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BETTER DEFINITIONS, BETTER BUILDINGS?

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ABSTRACT

Because of the magnitude of their impact on the environment, the way we design, build and operate our buildings must change. So-called ‘sustainable’ buildings are now appearing in our cities. However, the term ‘sustainable’ is now so widely used that it has lost all meaning. Other equally ill-defined descriptions are also being used of the new generation of buildings appearing in the built environment. These terms, including ‘environmentally friendly’, ‘low energy’ and ‘green’. This paper argues that a lack of clarity over meaning can foster illusions, reflect careless thinking and/or provide cover for a business-as-usual agenda. In universities, courses for today’s architecture and construction management students are being redesigned to include ‘sustainability’. However, a review of subject guides from Schools of Architecture in Australian universities indicates that ‘sustainability’ is also being used misleadingly. While there is merit in both of the professional accreditation systems for buildings in Australia, there is certainly room for improvement. One scheme reinforces illusions by rewarding features that should merely be regarded as good building design. The ‘sustainability’ objectives of the other scheme have narrowed significantly from the original intent. The authors conclude that the critical thinking of our students will be sharpened by defining sustainability correctly and that meaningless descriptors of buildings must be challenged.

Keywords: buildings, sustainable, education, curriculum, industry.
INTRODUCTION

In late 2008, the Age newspaper carried a bold statement that “sustainable buildings [had been] put on the map” (Dowling, 2008). The map, produced by Melbourne City Council was launched at the World Sustainable Buildings conference which was held in Melbourne that year. The map identified the location of 38 ‘sustainable buildings’ and eight water saving projects; some in the CBD and others further afield in Melbourne. Are these buildings really sustainable in the true sense of the word or have they just been badged this way as a result of the misuse of language? The article prompted the authors to reflect on what we say to university students about sustainability, particularly to construction and architecture students, and how this might be reinforced or contradicted by the industry for which they are being trained.

Buildings are responsible for 38% of all primary energy consumption (IAC, 2007), which indicates that the building sector must be a major participant in any transition to a sustainable society.

While it may be too early to judge the efficacy of the eco-labelling of commercial buildings in winding back emissions, there is evidence that warrants concern. Over ten years ago, the Australian Greenhouse Office published an analysis of greenhouse gas emissions from the commercial building sector (AGO, 1999). A key project finding was that emissions were expected to almost double by 2010 under a “business-as-usual” scenario. By the end of 2006, emissions had risen by 87%, indicating that little had changed (DCC, 2010). In the US, Schofield (2009) re-analysed the data by the National Building Institute of 121 commercial buildings, which had been accredited using the Leadership in Energy and Environmental Design (LEED) rating system of the US Green Building Council. Schofield (2009; 1387) found that the “LEED-certified commercial buildings, on average, showed no significant primary energy savings over comparable non-LEED buildings”.

This paper does not claim that there is necessarily a connection between inaccurate definitions and poor buildings. However, it is contended that it is impossible to get where you want to go without knowing the route, and in order to decide on the route, you must know the address! Morasky (1997; 87) states that goals (in our case,
sustainability) must be ‘specific enough to permit objective interpretation’. This paper explores these issues. It begins with definitions of sustainability and what it means to be sustainable, and contrasts this with the ambiguous words used by the industry. Some examples from university curricula illustrate how the current mislabelling of buildings is being reinforced. Lastly, the paper critiques the two main accreditation systems used to evaluate new and refurbished buildings, and to what extent they contribute to the confusion.

THE MEANING OF SUSTAINABILITY

According to an early policy document on sustainability from the Institution of Engineers Australia, “Sustainability is the ability to maintain a desired condition over time” (IEAust, 1994). This simple definition agrees with what most of us instinctively know to be the meaning of the word. This definition means that sustainability is the goal or aim of a process or system. It is not the process or system itself. By implication, therefore, being ‘sustainable’ is a characteristic of that process or activity. Since sustainability is a steady state condition, then the process or activity is either sustainable or it is not. If the bank manager tells us that our financial situation is unsustainable, then we know immediately that our cash inflow is less than our cash outflow. At a global level, we now know the level of carbon emissions we can release into the atmosphere to maintain a certain atmospheric concentration, one which hopefully will avoid uncontrolled changes in our climate. Inputs of carbon dioxide must equal the various mechanisms for absorbing the gas.

