POLICY STRATEGIES AND DESIGN PROCESSES: COMPETING LOGICS?

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Abstract

The future urban environment comprises the political trademarks of sustainability; renewable energy, high performance architecture and low carbon transport (DECC, 2008). Although polling confirms public agreement with the requirement for such trademark sustainable practices (Carrington, 2011), their physical manifestation in the landscape is often contentious and unpopular. Society's unwillingness to accept some of the more obvious impacts of sustainability policies on lifestyle and the visual appearance of their surroundings is especially illustrated by the reaction of individuals and organisations to wind farms (Chancellor, 2011; CPRE, 2010) and eco-towns (Peterkin & Hope, 2008). This dissension highlights a cultural disconnection between the causal drivers of sustainability policy and the design solutions those policies deliver.

Policy strategies for sustainability are intended to eliminate the risk of further environmental degeneration. However, written in isolation, policy objectives often incentivize sustainable economies (DCLG, 2012) relegating culturally meaningful design in favour of profit (Carmona, 2009). The effect of these priorities leads to design solutions that, although satisfactory in terms of policy requirements, foster cultural ambiguity, and are subsequently rejected by society (Hatherley, 2010). Whilst it is increasingly feasible that development in technologies, materials, infrastructure and techniques, can satisfy the performance requirements of sustainability policies, the questions remain: What are the consequences of target driven design? How does policy inform the practice of design? And, how are these schemes received by society?

Moreover is our sustainable future destined to be a windmill shaped cliché, or, can design make a difference?

1.0 Introduction

Sustainability is a principal concern in the production of architectural and urban form. Although it would be difficult to place an architectural practice that did not "profess passionate commitment to 'green' buildings" (Sudjic, 1996, p.7), as a mark of contingency and commitment toward climate change, planning policy advocates regulations and codes that set benchmarks for building design.

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Regulations and codes comprise “a combination of written and graphical rules” (Street, 2006: 7) and, with regard to the design of architectural and urban form, are formalised during the design processes conducted by architects and designers. Rowe (1987, p.1) identifies that “the design of buildings can be viewed in a number of ways”. In general terms he suggests that “design appears to be a fundemental means of inquiry by which man realises and gives shape to ideas of dwelling and settlement” (ibid). To do this, design thinking requires the ability to synthesise, evaluate and resolve often conflicting requirements and objectives that comprise the design problem.

Inevitably, the products of architects’ practices are manifest in urban form and therefore have indirect implications for the societies and cultures supported by it. This raises the following questions: What impact does sustainability policy have on architectural and urban form? How does it affect architectural and urban form in terms of typology and materiality? And what are the implications for cultural representation and social use?

Historically, inquiry into the consequences of policies, codes or political ideologies has relied on the retrospective evaluation of the architectural edifices and urban patterns they have informed. Carmona & Dann (2007) note a rise in support of supplementary codes in planning policy. Often these are place-specific codes with the intention of creating desirable place (real-estate). Ostad-Ahmad-Ghorabi & Collado-Ruiz (2010) articulate that the pivotal need to address sustainability issues has led to the unquestioned application of performance-based parameters, without any indication of the efficacy of these, or, how they reconcile with the processes of the designers that formalise them.

Parallel to this, Guy & Moore (2007; also see Guy, 2000; Moore, 2007) propose that sustainability has been dominated by technical and economic performance parameters evident in policy. Principally, they suggest that this detracts attention from the social and cultural implications of design and therefore question whether performance parameters are commensurable with end use. Viewed in this way, sustainability has many dimensions and Guy & Famer (2000) indicate that for these reasons it is not measurable with the simplicity that policy implies.

Circumstances such as these indicate the imminent need to examine the effects of sustainability policy strategies ahead of retrospective opportunity (Imrie & Street, 2011). This research contributes to study in this area by examining the structure of sustainability code in the context of the design process. The research draws analogies between the structure of policy strategies and modernist rational design processes. It considers possible tensions between the two paradigms, looking specifically at the consequences of this for typology and materiality of design solutions.

