

TRAVERSING SUSTAINABLE ARCHITECTURE

BETWEEN DISCOURSE AND PRACTICE

BOOK ONE

ELIZABETH DONOVAN
PHD DISSERTATION 2018

TRAVERSING SUSTAINABLE ARCHITECTURE

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AND PRACTICE*

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**TRAVERSING SUSTAINABLE ARCHITECTURE:
BETWEEN DISCOURSE AND PRACTICE**

PhD dissertation submitted in partial fulfilment of the requirement of the degree of
Doctor of Philosophy by:

ELIZABETH DONOVAN

Master of Art in Architecture

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PhD assessment committee:

Michael Asgaard Andersen

Sergio Altomonte

Elena Marco

Primary Supervisor:

Charlotte Bundgaard

Secondary Supervisor:

Walter Unterrainer

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Declaration:

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ABSTRACT

Concepts of ‘sustainability’ have increasingly informed architectural discourse since the environmental movement of the 1960s, yet practices of construction have proved resistant to change. As Hunter Lovins describes, the construction industry is “dynamically conservative – it works real hard to stay in the same place.” This quote resonates with the premise of this research: ample information, knowledge and technologies exist; so why is integration of sustainable architecture into practice so slow? Existing literature indicates that despite the immense array of existing information and knowledge, the discourse of sustainable architecture is still vast and ambiguous. Additionally, the practice of sustainable architecture is fragmented and often overrepresented by ‘shallow’ approaches adorned in technological add-ons. The focus of this research is to investigate sustainable architecture discourse and practice, identifying the key themes which bridge or act as barriers between these two paradigms. These bridging or barrier themes are then analysed to develop understanding as to how they interrelate, and are positioned within the field of research.

The methodological approach for this research brings together bricolage and grounded theory. This approach employs six interrelated qualitative and quantitative studies to construct five key themes using information collected from a variety of primary and secondary sources. Based on the ‘grounded-bricolage’ approach, methods include: (1) diagramming and mapping of recent history, (2) a questionnaire and (3) series of semi-structured interviews with leading experts in sustainable architecture from industry and academia, (4) architectural website content analysis, (5) qualitative periodical content analysis and (6) visual content analysis. The six studies have been designed responsively as new insights emerged and constructed in overlapping iterations throughout the PhD process to contribute to a cohesive body of research.

The original contribution to knowledge of this dissertation is an articulated understanding of the relationship between sustainable architecture discourse and practice, specifically identifying the five key barriers:

- Definitions, terminology and language
- ‘Greenwashing’ and techno-centrism
- Information, knowledge and communication
- Approaches, perspectives and attitudes
- Visual language

Analysis of these themes explores their connections, content and potential to better bridge the gap between discourse and practice. The findings offer insight into how we discuss, practice, learn, communicate, approach, perceive and view sustainable architecture and prompts a re-thinking of traditional understandings of discourse and practice within the field.

RESUME | DANISH

Bæredygtighedsbegreber har i højere og højere grad sat sit præg på den arkitektoniske diskurs siden den internationale miljøpolitiske bevægelse i 1960'erne, mens praksis for byggeriet har vist sig sværere at ændre. Som Hunter Lovins beskriver, er byggebranchen 'dynamisk konservativ – den arbejder rigtig hårdt på at forblive uændret'. Dette citat giver genlyd af præmissen for nærværende forskningsprojekt: der findes rigelig information, viden og teknologi; så hvorfor går integrationen af bæredygtighed i byggeriet så langsomt? Den eksisterende litteratur indikerer, at diskursen omkring bæredygtig arkitektur, trods den enorme mængde af eksisterende information og viden, stadig er upræcis. Derudover er der ikke nogen samlet praksis omkring bæredygtigt byggeri, og løsningerne er ofte overrepræsenteret af overfladiske tilgange prydet af teknologiske tilføjelser. Fokus for dette forskningsprojekt er at undersøge den bæredygtige arkitekturs diskurs og praksis, og at identificere de nøglebegreber, der danner bro, eller virker som barrierer, mellem disse to paradigmer. Disse temaer analyseres herefter for at udvikle en forståelse for, hvordan de interrelaterer og er positioneret i forskningsfeltet.

Den metodiske tilgang til forskningsprojektet er en kombination af bricolage og grounded theory. Denne tilgang gør brug af syv interrelaterede kvalitative og kvantitative studier. Gennem disse studier konstrueres fem nøgletemaer på baggrund af information indsamlet gennem en variation af primære og sekundære kilder. Baseret på 'grounded-bricolage' tilgangen inkluderer metoden: (1) mapping og diagramatisering af den moderne arkitekturhistorie, (2) spørgeskemaundersøgelse og (3) serier af semi-strukturerede interviews med førende eksperter i bæredygtig arkitektur fra såvel praksis som den akademiske verden, (4) indholdsanalyse af arkitektur-hjemmesider, (5) kvalitativ indholdsanalyse af tidsskrifter og (6) visuel indholdsanalyse. De syv studier er designet og tilpasset i takt med nye indsigter, og er konstrueret i overlappende iterationer gennem ph.d. processen, for samlet set at bidrage til et sammenhængende forskningsmateriale.

