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Educating the global citizen in sustainable development: the influence of accreditation bodies on professional programmes

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Biographies

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Professor Srinath Perera

Professor Perera is a Chartered Surveyor with over twenty years experience in academia and the construction industry. Professor Perera has a first class honours in Quantity Surveying and MSc in Information Technology, and a PhD in the Application of Artificial Intelligence Techniques in Construction. As Senior Lecturer at the University of Moratuwa, he received an award for outstanding academic publication from the President of Sri Lanka. He was the Honorary Secretary of the Institute of Quantity Surveyors in Sri Lanka before joining the University of Ulster, and recently joined Northumbria University to take up a Chair in Construction Economics.

Dr Sara Walker

Dr Walker is Director of Sustainable Buildings and Energy Systems in the School of the Built and Natural Environment. She is a physics graduate and qualified teacher with an MSc in environmental science. Whilst a researcher at De Montfort University, she gained a PhD on renewable energy policy impacts. A multi-disciplinary approach to the PhD research has led to a continued interest in the behavioural and technical barriers and solutions to uptake of renewable technologies. Following a five year stint in consultancy, Dr Walker recently returned to academia at Northumbria University with research and teaching interests in renewable energy.

Abstract

It is estimated that over 50% of UK CO_2 emissions arise from the buildings and industry sector. Globally, construction is estimated to be the world's largest employer with 111 million employees. The Built Environment sector is therefore a major economic player with significant environmental, social and economic influence across the globe.

Pressure on Built Environment degree curriculum partly comes from the professional bodies, with whom a large proportion of the School of the Built and Natural Environment's

programmes are accredited. Accreditation is in many cases a requirement in order for graduates to practise their profession while in others it is not a requirement but an expectation. As a result, accreditation is vital to the marketability of School degree programmes.

This paper discusses the key competencies within professional accreditation requirements for three case study subject areas within the School. Through this case study analysis it was found that all three accreditation requirements analysed referred to the accepted three pillar model of sustainability (see for example Kates et al, 2005; van Zeijl-Rozema et al, 2008; Mackelworth and Carić, 2010). Guidance in all three disciplines referred further to ethics and social responsibility. However, the three professional body accreditation guidelines differ in the prescribed quantity, and the detail of guidance, on sustainability criteria. In ensuring compliance with accreditation guidelines, the three subject areas have taken differing approaches across a continuum. The authors consider that the approaches taken, and the extent to which sustainability criteria are explicit or implicit within the curriculum, are in part influenced by the pedagogic approaches typical of the subject discipline.

1. Introduction

This paper discusses the key competencies within professional accreditation requirements for three case study subject areas within the School. The focus is on sustainable development with respect the wider issue of educating the global citizen.

Sustainable development is subject to many definitions, but often described as *'meeting the needs of the present generation without compromising the ability of future generations to meet their needs'* (World Commission on Environment and Development, 1987). The UK sustainable development policy approach has focused on the accepted three pillars approach of environment, social and economic issues (see for example Kates et al, 2005; van Zeijl-Rozema et al, 2008; Mackelworth and Carić, 2010).

The Built Environment sector has a role to play in delivering UK Government policy targets on sustainable development. It is estimated that over 50% of UK CO_2 emissions arise from the buildings and industry sector (Committee on Climate Change, 2008). The UK construction sector accounted for 6.5% of Gross Value Added (GVA) in 2007 (Office for National Statistics, 2010) and employed 2.3 million people at the end of 2008 (Office for National Statistics, 2009). Globally it is estimated to be the world's largest employer with 111 million employees (Murray and Cotgrave, 2007). The Built Environment sector is therefore a major economic player with significant environmental, social and economic influence across the globe.

The impact which the Built Environment has on environment, social and economic issues is not just restricted to individual buildings. For example, the way developments are laid out, infrastructure and transport provided, and proximity to key services, can also impact on the sustainability of the Built Environment. Therefore, sustainable development is a concern of relevance to all the disciplines within Northumbria University's School of the Built and Natural Environment (architecture, building services engineering, building surveying, construction, housing, project management, property and real estate, quantity surveying,

visualisation, geography and environmental management) and beyond the School into other disciplines such as engineering, psychology, and politics for example.