2.0 The Structure of Policy Strategy

Stemming from a global concern for climate change, the need for sustainable architecture and urban form originates in international agendas to reduce harmful emissions. At the building scale, this has resulted in the emergence of regulations and codes that set performance efficiency benchmarks as an aid to substantiate claims of 'green' building. According to the Building Research Establishment [BRE], their Environmental Assessment Method [BREEAM] is the "leading and most widely used environmental assessment method for buildings" (BRE, 2012a). Dwellings are commonly assessed using the Code for Sustainable Homes [CSH], also initially developed by BRE. Both are endorsed by legislative planning policy (DCLG, 2012; BRE Global, 2010), which encourages their adoption in the early stages of building design.

BREEAM	Score
Outstanding	85
Excellent	70
Very Good	55
Good	45

CSH	Score
Level 6	90
Level 5	84
Level 4	68
Level 3	57
Level 2	48
Level 1	35

Category	BREEAM	CSH
Management	12	10
Health & Wellbeing	15	14
Energy	19	36.4
Transport	8	na
Water	6	11.2
Material	12.5	7.2
Waste	7.5	6.4
Land Use & Ecology	10	12
Pollution	10	2.8
Total	100	100
Innovation (additional)	10	

Figure 1. BREEAM performance ratings, categories and credit weightings.

The categories presented in figure 1 provide the framework for a point-based system that measures performance. The system has "three main functions: simplification, quantification and communication" (Kirkpatrick, 2009, p.18). Effectively, they are designed to provide a comprehensive construct of reality (ibid) and in doing so it is assumed that point-scoring is causal. This means that the complexity of reality is reduced to a linear system in which the code implies more points equate to greater sustainability, regardless of design processes or subsequent utilisation (Carmona, 2004).

In summary, sustainability codes are "de facto measure[s] used to describe a building's environmental performance" (BRE, 2012a). To do this they simplify and quantify expectations of reality in order to make predictions about the performance of a building; offering certainty that emissions will be reduced and therefore the resultant building minimizes its negative impact on the environment. In turn, this validates that progress is being made towards meeting overarching targets such as the Climate Change Act. In short, the relationship between cause (the targets of objectives) and effect (the consequences of meeting targets) is linear for the purpose of comprehensibility and predictability: The primary effects of objectives are therefore the raison d'être of policy, explaining the significance and emphasis of codes as planning and design devices.

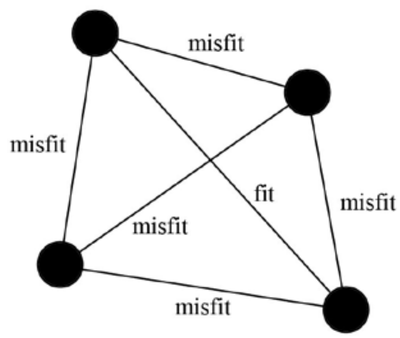
3.0 The Structure of Design Processes

Design process refers to the sequences followed by designers to arrive at a design solution. Design methods are descriptions of the tasks performed during the sequences. Whilst "designers are traditionally identified not so much by the problems they tackle as by the solutions they produce" (Lawson, 2006, p.53) the design process initiates with the design problem.

For architects, the client commonly delivers the design problem. Lawson (2006, p.58) points out that, "design problems are both multi-dimensional and highly interactive" and he suggests that the requirements of the client form only part of the problem, with other stakeholders in addition to the site context and policy requirements contributing to the many dimensions and the complex relationships between them. Forty (from Clark & Brody, 2009, p.16-19) adds to this his conception of design solutions as expressions of society and politics: He considers the designer as the translator of these ideas into objects. From this, it is visible that there are many considerations and constraints in the design problem; too many to map, and some that are never consciously conceived.

During the mid twentieth century, a body of research emerged that specifically addressed design problems in a search to establish a universal method for problem resolution (see, Broadbent, 1969; Moore, 1970). This was sparked by Herbert Simon's (1947) conviction that the human mind was limited in its ability to resolve multifaceted problems that arose in modernizing society. Consequently, a plethora of theories emerged; from Alexander's (1964) formulaic tracing of all components and subcomponents in a problem, to Rittel's (Protzen & Harris, 2010) concept of wicked problems that acknowledged large areas of uncertainty in design problems. This modernist movement of design methods seemed to prove that the human mind was not necessarily limited in its capacity to solve problem, as much as it was limited in its ability to identify every aspect of large complex problems.

Wahl & Baxter (2008) identify that the wicked nature problems (in terms of problem ambiguity) is still prevalent in design issues that arise from the desire for sustainable architectural and urban form. Defining design solutions is therefore an ineffable task that involves complex, non-linear thinking (see Teal, 2010) to resolve multiple constraints.



