Setting Global Academic Standards for the Building and Construction Industry: A Discussion Piece

Sidney Newton, s.newton@unsw.edu.au, The University of New South Wales
Martin Betts, m.betts@qut.edu.au, Queensland University of Technology
Richard Burt, rab0011@auburn.edu, Auburn University
Melvyn Lees, Melvyn.Lees@bcu.ac.uk, Birmingham City University

Abstract

Building and construction industry professionals are competent to practice because of the knowledge, skills and attitudes they have developed over the course of their education, training and work experience. Different professional groups, registration boards, companies and construction organisations in different jurisdictions can have quite disparate expectations of how professional competence should be constituted and how it might usefully be measured. With the globalisation of the construction industry and increasing mobility of labour it is timely to review how academic standards for building and construction professions should be benchmarked internationally.

This paper will review some of the global trends in academic standards generally, and compare and contrast more specifically the current developments in academic standards for building and construction in Australia, the UK and USA. The case will be made for setting academic standards for building and construction practitioners globally.

A variety of models for and approaches to setting global academic standards will be considered and discussed. The paper concludes with a proposed agenda for setting global academic standards in the building and construction industry.

Keywords: Academic standards, Benchmarking, Globalisation, Building and construction

1. Introduction

Significant developments are taking place internationally that relate to both the policy and practice of building and construction education. Those developments have implications at the micro and macro levels of higher education. They flow directly to and from the broader context of professional practice. Critically, these developments are being fragmented across national and professional borders. The opportunity exists for current global change to result in a more coherent and harmonious educational framework for building and construction.

It is useful in the current context to consider building and construction education as a single, important step on the pathway to professional practice. Figure 1 illustrates this notion of the pathway to professional practice as a series of steps. Taking building and construction education as the first step, this leads to a period of post-education training and industry experience, and only then leads to authentic professional practice. Progression from one step to the next is generally controlled through some form of assessment regime that ensures candidates have achieved the requisite standard to progress. The quality of those standards is assured at each step through a variety of conventions and systems.

