essential in understanding and addressing pressing sustainability challenges, whilst higher education has been considered vital in shaping the way which future generations learn to cope with the complexities of sustainable development. Therefore, contemporary higher education practices in different disciplines around the world have been striving to adopt sustainability features in their courses. Following his defining Egan Report (1998), Sir John Egan was leading another government initiative championing the concept of "Sustainable Communities" in the UK. Many of the aspects of the sustainable communities can be considered relevant to the built environment discipline. However, many of them can be difficult to quantify and measuring their achievement may be harder to demonstrate. Relevant events, including UK Government involvement in the Kyoto Protocol to reduce greenhouse gases emission, have driven the UK construction industry into environmental sustainability focus. Attempting to respond to various reports and articles depicting gaps between higher education academic practices and the needs in the construction industry, built environment higher education in the UK are trying to integrate sustainability in their curriculum. This ranges from simply including add-on knowledge of relevant tools such as BREEAM into their modules to developing new modules with the word 'sustainability' explicitly showcased in the titles. Many of these attempts are focused on environmental sustainability with the bigger agenda for sustainable communities quietly disappearing in the background. This paper aims to provide a review of potential ways to refocus practices back to the achievement of sustainable communities. Comparative analysis of two case studies involving practices in the UK and Australia was conducted to bring together lessons learned and recommend the way forward for the UK higher education in built environment.

Keywords: Built environment, construction management, higher education, sustainable communities.

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1. Introduction

Learning has been considered important and even imperative in understanding and addressing the pressing sustainability challenges that we are facing today (Dunphy, *et al*., 2007; Ballard, 2005). Thus the higher education sector is deemed to play a vital role in shaping the way which future generations appreciate and learn to cope with complexities of sustainability related issues and sustainable development (UNESCO, 2005). This is largely manifested in the establishment of the United Nation Decade of Education for Sustainable Development (UN DESD) aiming to reorient traditional educational approaches towards interdisciplinary and holistic learning values-based learning, critically reflective thinking, multi-method approaches, participatory decision-making and locally relevant information. Naturally, the role of the education sector in championing the creation of a sustainable community is focused at the knowledge, skills, values, capacity and motivation needed for individuals and organisations to be able to respond to the complex sustainability issues they may encounter. Motivated by the UN declaration (UN, 2002) of the period 2005 to 2014 as the decade of education for sustainability, higher education institutions have been working hard trying to integrate sustainability into their curriculum and to somehow include sustainability in their practices. Different disciplines have been taking different approaches in doing so with varying results (Sutrisna and Rowe, 2012).

Whilst designing curriculum in general has been regarded core but not without its problems by many higher education scholars (e.g. Lea, 2004; Jarvis, 2002; Biggs, 1999; Wiklund and Wiklund, 1999), embedding sustainability into the curriculum has naturally increased the degree of difficulties. Added complexity into curriculum design may come from the need to embrace the potential of interdisciplinary and holistic learning, the dynamic need to create innovative teaching formats to foster student enthusiasm and inquiry (Letterman and Dugan, 2004) or the existence of 'discipline allegiances' that may vary the degree of acceptance of the benefits of adding something that may be perceived non-traditional in certain disciplines (Clifford, 2009; Becher and Trowler, 2001). Thus, even though sustainability comes as a universal theme, its actual embedment into curriculum is a delicate matter. Specific to the built environment and other construction related disciplines in the UK, the existence of the sustainable community agenda (this is discussed in the subsequent section) has added another dimension to the sustainability discourse.

In light of the on-going discussion, this paper intends to present a comparative analysis of two case studies from the UK and Australia, identifying similarities, differences and context, as well as lessons learned and recommend the way forward for UK higher education in the built environment to refocus practices toward the achievement of sustainable communities.