There is a growing pressure on the Higher Education sector to increase the 'sustainability literacy' of graduates: 'Sustainable development principles must lie at the core of the education system, such that schools, colleges and universities become showcases of sustainable development among the communities that they serve' (Great Britain, 2005).

Guidance regarding curriculum content for Built Environment programmes comes from Quality Assurance Agency (QAA) benchmark statements for subject areas. Pressure on curriculum also comes from the professional bodies, with whom a large proportion of the School's programmes are accredited. Accreditation is in many cases a requirement in order for graduates to practice their profession while in others it is not a requirement but an expectation. As a result, accreditation is vital to the marketability of Built Environment degree programmes.

In addition to QAA benchmarks and professional body guidance, curriculum development is influenced by research in the subject discipline, pedagogical research with respect to how learners learn, employer engagement and market research into competencies needed of graduates, and economic drivers to deliver HE programmes in an efficient and effective manner.

Education for Sustainable Development has been promoted by the United Nations, and a consideration of this is given in Mochizuki and Fadeeva (2010), who argue that the approach should be competence-output based but is instead primarily content-input based. A brief analysis of the sustainability requirements of professional body accreditation is contained within Murray and Cotgrave (2007). They reported that curriculum requirements were vague in this subject area, and therefore susceptible to relatively high levels of interpretation. Harvey (2004) proposed that accreditation was primarily a process of control and that this control process was less about safeguarding the public interest and more about representing professional body members' interests and reinforcing the body's own status. Stensaker and Harvey (2006) further found that public and private accreditation bodies focused on issues of quality and process in accreditation, with little or no emphasis on issues of the public good, such as social responsibility, cultural sensibility and ethics. The ethos and vision of accreditation is not discussed further in this paper, but is an interesting context to this review.

If the professional body can have a major influence on curriculum content through accreditation, where in the accreditation process is the driver to include global citizenship and sustainability in particular? This is the key question which this discussion paper aims to address. The paper discusses the key competencies within professional accreditation requirements in relation to the ongoing drive for graduates literate in sustainable development, for three case study subject areas within the School of the Built and Natural Environment at Northumbria.

2. Building Services Engineering

Current provision of Building Services Engineering programmes at Northumbria University is at Foundation Degree, Bachelors (Beng(Hons)) and Integrated Master (MEng) levels. These

professional qualifications are accredited by the professional body, the Chartered Institution of Building Services Engineers (CIBSE). Accreditation is important for graduates since completion of accredited programmes enables them to apply to CIBSE for Incorporated Engineer (IEng) or Chartered Engineer (CEng) status. These titles relate to standards of competency and are recognised across the sector.

In determining accreditation, CIBSE uses the UK Standard for Professional Engineer Competence (UK-SPEC) (Engineering Council, 2010). This standard has been produced by the Engineering Council and contains details of general and specific learning outcomes which higher education programmes are expected to deliver for engineering subjects. (It should be noted that the UK-SPEC and the Quality Assurance Agency (QAA) benchmark for engineering (Quality Assurance Agency, 2006) apply to a wide range of engineering disciplines and are therefore fairly generic by necessity). The economic, social and environmental context is one of five specific learning outcomes in UK-SPEC. Approximately one third of the knowledge and understanding general learning outcome relates to sustainability and it is one of four general learning outcomes. Further information is provided in Table 1.

Table 1: UK-SPEC sustainability criteria for engineering programmes (Engineering Council, 2010, p.11, 13).

Learning outcome type	**Identified sustainability criteria**
General learning outcomes	Knowledge and understanding: 'They must appreciate the **social, environmental, ethical, economic and commercial** considerations affecting the exercise of their engineering judgement'
Specific learning outcomes	Economic, social, and environmental context: • 'Understanding of the requirement for engineering activities to **promote sustainable development**'; • 'Understanding of the need for a high level of professional and **ethical conduct** in engineering'

CIBSE has produced guidance for accreditation of degree programmes (CIBSE, 2007), which refers to the UK-SPEC requirements and provides further elaboration on three key curriculum areas: design, health and safety and sustainability. With regards to the sustainability issue, there is recognition that the topic should be embedded throughout the programme of study. A key aspect of this integration of sustainability across the curriculum is the recognition that attitudes and skills are just as relevant as knowledge. Further information is provided in Table 2.