Contrast the clarity of the above definition with that used to describe ‘sustainable’ buildings and the other terms ‘environmentally-friendly’, ‘low energy’ and ‘green’ that are widely used in the building sector. Wikipedia (2010) tells us that: “[a] sustainable building or green building is an outcome of a design which focuses on increasing the efficiency of resource use – energy, water, and materials – while reducing building impacts on human health, and the environment during the building’s lifecycle, through better siting, design, construction, operation, maintenance and removal.”
The definition of a sustainable building says nothing about a maintained condition, or any balance between resource inputs and waste outputs. All that is required is some reduction in resource use and waste production. How much reduction is not quantified. Does that mean that a new building that makes only a meagre reduction in resource use and impacts compared to existing stock can be described as ‘sustainable’?

The Cambridge Dictionary (2010) defines the term ‘environmentally friendly’ to mean goods and services that inflict little or no harm on the environment. A media release in 2004 from the South Australian Government announced the “Green Light for Environmentally-Friendly Government Office Accommodation” (SA Government, 2004) and the NSW Government has a programme to make your home an “environmentally friendly building” (NSW Government, 2008). The National Timber Development defines an ‘environmentally-friendly’ building design as one that:

“aims to minimise impact on the natural environment by using materials and adopting design practices that reduce total greenhouse gas emissions and the use of non-renewable energy over the life of the building.”

In this case, minimising impact is the only criterion for an environmentally friendly building. But against what measure? Greenhouse gas emissions and non-renewable energy need to be reduced, but compared to what?

The term ‘low energy building’ is used by the Property Council of Australia in its guidelines for reducing energy consumption from buildings by energy management and design (PCA, 2001). Use of the term continues a tradition established by the council’s predecessor, the Building Owners and Managers Association (BOMA, 1994). Initially, the targets for low energy buildings were based solely on the performance of existing building stock. The later methodology combined this approach with detailed auditing and simulation to establish benchmark targets. The term is both comparative and temporal in nature. It is highly likely that today’s ‘low energy building’ is tomorrow’s energy guzzler.
The American Environment Protection Association (EPA, 2009) describes the practice of green building as:

“…creating structures and using processes that are environmentally responsible and resource-efficient throughout a building’s life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green building is also known as a sustainable or high performance building.”

The term ‘green’ is probably less informative than any other in use as a descriptor of a building, because it conveys absolutely nothing in contrast to other terms in use which at least suggest an inkling of intent. Most of the above definition describes outcomes that should be sought in any designer or architect. One Australian building, described as ‘deep green’ (Johnson, 2001), provides an example of how it is possible to fail even the basic criterion of a low energy building (Taylor et al., 2008). In this case, a rammed earth office building used more energy for heating than a comparable concrete office building in the same location. The description ‘green’ is also likely to be era-dependent. Today’s green building may be viewed in years to come as being quite ‘brown’.

**DOES IT MATTER?**

So does all this loose usage of language and the introduction of vague and even meaningless terms really matter? Likewise, are those who argue for a more rigorous use of terminology simply being pedantic? The authors contend that it does matter for a variety of reasons. Firstly, use of these vague words allows our illusions to continue and remain unchallenged. If we accept that living within the earth’s capacity is the paramount challenge of this century and that we are currently living unsustainably, then hard decisions can be avoided if we convince ourselves with illusions that we are taking adequate steps.
Secondly, sloppy use of language can reflect confused or careless thinking. Many of the buildings we construct today should be here at least to the end of the century. It may be too late then to say to that we wish we had designed and built with more accountability to a precise notion of ‘sustainability’. If we had better definitions, we might indeed have better buildings.

Imprecise language can provide a cover for many to hide under and continue their ‘business-as-usual’ agenda. Chapman (2004) argues that “sharpening definitional clarity [in the language of sustainability] reduces the size of the umbrella and limits the room to shelter under it … “. There are apparently more than 300 definitions of sustainability and therefore understandably there is confusion over its meaning (Sustainability Now, 2009). The words ‘sustainability’ and ‘sustainable’ have been co-opted by every section of society to the point where the words have become meaningless clichés i.e. words so commonly used that they are “drained of all meaning” and are now “dead bit[s] of filler material” (Wallace-Crabbe, 2008:1). It is ironic that sustainability, so vital for the continuation of life as we know it, should now have fallen into the category of the lifeless.

Some might argue that this definitional precision does not matter anyway because in reality there is no such thing as a sustainable building. After all a sustainable building would be one that has a zero or positive net environmental impact over its lifetime in terms of direct and embodied energy, biodiversity, resource use and waste production. In these terms, our current buildings are far from sustainable. Until such time as the sustainability of a building can be demonstrated against these variables, these authors would contend that the term should not be used.