2. Sustainability in the Built Environment and Sustainable Communities in the UK

The Higher Education Funding Council for England (HEFCE) recognise the important role of Higher Education in championing sustainability and set an inspirational vision that within the next 10 years, the higher education sector (in England) should be recognised as a major contributor to society's efforts to achieve sustainability – through the skills and knowledge

that its graduates learn and put into practice, and through its own strategies and operations (HEFCE, 2005). However, this appears to be easier said than done. The Consultation on Sustainable Development in Prague in 2003 acknowledged the failure of the higher education sector to produce graduates with the skills, motivation and knowledge to address the problems emerging in the work towards sustainability (IAU, 2006). Sibbel (2009) reported various potential sources of this 'failure', highlighting redesigning curricula to incorporate sustainability as one of the most prevalent ones. It appears that a certain focus point may be required for different disciplines to better align their industry practitioners and academics in incorporating sustainability in the curriculum.

In the UK construction industry, there have been many government and industry initiatives to review and put together reports aiming to improve the industry. These started as early as 1944. These reports were prepared with the view to evaluate current practices and propose improvements in a more collective manner. Following the defining Egan Report (1998) that unveiled deficiencies in the industry and set targets for improvement for the UK construction industry in order to retain its competitiveness in the world, Sir John Egan was tasked to lead another government initiative and produced another report championing the "Sustainable Communities" concept. The key features of sustainable communities described in the report includes the creation of flourishing local economy to provide jobs and wealth; effective engagement and participation by local people, groups and businesses and an active voluntary and community sector; good public transport and other transport infrastructure both within the community and linking it to urban, rural and regional centres; building – both individually and collectively – that can meet different needs over time, and that minimise the use of resources; good quality local public services, including education and training opportunities, healthcare and community facilities; a diverse, vibrant and creative local culture, encouraging pride in the community and cohesion within it; a "sense of place"; and the right links with the wider regional, national and international community. Thus, the report defined sustainability in a more holistic way and aimed to build the community rather than focusing at environmental alone with special emphasis on the further development of skills of people in achieving sustainable communities (Egan, 2004).

Many of the aspects of the sustainable communities are relevant to the built environment discipline. The wide spectrum of the built environment manifests in its definition as an abstract concept used to describe the products of human building activity and it refers to the broadest sense to any physical alteration of the natural environment, from hearths to cities, through construction by humans (Lawrence and Low, 1990). Thus, the concept of sustainable communities appears to be a suitable focus point to better align industry practitioners and academics in incorporating sustainability in curriculum. However, many of the aspects are not really straightforward to quantify and measuring their achievement may need to be discussed and in some cases debated. Relevant events, including UK Government sign up to the Kyoto Protocol to reduce greenhouse gases emission (UN, 1998), has driven the UK construction industry into a low carbon emission focus. The UK based environmental assessment and certification system, BREEAM, has rapidly becoming the standard in the UK construction industry. Attempting to respond to various reports and articles depicting gaps between higher education academic practices and the needs in the construction industry (e.g. Langlands Report, 2005; Roberts Report, 2002; Gann, 2001), built

environment higher education in the UK have been striving to integrate sustainability in their curriculum. This is ranging from simply including add-on knowledge of relevant tools such as BREEAM into their modules to devising new modules explicitly labelled with the word ‘sustainability’ in its titles. Most of these attempts are focused on environmental sustainability with the bigger agenda for sustainable communities quietly fading in the background (Sutrisna and Rowe, 2012).

3. Research Methodology

Research methodology refers to the principles and procedures of logical thought processes applied to a scientific study (Fellows and Liu, 1997). Thus, research methodology mainly concerns with the discussion of how a particular research should be undertaken and can be understood as the critical study of research methods and their use (Grix, 2001). Research methodology includes justification of the choice of research strategy taken by a particular researcher in tackling a specific set of research aim and objectives. The research strategy actually applied is usually a compromise between options, and the choices are frequently determined by the, the nature of the problem itself as well as availability of resources (Gill and Johnson, 1997).