Afhandlingens vidensbidrag er en artikuleret forståelse af sammenhængen imellem diskurs og praksis i bæredygtig arkitektur, specifikt ved identifikationen af de fem nøglebarrierer:

- Definitioner, terminologi og sprog
- 'Greenwashing' og tekno-centrisme
- Information, viden og kommunikation
- Tilgange, perspektiver og holdninger

Analysen af disse temaer afsøger deres sammenhænge, indhold og potentiale med henblik på at forbedre sammenhængen mellem diskurs og praksis. Forskningens fund skaber indsigt i, hvordan vi diskuterer, praktiserer, lærer, kommunikerer, opfatter og ser bæredygtig arkitektur, og foreslår en gentænkning af den traditionelle forståelse og praksis inden for feltet.

LIST OF PUBLICATIONS

Peer-reviewed Journal Articles

Donovan, E., 2017. Sustainable Architecture Theory in Education: How Architecture Students Engage and Process Knowledge of Sustainable Architecture, in: *Implementing Sustainability in the Curriculum of Universities*, World Sustainability Series. Springer, Cham, pp. 31–47.

Peer-reviewed Conference Papers

Donovan, E., 2017. Sustainable Architecture Theory in Education: How Architecture Students Engage and Process Knowledge of Sustainable Architecture, Presented at *Implementing Sustainability in the Curriculum of Universities Symposium*, Manchester Metropolitan University, Manchester, United Kingdom.

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Donovan, E., 2017. From sustainability to resilience: an exploration of the development of sustainable architecture terminology. Presented at the *Living and Sustainability: An Environmental Critique of Design and Building Practices, Locally and Globally*, AMPS, Architecture MPS, London South Bank University.

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During the Autumn of 2016, I had the opportunity to be a visiting PhD fellow at the Welsh School of architecture at Cardiff University. This experience was invaluable, and I owe many thanks to the PhD students who welcomed me into their group, all of the staff who gave me help and feedback and especially my supervisor for the period of stay Dr. Clarice Bleil de Souza.

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Lastly, many thanks to my family (particularly my Mum, Suzanne and Connor), friends (especially Buffy) and flatmate (Tine), who have supported me from near and far. Particularly to my partner Giando for the enduring encouragement, perpetual support and endless help through my many Excel tantrums. I would also like to thank Aaron for his help and a special thanks to Tala Skeens who spent many hours proofreading the many pages of this dissertation.

READING THE DISSERTATION

This dissertation is structured in five parts: Planning the journey (Part One); The first steps (Part Two); Traversing key studies (Part Three), Reflecting (Part Four) and the Appendices (Part Five).

Part One lays the foundation for the research. Part Two and Three present the primary information and construct findings. Part Four brings together all of the findings from the six studies in an extensive discussion and concludes the dissertation. Part Five is a separate book and is a collection of appendices consisting of large fold-out diagrams, transcripts, and tables which could not fit within the pages of this dissertation. This dissertation is structured linearly, and each study is presented separately. This format was chosen to aid in the cohesion of the complex narrative, despite in reality there being an overlap that consists of interweaving spirals of iterations. Specifics about each chapter are outlined in the following 'Chapter Overview'. The structure of each of the study chapters (from four to ten) consist of an introduction to the study; the specific methods of collecting, processing and analysis outlined; followed by a presentation of the constructed findings and summary. References are listed at the end of each chapter in addition to the full bibliography at the end of the dissertation which is structured alphabetically. Elsevier Harvard is used as the referencing style with incite references and page numbers.

Additionally, some parts of this dissertation have been published in peer-review conferences and journals. These references are indicated within the relevant text, in the references and within an explicit list of publications presented previously.

The dissertation is illustrated with photos, diagrams, drawings, and graphs. These are referred to in the main body of text and also accompanied with captions. A full list of figures is located at the end of the dissertation after the bibliography. All images, pictures, and diagrams are my own creation unless otherwise stated. Furthermore, images of diagrams are used in two different manners throughout the dissertation. Firstly, to illustrate different processes, and these images are intentionally not always legible and are often diagrams which were used internally as a way to process information. Other diagrams which are used to explicate findings are provided in selected instances within the dissertation but are otherwise provided at full size within the appendix.

Finally, some terms have been shortened within the body of this dissertation, primarily, sustainable architecture discourse and practice is shortened to only 'discourse and practice' within the text. Additionally, the five themes which were coded and constructed within this research are both colour-coded throughout the research in many of the diagrams and also shortened in the text as shown below.