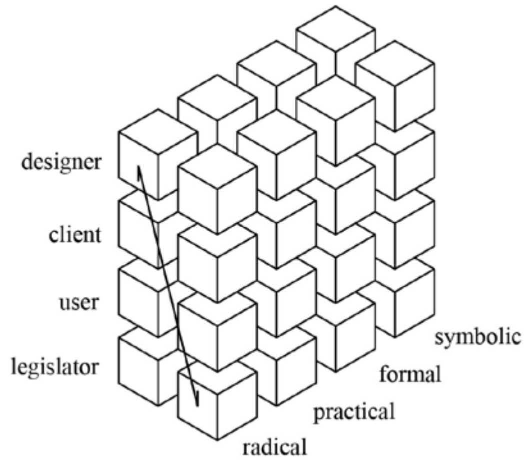


Figure 2. Paradigms of Design Problems
Left: Christopher Alexander's perception of design problems (1964, p.2).
Right: Lawson's model of constraints that structure design problems (2006, p.106).

4.0 Comparing Structures

The view of the architect as "heroic form giver" (Bentley, 1999, p. 28) supports the misconception that the architect operates autonomously. This is a sentiment recently resonated by Professor Carlos Ratti where he described the Le Corbusier as having the "hand of god"[4] (Ratti, 2012). The purpose of this was to point toward increasing integration of technology in design process and inevitably in design solutions. In a similar vein, Yaneva (2009, p.102) conveys; "the master architect is not a lone genius", they are in fact supported by the design team that surrounds them and importantly for Yaneva, the materials they use.

For Imrie (2007, p.926) this misconception of the role of the architect obscures the reality that architects and urban designers are dependent on external forces (discussed in section 3.0) and with this he makes specific reference to the "rules and regulations that codify and regulate architects' practices". These two perspectives present "architecture [as] a dependent discipline" but also "as [a] profession and practice … which does everything to resist that very dependency" (Till, 2009, p.1): A paradox which suggests that design and policy have perennially been at odds.

[4] Professor Carlo Ratti put forward this view of Le Corbusier in a presentation made at the Smart Cities Conference, University College London, 20th April 2012.

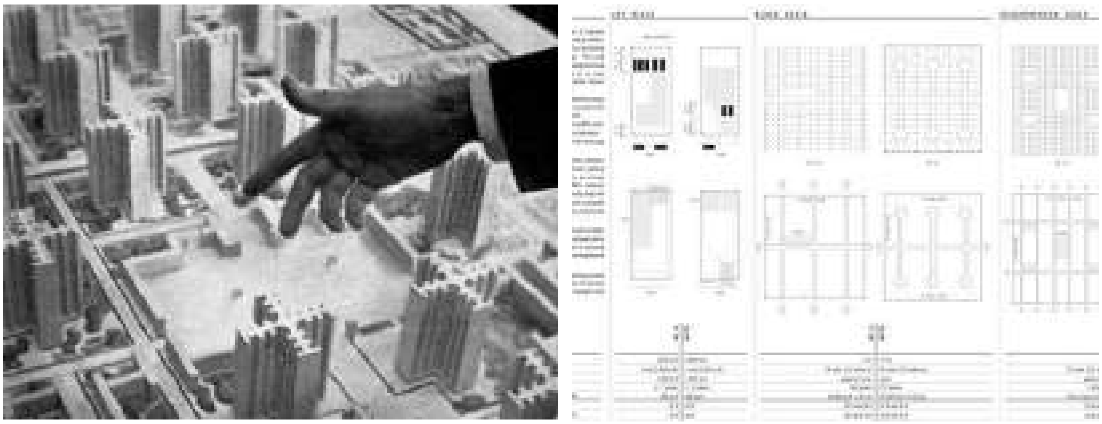


Figure 3. Who’s in Charge Here?
Left: La Ville Contemporaine, Le Corbusier.
Right: Extract from New Urbanism Public Streetscape, Duanny Plater-Zyberk & Co (2002, p.31)

Section 2.0 presented the structure of policy: Revealing how current objectives for sustainability are predicated on comprehensive, deterministic logic and deriving optimum solutions. In this regard, it addresses the design process as a ‘black box’ (Jones, 1992), and assumes that the output from the box will perform in the manner anticipated by the input.

