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AN EVALUATION OF CONSTRUCTION PROFESSIONALS SUSTAINABILITY LITERACY IN NORTH WEST ENGLAND

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Sustainability represents the UK construction industry's most important and indeed challenging issue, placing it at the forefront of both current debate and government policy. As pressure increases on the industry to embrace its principles, a radical shift is required in the awareness, understanding and cultural acceptance of its potential benefits. Whilst a shift is slowly being realised at a strategic level, delivering sustainable construction in practice remains a challenge. Not least due to a lack of sustainability awareness and engagement amongst construction professionals revealed by successive quantitative surveys, and a need to raise sustainability literacy levels. In an attempt to understand why construction professionals give so little credence and genuinely struggle to attain sustainable construction in practice, eight in-depth semi-structured interviews were conducted in North West England. The research explored their awareness, understanding and literacy levels of sustainability and how this impacts their ability to deliver the concept at both theoretical and applied levels. Findings suggest that whilst practitioners exhibit a strong awareness at a theoretical level, this often is highly individual in interpretation promoting inconsistency within and across projects. At an applied level, construction professionals observed a gap in the application of the sustainable construction in practice due to 1) a tick box mentality enshrined in sustainability appraisal tools such as BREEAM; 2) an isolation from key decisions related to sustainability, and 3) a lack of awareness amongst client organisations. The research concludes by proposing further data collection to both expand the sample and contrast these preliminary findings with professionals who desire a more sustainable model of delivery.

Keywords: construction professionals, learning environment, sustainable construction, sustainability literacy.

INTRODUCTION

Sustainable construction has emerged as a clear agenda over the past decade and is driven by a desire to realise the potential economic, social and environment benefits from a more efficient and sustainable construction industry (Pearce 2006). In the UK, this agenda has been supported by a number of strategies emphasising the industry's role in delivering national climate change and sustainable development targets: UK Sustainable Development Plan (2005); Sustainable Procurement Strategy and Action Plan (2006); Sustainable Communities Plan (2003); the Low Carbon Transition Plan (2009); culminating in the revised Strategy for Sustainable Construction (2008). Sustainable construction brings a previously disparate agenda together under a

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common framework where climate change and traditional issues of environmental sustainability, are considered alongside economic sustainability (i.e. contribution to the wider economy, Considerate Contractors and Corporate Sustainability) and wider societal issues (i.e. quality of life, well-being, equity and social justice). The likes of Rees (2009) recognise the need for radical change in professional practice, requiring a promotion of greater integration in the project process and the adoption of a whole-life view of a building which considers its implications for the three sustainability pillars (i.e. environmental, economic and social).

The need for change is apparent, and the UK government have demonstrated a desire to progress the agenda through their own construction procurement strategies (HM Government 2011; Berry and McCarthy 2011); the revision of planning requirements and application of Code for Sustainable Homes in England, Wales and Northern Ireland and BREEAM for non-domestic buildings, changes to building regulations in England and Wales (Part L) and Section 7 in Scotland. With around 40% of construction procured through the public sector, a focus of spreading sustainable practices into the wider construction industry through public procurement and reflected in its promotion within major projects such as London Olympics 2012; Glasgow Commonwealth 2014 Games and CrossRail. Indeed the Construction 2025 Industrial Strategy (BIS 2013) cites a clear objective from policy makers for UK construction industry to emerge as a market leader in sustainable construction.

LITERATURE REVIEW

Readiness of construction professionals to respond

Despite this, it is clear that the ability of the industry and its professionals to respond to the scale of the problem advocated by the likes of Rees (2009) and achieve the pace of change proposed within Construction 2025 Industrial Strategy has been questioned by high profile reviews citing a chronic skills shortage and a lack of sustainability literacy amongst professionals as key barriers (BIS 2010). Recognition has emerged that this change will not occur organically with a number of surveys amongst construction professionals citing an inherently low level of understanding amongst construction professionals of the implications of sustainable construction on their role, and how practice needs to evolve (CIOB 2013; Dixon *et al.* 2008). Many decisions related to delivering sustainable construction are often counter intuitive to traditional practice and to overcome this construction professionals require education around the rationale and wider implications emerging from these decisions. This appreciation is important to deliver the cultural shift required to move sustainable construction away from being viewed as an enforced agenda and to instead view it as an aspiration for projects (Thomson and El-Haram 2014).

