Environmental Science and Sustainable Development

Guilty by Association: Addressing Sustainability in Architecture Education

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Abstract

Despite the growing interest in sustainability, negative associations of this term with naïve discourses, green-washing, or low-quality design are still common within some areas in the discipline of architecture. Through a literature review and an examination of the programs of the top ten architecture schools, this article explores the causes and implications of this slight but persistent discredit of sustainability in the field of architecture. The article discusses how some of the perceived downsides of sustainability are reflected on the university curricula, as the fragmented understanding of environmental problems or the overly technical approach to their solution within technology and design. The discussion also addresses the improvements brought by recent multidisciplinary explorations of environmental issues made within the architectural humanities, that provide students a comprehensive historical, social, and cultural understanding of the issue.

1.Introduction

Over the past two decades, the increasing awareness of environmental issues has encouraged architecture schools to expand their offers on sustainability lectures and programs. Many institutions are even integrating architectural schools into the more comprehensive Environmental Design departments, which have a much more interdisciplinary approach to construction than the traditional architecture education. However, there is still within the discipline a subtle rejection of sustainability —usually stronger among historians and theorists (Hurley, 2009; Baird, 2011)— that has inadvertently distanced many architects from the entire subject of environmental problems.

Although negative views of sustainability are not prevalent, they have been nonetheless withholding the full engagement of the discipline with environmental issues, and it is the intention of this article to discuss the reasons behind these negative views. To this end, first, the literature review presents an analysis of the bad reputation of sustainability among architecture professionals and scholars in section 2. The study then places the discussion in the context of education through a careful examination of the programs and syllabi of the world's top ten architecture schools, which is further explained in section 3.

It is not the purpose of this article to cover all the complex problems of the integration of sustainability in higher education, for which there is an extensive array of general and discipline-specific research (Wright, 2003; AIA, 2006; Shari & Mohd, 2006; Guy & Moore, 2007; Altomonte, 2009; Kahn, Vandevyvere and Allacker, 2013; Iulo, Gorby,

Poerschke, Kalisperi and Wollen, 2013; Gale, F., et al., 2015; Gucyeter, 2016; Higgins, B., & Thomas, I., 2016; Ismail, Keumala and Dabdoob, 2017; Hassanpour, Alpar and Ghader, 2017). This discussion article hopes to bring forward a relevant analysis of the particular subject of the negative connotations associated with sustainability among some scholars. Moreover, despite the focus on architectural programs of the 2016-2017 academic period, this discussion intends to reach a readership beyond this field and timeframe to share some insights into a problem that may affect other areas of knowledge.

2. Architecture and Sustainability's bad press

Architecture is a complex discipline. It involves the creative act of design, the ability to manage strict scientific data for the construction process, and the aptitude to reflect on philosophical matters as aesthetics or the conflicts of our contemporary world. Within architecture education, these multiple and interconnected dimensions are addressed on an ever-increasing variety of lectures that allow for various categorizations. Howevetr, for the specific purpose of this article, lectures are divided in the traditional areas of building technology, design, and humanities.

Building technology has been the area most committed to solving the environmental crisis, but it is also the source of some polemics that have encouraged the distrust in the concept of sustainability (Czajkowski, 2016; Green 2018). For example, the growing phenomenon of green-washing —or 'false sustainability'— has had a negative impact on the public's perception of sustainable architecture (Jurado, 2016; Graham, 2017). Authentic efforts of achieving efficient constructions are affected by the misuse of 'ecogadgets' that serve more as status symbols than as efficiency enhancers (Williamson, Radford and Bennets, 2003).

Within architectural research, the international certification systems for green buildings have become a frequent target of criticism. One of the most frequent claims against leading certifications as LEED or BREEAM is that they make too much emphasis on energy efficiency, encouraging a fragmented and limited approach to sustainability (Wargo, 2010), overlooking other important problems as resource depletion or pollution (Newsham, Mancini and Birt, 2009). These certifications have also been accused of endorsing deficient assessments of the building's life cycle (Scofield, 2009; Blaviesciunaite and Cole 2011), of being potentially harmful for local identities (Cole & Valdebenito, 2013), and of unwisely disregarding the benefits of traditional constructions (Dirlich, 2012). Still, the biggest limitation of these certifications is that their usefulness is rather symbolic since, on a global scale, the percentage of buildings achieving real sustainability is negligible (Jarzombek, 2009; Kozak, 2014).