Section 3.0 presented the ineffable nature of design process: It showed that present understanding of design problems were predicated on models that referred to the relative flexibility of constraints within those problems, of which, legislation was the most rigid.

This builds up a picture of two contrasting logics: Of the linear and deterministic objectives of policy, and of the entangled complexity, minimally structured, processes of design. Furthermore, it is a contrast analogous to the tension between “biological determinism … and free expression” that Colquhoun (1969, p.73) observed during the height of the modernist design methods movement.

Rational design methods, Colquhoun identified, were derived from biological determinism: This is the idea that the genotype of an organism is the sole informant of its behaviour and its development. It contrasts with the findings of D’Arcy Wentworth Thompson’s (1917) allometric study, which indicated that environmental forces were determinants of an organism’s structure. Nature, seen to ‘design’ itself (freely self-regulate and adapt), has frequently served as an ideological model of design as both noun and verb. Therefore, applied to design method, for design theorists such as Tomaś Maldonado (1972) biological determinism defined the need to map the genetic makeup of design problems in order to derive the optimum solution.

The problem with this was that the process of defining the whole design problem was untenable. The consequence of this for design solutions was that "without sharper tools for analysis and classification, the designer tends to fall back on previous examples for the solution of new problems" (Colquhoun, 1969, p.71). Putting forward a remedy, Colquhoun contended that the "exclusion" of conventions, would challenge the "reduction" of traditional typologies that prevailed in solutions.

"*The process of change must involve a dialectical relationship between those parts of the system that are resistant to change (because they are conventional) but changeable (because they are arbitrary); and those parts of the system which depend on natural laws which progressively come to light under the pressure of new technology*."

(Colquhoun, 1969, p.74)

In contradistinction to Simon's (1947) conviction that human intuition was incapable of dealing with the complexities that comprised modern design problems, Colquhoun proposed that intuition, unleashed from convention could address consistently changing circumstances.

Policy criteria could be considered analogous to Alexander's (1964) rational methodology: In *Notes on the Synthesis of Form*, the design problem is aggregated into constituent components that make up the whole. Any sub-problem in this system can exist in the binary states; 'fit' or 'mis-fit'. Each problem must be resolved to an equilibrium in which all components 'fit'. Although Alexander later readdressed this proposal (Alexander, 1966), Lawson (2006) discredits the original for its equal weighting of problems because he considers that designers often make unconscious judgments about the relative significance of issues to be resolved.

Whilst rational design methods may have been discredited, their formulaic approach to design is analogous to the performance-based parameters defined by sustainability polices and codes. Referring to the US LEED system, Garde (2009, p.438) points out that assessment methods for sustainable development often evaluate factors of the built environment equally, "because it is difficult to determine the relative importance of criteria" out of context: He conveys that the variation in location and design requirements make it difficult to tell how much specific objectives in the code will contribute to sustainability in a specific circumstance. Notwithstanding this, the point based system of codes weigh parameters equally.

Parallel to this, Wahl & Baxter (2008) argue that the parameters set by sustainability policies pursue environmental performance objectives potentially at the expense unquantifiable requirements. They recognize that the environment undergoes continuous adaptation, identifying that sustainable development is commonly appreciated as equilibrium between society (and its systems) and nature: It is considered a process of communication and adaptation analogous to that of evolution. In this respect sustainability cannot be explicitly determined as a sequence of objectives that represent social, economical and environmental requirements, because the nexus of values it constitutes are constantly evolving. (ibid, p.72-73)

5.0 Design Workshops

Taking precedent from studies of the effect of constraints on the design process (see, Chan, 2001; Ostad-Ahmad-Ghorabi & Collado-Ruiz, 2010) a series of workshops were conducted to gather data that would allow further inquiry into of the implications of policy strategies and design processes.

Three workshops were held in 2009 and 2010. Two of the workshops involved undergraduate, cross-disciplinary art and design students in their second year and one comprised postgraduate students in architecture who also had experience in working practice. Many of the postgraduate students studied part time, working in practice for the majority of the week. Postgraduate and undergraduates participants were specifically sought for their anticipated distinction experience and knowledge.