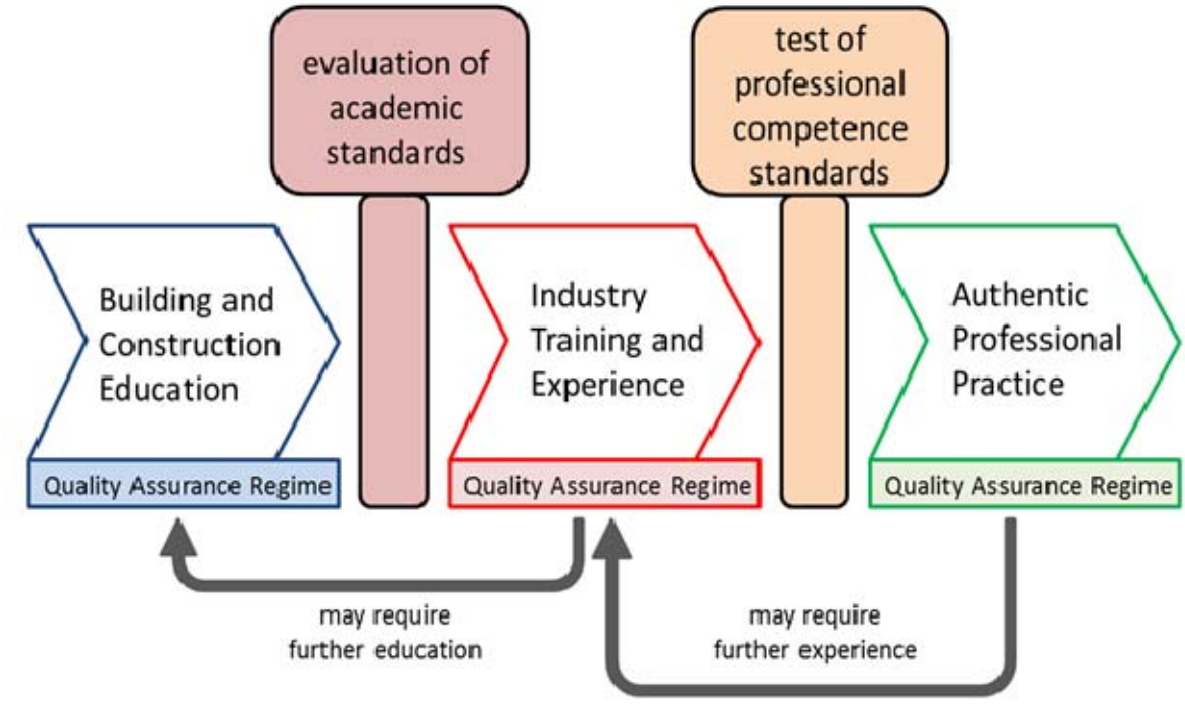

Figure 1: The pathway and Steps to Authentic Professional Practice

The quality assurance regime for building and construction education is achieved by mapping course outcomes to specific academic standards, aligning assessment tasks with course objectives, using appropriate learning and teaching strategies, maintaining provider standards, etc. The academic standards of building and construction education are then most typically evaluated by some external

accreditation agency. The quality assurance regime for industry-based training and experience is achieved by effective mentoring and supervision, broad exposure to and engagement with industry practices, structured training programs, etc. The professional competence of individual candidates is formally assessed by an appropriate professional body and specific test of professional competence. The quality assurance regime for professional practice is then assured by adhering to codes of conduct, continuing professional development, industry standards, effective human resource management, etc. At each step, a return to some previous step may be required.

It is also worth noting that Figure 1 is an idealised representation of the typical pathway. There is growing integration of industry training and experience into building and construction education. There is growing supplementation of industry training and experience with in-house building and construction (continuing) education. Whilst professional accreditation is not always the same as academic standards for learning and teaching clearly the two are intimately related. The difference is most often in terms of the underlying purpose. In the case of academic quality assurance, there is a focus on student learning outcomes that culminate in the award of an academic qualification. For professional accreditation, there is a focus on student learning outcomes in relation to the requirements for safe and competent professional practice. In building and construction, it is also the case that professional accreditation is not a prerequisite to authentic professional practice.

Building and construction industry professionals are competent to practice because of the knowledge, skills and attitudes they have developed over the course of their education, training and work experience. Different professional groups, registration boards, companies and construction organisations in different jurisdictions can have quite disparate expectations of how professional competence should be constituted and how it might usefully be measured. With the globalisation of the construction industry and increasing mobility of labour it is timely to review how academic standards for building and construction professions might usefully be benchmarked internationally. This paper is concerned with the academic standards of building and construction education: what the standards are, how they get accredited and how they should be benchmarked internationally.

2. Academic Standards

The term ‘academic standards’ is used in a variety of ways, and is often ambiguous (Yorke, 1999). Its definition has been explored in several recent reviews (see for example, Coates, 2010; Harris, 2009). Several key distinctions should be drawn:

(i) Provider standards versus program standards – the institutional standards of service provision, quality assurance protocols, resourcing and so forth, compared to the learning outcomes from particular programs of study. This paper concerns program standards.

(ii) Qualification standards versus discipline standards – the generic regulatory frameworks that stipulate the volume of learning, purpose of the award, broad capabilities, etc. for the different levels of learning awards (from school-leaving certificates through to PhD), compared to the

standards specific to a particular level of award made particular to a given discipline (such as building and construction). This paper concerns discipline standards.

(iii) Aspirational standards versus baseline standards – the standards set as goals towards which programs of study will develop, compared to the standards that all programs of study in a particular jurisdiction will be guaranteed to have achieved. This paper concerns baseline standards.

(iv) Content standards versus performance standards – the specification of program content in terms of subjects taught and knowledge delivered, compared with the evaluation of student capabilities and learning outcomes. This paper seeks to move the consideration from (input) content standards to (output) performance standards.

(v) Formative standards versus summative standards – the staging of learning development within the term of a particular program of study, compared with the staging of learning development at key points on the pathway to professional practice. This paper is concerned with summative standards at the transition point from building and construction education to post-education training and industry experience. That point is typically at graduation from a baccalaureate degree program.

The attention given to academic standards has grown significantly over recent years for a number of reasons:

(i) A broad recognition internationally that "the reach, quality and performance of a nation's higher education system will be key determinants of its economic and social progress" (Bradley, 2008: xi). This has promoted a series of national reviews of higher education, including in the UK (Dearing, 1997) and Australia (Bradley, 2008). A critical issue in all of these reviews has been the quality assurance of graduate outcomes, typically expressed in terms of academic standards.