Definition: Definitions, terminology, and language

Greenwashing: Greenwashing and techno-heroism

Communication: Information, knowledge, and communication

Approaches: Approaches, perspectives, and attitudes

Visual language: Visual language and identity.

CHAPTER OVERVIEW

PART ONE | PLANNING THE JOURNEY

1. Introduction

The introduction chapter (1) constructs the initial background for the research project and forms the preliminary delineation. To contextualise the research, a brief motivational section is included to position and orientate myself within the research. To commence, the explorative grounded-bricolage research approach is outlined and frames the initiating research focus, context, and scope. This initial focus appraises the general guiding framework, focus and aims for this research project, then delineates the subsequently chosen methods and gives an overview of the dissertation structure and contribution to knowledge.

2. Mapping the Terrain: literature review

Chapter two presents a review of the available literature relating to the research focus - the relationship between sustainable architecture discourse and practice. This discussion explores key terms and positions the research concerning broader associated concepts, including; mapping the literature; sustainability; sustainable development and sustainable architecture; and between discourse and practice. Additionally, this chapter serves to position and orient the research within existing literature and the five constructed themes: Definitions, terminology, and language; greenwashing and techno-centrism; information, knowledge, and communication; approaches, attitudes, and perspectives; and visual language and identity, which form the findings. The intent is not to convey an exhaustive analysis of the five themes but to indicate ongoing research activities, literature, and concerns related to this research.

3. Planning the Journey: Methodology

The methodology chapter (3) expands and clarifies the explorative 'grounded-bricolage' approach employed in this dissertation. It is introduced and discusses the design of the approach, aims, scope, limitations, positions, and procedure. This chapter consists of six short, interrelated sections which describe how I gathered, analysed and represented the heterogeneous information collected through a bricolage of qualitative studies. Within this bricolage approach, six studies combine a set of methods comprising of literature and historical mapping; a questionnaire of experts in the field; semi-structured interviews; qualitative and quantitative content analysis of architecture websites, periodicals and online blogs, and lastly built examples. This set of methods emerged during the research process and were considered to be most suitable for each phase of the research. These methods demonstrate the decisions that were made as information was collected, the material generated, analysed and the findings constructed.

PART TWO | THE FIRST STEPS: INITIATING STUDIES

4. Contextual narrative

This initiating scoping study is presented in chapter four; it is the first of six study related chapters. This chapter initiates through the presentation of the different mapping methods employed to collect, process and analysis different historical information progressively focusing after the 1960s. The first half of the chapter describes a short historical narrative constructed from the various maps, which include key publications, events, built examples, approaches, and developments since the start of the environmental movement in the sixties. Following this, three different themes (definitions, greenwashing and communication) were used to filter the vast amount of information to explore. Then the description of their development as a basis for future studies.

5. Questionnaire with experts

Chapter five presents the questionnaire study which uses a non-statistical method to collect primary information from experts in the field of sustainable architecture. The study aims to elaborate the scope further and build on the previous contextual narrative, adding perspectives from practice, on the relationship between discourse and practice, particularly probing the three established themes. Before presenting the findings from this study, the method is presented, (discussing the selection of participants and how information was collected, process and analysed). Then the conclusions constructed are described in three sections related to the different parts of the questionnaire design as well as specific correlation between selected questions. These findings are then concluded by a thematic discussion, and a summary of the codes and categories constructed thus far in the research that is built on in the following four essential studies.

PART THREE | TRAVERSING KEY STUDIES

6. Semi-structured Interviews

Chapter six is the first ,in the second collection of studies, which contribute to Part Three. A qualitative, semi-structured interviewee method was employed to design a study which built on the previous questionnaire study. Fourteen participants from the questionnaire were interviewed mainly over Skype to elaborate on their questionnaire responses and give personal perspectives, opinions, and experiences concerning the relationship between discourse and practice. This study furthered the richness of information collected regarding the first three themes (definitions, greenwashing and communication) and established the second two themes (approaches and visual language). The introduction is followed by an outline of the method, presenting the interview guide, question themes, selection of participants, data collection, and analysis. Next, the questionnaire profiles are shown to frame the discussions which are present in the subsequent constructed findings. They are organised by initial results and then conversations of each of the five themes assembled from the different interview responses.

7. Architecture website analysis

This fourth study and seventh chapter present the first of three content analysis studies of secondary information. This content analysis examines a selection of around ninety architectural websites. The text was analysed to understand how the website authors discuss (in the text) sustainability across a collection of 1600 different constructed projects. This study was designed to address the theme of greenwashing and techno-centrism specifically. This study is introduced, then the method is outlined concerning the selection of architectural office, projects and keywords; followed by an articulation of how information was collected, processed and analysed, then the limitations of this study and method is discussed. The constructed findings are first described addressing the general conditions of the information, after this, the information is discussed concerning the theme of greenwashing and techno-centrism, then later summarised.