Workshops took place in the first semester of the year and spanned a twelve-week period, meeting for three hours each week. During the meeting hours, design activities were conducted, which included group discussions and brainstorming for generation of ideas. Participants were provided with a framework within which they would generate their own design brief including the context which it addressed. This was intended to resemble the format of the RIBA Plan of Work (2007; illustrated in Figure 4).

RIBA Plan of Work (to stage E)			Workshop Framework
Preparation	A	Appraisal	Define Sustainability
			Acknowledge Legislation
			Explore Problems
			Examine Precedents
	B	Design Brief	Compare Problems and Precedents
			Identify Design Task
Design	C	Concept	Generate Design Proposals
	D	Design Development	Design Development
	E	Technical Design	Solution Justification

Figure 4. Workshop format in the context of the RIBA Plan of Work (2007).

Outside of the workshop hours participants progressed their designs, documenting thoughts, research and analysis that helped formulate ideas and formalize design solutions in design reports. Progress was presented and discussed each week. Finally, at the end of the workshops, participants produced a 500 word summary of their design and the reasons they considered their design to be sustainable in accordance with the code. These presentations and written statements form part of the data, combined with notes that document verbal presentations.

Central to setting their own design brief, participants were required to identify the problem to be addressed. At the outset, this involved asking participants to provide personal definitions of sustainability. Parallel to this, all participants were encouraged to consider what sustainability meant for society in the context of urban form. No limits to the term ‘urban form’ were implied and as a result of this, the solutions produced were naturally varied. A total of 31 projects were produced, of these, 17 concerned building production or physical changes to urban form. This equated to 50% of undergraduate designs critically focussed on built form, compared to 80% in postgraduate proposals.

Figure 5. presents key information about workshop participants and the solutions they produced. Firstly, it provides a breakdown of the mix of disciplines involved in the workshops. Over half the participants involved studied architecture, and although roughly the same amount of designs produced concerned architectural and urban form, the type of solution produced did not necessarily correspond to the discipline of the participant.

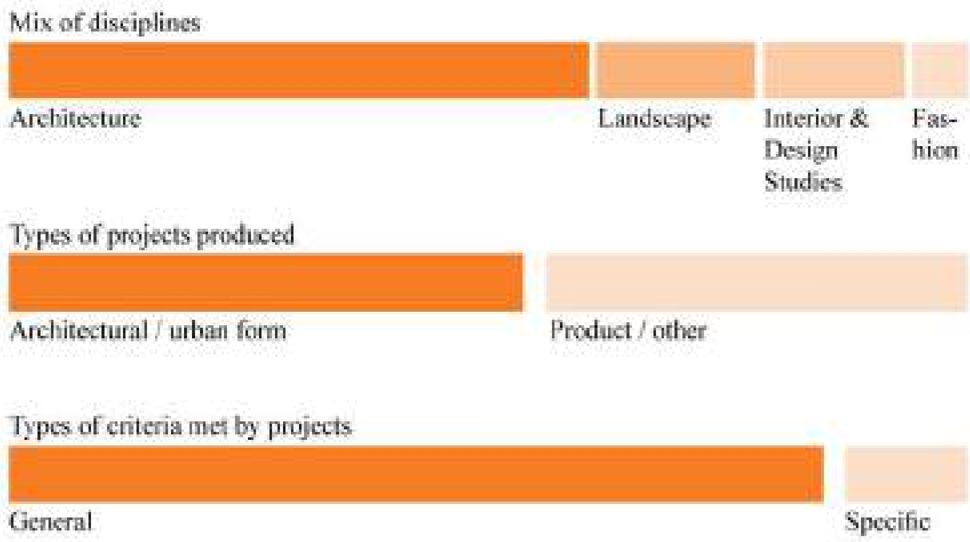


Figure 5. Quantitative summaries of participants and solutions.

Solutions could be divided into those that met general criteria, and those that were more specific about responding to particular regulation and code criteria. Here, ‘specific’ refers criteria derived from the technical documents of the Building Regulations, BREEAM and CSH. ‘General’ refers to umbrella targets, such as the Climate Change Act (2008).

5.1 Outcomes of Specific Criteria

Postgraduate participants took a greater interest in the specifics of code, with a 50/50 split between general and specific in this group. It is assumed that this related the more advanced experience and knowledge of practice and the discipline in general of postgraduate participants: Therefore, the codes they explored and the solutions they proposed were a consequence of the nature of the problems they typically address on a daily basis.