Within the area of design, attitudes towards sustainability are more complex. Trends in this area are usually guided by the built and written work of renowned practitioners, better known in the field as 'starchitects' (Ponzini, 2018). For the particular purpose of this discussion, starchitects' postures towards sustainability could be broadly divided into two major approaches, namely, sustainability seen as a guiding element intrinsic to the design process, and sustainability seen as a feature subordinated to other more important interests of the design process, as it is done with plumbing or electric systems.

Among the most publicized contemporary architects involved with green or sustainable design –the ones representing the first approach– are Richard Rogers, Bjarke Ingels, Renzo Piano, Stefano Boeri, and Ken Yeang. The active engagement of these architects with sustainability is apparent in their buildings and discourse. Their theoretical production on sustainable architecture is not as extensive as their built work, but there are noteworthy contributions as Roger's book 'Cities for a Small Planet' or the development of the concept of 'hedonistic sustainability' by Bjarke Ingels (Jacobsen & Tester, 2016).

For the second group of architects, efficiency is not a central aspect of the design process, and despite the mainstream popularity of sustainability, this is the prevailing approach among architectural practitioners. This, however, does not necessarily imply that these architects are unaware of environmental issues or that their buildings are less sustainable. In the work of these architects, other concerns as formal experimentation or the social role of the building take priority in the design process. Some examples of this second group are Remment Koolhaas or Peter Zumthor. Although most of their late designs do consider efficiency and environmental impact, sustainability or environmental problems are not usually part of their discourse (OMA, 2018; Zumthor, 2006). When talking about their own production, these

architects make emphasis on other aspects of architecture as formal issues, the effects created by different spaces, or the relation of the building with its context.

Within this group, there are architects who straightforwardly condemn sustainable architecture. The most recognized personality in this regard is the American architect Peter Eisenman, an open critic of contemporary green construction. On a controversial interview from 2009, Eisenman stated that '"green" and sustainability have nothing to do with architecture', adding that '[s]ome of the worst buildings [he has] seen are done by sustainable architects' (Eisenman, 2009). Today most architects would not openly share this view, but there is consensus in that sustainability does not necessarily translates into good architecture, or bad for that matter (Moss, as quoted in Hosey 2012; Kozak, 2016).

Within architectural humanities, there was until recently a widespread rejection of sustainability as a serious subject of research, either as a general concept or as applied in construction. Architecture historians and theorists tend to avoid the term because of its vagueness or ambiguity (Pareja and Støa, 2004; Moe, 2007; Fuller, 2010; Schroeder, 2018) and it is still common within this area for comments on sustainability to quickly turn into semantic disputes. The lack of serious theoretical grounds or significant architectural contribution of green architecture have also been common reasons to reject sustainability within the humanities. But perhaps the most harmful association has been that of sustainability with the uncritical acceptance of naïve discourses and compliant attitudes (Guy and Moore, 2007; Jaimes, 2016). Two decades ago, the professor of urban planning, Peter Marcuse, stated that 'the promotion of "sustainability" may simply encourage the sustaining of the unjust status quo' (Marcuse, 1998), while more recently, Koolhaas' analysis of the smart city movement denounced that 'traditional European values of liberty, equality, and fraternity have been replaced in the 21st century by comfort, security, and sustainability'(Koolhaas 2014).

Besides the harm that these associations made to the image of sustainability, there was a lack of an appropriate body of knowledge on environmental problems, suitable for discussions on architecture in humanities. However, in the last decades the production of architecture history and theory has been accompanying the developments of other environmental humanities in the creation of more comprehensive and critical perspectives of sustainability (Rawes, 2013; Axel, Colomina, Hirsch and Vidokle, 2018). A new framework for the contextualization of contemporary architecture has become available through the insights on the politics of the Anthropocene of Bruno Latour (2004), while Kate Soper's challenging reinterpretation of the good life (Soper, Thomas and Ryle, 2009) offers valuable insights into social changes. Similarly, the works of William Cronon (1995) and Timothy Morton (2007) on nature and wilderness are enriching architects' reflections on the relationship of the built and natural world.