8. Periodical and blog analysis

The second content analysis, uses both quantitative and qualitative methods to study five years of publications from four popular architectural periodicals and one-hundred articles from two architecture online blog websites. The discoveries within the questionnaire responses, emphasised the frequency with which journals and websites were used as information sources. Nearly 25,000 pages were examined for select keywords to understand the extent sustainable architecture occurs within popular media. Furthermore, qualitative tactics based on grounded theory were employed to thematically code and analyse specific information connected to the different identified instances of keywords. Within this chapter, the specifics of this method are articulated regarding the selection of sources, data collection, processing, and analysis. Following, the constructed findings are presented, first with 'sustainability in numbers' which offers the quantitative portion of the findings, followed by discussions of the thematic analysis presented in sections for each of the five themes.

9. Visual Analysis

The exploration of the visual language of sustainable architecture is presented in this chapter. This study is the second to last in the series of studies which make up the main body of this dissertation. It was designed in response to the observed theme and barrier related to visual language and identity. Around one-hundred and seventy buildings were examined using visual content analysis to understand what variation of visual language is employed and subsequently communicated. This exploration is first introduced, then the method defined focusing on how the buildings that were examples, were selected, then information collection and process. Next was visual analysis, followed by a description and discussion of the constructed findings.

PART FOUR | REFLECTING

10. Synthesis

This chapter presents the synthesis of the different constructed themes from the six studies (chapter four to ten). It clarifies the content throughout the discussion of the categories and sub-categories within each of the five central themes. It further elaborates to mark the boundaries of the research and provide an additional basis for the concluding remarks and proposed contributions to knowledge in Chapter Twelve.

11. Conclusion

This chapter presents the concluding remarks of this dissertation. It consists of a resume of the instigating concerns for the research, indicating the initiating aims and framework. It also consists of the survey of literature and the design of the research approach which were outlined in Part One of the dissertation. With these articulated, the research aim is reflected on and the main contributions of the dissertation are discussed, reflecting on how they contribute to the wider field of sustainable architecture. Finally, a last discussion presents potential future studies which could build on or be influenced by the research presented in this dissertation.

PART FIVE | APPENDICES

This second book contains the different appendix to support some of the studies and includes a series of different information formats including, tables, graphs, text and large fold-out diagrams. As a note, all of the large fold-out diagrams have a perforated edge to allow them to be removed for your convenience.

Appendix A – contains all of the tables from the questionnaire study presented in Chapter Five. These are arranged by common questions, tables for Part A and B of questionnaire, followed by questions and tables from Part C. Lastly are the tables relating to the correlation analysis.

Appendix B – contains all of the aggregated transcript organised by questions, related to the interview study presented in Chapter Six.

Appendix C – consists of six large diagrams which fold out and provide the information collected for the architectural website analysis outlined in Chapter Seven.

Appendix D – provides a series of graphs which supply the support information gathered for the periodical and blog analysis discussed in Chapter Eight.

Appendix E – has the largest of the fold-out maps, which were used to support the exploration of the visual language and identity of sustainable architecture presented in Chapter Nine.

PART ONE

Planning the Journey

Chapter One

INTRODUCTION

This introduction chapter constructs the initial background for the research project and forms the preliminary delineation. To contextualise the research, a brief motivational section is included to position and orientate myself within the research. To commence, the explorative grounded-bricolage research approach is outlined and frames the initiating research focus, context, and scope. This initial focus apprises the general guiding framework, focus and aims for this research project, then delineates the subsequently chosen methods and gives an overview of the dissertation structure and contribution to knowledge.

To traverse can mean to travel across or through, to move back and forth or sideways, or to consider the whole extent of a subject (Oxford Dictionaries, 2018). These three meanings have defined how this dissertation explores the relationship between sustainable architecture discourse and practice. More explicitly, to travel through this broad field in order to understand what key factors influence this relationship and how an improved connection may contribute to advancing the field of sustainable architecture. Since the environmental movement in the 1960s, discussions have increased around what is now labelled sustainability and specifically, sustainable architecture. Sim Van der Ryn and Stuart Cowan (1996) explain “[...] the environmental crisis is a design crisis. It is a consequence of how things are made, buildings are constructed, and landscapes are used.” This quote emphasises how crucial the role of the architect is in helping to solve current environmental issues. However, despite this important role, increased discussions, awareness, developing information and technology; sustainable architecture is not at the forefront of the profession for all. It is understood that there is a plethora of existing information and technology, yet the contemporary discourse around sustainable architecture is often fragmented and ambiguous. It is this discrepancy between the existing knowledge and what is designed and constructed within our built environment, and as a result the subsequent conflicts or challenges which arise in this space that are of interest to this research.