Only one undergraduate project met with specific criteria. This project met specific criteria by making a polemic statement about the nature of policy: They projected that the most simple method by which to meet policy criteria was to replicate existing precedents. In this case the participants proposed that new buildings could be designed by compiling elements already proven to satisfy regulation, taking into account only generic contextual conditions, most of which related to climatic conditions. Additionally, their work stretched to suggest a sample of retrofitting techniques that could bring existing building stock up to current specification. Building variations and components were proposed in a catalogue from which prospective clients could affectively assemble their own building from prerequisite, BREEAM certified parts. Solutions that comprised contextual interventions were not so far removed from this polemical statement:

The Compositional Paradigm
Materials and technology were prevailing concerns in three of the four projects that followed specific criteria. From the projects collated, it was clear that in addressing specific criteria certain building materials and technologies implicitly related to meeting particular code criteria: In these circumstances, the process of design becomes one in which relevant materials and technologies are assembled in the best possible way in relation to the site. A compositional design paradigm, therefore, provides the predictability necessary to acknowledge (measure) direct links between input (code) and output.

From the workshops it emerged that there were two consequences of this (see Figure 6): Designs either appear indistinguishable; often adopting desirable vernacular typologies and relying on materials to improve energy efficiency and performance, or, design adhere to contemporary typological conventions, incorporating often visible, technological additions that satisfy policy criteria. This is an observation which is not only visible in the design solutions produced in the workshops, but on that is also prevalent in built examples of sustainable architectural form, in particular the examples displayed at the BRE Innovation Park (see Figure 6).

Figure 6. Exemplar sustainable homes at the BRE innovation park:
Left: The undistinguishable - The Prince's House, The Prince's Foundation (BRE, 2012b, p.26-27)
Right: The conspicuous - The Sigma House, Rexel Energy Solutions & Stewart Milne Group. (BRE, 2012b, p.20-21)

5.2 Outcomes of General Criteria

Consensus among projects that explored general criteria acknowledged sustainability as a need to reduce greenhouse gas emissions. Not only did they generalise their proposals to this broad target, but also in doing so, they adopted or challenged no more than four approaches to reducing emissions (see Figure 7).

With general criteria, there was also a clear link between input and output, which drove subsequent design processes. Participants defined sustainability at the outset of the workshops in one of two ways: Providing descriptive definitions of problems, or by identifying precedent solutions. Those that provided descriptive accounts of sustainability tended to focus on society's relationship with emissions. Much of this work made observations about the tensions between the need to propose fundamentally different strategies for future living, within the existing urban context. Solution-orientated definitions in many cases included popular building precedents marketed for high BREEAM, LEED and Green Star ratings.

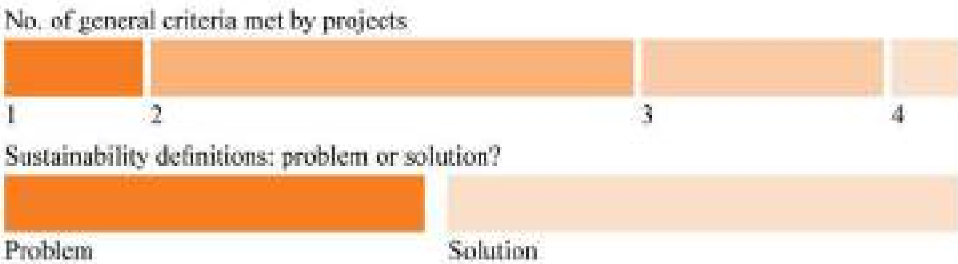


Figure 7. Sustainable criteria and definitions

Participants with descriptive accounts commonly observed problems and proposed problem specific solutions. This paradigm will be referred to as the observational paradigm. In contrast, participants that provided solution-orientated definitions of sustainability went on to produce designs that that shared remarkable similarities with the precedents identified and explored in the first week. This paradigm will be referred to as the iterative paradigm.

The Observational Paradigm

In the observational paradigm participants examined existing theories and definitions of sustainability in the first week, expressing tensions between these and current social and cultural attitudes towards sustainability. Design processes in this paradigm examined the tension identified and explored a variety of design fields searching for precedents of similar problems, rather than looking for solution precedents (as can be seen in the iterative paradigm). The outcomes in this paradigm displayed varied characteristics and consequently, these types of solutions divided relatively equally between built and urban proposals and otherwise, though this corresponded to 55% of participants producing a solution that didn't reflect their original discipline (see Figure 8).