3. Sustainability and Architecture Education

Despite all the criticism of current practices of sustainability, there is a general agreement on that future architects should be educated on the subject. Nevertheless, the integration of any current issue into education is bound to provoke controversies, and sustainability has not been an exception. One of the most vocal critics of the incorporation of sustainability into education is the British architect Austin Williams. In his view, environmental discourses tend to be misanthropic (Williams, 2008) and he argues that sustainability education 'undermines critical engagement and replaces it with blind loyalty' (Williams, 2013). This point of view is extreme and shared by few (Peterson & Wood, 2015), but is driven by a premise widely accepted among architects, which is the shortage of critical approaches to sustainability.

In order to examine how the shortcomings of sustainability perceived by architects relate to education, a review of the top ten architectural schools was made. The institutions selected were the ones occupying the top ten places of the Architectural Schools ranking made by the British firm Quacquarelli Symonds (QS), one of the world's leading higher education analysts. The schools and departments reviewed belong to the following universities: The National University of Singapore (NUS) and The University of Hong Kong (HK) from the Asian region; Harvard University (GSD), Massachusetts Institute of Technology (MIT), and the University of California-Berkeley from the Unites States; and from Europe, the University College London-Bartlett (UCL Bartlett), Manchester University, Cambridge University, Delft University of Technology (TU Delft), and the Swiss Federal Institute of Technology in Zurich (ETH Zurich).

The official programs and brochures that were publicly available of these ten schools were carefully examined. For the seven schools where syllabi were available (NUS, HK, Harvard GSD, Berkeley, MIT, TU Delft, and ETH Zurich), a comprehensive review was made of the contents of the lectures offered. A total of 1364 course descriptions were

examined to determine if and how they addressed sustainability or current environmental issues. The categorization of a lecture as 'environmentally aware' was not strictly limited to those that used particular terms as 'sustainability' or 'environment' — or any of their variations. It was taken into account that references to these subjects were often made indirectly, as for example with the citation of an author highly concerned with environmental problems or with the inclusion of technical means that reduce the environmental impact of buildings. It should be considered that all the lectures surveyed belonged to the architectural departments. This study examines the standard curriculum of the architecture schools and does not consider cross-listed lectures or other options offered in which students tailor their majors or minors with lectures from other departments, making each student's experience highly individual.

The percentage of lectures by area who address the environmental issues is shown in Table 1, while Table 2 shows the percentage of lectures in the six schools where the available information allowed for a distinction between graduate and undergraduate lectures. It is important to note that the main purpose of the survey is not to conduct an exhaustive evaluation of sustainability in architectural education —for which the data is not suitable— but to explore the content of programs and syllabi to discuss possible connections with the issues covered in the literature review.

Table 1. Percentage of Environmentally Aware Lectures by Area

School	Building Tech. (%)	Design (%)	Humanities (%)
Harvard GSD	48%	34%	10%
MIT	33%	9%	18%
Berkeley	35%	30%	16%
TU Delft	44%	43%	25%
ETH Zurich	30%	11%	16%
HK	30%	10%	13%
NUS	33%	45%	35%

Table 2. Percentage of Environmentally Aware Lectures by Program and Area

School	Building Tech.	Design (%)	Humanities (%)
MIT Und.	62%	6%	6%
MIT Grad.	10%	12%	30%
Berkeley Und.	38%	45%	20%
Berkeley Grad.	33%	17%	14%
TU Delft Und.	100%	45%	19%
TU Delft Grad.	30%	43%	28%
ETH Zurich Und.	22%	10%	19%
ETH Zurich Grad.	38%	13%	15%
HK Und.	29%	7%	18%
HK Grad.	31%	13%	13%
NUS Und.	50%	48%	33%
NUS Grad.	20%	37%	39%

3.1. Building Technology

In architecture education, this area provides from the most basic construction knowledge about structure to the most complex computations of hyperbolic rooftops or house automation. This area also deals with all the aspects of human comfort, as thermal regulation, humidity, acoustic control, and lighting. The traditional goal of these subjects has been to teach future architects how to create safe and comfortable environments. Nevertheless, in the last decades, building technology has gained the additional responsibility of providing the technical knowledge for an efficient use of resources, low energy consumption, and the minimization of pollution.