In this dissertation, discourse and theory are considered of equal importance as design practices and for the remainder of this dissertation ‘sustainable architecture discourse and practice’ will simply be referred to as ‘discourse and practice’ with the sustainable architecture aspect implied. Discourse can influence architectural practice by introducing new ways of looking at reality and therefore, new ways of representing that reality in the built form (Brown, 2009). There is a direct relationship between how the profession discusses and represents different concepts and how they then materialise. This is clarified by Inca Basa (2009, p. 271) “abstract”：“This study attempts to examine the environmental discourse of architecture. The attempt to constitute a linguistic framework for the environmental discourse requires a critical understanding of the interrelationship among the following concerns: a who explains that the discipline of architecture is regulated by different discourses each with “its own objects, operations and effects.” Basa (2009, p. 271) “abstract”：“This study attempts to examine the environmental discourse of architecture. The attempt to constitute a linguistic framework for the environmental discourse requires a critical understanding of the interrelationship among the following concerns: a, elaborates that each discourse “introduce[s] their priorities and principles through the distribution of a fragmented series of verbal and non-verbal statements.” This is important as sustainable architecture is often researched as a product or artefact rather than the process of how different discourses materialise (or in some cases do not) in the built form. In many ways, this is evident within the field of sustainable architecture as parallels can be drawn between the fragmented nature of discourse and the fragmented approaches to practice. However, it is not the discourse alone that is

under scrutiny but rather the relationship it has with practice. Discourse and practice have both been examined in an expansive sense, and no attempt has been made to reduce the complexity. In fact, entirely the opposite has occurred; when examining the relationship, this research has tried to include as much complexity as possible within the narrow scope, elaborated later in this chapter.

These particular phenomena have not been the focus, nor even convincingly explored in existing research or literature. Within the field, research often focuses on a particular topic with a narrow scope rather than taking a holistic position. Thus, one of the key strengths of this PhD research has been that it is designed to address this overarching gap through this particular scope which is present across many aspects of this broad field. Much of the existing literature and research can be divided into two categories: the abstract, theoretical conceptualisation; and the practical applied strategies. Literature published by leading authors such as Simon Guy, Graham Farmer and Steven A. Moore (especially in their co-authored work) often focuses on the discussion of sustainable architecture in a broader sense, tackling the underlying trends and challenges. Meanwhile, other authors such as Brenda and Robert Vale publish practical, case-study style, how-to information. Often many publications lightly touch on or allude to the relationship between discourse and practice. However very few, if any (to my knowledge) go in depth so as to better understand or explicitly state why such a small amount of discourse makes its way into architectural practice.