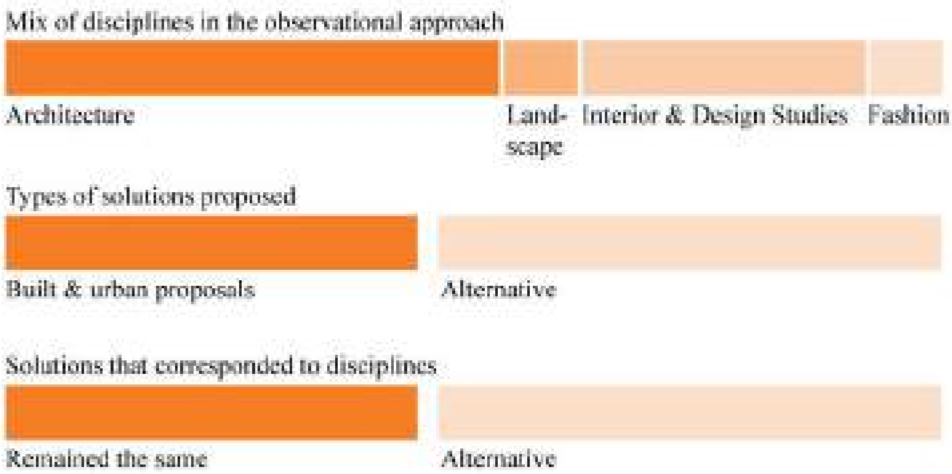


Figure 8. Solutions and comparative disciplines of the observational paradigm.

The Iterative Paradigm

Designers that followed the iterative paradigm presented solution-orientated precedents of design (in a variety of scales and products; from buildings to household items) already nominated 'sustainable'. They tended to present key facts concerning these artefacts and edifices, as though these were definitive descriptions of, or solutions to, sustainability. Following their exploration of sustainable precedents in the first week, designers that followed the iterative paradigm sequentially produced variations on the themes addressed by their selected precedents. Notably, their design solutions, deconstructed into components, showed in many cases, marked similarities to the images that had been presented at the outset. Accordingly, solutions tended to be built or urban forms since built form prevailed at the outset. In marked contrast to the observational paradigm, participants that demonstrated the traits of the iterative paradigm, tended to produce solutions within the realm of their original discipline.

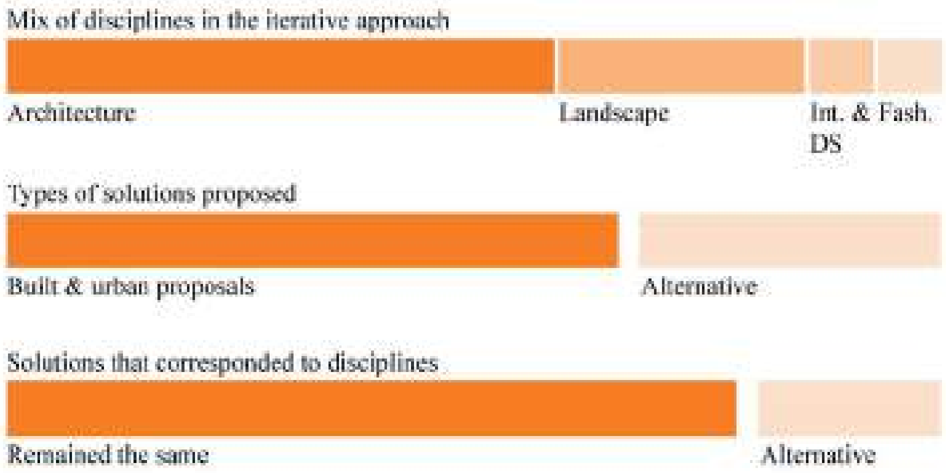


Figure 9. Solutions and comparative disciplines of the iterative paradigm.

5.3 Discussion and Evaluation

Coleman's (2005) inquiry into *Utopias and Architecture* articulates how design ideals for architectural and urban form are preoccupied with uniting fragmented theories and forms as well as providing contingency. The theoretical appetite for coherency stems from the often incomprehensive-messiness of reality (in this case specifically of cognitive design processes. Till, 2009). Referring to Zygmunt Bauman (1991), Till (2009, p.28) argues that ideals are born out of a fear for uncertainty, therefore, the ordering of architectural and urban form is a means of making sense of civilization and shaping a more predictable future (Bentley, 1999, p.27). The results of workshops carried out support the principle that codes and coherency are idealistic bedfellows.