Despite increased investment to up skill construction professionals in green and sustainable technologies and practices, it is questionable as to whether current training programmes and learning practices are sufficient or appropriate to meet the challenge ahead. Whilst acquiring specific skills is important, it is clear that a suitable learning environment is required for construction professionals in order to help change the mindset. Hansmann (2010) writing about the development of sustainable education argued that sustainability literacy is key for professionals to recognise their role in its delivery and then to provide a stimulus for acquiring the necessary skills and appreciation of new technologies and techniques. Unless professionals are sufficiently literate in the holistic nature of its principles, view it through a multi-disciplinary lens and can relate to its often specific language, they are going to

struggle to be able to reflect on its implications for their own role within construction practice.

Emergence of sustainability literacy

Sustainability literacy starts with an appreciation that our current mode of production and way of life is inherently unsustainable with far reaching immediate and long term implications on economy and society (Orr 2004). Stribbe (2009) argues that people need to survive and thrive in challenging conditions and that they need the skills and attributes to demonstrate ecological intelligence and technological appraisal whilst appreciating that there is no one right way. A review of the theory reveals two levels of learning required to raise literacy levels. The first relates to a need for a holistic, multi-disciplinary appreciation of the core principles and implications of sustainability on decision making (Dawe *et al.* 2005) and the second focuses on the importance of experiential learning (Kolb 1984) and that real life understanding is required for its implications. The following section looks at how well equipped current learning within construction is to support these two levels.

Current learning environment for sustainable construction

Dixon *et al.* (2008) reported on a survey of RICS professionals highlighting a stubborn low level of awareness and understanding of sustainable construction, a trend shared by surveys of other professionals over the last decade by Dale (2007), CIOB (2013) and RIBA (2014). Professional bodies over the last decade have sought to foster sustainable construction within their professional competency frameworks, developing associated CPD programmes for their members and have established it as an integrated requirement for their accredited degree programmes aimed at ensuring new graduates are sufficiently literate (Murray and Cotgrave 2007). Hansmann (2010) argues that other disciplines started to evolve their sustainability degree level curriculums in the 1990's but it took another decade before built environment disciplines systematically embedded sustainability within their higher and further education provision. Trade associations are moving to increasingly facilitate awareness of sustainable construction practice and technologies with provisionally accredited formal education through CPD (Gleeson and Thomson 2012). Yet as Gleeson and Thomson (2012) espouse, promoting sustainable construction is as much about changing the mindset and culture of its professionals as it is about developing skills to implement the technologies and new techniques. A question exists as to whether the current formal approaches to learning remain skills based and fail to provide professionals the holistic understanding necessary to change the mindset and culture. It is clear that on its own formal learning remains insufficient to achieve the levels of change advocated by the likes of Wostenholme (2009) and recently within Construction 2025 (BIS 2013).

Concern exists for construction professionals who have not been engaged in formal education in the last decade (or even at all) and have limited access to sustainability related training or professional CPD, as to their ability to achieve the necessary sustainability literacy. Learning within construction is primarily rooted in experiential learning (Kolb 1984) focused on learning by doing through informal pathways to education associated with apprenticeships, work shadowing, peer support and communities of practice which also promote mutual and social learning (Mathur *et al.* 2008). A question exists as to whether these often individually driven learning pathways effectively foster sustainability literacy.