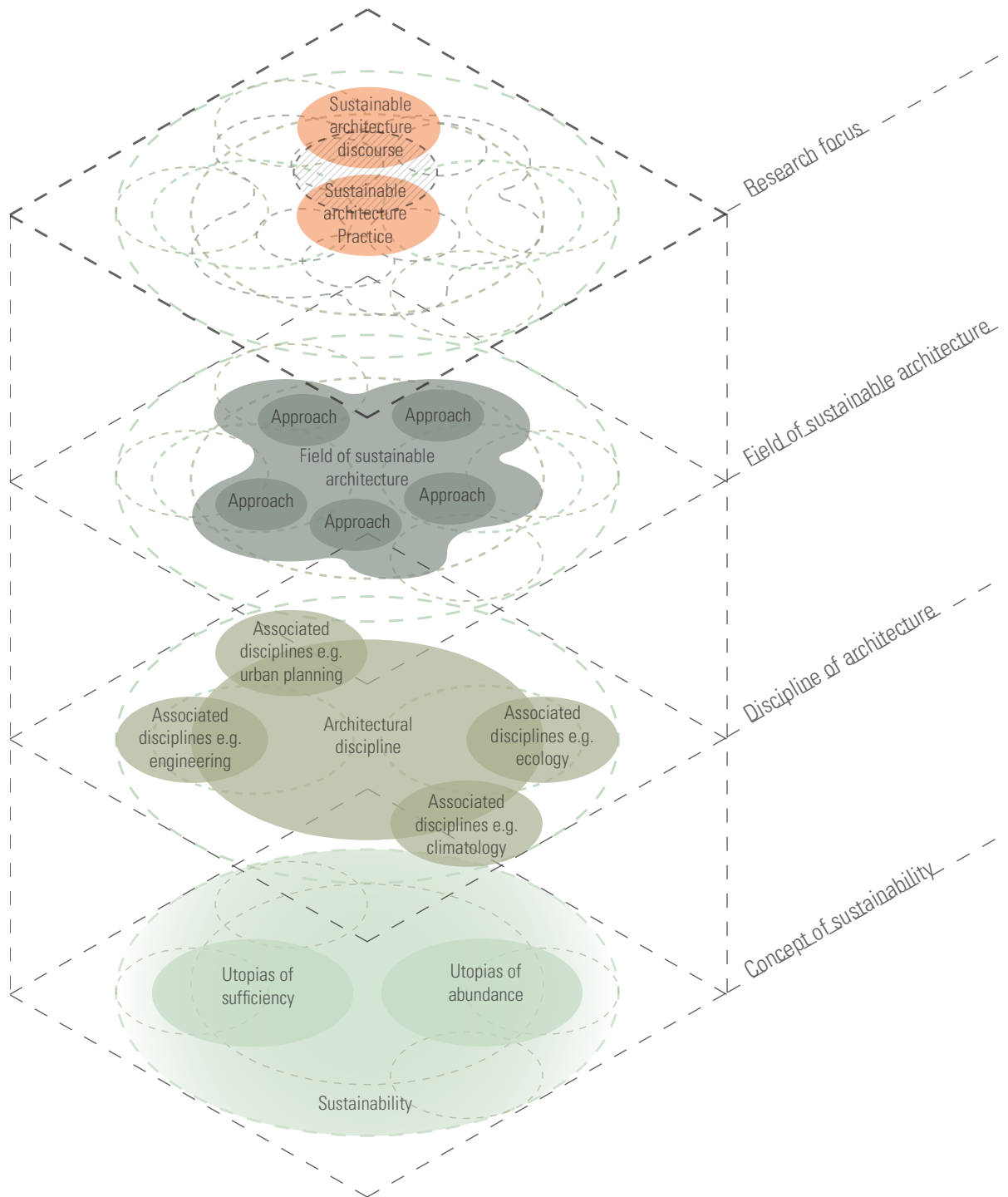
This research contributes to the field of sustainable architecture through the identification of five different themes which are considered to be barriers or obstacles between discourse and practice. These are elaborated at length throughout this dissertation; however, their most broad labels are:

- Definitions, terminology, and language
- Greenwashing and techno-centrism
- Information, knowledge, and communication
- Approaches, attitudes, and perspectives
- Visual language

The remainder of this chapter will firstly outline and discuss the research context by describing the research focus as one that concerns the concept of sustainability, the discipline of architecture and the field of sustainable architecture. Following this, the chapter will present a short introduction to the research approach, my motivation for undertaking this research, and an outline of the scope, aims, and objects. To conclude, the framework of the research process is explicated with a summary of the contribution to knowledge.

1.1 RESEARCH CONTEXT

The context for this research is complex and ill-defined. The diagram in figure 1.1 has been produced to illustrate where this research is positioned amongst the many layers of other concepts and disciplines which frame the relationship between discourse and



practice and sustainable architecture as a field. This research builds on and combines information from the concept of sustainability and sustainable development as well as the discipline of architecture. This section attempts to clarify my understanding of the complex context for this dissertation. I acknowledge that this diagram is only one of many possible perspectives; nonetheless, it is used to organise and explicitly frame this specific project as a point of departure.

The concept of sustainability is positioned at the bottom of figure 1.1 and is the basis for this research. When referring to the 1956 work of Walter Bryce Gallie, Cook and Golton (1994) describes Sustainability as an ‘essential contested concept’; this is later elaborated on in detail within the literature review, section 2.5. Ceridwen Owen and Kim Dovey (2008, p. 12) describe sustainability as a broad concept “characterised by a highly permeable boundary” that is relevant to nearly all disciplines; this is visually represented by the faded boundary in the diagram. Owen and Dovey continue to explain that sustainability is without institutional boundaries unlike architecture; “rather it is a field of discourse and practice that straddles multiple professions and disciplines including architecture, engineering, urban planning, ecology and climatology” (Owen and Dovey, 2008, p. 12). While I agree with this explanation regarding sustainability, I would argue that the institutional boundaries of architecture are less concrete than Owen and Dovey explicate. Instead, I would contend that architecture, like sustainability, ‘straddles multiple professions’. This is discussed in greater depth shortly.