(ii) The Bologna Declaration of June 1999 has put in motion a series of reforms, first in Europe but later in other jurisdictions, to help make higher education more compatible and comparable, within and across national borders (EACEA P9 Eurydice, 2010). The transparency and consistency of how academic standards are measured and reported is a fundamental platform of the Bologna initiative.

(iii) A more active engagement with and involvement in higher education practice by the relevant professional bodies. Professional bodies have sought to clarify and review their professional pathways, including giving particular attention to the accreditation of building and construction education programs. See for example, CIOB (2007) and RICS (2008). This drive by professional bodies to exert more specific influence on building and construction education has brought the question of academic standards into greater relief.

(iv) The currency and popularity of constructivist and experiential theories of learning has had direct impact on pedagogy and educational reform (Piaget et al, 2001). In particular, it has promoted

the teacher as a facilitator of learning and rendered added emphasis to student-centred approaches. Placing the student centre-stage in this way results in measures and criteria for learning that articulate around the learning achievements (outcomes) of each individual student.

A recent review of international trends in the development of academic standards specific to higher education identified five separate focal points for the consideration of academic standards related to learning outcomes (Harris, 2009). Figure 2 represents the conceptual framework emerging from that review, with the five focal points marked A through E. Points A to C each relate to setting expectations. D and E represent distinct approaches to the measurement of attainment.

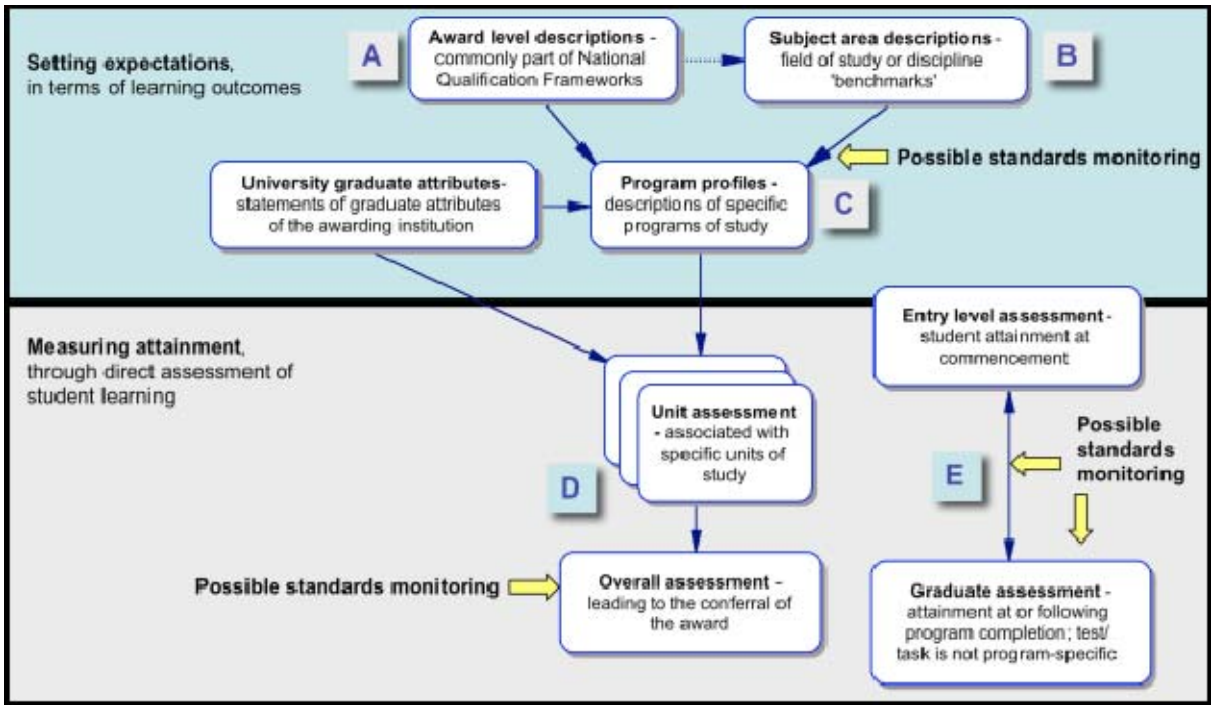

Figure 2: A Conceptual Framework for Setting Expectations and Measuring Academic Achievement (Harris, 2009: 2)