Existing professionals with busy roles are faced with limited opportunities to engage with formal learning environments, and instead rely on specific guidance from literature, schemes such as BREEAM or even outsourcing responsibility to sustainability consultants (Schweber, 2013). Schemes such as BREEAM play a significant role in raising sustainability profile and performance within the industry but that through its often prescriptive and checklist format that, it has been argued, fails to educate professionals beyond compliance (Fortune, 2008). It is failing to provide the depth of understanding to encourage professionals to question the agenda and its implications, or to understand the reasoning for some of the best practice being recommended to them. Therefore concern exists that this is not raising sustainability literacy levels sufficiently, and on its own whilst raising performance levels will not facilitate the cultural change required (Murray and Cotgrave 2007). The potential for change is highlighted by a recent NBS survey (NBS 2014) arguing that 4 out of 5 professionals consider personal belief and values as the primary motivation for the promotion of sustainable construction practice. The RIBA (2014) suggested that personal commitment is more powerful than regulations, client demands, and company policies as the main driver. An approach is sought which provides construction professionals understanding and challenges them to revolutionise their approach by placing sustainability as the core objective from the outset and to move away from a perceived struggle to adapt conventional practice in a way that is merely 'less unsustainable' (Rees 2009).

The literature highlights the combination of a chronic skills shortage and lack of sustainability literacy as fundamental barriers to the evolution and growth of the UK construction industry. Whilst theory reveals two levels of learning through which sustainable literacy could be enhanced with successive surveys contributing little to our understanding of where UK construction professionals sit on this learning continuum. Further work is therefore needed if we are to understand the extent of the sustainability literacy challenge and devise strategies to overcome it.

RESEARCH DESIGN

The research reported, set out to explore the extent to which construction professionals are sustainability literate by examining whether the current learning environment for promoting sustainable construction is sufficiently supporting an appreciation of the holistic principles of sustainability, and experiential learning through formal and informal learning pathways. Research is required to explore whether current approaches based on promotion of best practice and focused development of specific skills, is failing to sufficiently engage professionals in the principles and implications of sustainable construction for their practice. To meet the objectives, the phenomenological paradigm was adopted, making use of an inductive research strategy supported by a survey methodology based on in-depth interviews.

Data collection and analysis

The research reported in this paper represents the first stage of a broader study, and presents the findings of eight in depth interviews with a range of construction professionals, from the North West of England. To achieve a balanced view participants were selected using discriminate sampling, which maximises the opportunity of relevant data collection from a small sample. Details of the sample are outlined in Table 1. Participants were invited to take part in a semi-structured interview held at their office and lasting approximately 45 minutes.

The interviews sought to establish the key thematic areas from which a broader research agenda can be established. Interviews focused on sustainability awareness levels, challenges of current practice and establishing a suitable learning environment for promoting sustainability literacy. The interviews were recorded with the consent of participants, fully transcribed and loaded into Nvivo qualitative analysis software before being thematically analysed. Open coding was used to identify sub-categories associated with the central themes outlined above. Once a large number of nodes were identified, axial coding revealed relationships between nodes and sub-nodes. As the analysis continued, each category was developed to reflect the content of the data collected and draw out more detailed categories. In developing this process, the data was repeatedly analysed.

Table 1: Research Participants

	Role	Sector		Role	Sector
Participant 1	Project Manager	Commercial Developer	Participant 5	Sustainability Consultant	Independent Practitioner
Participant 2	Services Engineer	International Consultancy	Participant 6	Architect	Small Consultancy
Participant 3	Director of Surveying	Local Authority Consultancy	Participant 7	Senior Architect	National Consultancy
Participant 4	Sustainable Design Manager	National Contractor	Participant 8	Director of Development	Local Authority

EMERGENT VIEWS FROM PRACTICE

Sustainability Awareness

The majority of professionals interviewed portrayed a sufficient understanding of the theory of sustainability, when asked what they thought sustainability was and what it entailed the majority suggested that sustainability was *“the whole kind of environmental, social and economic stuff”* (Int.2) and *“sustainable construction involves more than just the building”* (Int.1). However, this understanding does not always translate into support for the concept, as one respondent espoused *“Whilst I understand sustainability, it’s not a philosophy of subscribe to in all honesty as I don’t think it is really proven”* (Int.8). Yet the majority routinely considered how sustainable construction could be enshrined into the projects they were involved with, although this was often constrained by their professional role. Nonetheless, a consensus of support emerged, together with an apparent desire to increase their knowledge and understanding of sustainability.