Table 2: CIBSE sustainability criteria for building services engineering programmes (Chartered Institution of Building Services Engineers, 2007, p.33-35.)

Criteria category	**Guidance on sustainability for criteria**
Attitudes/awareness	'An overarching approach to engineering problems in the context of **environmental, economic and social issues**, and other dimensions including **ethics and environmental justice'**
Skills	'Ability to work with complex/ill-defined problems Team work and communication skills Ability to evaluate the merits and demerits of options/feasibility assessment'
Knowledge – Broad and Deep	'Technical **Environmental** **Social processes** Legal'
Teaching and learning	'**Sustainability** issues need to be embedded into engineering education…Degree programmes put forward for accreditation are required to contain elements which provide a good understanding of a broad range of inter-related **social, economic and environmental** issues'
Topics	CIBSE guidance includes a range of topics under the headings attitudes, skills and knowledge, which could form part of a degree programme. This list includes, for example, an **environmental ethic, an awareness of social, economic, environmental and political implications of development, life cycle assessment, pollution measurement, natural systems, buildings and health**.

CIBSE's recommended approach to embedding the sustainability issue within the curriculum has been followed within the Building Services Engineering programmes at Northumbria University. One specific module in MEng final year deals with sustainability policies and practice, but elsewhere it is embedded across many modules and all years of study, particularly within project work.

3. Quantity Surveying

Quantity Surveying programmes are currently offered at undergraduate and postgraduate levels at Northumbria University. Programmes at both these levels are accredited by the Royal Institution of Chartered Surveyors (RICS). The undergraduate programmes have both

Foundation Degree and Bachelors (BSc (Hons)) provisions while the postgraduate provision is aimed at non-cognate bachelor's degree holders who intend to re-specialise in Quantity Surveying. These programmes are designed in compliance with the QAA benchmark Building and Surveying 2002 (Quality Assurance Agency, 2002) but now superseded by the latest version the QAA benchmark for Construction, Property and Surveying (Quality Assurance Agency, 2008).

The RICS is the major professional body that regulates the quantity surveying profession. The Northumbria Quantity Surveying graduates completing the RICS accredited programmes are eligible to enrol on the Assessment of Professional Competence (APC), a process by which a member can become a Chartered Quantity Surveyor. A Chartered Quantity Surveyor is recognised in the industry as the qualified professional to act as independent client advisor or consultant. Quantity Surveying graduates predominantly work for construction consultants or contractors providing expertise in cost and financial management and procurement of construction projects. As such they have a prime role in advising clients or construction contractors on sustainable construction and energy efficiency and their impact on whole life costs and procurement.

The successful achievement of the status of Chartered Quantity Surveyor depends on graduates' ability to complete RICS Quantity Surveying competencies as set out in the RICS QS pathway guide (RICS, 2008). There are 10 mandatory competencies, 7 core competencies and 07 optional competencies. These competencies are required to be satisfied at Levels 1, 2 or 3 depending on working environment of the graduate quantity surveyor. All mandatory competencies must be satisfied at level 1 (minimum for most) and all core competencies at level 3 with a selected 2 of the 07 optional competencies at level 2.

RICS have recently upgraded competency 'M009 – Sustainability' to the status of a mandatory competency required to be satisfied at level 1 (minimum) by all Chartered Quantity Surveyors. The Sustainability competency covers the role of the quantity surveyor in dealing with the impact of sustainability issues on development and construction. It requires members to be aware of ways to manage sustainability and its impact on financial management of projects. Further details on the competency are provided in Table 3.

Table 3: RICS sustainability criteria for quantity surveying programmes (RICS, 2008)

Competency	**Level description**
M009 - Sustainability	• Level 1: Demonstrate knowledge and understanding of why and how sustainability seeks to balance economic, environmental and social objectives at global, national and local levels in the context of land, property and the built environment. • Level 2: Provide evidence of the practical application of sustainability appropriate to your area of practice, and of awareness of the circumstances in which specialist advice is necessary. • Level 3: Provide evidence of reasoned advice given to clients

	and others on the policy, law and best practice of sustainability in your area of practice.