In accordance with the situation in architectural practice, the predominance of the technical approach to sustainability was apparent in all ten architectural programs. Six out of the seven universities with available syllabi had the highest percentage of lectures dealing with sustainability within building technology, with percentages ranging between 30% and 48%. Within the universities in which graduate and undergraduate programs could be differentiated, four out of six cases had a higher percentage of sustainability lectures in undergraduate programs, being the highest percentages found in MIT (62%) and TU Delf (100%). This outcome confirms that the technical instruction on sustainability is seen as part of the basic education that an architect should have, and not only as a specialization. This is also evident in the reviewed schools not included in the tables, as UCL Bartlett, Cambridge, and Manchester School of Architecture, where courses on sustainability technology are offered during the first years of undergraduate programs (Manchester School of Architecture, 2017; UCL Bartlett, 2017; University of Cambridge, 2017).

As discussed in the previous section, one of the causes of the negative image of sustainable architecture within building technology is the emphasis on inefficient certification systems. However, despite the importance of these certifications in practice, the subject is surprisingly absent from technical lectures. To become a professional with LEED or BREEAM credentials it is necessary to undertake a specialized test of such institutions. Some architectural schools, as Harvard GSD or UCL Bartlett, provide courses to prepare these tests, but these are not included in the official architectural programs. The rare lectures that explicitly claim to address sustainability certifications seem to be aware of their limitations, as the MIT course 'Design for Sustainability' (Ochsendorf, 2016), which covers some requirements of the LEED certification, but in combination with a system called Life Cycle Assessment, which is one of the alleged weak points of the system.

Following the trends of architectural practice, the subject most commonly addressed in sustainable technology lectures is energy efficiency, mainly approached through the enhancement of thermal control, ventilation, and lighting. On the other hand, the appropriate use of water, the management of construction waste, and other issues associated with environmental problems are still rare. However, within the reviewed syllabi there are scarce but valuable examples of lectures dealing with subjects other than energy. At MIT, structure courses include the assessment of the environmental impact of structural systems (Ochsendorf and Mueller, 2016), where a lecture on building materials at ETH Zurich considers the availability and lifecycle of materials (Carmeliet, Koebel, Trzebitowski, Winnefeld, Zimmermann, 2016), while at TU Delft, the course 'Zero-Energy Design' introduces strategies on waste products in accordance to regional plans (Broersma, 2016). The growing awareness of the negative effects of the energy-focused approach to sustainability is apparent in the content of new lectures as 'Renewable Resources and Architecture' (NUS, 2017), where the impact of the construction industry in the natural environment are examined. Moreover, the MIT course 'Modelling Urban Energy Flows for Sustainable Cities and Neighborhoods' provides an understanding of the subject that goes beyond the limits of the building, encouraging students to examine environmental issues related to urbanization and greenhouse (Reinhart & Jones, 2017).

3.2. Design

Courses in which students engage in design practice are considered the backbone of architectural education. This category includes everything from the first drawing and modelling lectures to graduation projects where future professionals must create comprehensive architectural designs. Studio-based courses are regarded as the most important for the development of design skills, and at some universities, as UCL Bartlett, design studios can reach up to 70% of the required courses (UCL Bartlett, 2019). Architecture schools offer several studio options with different approaches to design achieved by either integrating art, making emphasis on computational skills, or focusing on the

conservation of historical areas. It is in design studios where students learn how to integrate the knowledge acquired in other lectures. This fact becomes especially relevant for sustainability since design decisions can have an important effect on the building's performance. A proper orientation can maximize natural sunlight, the level of insulation changes according to the materials chosen, and facade decisions can hinder or favor natural ventilation.

All the programs reviewed have a wide range of design courses fully or partially dedicated to sustainability, but in smaller percentage than in building technology. NUS is the only university with the highest percentage of courses claiming to consider sustainability within the area of design (45%). These results reflect the predominant attitude in architectural practice, that takes sustainability as one of the requirements to which constructions must comply, and not as a crucial guiding premise of the design process. Still, a positive aspect revealed by the review is that, as in building technology, most universities have a higher percentage of design courses that include sustainability on undergraduate programs.

The degree of engagement of design studios with sustainability varies extremely. Within studios where environmental issues are not the main concern, students are not normally expected to undertake efficiency calculations, at least not within the framework of the studio requirements. A good example to illustrate this approach is the TU Delft studio 'Housing the Inner City,' where the premise is to design a housing project for the city of Johannesburg. In this studio, students are asked to conceive an urbanization strategy for an area with a difficult economic and social context of segregation, gentrification, and over-population (Brillembourg & Klumpner, 2017). Within this context, environmental issues are only one part of the complex equation. Not all studio proposals are as complex as this one, but students usually have to deal with a wide range of difficult factors while keeping the focus on the overall design. General sustainable measures must be foreseen, as it is done with structures or electricity systems, but detailed specifications are not expected. In most universities, the technical knowledge to achieve an efficient design is taught separately in building technology courses. That is the case of the University of Cambridge, where from the first undergraduate year, technical lectures on environmental systems and bioclimatic design are offered with the explicit intention of preparing students to evaluate the performance of their own designs (University of Cambridge, 2017).