Two different paradigms of thought which are chosen for this frame are positioned within the concept of sustainability. They are ‘utopias of sufficiency’ and ‘utopias of abundance.’ These two paradigms represent a split and conflict within the concept and emphasise different understandings, approaches, and goals. Utopias of sufficiency, as described by Marius de Geus in ‘Ecological Utopias’ (1999, p. 52), advocate for the satisfaction of moderate material needs and harmonious social and ecological relationships – less consumption and technology or an “ecological utopia” (1999, pp. 20–21). In contrast, utopias of abundance celebrate human dominance over nature rather than human interdependence with nature. Focusing on technology and human ingenuity, this is what de Geus describes as a “technological utopia” (1999, pp. 20–21). Utopias of sufficiency, particularly Henry David Thoreau’s “Walden” version, were popular in the sixties and seventies during the environmental movements. Both Garforth (2018, p. 84) and Berry (2017, p. 18) argue that since the seventies, “technocentric dreams of abundance have dominated” (Garforth, 2018, p. 84) in contemporary society. The utopia of abundance thinking is also evident in popular guiding frameworks and definitions including the 1987 Brundtland report’s introduction and definition of ‘sustainable development’ which is explored later in the literature review (section 2.2). These two conflicting paradigms are also visible throughout the context of sustainable architecture through the different approaches employed that range from low-tech to high-tech solutions.

The discipline of architecture is positioned within the concept of sustainability. This dissertation argues that the discipline of architecture is defined by professional

Figure 1.1 (left) Research context: Diagram created from my understanding of the relationship between the concept of sustainability, the discipline of architecture, the field of sustainable architecture and the research focus - the relationship between discourse and practice

boundaries and institutes, as Owen and Dovey (2008, p. 10) declared, but these boundaries are often overlapping and connected with other disciplines such as engineering, urban planning, and ecology to only name a few. The diagram illustrates four connecting disciplines; these do not represent all connecting disciplines by any means. Instead, they offer examples of some connections and overlaps. To illustrate all was not feasible within the space of this diagram.

Illustrated above the discipline of architecture, is the field of sustainable architecture. It is drawn as a line which sits within the discipline of architecture while also departing its limits to intersect with other related disciplines. It is often debated whether sustainable architecture is a field in and of itself or if there is a division between sustainability and architecture. Owen (2006, pp. 25–26), explores the debate and dichotomy between architecture and sustainability and thus, art and science. She explains that there are two distinct fields using the symbolic structures of “architecture as art” and “sustainability as science.” Owen (2006, p. 25) justifies that architects who do not “attempt to produce art” are merely producing sustainable building or construction and often these are “celebrated as being green.” I rebut that a field of sustainable architecture does exist and there are many designers and architects whom aspire to integrate both science and art in order to produce sustainable architecture. This being said, there are also those designers who do

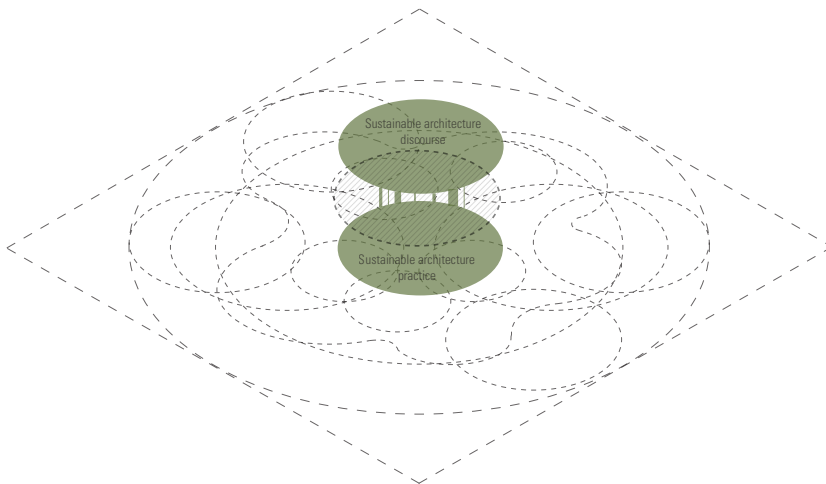
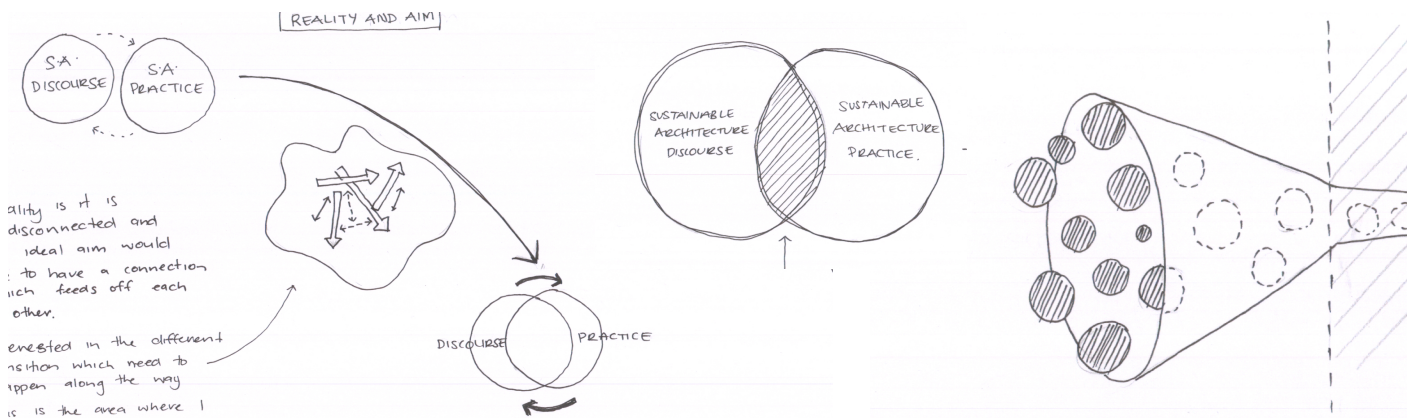