The BSc (Hons) Quantity Surveying programme conducted by Northumbria University attempts to meet the Sustainability competency requirement through several modules of the programme. A first year module titled 'Sustainable Development' primarily aims at establishing sustainability principles at the beginning of the programme while several other modules at Year 2 and Final year deal with procurement relate aspects and techniques of assessment such as Whole Life Costing and Cost Benefit Analysis respectively. However, the level of cohesion and integration of the broad levels of knowledge related to sustainability and its industrial transferability is an important factor that needs to be addressed in further curricular development.

4. Architecture

Architectural education in the UK is validated by the professional body, the Royal Institute of British Architects (RIBA) and prescribed by the Architects Registration Board (ARB), which is the 'competent authority' in the UK, legally responsible for ensuring that those registered as architects satisfy the requirements of the EC directive on architecture.

The current criteria for the required competencies of graduates are held in common by these two bodies, and are an interpretation of the 11 criteria stated in the EC directive (Council of the European Union, 2005), arranged under headings which related to design, technology and environment, cultural context, communication, management practice and law. There are separate criteria for the undergraduate (Part I), Masters or Diploma (Part II) and Professional Practice (Part III) stages of the education process. The current Quality Assurance Agency for Higher Education (QAA) benchmark on architecture deals only with the undergraduate programme, and is expressed differently from the ARB and RIBA criteria. A new set of criteria and QAA architecture benchmark statement has been published, agreed by the ARB, RIBA, and the QAA, covering all three stages of architectural education, which courses must satisfy from 2012. Parts I and II are more directly aligned to the EC Directive than in the previous criteria, but as the 11 points are very general, there is detailed interpretation of the meaning for UK architectural competences. In this case study, the new criteria are discussed.

4.1 The new criteria

The requirements for architecture described in the new QAA Benchmark suggest:

> *"While architecture education must be concerned with the constraints of the physical world and historical and cultural dimensions, it must also constantly adapt to a changing social, economic and environmental context exemplified by climate change, globalisation, cultural diversity, artistic practices, information exchange and new social relationships."* (QAA, 2009)

The criteria related to sustainable development are shown in Table 4.

Table 4: QAA sustainability criteria for architecture programmes (QAA, 2009)

EC Criteria	**Additional guidance in ARB/RIBA/QAA documents**
EU1 Ability to create architectural designs that satisfy both aesthetic and technical requirements	understand the constructional and structural systems, the **environmental strategies** ... that apply to the design and construction of a comprehensive design project
EU2 Adequate knowledge of the histories and theories of architecture and the related arts, technologies and human sciences	the differing **cultural, social**, intellectual histories and **theories and technologies** that influence the conceptual design of buildings; building design projects which reflect the influence of history and theory on the spatial, **social,** and technological aspects of architecture
EU4 Adequate knowledge of urban design, planning and the skills involved in the planning process	theories of urban design and the **future planning of communities**; contemporary planning policy and development control legislation, including **social, environmental and economic** aspects, and the relevance of these to design development
EU5 Understanding of the relationship between people and buildings, and between buildings and their environment, and the need to relate buildings and the spaces between them to human needs and scale	the impact of architectural design projects on the surrounding built environment, realised within **relevant precepts of sustainable design**
EU6 Understanding of the profession of architecture and the role of the architect in society, in particular in preparing briefs that take account of social factors	the potential impact of building projects **on existing and proposed communities**
EU8 Understanding of the structural design, constructional and engineering problems associated with building design	the physical properties and characteristics of building materials, components and systems, and the **environmental impact of specification choices**
EU9 Adequate knowledge of physical problems and technologies and the function of buildings so as to provide them with internal conditions of comfort	alternative systems for environmental comfort realised within relevant precepts of **sustainable design**, and ability to critically appraise these; strategies for building services in a design project,

and protection against the climate	and ability to **integrate an understanding of environmental theories and techniques**

It can be seen that although the eleven points of the EC directive are couched in very general language, the UK interpretation relates sustainable development to seven of the eleven points, and range from general knowledge of culture, societies, the urban context, sustainable development and climate change which inform high level strategies, to an understanding of principles and technologies which relate to detailed design of buildings.