Within design courses entirely focused on sustainability, approaches tend to be more technical. For instance, at the University of Hong Kong advanced computational methods are taught as part of design studios (The University of Hong Kong, 2016). In this type of studio, efficiency calculations do take precedence over design, but contrary to what might happen in building technology courses, the functional, formal, and aesthetic aspects of the building are as important as the performance of the building. The search for aesthetic quality is understood to be an implicit aspect of design courses. However, the syllabus of some courses as 'Zero Energy Residential High-Rise' from Harvard GDS (Malkawi & Gill, 2017), explicitly state that the aesthetic aspect of the design will be taken into account, possibly in response to the associations of green architecture with poor quality design. Unlike courses in building technology, the term sustainability rarely appears in the syllabi of design courses, and when it does, it is frequently written within quotation marks.

Although the emphasis on technological aspects is predominant, a small group of design studios are providing a more comprehensive approach to environmental issues. The studio directed by the influential Rem Koolhaas at Harvard GSD, focuses on the social consequences that environmental changes have in rural areas and examines, among other subjects, the emerging counterculture communes and the interaction of animals and humans (Koolhaas, 2017). In this interdisciplinary studio, students collaborate with experts from fields such as bioscience, anthropology, history, robotics, and environment studies. Another interesting example is the studio directed by Carola Hein at TU Delft entitled 'Architecture and Urbanism Beyond Oil', which also addresses environmental issues from a perspective still unusual in architectural schools. Her studio focuses on the current oil dependency, and students are encouraged to think about the larger political, economic, and socio-cultural contexts of architecture and urban design (Hein, 2017). These studios —both directed by scholars who have produced theoretical work related to environmental issues (Hein, 2009, Koolhaas, 2014)— take the examination of environmental issues beyond the subject of energy efficiency, which is essential to explore comprehensive views of sustainability that incorporate social change.

3.3. Humanities

Courses on architecture humanities deal with the development, aims, and principles of architecture. All courses dedicated to history and theory, as well as classes or workshops dealing with the socio-cultural aspects related to architecture such as sociology or ethics, are considered within the humanities. The complex array of lectures considered as humanities allow students to understand the evolution of styles, reflect on the formal language of architectural movements, and explore the different ideological grounds behind them. One of the goals of the humanities is to guide students in the development of a critical position towards the context in which they will act. Currently, environmental issues are an important part of that context (Buchanan, 2012).

The syllabi examination confirms that, in education as well, humanities is the area less involved with sustainability or environmental problems, where NUS and TU Delft are the universities with the highest percentage of humanities lectures addressing these issues (35% and 25% respectively). Although there are some lectures entirely dedicated to environmental problem, most of these lectures cover the issue only superficially, as it is done with other subjects of our contemporary context such as politics or economy. The hard criticism towards sustainability does not explicitly appear on the programs or syllabi, but it makes itself apparent in the small number of lectures engaged with the subject as well as in the emergence of an alternative vocabulary that replaces the terms that carry negative associations. Within the humanities syllabi, references to sustainability or environmental crisis are frequently made while avoiding those expressions, as in descriptions of our contemporary world as anthropocenic (Jarzombek, 2016) or by referencing works of authors concerned with environmental degradation as Rebecca Solnit or J.B. Jackson (Crawford & Stewart, 2017).

Lectures on architectural humanities are taking references from various environmental disciplines but maintaining the focus on the contents related to social concerns. For example, the lecture offered in NUS entitled 'Topics in Urban Studies - Shaping Liveable Places' explores how the loss of biodiversity and climate change have a negative impact on the citizens' lives (NUS, 2016), while the MIT lecture 'Ecological Urbanism Seminar' examines the effects of the interacting natural and urban processes in human welfare (Spirn, 2016). This way, environmental issues are being integrated into the subjects that have been central to the architectural humanities.