**SUSTAINABILITY TEACHING IN SCHOOLS OF ARCHITECTURE**

To breathe meaning into meaningless words like ‘sustainable’ will be no mean feat. In the building sector, the responsibility lies with its professionals, particularly architects and designers. Educating the next generation of professionals to use (or stop using) words correctly (or incorrectly) is the responsibility of universities. Rajan (2009) and Stergiopoulos (2009) reviewed the course guides of twenty schools of
Architecture and Building in Australia and New Zealand as research topics for their Masters in Architecture from Deakin. While the main purpose of these reviews was to determine to what extent the teaching of ‘sustainability’ was integrated into the whole degree rather than as an ‘add-on’, the reviews indicate the extent that sustainability now appears in various tertiary architecture syllabi.

Rajan and Stergiopoulos found design subjects with titles such as ‘Ecologically Sustainable Design’, ‘Sustainable Architecture’ and ‘Design for Sustainable Communities’ were on offer in the twenty universities they surveyed. These subjects complemented more general units entitled ‘Introducing (or Introduction to) Sustainability’ and Sustainable Development. While it is not possible to critique these subjects in detail, handbook entries indicate that ‘sustainability’ can be a catch-all title and used misleadingly. For example, in one subject entitled ‘Architectural Design – Sustainability’, “students are taught passive design principles and how to critically examine climatically appropriate design”. While the teaching of these principles is vital, it is not, in the authors’ opinion, the same as teaching what sustainability is or might look like. A well-designed passive solar house may require zero operational energy input, but may be far from sustainable because of its high embodied energy content and impact on biodiversity.

It is also acknowledged that what is actually said to students in the lecture theatre can be more (or less) detailed than what is outlined in handbook entries. For example, one of the authors’ discovered when giving a guest lecture in a week-long postgraduate subject entitled ‘Sustainable Buildings’ that halfway through the course that no-one had discussed what a sustainable building might look like! A similar finding was made by De Jong (2008), who studied the teaching of sustainability at a school of architecture within context. She posed the questions; where is sustainability taught; what is taught; what guides the teaching and how are they related. She found that one unit professing a sustainable approach had only one lecture on sustainability and this was “delivered in the final week of the unit, when students have already completed their integrated project!”
There are two ‘environmental’ rating schemes in Australia used to evaluate buildings
Green Star and NABERS. These schemes are very different in branding, aims and
methodology.

Green Star ratings are issued by the Green Building Council of Australia (GBCA),
whose mission is “to drive the adoption of green building practices through market-
based solutions” (GBCA, 2010). Rating tools are used at the design, refurbishment or
construction phase of a building and require demonstration that the building has been
designed with the specified ‘green’ features. While the intent of the scheme is
laudable, it does reward features that should really be regarded as best practice.
Lstiburek (2008) has made a similar criticism of American LEED scheme. However,
credit is also given for design work which is beyond best practice and Green Star
recognises – at least in design – the possibility of a building with zero greenhouse gas
emissions.

The GBCA states that “a sustainable property industry will balance (our emphasis)
environmental, social and economic issues to ensure a viable and valuable industry
for future generations”. While respecting the need for balance, it is not the needs of
the market place that will determine environmental sustainability. As Daly and
Townsend (1993: 29) states “the limits regarding what rates of depletion and
pollution are tolerable must be supplied by ecology”.

The NABERS scheme is the reporting tool for the Energy Efficiency in Government
Operations policy and was introduced in 2004. The scheme rates a building on its
performance (rather than its design) against statistically-generated benchmarks. As
such it overcomes the weakness of the Green Star program. Its current focus is on
energy and water efficiency, and the scheme rewards a reduction in these two
indicators of building design and operation. However, the original thinking behind
NABERS was to include a much wider range of measurables, including biodiversity
and habitat destruction, embodied energy and resource efficiency. Fay et al. (2001;
1296) envisaged that a five star NABERS building would be “one that is made from
sustainable, renewable materials, that has no deleterious emissions in use, and that enhances biodiversity”.

More than 60% of the buildings in the Sydney CBD and 50 per cent of all Australian CBDs now have NABERS ratings, and according to the manager of the scheme have achieved an average 13 percent reduction in carbon emissions (Perinotto, 2010). The current NABERS scheme makes no claims to sustainability or green practice. It does not reward dubious indicators and therefore does not reinforce illusions.

CONCLUSIONS

The definition of ‘sustainable’ used by the building industry and governments alike falls far short of what the word actually means, and therefore should not be used. Illusions about the sustainability of new buildings are supported by the use of other meaningless terms such as ‘environmentally friendly’ and ‘green’, which should also no longer be used to describe the new generation of buildings. Building professionals need to think critically about the way buildings are described. Schools of Architecture in universities play a key role in developing this critical thinking because they are responsible for educating the next generation of professionals.

REFERENCES