Case study has been used to develop and test research hypothesis in formal settings as early as the 1800s (Naumes and Naumes, 2006). Case study has been regarded as a strategy, a stance, or an approach rather than a method in research (Robson, 2002). The case study approach, as a research strategy, has been perceived as an empirical inquiry that allows researchers to investigate phenomena in their natural settings (Yin, 2003). Case study strategy includes both single and multiple case studies. In many studies, it has been found more appropriate to study more than a single case. Multiple case study can improve the potential to better generalise the results of the study (Naumes and Naumes, 2006). The use of multiple case studies, however, is not intended to gather a ‘sample’ of cases to make a generalisation to some population in the same manner as in a statistical generalisation, but rather to have an ‘analytic or theoretical generalisation’ (Robson, 2002). Analytical or theoretical generalisation in this matter differ in the use the data gained from a particular study to provide theoretical insights containing a sufficient degree of generality/universality to allow their projection to other contexts or situations (Sim, 1998). The multiple case study strategy aims to identify patterns using replication logic within and among cases, which can be either similar (literal replication) or contrary but for predictable reasons (theoretical replication). Another strategy known as pattern matching compares findings across cases or to a theoretical proposition to reveal patterns (Yin, 2003). In a multiple case study strategy, the cases are studied in their real-life contexts with reliance on multiple sources of evidence (Groat and Wang, 2002).

Case studies, including the data gathering and analysis, can be designed and conducted in various ways (Platt, 1992; Stake, 1995). In this particular study, two cases have been selected for comparative analysis. The analysis was conducted adapting a structured procedure for designing integrated learning environments proposed by Lewis and Merton (1996). The original model takes into account students' needs and learning styles as the starting point of the process of embedding Communication and Information Technology

(ICT) into higher education curriculum. This has been adapted to suit the purpose of this analysis, i.e. sustainability instead of ITC. The steps adapted from this model includes the following steps: identification of students' learning needs, identification of student ability, consideration of the organisation and presentation of the curriculum (including: learning outcomes, learning methods, sequence of methods and media, assessment methods, learning hours and access to learning materials).

4. The Case Study

The case study involves two UG construction management courses, one in the UK and one in Australia. Both cases are within the Construction Management domain in the Built Environment. Construction Management courses are selected for further discussion here due to some identified issues (particularly the UK). In the UK, scholars have long acknowledged the difficulty in defining the field of construction management (Hughes, 1997). Construction management have been considered falls short of being a profession in the traditional sense despite its steady gain in status and recognition in the eyes of clients and other Built Environment profession (Fryer *et al*., 2004). Research suggest most large employers in the UK thought that level 4 qualifications were a good proxy of skills, however in some sectors there is a mismatch between the needs of business and the courses provided by higher education institutions (DIUS, 2008). A survey conducted by the Chartered Institution of Buildings (2011), the professional institution in the UK that accredits construction management courses, revealed that despite the recession and downturn in demand, construction industry is still suffering a skill shortage.

As discussed above, the comparative analysis is conducted using the Lewis and Merton (1996) procedures. Below is an overview of each case study.

4.1 Case Study 1

The case study 1 is a Bachelor with Honours in Construction Management course in the UK. The course was originally introduced in 1988 and has enjoyed construction industry support in the form of sponsorship to its students, thin sandwich industrial placement opportunities (the thin sandwich arrangement has made the course duration into 4 years instead of the typical 3 years Bachelor Honours in the UK) and direct input towards further development of the curriculum via a formal industry consortium attached to the course. In addition to that, practitioners from the construction industry have helped delivering guest lecture and involved in project based modules. The student body in this course is mostly made from local UK students mainly due to the thin sandwich arrangement that may require working permits for international students to work during the placement period. The mode of attendance offered is full time only, again mainly due to the thin sandwich arrangement.

Sustainability related matters and principles have been embedded informally through various modules, mainly through project based modules. For the first time since its inception, a module called “Sustainable Design and Construction” has been included in the course structure (core for final year students) in 2012/2013 academic year. The module is an existing one and has been included in other courses in the school as an elective module in

last few years but has been made a core module for final years (level 6) in this particular course. This inclusion is done taking the momentum from the recent requirement from the university to review courses and modules to comply with certain criteria and principles.