Few lectures within humanities explicitly address the subject of sustainable architecture. The lecture offered at TU Delft entitled 'Aesthetics of Sustainable Architecture' is one of the rare lectures that discusses the aesthetic possibilities of sustainable architecture (Lee, 2016), while also at TU Delft, the class entitled 'Building Green: Past, Present, Future' provides a historical perspective on sustainable architecture that allows students to relate the subject with the ecological, economic, and social sustainability (Hein, 2016). Literature on environmental history and theory of architecture is still limited, but some lectures are fostering the development of this historiography. A good example is the seminar 'Design Radicals: The Bay Area Counterculture Legacy' offered by Greg Castillo at Berkeley in Spring 2017, which published the results of its exploration of the 'ecofreak' and the beginnings of the ecological consciousness (Castillo, 2017).

As in other areas, there are some courses that confront environmental issues from a broad perspective, as the HK course called 'Sustainability and the Built Environment'(The university of Hong Kong, 2016), which examines sustainable futures in view of recent changes of population, transportation, technology, and energy, or the MIT course 'Landscapes of Energy' that analyses systems of energy at many scales, considering the perspectives of critical geography, history of technology, and environmental history (Ghosn, 2016). The approach of these lectures reflects the changes in research trends of architectural humanities, which are developing as a broader and more comprehensive analysis of environmental problems that merge the perspectives of technology, design, and the humanities.

4. Final Considerations

The way environmental issues are confronted within architectural education is a reflection of the way the subject is dealt with in research and practice. It could be said that sustainability has already been assimilated within the technical areas of architecture. However, some of the drawbacks that architects perceive in sustainability are reflected on the curricula, which presents the fragmented approach seen in practice and it is overly focused on energy efficiency. There is, however, a promising interest of a small group of lectures in the interaction of the built and natural systems

among professionals that is reflecting a cosnideration of the life cycle of materials, water treatment, and even architectural waste.

Within design studios, the situation is more complex since students must learn to comply with construction specification while creating functional spaces with aesthetic quality, meaning, and in the best-case scenario, even artistic value. While some studios place special emphasis on environmental issues, the tendency is for sustainability to be treated as one of the factors among the many that students must consider when designing a building. Most probably, this integrative tendency will continue, and sustainability measures will become as assimilated to the design process as are now, for example, safety measure. Irrespectively of positions on the integration of sustainability into design studios, the main agent driving the transition to a more sustainable architecture is the increasing legislation to minimize the environmental impact of constructions. Therefore, if design studios keep in touch with the real-world requirements, the inclusion of sustainability will eventually become unavoidable.

The engagement with environmental issues of architectural humanities is certainly limited if compared with other areas of the discipline. In the case of architecture education, the knowledge of historical and cultural problems associated with environmental issues becomes particularly relevant since construction happens to be one of the human activities with high impact on the environment (Ortiz, Castells, and Sonnemann, 2009). However, the long-standing architects' interest in nature has been relatively slow to transform into a sound critical perspective on environmental problems (Buchanan, 2012; Ursprung, 2017). At present, this situation is rapidly improving since references from environmental humanities are providing the historical, theoretical, and speculative approaches to evaluate the socio-cultural dimensions of environmental problems (Neimanis, Åsber and Hedrén, 2015; Carr, 2004). Moreover, examinations of environmental issues could be integrated into architectural education through indirect paths, as through the growing interest in social problems related to the environment as green gentrification (Rigolon & Németh 2020) or social justice (Marsh, Pilkington and Rice 2020).

Universities have the responsibility to keep challenging knowledge claims with prescriptive tendencies (Wals & Jickling, 2002), and therefore, critical attitudes towards sustainability discourses should continue within architectural humanities, but without undermining the importance of environmental issues. Sustainability has become ubiquitous in discussion of all areas of our contemporary world and it can no longer be dissociated from development plans or political agendas. For that reason, and regardless of positions on the subject, architectural humanities must provide students the proper tools to develop well informed arguments and strategies to confront the issue.

Attitudes towards sustainability within architecture are associated with worldviews, ideologies, and even local contexts, and a unanimous agreement on its meaning and implications is perhaps unachievable. Nevertheless, it is important to remember that the discipline of architecture is used to cope with controversial concepts —as beauty or even the concept of architecture itself— and the evolving nature of the concept of sustainability should be accepted within all areas of the discipline (Batty & Marshall, 2012; Guy & Moore, 2007).

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