In similar research, Clevenger & Haymaker (2011, p.449), in addition to Ostad-Ahmad-Ghorabi & Collado-Ruiz (2010), provide statistical analysis to show a link between sustainability codes and a reduction in creativity. Their statistical approaches require the quantification of creativity, and as such these examples have particular interests in examining the cognitive processes as much (if not more) than the outcomes of those processes. They consider that the nature of design policies, as "incremental approaches" is isolated from the creative and predominantly social process of design (ibid, 2010, p.480). They argue that design policies for sustainability are predefined by existing technological conventions that influence typology, materials and function. They suggest that policies (or 'eco-design strategies' as they refer to them) are driven by economics and the requirements of the market. As such, these forces encourage the specification of materials, the reduction of material consumption and performance targets such as strength or capacity to retain heat. Simply put, they infer that the object to be designed is often predefined and that code is simply used as a means of environmentally considerate refinement and measurability.

Predictable design outcomes are useful for measuring sustainability. However, as Guy & Farmer (2000) indicate, it does not necessarily respond well to user requirements or future needs, nor, as this study has shown, do they produce the most innovative results.

6.0 Conclusions

The research set out to examine the consequences of sustainability codes for design. It identifies that codes present well-defined problems. For example, they refer to specific building elements, and impose targets or limits on the performance of that element. In this regard, sustainability codes are predicated on a form of logic that demands linear and causal outcomes, enabling design solutions to be measureable against those outcomes. In contrast to this logic, the paper has also shown that the design processes of architects and urban designers are ineffable activities in which sustainability codes are formalized. This presents a ‘black box’ in which code is input in the setting of the broader design problem, its constraints and requirements.

Workshops provided a test bed for the hypothesis that architects and designers in the construction industry would produce more predictable outcomes when responding to policy criteria. Trends in the data indicate the validity of this hypothesis, and suggest that certain methodological approaches to design, in addition to cross-disciplinary influence, tend to produce more innovative solutions to sustainability policies. It follows from this that the logics of policy strategies and design thinking play a principal role in driving sustainability. Consequently, this paper suggests that the complex and non-linear process of design thinking could be said to conflict with the linear mechanisms and causal expectations set out in design codes:

Research findings suggests that where a greater number of specific design codes are imposed on the design process, the design outcome appears to be more predictable (conventional), meaning that the design solution often looks familiar and uses technologies and materials in a intended manner. Where targets were less specific, design solutions tended to demonstrate a broader exploration of the fundamental problem and propose designs based on observations of how domestic and urban environments were currently utilized by society. Rather than exploring how to apply conventional technologies and materials, designers appeared to explore alternative fields in order to produce unique solutions. This aligns with Lawson’s (2006, p.43) view of design as a solution finding process. Lawson proposes that, by comparison to scientists, who tend to “[focus] their attention on understanding the underlying rules” architects can be seen to focus on “achieving the desired result” and with this technique, designers are suited to solving ill-defined problems (see, Horst Rittel's definition of wicked problems in Protzen & Harris, 2010).

The results of this research show that codes, set out in a format that specifies many specific performance requirements, encourage the scientific problem solving method: This means that code, forces designers to pay attention to the underlying rules (defined by the code) of sustainability. In this context, codes are supplemented by guidance produced from within the professional institution and elsewhere that indicate suitable approaches, technologies and materials that can help meet code criteria. Consequently, design outcomes embody these techniques and at the same time are constrained by the possible combinations of solutions offered by these techniques. The benefit of this is that design is more easily measurable, but nevertheless, predictable.

Predictability, as Colquhoun (1969) proposed can be considered as the repercussions of the competing logics of rational methods (in this instance policy) and the reliance on the knowledge of past solutions as function of traditional design technique. In contemporary circumstances it could be argued that precedents and tradition are further encouraged by guidance provided professional institutions and QANGO's.

Sustainability requires drastic change. However, policies pursue rather incremental changes. If design process and code remain in conflict such changes are unattainable. This research provides proof of principle that design can make a difference.

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Figure 3.

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Figure 6.
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