Point A (Award level descriptions) would include such initiatives as the Dublin Descriptors, defining learning outcomes in simple generic terms for broad application (available at: http://www.jointquality.nl/ge_descriptors.html). Typical terms include knowledge and understanding, applying knowledge and understanding, making judgements, communication, and learning skills. Point B (Subject area descriptions) would include such initiatives as The Tuning Process, which seeks to identify threshold-level learning outcomes for a wide range of subject areas, but particular to each discipline group (Tuning, 2010). Point C (Program profiles) would include such initiatives as the CoRe Project which seeks to identify learning outcomes specific to particular programs of study (available at: http://www.core-project.eu/?file=core1/background). Point D (Program-specific assessment) would include a broad range of initiatives, such as the external examination system of the UK, which seeks to determine whether a candidate has met or exceeded the threshold requirements for a particular award based on the actual assessment tasks completed (QAA, 2009). Point E (External

graduate assessment), possibly the most contentious, would include such initiatives as the AHELO project, which provide for a common, broad-based external method of measuring student attainment (OECD, 2009).

Together these five focal points identify the full range of issues to be considered relative to academic standards. This paper will consider only Point B initiatives, as initiatives at that level best accord with consideration of the building and construction discipline. It is recognised that much work has already been completed around the other points of focus, and that such developments will have implications for Point B. However, a review of the entire framework would be monumental and given that much work remains, probably premature.

3. Building and Construction Subject Area Descriptions

Subject area descriptions are perhaps best considered as benchmarking exercises for a particular field of study or discipline group. Building and Construction would represent such a field of study/discipline group, and be distinguished from the other fields of study that comprise the modern academy, such as Architecture, Engineering, Law, etc. This is not a clear boundary of course. The discipline of Building and Construction draws together a substantial range of otherwise distinctive communities of academic and professional practice, around a rich and dynamic mix of project activities. At the core of the discipline are a number of discrete professions such as Construction Management, Quantity Surveying, Building Surveying, Facilities Management and Property Development, united through a shared concern with the initiation, provision, operation and sustainability of the built environment. The broad nature and extent of Building and Construction can involve projects that vary in scale and complexity from a minor home renovation through to national-level infrastructure developments, with all levels of domestic, commercial and industrial activities in between.

With internal professional boundaries in a state of flux and the structure of the industry shifting, no clear definition of the discipline is likely to be agreed to by all stakeholders. There are further complications with the articulation of boundaries between Building and Construction and its allied disciplines such as Architecture, Civil Engineering, Business and Law. In key jurisdictions Construction Management is accredited as both a Building and an Engineering professional pathway.

Broadly speaking, however, Building and Construction work includes activities such as planning, commissioning, design, construction, alteration, repair, operation and demolition of any structure that forms a permanent or temporary part of the environment. It is a highly significant market sector of any modern economy, competitive and innovative. Most notably perhaps, it is very much a project-based industry. Any degree program in Building and Construction will therefore require students to study the science and technologies of multiple and varied forms of construction, the management of projects and people, market economics and finance, as well as the laws of business, contract and real property. As a consequence, Building and Construction programs of study draw upon knowledge, concepts and paradigms from a wide range of academic sources and a Building and Construction

graduate has the potential to pursue a host of divergent and emerging careers, both nationally and internationally.

Building and Construction professions operate as part of a multi-disciplinary team, often taking a leadership role. They are required to communicate formally and informally with the complete spectrum of stakeholders, from clients to subcontractors, from lay public to technical specialists, and from tradespeople to regulators. The project-by-project focus demands mental agility and analytical problem-solving capabilities that deliver specified building performance outcomes. Most critically, Building and Construction is a vocation. Practical experience is an essential element of any Building and Construction professional development. Fashioning the most effective relationship between academic and practical experience (their integration and balance), is perhaps the key challenge facing the discipline at this time.

Given that broad definition, what initiatives around academic standards for building and construction at the subject area level of description are current in different jurisdictions?