Despite this commitment, when asked about the specifics of their contribution the majority lacked the knowledge required to competently explain how they had implemented their principles in practice. Namely, that they sought to incorporate methods and techniques to mitigate against environmental impact. As one architect explained they had *“put on what would you call it . . . Eco bling I suppose, slap it all on the buildings, but it doesn’t serve a purpose”*(Int.6) whereas the services engineer explained he *“design[ed] sustainability systems [by] throwing in PV panels. Considering wind turbines, ground source heat pumps or whatever technology”*(Int.2).

Challenges of current practice

Given the discussion above it is perhaps not surprising the professionals interviewed identified a number of challenges associated with the implementation of sustainability.

Sustainable development driven by legislation

The majority of those interviewed for this study continue to view sustainability as a target driven concept associated with a need to tick boxes to ensure compliance with government policy, rather than something that can genuinely enhance the project, society and the environment. As one consultant candidly admitted *“If I am honest [we are implementing sustainability] not particularly out of choice but . . . because of legislation more than anything”* (Int.3).

Examples of this compliance culture included a 14-storey student accommodation building, where the architects suggested they in effect added a token sustainability feature to meet the planners' desire for sustainable buildings. Where the architect admitted, *“We put a green roof on it [the scheme] as planners want to see sustainable methods”* (Int.6). Unfortunately, this has on occasion led to a situation where various regulations and policy demands become contradictory, as there *“tends to be an overlap with planning, building regulations and other regulations. And you're finding that you've got a conflict sometimes between the two, or that you're doing things twice because the planners want it built to [a specific] BREEAM [standard]”* (Int.3).

With such a strong compliance culture, it is hardly surprising that professionals feel disconnected and even resentful of sustainability. Imposing sustainability on the construction industry in such a target driven way is damaging future evolution. With a number of professionals, admitting they feel so de-motivated and disinterested in sustainability, they do the minimum demanded. As one architect opined, *“there is very much an attitude of getting away with it i.e. what's the minimum we can do to achieve the minimum requirements”* (Int.7).

Dominance of sustainability assessment frameworks

Given the strong focus on BREEAM amongst regulators, it is perhaps unsurprising that the interviews revealed widespread support for the use of frameworks such as BREEAM. Predictably, the sustainability consultants argued BREEAM provides *“a good way for somebody saying or taking any design team to get them to do something better and make them reevaluate what they are designing. . . .in terms of sustainability”* (Int.4). A view strongly supported by a second sustainability consultant who argued the framework not only considers energy and carbon but also *“assesses the ecology of the site, recycling to help reduce waste and all that kind of stuff and also look at management issues”*(Int. 5). Whilst others felt the adoption of frameworks such as BREEAM bridged the gap between traditional and more sustainable ways of thinking about buildings. As an architect explained, *“it gets some options on the table and have a look at which one will suit you best”* (Int.6) without the need for an extensive understanding of sustainability, as one Project Manager attests, *“What we actually need to know to comply with BREEAM it's next to nothing to be honest”* (Int.1).

Others, however, were critical of the use of such a rigid points driven approach, reinforcing Rees (2009) assertion that the BREEAM is methodologically flawed. For example the director of one local authority consultancy argued that such frameworks are *“quite academic in outlook leading to a situation whereby a lot of effort goes into scoring a few points, which, sometimes, is not even adding anything to the sustainability of the building”* (Int.3). A view further espoused by the CEO of a small practice who suggested they would *“sometimes question the value in people's time in achieving those points for very little ... fine if it's going to increase the thermal efficiency of the building, those sort of things are great, but there are other elements*

where you begin to wonder is this really value for money in as much as how much it's costing to actually achieve it" (Int.6).