4.2 Case Study 2

The case study 2 is a Bachelor ordinary/with Honours in Construction Management and Economics course in Australia. The course was originally introduced in early 1990s and has enjoyed construction industry support in the form of teaching delivery from many sessional staff who are working full time as practitioners in the construction industry. The course duration is typical for Australian UG degrees in similar field which is 4 years. The student body in this course is made of roughly equal proportion of local and international students. Both full time and part time modes of study are offered, but international students will have to take the full time mode mainly due their visa requirement.

Sustainability related matters are covered in a module taught in year 3 which is a part of the Building Technology stream. Currently a proposal has been approved to use this module as a basis for a new module called “Sustainable Construction” upgraded to make it suitable for year 4 from 2014 academic year. This is a part of a regular cycle of reviewing and modifying courses in the university. The course title will also be changed into Construction Management (leaving out “Economics”) to better represent the modification to be applied to the course.

Whilst looking into both courses holistically, a special attention is drawn towards the two modules addressing sustainability as discussed in 4.1 and 4.2 above in conducting the comparative analysis. The main intention here is to use the case study from Australia as a benchmark to the UK case study.

5. The Analytical Framework

The comparative analysis using the above mentioned framework is shown in the table 1 as follows.

Table 1. Comparative Analysis of the 2 case studies

Implementation factors	Case study 1	Case study 2
Identification of student learning needs	• There is no official guidance on the level of need for UG student in the Built Environment in the UK on sustainability • The module leader and tutors jointly determined what level and scope needed for each module guided by the module specification • Input of industry consortium available	• There is no official guidance on the level of need for UG student in the Built Environment in Australia on sustainability • The module leader and tutors jointly determined what level and scope needed for each module guided by the module outline

Identification of student ability	• Aimed at UG level and assuming that students do not possess any prior knowledge on sustainability • Students in this particular course would have some knowledge about the implementation of sustainability on project site • Industry involvement in selection process	• Aimed at UG level and assuming that students do not possess any prior knowledge on sustainability • Some students in this course may have some knowledge about the implementation of sustainability on project site
Consideration of the organisation	• Staff involved in the development and delivery of the module mainly come from design and architecture domain • The expertise of sustainability in the school is mainly including urban design and regeneration	• Staff involved in the development and delivery of the module mainly come from construction and commercial management domain • The expertise of sustainability in the school is including architecture, urban design and construction management
Presentation of curriculum:		
• learning outcomes	• The learning outcomes are clearly prescribed including knowledge and understanding as well as transferable key skills and other attributes • Learning outcome and syllabus are leaning towards regulatory framework as well as design and construction (mainly environmental/ecological)	• The learning outcomes are described in the module outline but not in a detailed manner • Learning outcomes and syllabus are prescribing roughly equal proportion of economic, social and environmental sustainability with the regulatory framework as a background
• learning methods	• Formal lecture, group works, tutorial, and independent study • Specialist project modules	• Formal lecture, group works, tutorial and independent study
• sequence of methods and media	• Syllabus is covered in lectures followed by team work activities/assignments supported by studio design tutorials	• Syllabus is covered in lectures followed by group activities and tutorials
• assessment methods	• Portfolio of individual assessments and group works	• 40% group exercises and 60% examination
• learning hours	• 36 hours of contact time in 1 semester	• 36 hours of contact time in 1 semester
• access to learning materials	• All lecture materials and supplements are made available via online system and students are given access to library including print out copies, online database of journals/e-books.	• All lecture materials and supplements are made available via online system and students are given access to library including print out copies, online database of journals/e-books.

6. Discussion and Conclusion

This is not a crisis, but merely a part of the continued evolution of the global political landscape and hence our society's understanding of what constitutes a "sustainable community". As such, we are in a dynamic, fluid situation and understanding the contribution that the built environment sector can make is an on-going process, rather than a finite target.

Within the built environment discipline, if we consider the construction management discipline studied here, there is a need to look at a number of performance parameters for that industry, before considering how these might be optimised for the future by modifying the HE learning environment. Traditionally, the construction industry has been trade skill based, indicating that "knowledge" is centred on the technology and engineering of the building product. Allied to this and equally prized by the industry are "application skills", both at trade level and, as project complexity increases, at organisation and management level. In the HE sector, this has lead to responses such as the construction management programmes considered here, where the knowledge content has been extended to include management processes, alongside product technology and some attention has been paid to building application skills for this management knowledge.