3.1 Australia

The Australian Government recently established the Tertiary Education Quality and Standards Agency (TEQSA) as a national body for the regulation and quality assurance of tertiary education against agreed standards. In 2010, the Learning and Teaching Academic Standards project commissioned 10 broad discipline groups to determine the Threshold Learning Outcomes (TLOs) appropriate to their discipline at a particular level of award (ALTC, 2009). Taken as a whole, the TLOs represent what a graduate is "expected to know, understand and be able to do as a result of learning" (AQF, 2010).

The TLOs for Building and Construction were developed through extensive consultation and engagement with the key discipline stakeholder groups. The consultation included all higher education providers of Building and Construction degrees in Australia, all relevant professional accreditation bodies (local and international), key industry professionals (representing small, medium and large organisational settings and a broad sample of industry sectors), key academic leaders, current students and recent graduates (Newton and Goldsmith, 2011). Each of the resulting TLOs is defined independently, but it is recognised that there are inevitable overlaps when graduates come to demonstrate each as part of a coherent assimilation of knowledge, skills and capabilities.

The TLOs are expressed as the baseline for graduation. All providers of a Bachelor-level degree program that promotes its graduates into the Building and Construction discipline would be expected to provide explicit evidence that they meet or exceed these standards at the time of graduation. Program diversity is valued and it is presumed that each relevant program of study will develop these and other learning outcomes beyond the baseline to a different extent, perhaps to reflect and distinguish their particular graduate profile from those of other providers.

The TLOs are expressed under six broad themes and each is structured to include one or more action verbs (what the graduate must be able to do), the level of achievement (how well they must be able to do it) and scope (in which context setting). The TLOs specified for graduates upon completion of any of a bachelor degree in Building and Construction in Australia are (Newton, 2011: 9):

- Integrate and evaluate the fundamental principles and technical knowledge of building and construction technology, management, economics and law.
- Identify and resolve typical building challenges with limited guidance, employing appropriate evidence-based problem-solving and decision-making methodologies.
- Critically and creatively reflect on personal behaviours and capabilities in the context of entry to professional practice.
- Interpret and negotiate building and construction information, instructions and ideas with various project stakeholders.
- Research and develop methods and strategies for the procurement and delivery of contemporary construction work.
- Demonstrate an integrated understanding of both the theory and practice of building and construction based on experience.

3.2 United Kingdom

The Quality Assurance Agency for Higher Education (QAA) published the first subject benchmark statement for Building and Construction (more specifically Building and Surveying) in the UK in 2002. This statement was reviewed and updated in 2008 as the benchmark statement for Construction, Property and Surveying (QAA, 2008).

Subject benchmark statements are developed by the relevant academic community. They establish the general expectations of the attributes and capabilities a graduate with a single honours degree within the subject of construction, property and surveying should have demonstrated. In addition to general expectations, subject-specific and generic skills are also identified. For Construction, Property and Surveying these skills are specified at two levels, namely threshold and typical. “The threshold standard describes the minimum level of attainment for the award of a single honours degree; the typical standard describes that achieved by the majority of graduates” (QAA, 2008: 8).

Threshold skills:

- Recognise the nature of the relevant specific discipline and its relationships within the context of the subject
- Describe and apply a range of relevant key concepts, theories and principles
- Identify and recognise relevant issues and why they are important
- Recognise and apply all relevant aspects of management and other specialisms within the context of regulatory requirements, the needs of society and ethical correctness
- Select and apply ICT applications appropriate to the discipline

- Present original ideas and reflections via a range of methods to convey appropriate standards of literacy and the use of numeric data
- Identify and explain the nature of the various working interactions and relationships in a professional context.

Typical skills:

- recognise and anticipate the need for change in the relevant discipline and perceive future trends leading to the formation of informed questions
- describe and examine a range of key concepts and theoretical approaches and evaluate their effective application
- analyse the relative importance of relevant issues and their future application
- evaluate and make judgements about all relevant aspects of management and other specialisms within the context of regulatory requirements, the needs of society and ethical correctness
- select and evaluate ICT applications appropriate to the discipline and evaluate and present original strategies to carry out a particular task
- analyse working relationships and interactions and evaluate their own strengths and weaknesses in a professional context.