Client understanding

A number of the participants suggested a lack of both commitment and understanding on behalf of the client presented a fundamental barrier to sustainable construction. One sustainability consultant suggested, "not every developer and client are as well informed or as well educated about sustainability" (Int.5). A view echoed by the services engineer, who opined "you tend to find that the construction professionals have all got sustainability upmost in their mind but the clients haven't" (Int.2). Yet as a sustainability consultant suggested this situation was evolving, with public sector clients becoming "switched on to sustainability [and] leading the private sector on that sort of thing" (Int.5). When asked why she felt this was the case, she suggested the public sector was simply more informed about the need to embrace sustainability, as "not every client are as well informed or as well educated as others" (Int.5).

Yet those employed directly by client organisations portray a different picture of sustainability awareness. In the private sector, a project manager employed by a developer suggested the incorporation of sustainability was not reflective of the organisations' knowledge, understanding or awareness. It was a commercial decision, driven by the need to respond to market demand. "It all depends on who the tenant is. Some tenants are very BREEAM driven. If you're a commercial developer and you've got a block of offices and you can offer 'BREEAM Very Good' or 'BREEAM Excellent' it's a big tick in somebody's corporate and social responsibility to move into the building" (Int.1). Whereas those in the public sector suggested sustainability was not optional "if you want the funding for some project or other you need to prove how sustainability will be achieved it's as simple as that" (Int.8). Whilst client awareness presents a challenge, the majority of professionals suggested sustainability would only be incorporated when the market, legislation or government policy demanded it.

Establishing a suitable learning environment

The consultant interviewed alluded to a significant shift in attitudes towards sustainability, suggesting more of the professionals she worked with were showing an increasing interest in delivery sustainable buildings. However, despite this, she still felt the industry was not doing enough to facilitate sustainability literacy, as the "lack of education in the industry means professionals lack the understanding they need to advise their clients"(Int.4). In an attempt to develop a better appreciation of the viability potential of formal and informal pathways to learning, views on learning opportunities ranging from self-directed study through to sustainability qualifications were elicited.

When questioned directly about enhancing their sustainability literacy, a number of respondents felt they only needed to know and understand enough about sustainability to successfully implement frameworks such as BREEAM and to ensure legislative requirements are achieved. One project manager opined, "What we actually need to know to comply with BREEAM is next to nothing to be honest" (Int.1). Knowledge a sustainability director asserted could be acquired from legislation, as it is "starting to come through and saying to a laymen reader that this is what we are expecting you to do in [this] aspect of sustainability"(Int.5). Yet the director of an architectural practice felt, "a self-directed approach is fine if you're just working on projects requiring a relatively low level of sustainable design but you could not deal with a

complex project this way” (Int.7). A view supported by another architect who warned “the literature is very confusing and you have to pick your way through it, so it's sometimes difficult to know that you're giving the best advice with so much confusing information out there” (Int.6).

The alternative to experiential learning is to undertake some manner of formal learning. Indeed the colleague of one participant “*is training to become a code assessor so there is someone within the office that can advise on green methods and techniques and point us in the right direction” (Int. 7) to enhance the ability of the practice to advise on and deliver sustainable design. Yet the sustainability consultant who completed a master's degree in environmental management warned of the dangers of attending short courses as those who complete them “don't always fully appreciate the complexities of sustainability and how it relates to the built environment” (Int.5).*

The alternative to attending short courses or CPD seminars is to undertake a structure programme of study offered by higher education providers. Although when discussing such intensive courses delivered by academics the project manager expressed concern that “*whilst they may well be provided a good commentary on sustainability, I think there's a fine line whether you go into too much detail and people switch off” (Int.1). A view echoed by the services engineer argued if such courses “talked about the building and how that impacts on sustainability and what you can do as a professional to impact on that or not impact on that, I suppose, that's where you would pick up and find it interesting” (Int.2).*

DISCUSSION

Sustainable construction has emerged as a clear agenda for the UK government, with a succession of top down policy documents published over the past decade calling for increasing levels of industry engagement with sustainability. Yet at the same time successive large-scale surveys of practice continued to reveal stubbornly low levels of engagement and understanding in terms of sustainability (Dale 2007; Dixon *et al* 2008; CIOB 2013; RIBA 2014) but seldom offered any deeper reflection from the participants as to why this occurred or indeed how their personal views and beliefs inform their practice. As with these earlier studies, the interviews revealed a significant disparity between construction professionals understanding and perception of the importance of sustainability and how these perceptions translate into practice.