At Northumbria, the concept of sustainable development is a key part of the programme philosophy, from first to final year, and learning takes place through the application of principles within increasingly complex projects. The undergraduate programme develops an understanding of the physical and social context that informs design process and this interest in projects with a connection to place extends to sustainability and materiality. The awareness and development of proposals in context lends authenticity to the process, and depth to the theoretical underpinning of the projects.

There are specific taught modules in both the undergraduate and master's programmes: an introductory module in first year of the degree programme, and one supporting the design projects in both third year degree and final year MArch (Part II). Application of environmental practice in building design is also part of the technology programme. Assignments relate to and inform design decision making in projects, which are increasingly based on research and a thorough investigation of broad physical, cultural, social, technological, ethical and theoretical issues; and sustainability is seen within this context. By this constructive alignment, students can see the relevance of the taught material, and in their final projects develop design solutions that respond to the complex multi-level issues of sustainable development.

5. Discussion

The three professional body accreditation guidelines differ in relation to the prescribed quantity of sustainability within the criteria. This is a very crude measure, but for comparison purposes elements of sustainability are within architecture guidance for seven of eleven criteria, quantity surveying guidance shows one of ten mandatory competencies with elements of sustainability, and sustainability is within building services engineering guidance for two of nine general and specific learning outcomes.

The three professional body accreditation guidelines also differ in respect the detail of guidance on sustainability criteria. This is again a very crude analysis. The quantity surveying guidance is the least detailed, referring to the need to demonstrate understanding and knowledge of sustainability issues, whereas guidance for architecture and building services engineering refers to specific topics of knowledge or skills.

All three accreditation requirements refer to the accepted three pillar model of sustainability: economic, social and environmental. Guidance in all three disciplines refers further to ethics and social responsibility, but only architecture guidelines extend this to the cultural dimension. None of the guidelines refer specifically to globalisation, poverty or the

Millennium Development Goals (United Nations, 2010), although these elements could be interpreted as part of the social pillar.

There is no indication in accreditation criteria of percentage of time allocated to sustainable development, which leads to a wide variation in approaches to course design and consequent issues as to whether all the criteria are addressed explicitly, implying a non integrated module approach, or implicitly within an holistic design strategy, in which case it may be difficult to demonstrate compliance. This is a tension which the HE sector has to carefully manage and the dynamics and politics of the relationship between HE and professional bodies is relevant to many disciplines beyond the Built Environment case studies shown here.

In ensuring compliance with accreditation guidelines, the three subject areas have taken differing approaches across a continuum. This continuum contains the two extremes of:

- Single modules clearly identified as comprising only sustainability issues in their title and module content, included at appropriate levels within the programme (explicit)
- No modules using the term sustainability within title or content, sustainability issues being embedded within all modules and across all levels of the programme (implicit)

BSc (Hons) Quantity Surveying comprises one specific module on sustainable development in Year 1. Sustainability is embedded in a discrete number of other modules at later levels of the programme. MEng Building Services Engineering comprises one specific module on sustainability policies and practice at Year 5. Sustainability is not specifically referred to in other module titles or content but is embedded to a significant extent across Year 1 to 5 of the programme. The BA(Hons) Architecture and MArch have specific sustainable development modules and sustainability issues are also clearly part of module content across other levels of the programme.

The pedagogic approach within the Architecture discipline and the extent to which sustainability criteria are embedded or compartmentalised within the accreditation criteria, appear to be key factors in the way in which sustainability is incorporated into the syllabus of the programmes reviewed. The project based approach within Architecture, as a pedagogic approach, perhaps lends itself to a more embedded approach to sustainability issues. This approach is also taken, to a lesser extent, in Building Services Engineering, which is also project based. It should be recognised that the pedagogic approach is likely to be influenced by the extent to which sustainability is embedded within the accreditation criteria, and therefore the programme, accreditation criteria and pedagogic approach are all linked.

The review of the three case study subject disciplines has shown, with respect to the analysis of accreditation guidelines, that professional body guidelines vary with respect to the extent to which sustainable development is embedded or stand-alone within the curriculum. The guidelines also vary with respect to the amount of detailed guidance on content of sustainable development curricula, although all guidelines refer to the three elements of social, economic and environmental issues.