3.3 United States of America

In the USA, accreditation in higher education is self-regulated, but requires explicit peer review of academic quality. The Council for Higher Education Accreditation (CHEA) is an association of 3,000 degree-granting colleges and universities and recognizes 60 institutional and programmatic accrediting organisations to accredit academic standards. Bachelor degree programs in Construction Management are accredited by either the American Council for Construction Education (ACCE) or ABET (originally the Accreditation Board for Engineering and Technology, but that title is no longer used).

The terms of an ACCE accreditation are set by prescribing minimum hours of academic credit across six curriculum categories (General Education, Mathematics & Science, Business and Management, Construction Science, Construction and Other). Within each curriculum category there are minimum hours of academic credit requirements for core subject material. In addition, there is a requirement for curriculum to contain a mix of fundamental and topical content. This three level structure of curriculum categories, core subject matter and fundamental topical content was established in 2002, following almost 10 years of committee work. For further details, see: http://www.acce-hq.org/. The ACCE is currently working towards a more learning outcomes-based approach to standards.

The terms of an ABET accreditation range across a variety of criteria (see: http://www.abet.org/criteria-engineering-technology-2012-2013/). The approach requires documented student outcomes that prepare graduates for explicit program educational objectives. For baccalaureate degree programs, the learned capabilities include:

- ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
- ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
- ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;
- ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;
- ability to function effectively as a member or leader on a technical team;
- ability to identify, analyze, and solve broadly-defined engineering technology problems;
- ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- understanding of the need for and an ability to engage in self-directed continuing professional development;
- understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;
- knowledge of the impact of engineering technology solutions in a societal and global context; and
- commitment to quality, timeliness, and continuous improvement.

4. Key Discussion Points

(i) Whilst there is much in common, substantive changes in context and conditions across national borders means important differences must be recognised and accommodated. Even within a jurisdiction, multiple accreditation models might apply to the same professional outcome. One-size of academic accreditation will not fit all globally.

(ii) The strong trend by national governments to require academic standards to be expressed in terms of learning outcomes offers real possibility for improved alignment internationally. It removes one of the critical differences between certain jurisdictions.

(iii) Any system of academic accreditation must be flexible and dynamic over time if it is to respond effectively to a rapidly changing context and the specific differences in particular situations.

(iv) Custodianship of the accreditation system is critical. Support appears to be growing for the notion that custodianship should be vested in a community of stakeholders rather than any particular vested interest, such as the providers themselves, governments or individual professional bodies. Unfortunately there is typically no obvious candidate in place to represent the community of Building and Construction stakeholders at a national or international level.

(v) The general lack of registration or licensing of building and construction professionals means there is no obvious alternative for universal quality assurance other than academic standards – the professional test of competence only applies to a proportion of professionals working in the industry.

There is a growing movement towards certification and licensing to regulate Building and Construction professionals, but these tend to remain voluntary as governments continue to resist any form of closed shop.

(vi) Other things being equal, government policies designed to promote broader access to higher education will inevitably place downward pressure on academic standards. Some robust minimum or threshold benchmarking requirement, if effective, would contain the downward pressure.

(vii) Internationalisation of the building and construction industry makes effective alignment of academic standards more vital. Organisations are increasingly multi-national, the industry is global and labour is highly mobile.

(viii) International agreements governing mutual recognition of academic qualifications in engineering (the Washington Accord and others) have helped promote international exchange and strengthened the standing of individual national accreditation processes. They have enhanced the position of the profession compared with other professions and increased mobility of professionals and the engagement of employing companies and education providers with their professional body. For example, the Washington Accord (http://www.washingtonaccord.org/) recognises the substantial equivalency of accredited programs and recommends that graduates of accredited programs from one signatory body be recognized by all other bodies as having met the academic requirements for entry to the practice of engineering in that jurisdiction.

Notwithstanding the other significant issues that arise at the various other points of focus in Figure 2, it is patently clear that even specific to Point B (Subject area descriptions) much is still to be determined before academic standards for building and construction can usefully be set globally. Nevertheless, key imperatives, emerging opportunities and important precedents all suggest that now is the critical moment for discussion and consideration to begin and progress. Some further clarity to, and consensus around, the key discussion points presented in this paper will drive the possibility of global academic standards for building and construction forward significantly.

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