The majority of practitioners interviewed demonstrated a clear commitment to sustainable development, with the majority suggesting all three aspects of sustainability were important to the construction process. Unfortunately however, with the majority engaged in trying to deliver sustainable construction from a position engrained in a business as usual model, the dominant paradigm in construction practice. This personal commitment to sustainability has not been translated into their individual practice. Indeed their slightly negative view of the sustainability agenda and a lack of literacy reflects the challenge they see in delivering an agenda that challenges business as usual with a more sustainable model which requires counter intuitive actions as market forces alone are unlikely to deliver sustainable outcomes (Rees 2009). As Rees (2009) himself argues, such actions require both top down legislative change as well as bottom up innovation. Whilst the former is evidence in the succession of government policy pronouncements, those interviewed didn't display the required level of sustainability literacy needed to instigate such bottom up approaches.

Whilst Murray and Cotgrove's (2007) on-going work with new entrants to the industry evidences that it is possible to provide a basic level of awareness, which can then be refined and extended through experiential learning in the workplace (Schweber 2013) to engender bottom up innovation. The interviewees were highly critical of this approach when used with mid-career professionals. Indeed many felt facilitating learning through targeted CPD or training was ineffective, with the majority favouring practice orientated experiential learning. However, throughout the course of the interviews the respondents sought to identify a number of barriers to the implementation of sustainable development which they used to try to justify why they could not engender further change in their practice, which calls into question the veracity of the arguments offered against formal learning processes given the support for such methods reported amongst other groups such as construction SME's (Gleeson and Thomson, 2012).

Despite, this however, a number of professionals suggested that they were beginning to embrace sustainability, albeit through the medium of assessment frameworks, a finding supported by Dixon *et al's* (2008) study which found that the implementation of BREEAM was in most case, the respondents only engagement with sustainability. Whilst such frameworks are in themselves open to critique, with authors such as Brandon and Lombardi (2011) questioning their appropriateness as they fail to appraise sustainability in its fullest sense. The interviewees felt such tools provided scaffolding around which experiential learning can take place, as they felt empowered to think about sustainability in an experiential way, with the safety net of expert guidance, a view reinforced by Schweber (2013). Whilst tools such as BREEAM represent little more than an adjustment at the margin that will in itself will not engender change (Rees 2009). Such adjustments can in themselves have a significant effect on the sustainability literacy of the professionals involved whilst moving the industry to a less unsustainable position (Rees, 2009)

CONCLUSIONS

The findings from this research raise questions about the sector's continued reluctance to engage with sustainability and sustainable development. The research findings suggest that the virtuous circle of blame observed over a decade ago has yet to be broken. With the professionals interviewed for this study engaged in trying to deliver an agenda from a position that is engrained in a business as usual model. Their slightly negative view of the sustainability agenda and a lack of literacy reflect the challenge they see in delivering an agenda that challenges business as usual with a more sustainable model that requires counter intuitive actions. Profit, client led decision-making and a regulatory system which remains slow and unwilling to challenge the industry to evolve its practices (evidenced by the code for sustainable homes abandonment in March 2015). This presents a system that is not going to achieve the progress required. Yet, those interviewed also didn't display the required level of sustainability literacy which raises the question, could a very different outlook have been achieved with professionals engrained in the sustainability agenda? In an attempt to advance knowledge in this area, further work is now proposed to test this hypothesis, the study will both expand the initial sample of professionals reflecting the dominant mode of delivery and contrasts this with a second series of interviews undertaken with professionals engaged in or desiring a more sustainable model of delivery. The 1st provides validation of our initial findings and the 2nd allows us to hear from those engaged in trying to deliver the agenda in practice.

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