Discussion of the programmes at Northumbria has identified that the extent to which sustainable development is explicit or implicit in the curriculum is influenced not only by the accreditation guidelines but also by the pedagogic approach appropriate to the discipline.

This interaction between explicit-implicit and pedagogic approach is worthy of further investigation.

There is a tension as to whether sustainable development is implicit or explicit within the curriculum given the relative ease or difficulty of demonstrating compliance with accreditation guidelines.

Higher Education in built environment should prepare graduates for the workplace (Attwood, 2010). The link with the professions through accreditation is a powerful mechanism for the HE sector to understand industry needs in many areas, including sustainable development. However there is a risk that the inclusion of specific areas of developing concern within accreditation criteria may be additive, progressively overloading curriculum content and consequently student workload; and short-sighted, with an emphasis on training in the use of current techniques, rather than educating the student to respond to changing demands throughout their professional careers.

There is, therefore, a continuing need for dialogue between Higher Education and the professions in order to achieve the appropriate educational balance for sustainable development within the curriculum.

6. References

Attwood, R. (2010, September 2). We can work it out. *Times Higher Education*, September 2010. Retrieved March, 2, 2011, from Times Higher Education Web site: http://www.timeshighereducation.co.uk/story.asp?storycode=413277

Chartered Institution of Building Services Engineers (2007). *Guidance notes on the preparation of documentation for accreditation of degree programmes*. London: CIBSE.

Committee on Climate Change (2008). *Building a low carbon economy - The UK's contribution to tackling climate change.* Norwich: The Stationary Office.

Council of the European Union (2005). *Article 46 Training of Architects* in Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications (2005L0036-EN-27.04.2009-005.001-43).

Engineering Council (2010). *The accreditation of Higher Education programmes: UK Standard for Professional Engineering Competence*. London: Engineering Council.

Great Britain (2005). *Securing the future: delivering UK sustainable development strategy*. CM 6467. London: HMSO.

Harvey, L. (2004). The power of accreditation: view of academics. *Journal of Higher Education Policy and Management*, *26*(2), 207-223.

Kates, R.W., Parris, T.M. & Leiserowitz, A.A. (2005). What is sustainable development? Goals, indicators, values and practice. *Environment*, *47*(3), 8-21.

Mackelworth, P.C. & Carić, H. (2010). Gatekeepers of island communities: exploring the pillars of sustainable development. *Environment, Development and Sustainability*, *12*(4), 463-480.

Mochizuki, Y. & Fadeera, Z. (2010). Competences for sustainable development and sustainability: significance and challenges for ESD. *International Journal of Sustainability in Higher Education*, *11*(4), 391-403.

Murray, P.E. & Cotgrave, A.J. (2007). Sustainability literacy: the future paradigm for construction education? *Structural Survey*, *25*(1), 7-23.

Office for National Statistics (2009). *Construction Statistics Annual 2009*. Newport: Office for National Statistics.

Office for National Statistics (2010). *Annual Abstract of Statistics No. 146 2010 edition*. Basingstoke: Palgrave Macmillan.

Quality Assurance Agency (2009). *Subject benchmark statement: Architecture. Draft for consultation September 2009*. Gloucester: Quality Assurance Agency.

Quality Assurance Agency (2008). *Subject benchmark statement: Architecture Construction, property and surveying.* Mansfield: Quality Assurance Agency.

Quality Assurance Agency (2006). *Subject benchmark statement: Engineering*. Mansfield: Quality Assurance Agency.

Quality Assurance Agency (2002). *Subject benchmark statement: Building and Surveying.* Gloucester: Quality Assurance Agency.

RICS (2008). *RICS Quantity Surveying Pathway guide.* Royal Institution of Chartered Surveyors.

Stensaker, B. & Harvey, L. (2006). Old wine in new bottles? A comparison of public and private accreditation schemes in Higher Education. *Higher Education Policy*, *19*, 65-85.

United Nations (2010). *The Millennium Development Goals Report 2010*. New York: United Nations.

Van Zeijly-Rozema, A., Cőrvers, R., Kemp, R. & Martens, P. (2008). Governance for sustainable development: a framework. *Sustainable Development*, *16*(6), 410-421.

World Commission on Environment and Development (1987). *Our Common Future.* G. Bruntland. (Eds.) Oxford: Oxford University Press.