It can be argued that these developments are in parallel with development in the industry with reports coming forward on the importance of the team (constructing the team, Latham 1994), the way that the industry performs and interacts with others (rethinking construction, Egan 1998), and the emerging environment of "sustainable communities" (skills for sustainable communities, Egan 2004). Clearly, these are addressing the process skills required by the industry, but are also widening the environment in which these skills might be called to operate. Examples of how this environment has been extended to embrace the wider community and its sustainability include the widespread adoption of Corporate Social Responsibility (CSR) policies by many construction companies, with initiatives such as the Considerate Constructors Scheme (CCS) in the UK arising from that. In its best form, this initiative does much to involve the local community in the construction of part of their environment. (e.g. Brunswick Health Centre, MastLift programme).

Part of the problem for HE curriculum designers is understanding the potential contribution of the built environment sector to sustainable communities and hence, where to apply development and in what form. If it is acknowledged that learning will be based around the acquisition of a blend of knowledge and application skills (which might be translated as product and process), then our product knowledge can already be shown to have given some contribution via measurable environmental improvements (e.g. improved insulations).

If we consider how process learning might contribute, those knowledge and skills need to be focused toward a sustainable community agenda. As such, it might be useful to extend our model of the industry thus:

Product – Process – Purpose

Where Purpose can be interpreted as the dynamic project environment within which construction takes place, part of this will include knowledge and awareness and part will be application skills within that environment.

As an interesting sub-plot, it can be argued that the higher education sector has sustainability issues of its own, needing to balance the advancement of knowledge with attracting sufficient students to study. Clearly it is important to students that they can find jobs at graduation, so a balance needs to be engineered between knowledge and skills appropriate for industry employers now and into the future.

When we consider the case studies here, it is possible to make a number of interesting observations:

1. They are remarkably similar in structure and overall approach, suggesting a maturity of development, as both programmes are well established

2. There appears to be a similar pedagogical approach, suggesting that understanding of the concept of "knowledge and skills" is broadly similar.

3. There appears to be a similar direction in better articulating the inclusion of sustainability explicitly into the module title. This is despite the fact that the module in case study 1 was originally developed from the design side which can be argued demonstrating convergence of the sub disciplines in the built environment, at least in terms of sustainability.

4. Case study 1 appears to have a slightly stronger emphasis on "skills" as evidenced by more project working.

5. Case study 2 appears to value individual knowledge, as evidenced by a stronger emphasis on individual examination based assessment.

6. Strongly informed by the 2 modules in sustainability in both cases, it is evidence that there are attempts in addressing knowledge acquisition in a new area, as evidenced by learning methods employed

In conclusion, these would both seem to be appropriate responses at this point in time, as understanding of the sustainability of communities and how the built environment sector can contribute to this is still developing. As a sector, the built environment already has some confidence in the improving technology of its products and its processes are evolving alongside the increasing complexity of the projects undertaken. It is reasonable to assume that its processes can evolve in similar manner in the future and that what is missing at this point in time is knowledge and awareness of the purpose – Sustainable Communities. Whilst the achievement of this 'purpose' will be hard if not impossible to measure (due to its dynamic nature), analysis such as the one conducted in this paper can be considered useful in continuously benchmarking practice in UK Built Environment Higher Education with its purpose taking into account practices elsewhere. Thus, such analysis may not be able to

directly inform higher education practitioners on how to 'successfully implement sustainability', but it may help higher education practitioners to continuously realigning their practices with the dynamics of the sustainable communities concepts.

One further consideration is that other sub-disciplines in the built environment sector may be more influential in addressing the sustainable communities agenda e.g. design. In the long run, the higher education may well have to consider the balance of its discipline products, but this should not distract from the construction discipline objective of delivering a sustainable built environment production process for the community within which it operates.

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