Figure 1.2 (left) Diagram of the research focus: the relationship between discourse and practice. Which is built on many of the overlapping concepts from the associated disciplines and fields.



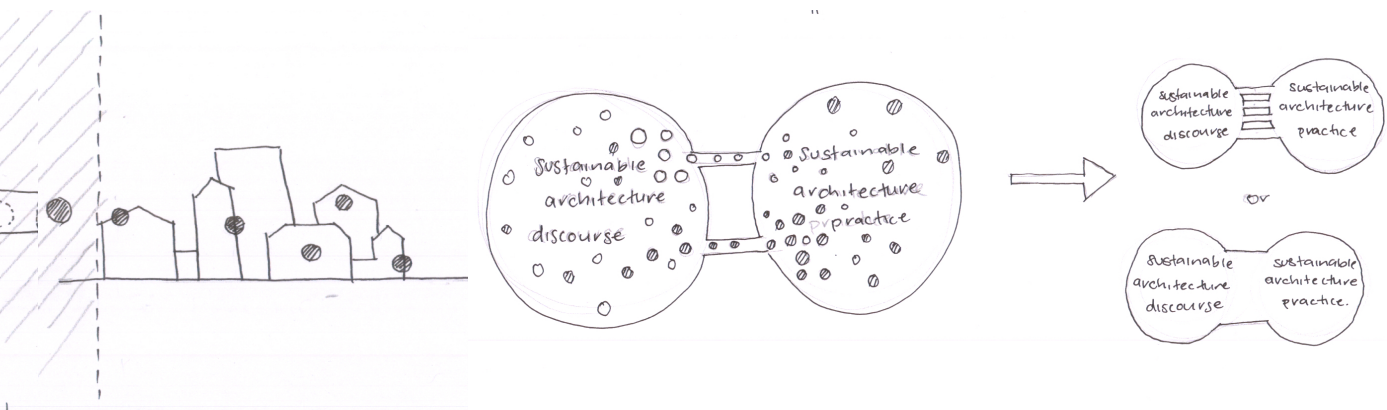
not attempt this, and in those instances Owen’s distinction of sustainable or green building is appropriate. This leads to the clarification that this dissertation focuses on sustainable architecture, not sustainable building, construction or materials.

Within the field of sustainable architecture, there are many smaller approaches which make up the field in the broader sense. These smaller paradigms include, but are not limited to, ecological architecture, green architecture, environmental architecture, solar architecture, regenerative architecture and resilient architecture. Steven Moore (2016, p. 17) explains that “there is not one sustainable architecture, but it can manifest in a variety of paradigms which exist together and often overlap within the field.” This research positions itself with this pluralistic perspective of sustainable architecture and does not attempt to define one discourse or practices, instead celebrating the many approaches which are explored later in section 2.8 in the literature review.

Finally, the focus of this research is illustrated at the top of the diagram, represented by two circles which are situated within the field of sustainable architecture but are additionally influenced by the concept of sustainability and the discipline of architecture. Zooming into diagram 1.2, it is visible that the relationship between discourse and practice is not overlapping but connected somewhat by ‘links’ (themes) of various weights. To elaborate, it is suggested that there is a connection between discourse and practice; however, it is not one of similar movement between both paradigms. It is this relationship within the hashed circle which is the focus of this research, explicitly identifying these relations and what would facilitate improved connection.

During this PhD process, an understanding of the condition between discourse and practice has developed with the explorative nature of the research approach. Various states have included an overlapping relationship (left of figure 1.3) to the other side of the spectrum where there was no connection at all. However, early in the research, a tentative proposition was formed which realised that it was not a lack of information or knowledge, but rather a ‘narrowing of the funnel’ between the two sides resulting in a reduced connection (middle of figure 1.3). The development of different understandings is illustrated in some early sketches in figure 1.3 from my notebook. To reiterate, this area of focus is not one with established research boundaries, and therefore it has developed and become more defined as the

Figure 1.3 (below)
 Understanding the research approach:
 Different sketches which illustrate
 different developments in the
 understanding of the relationship
 between discourse and practice.
 From the left, initial understandings
 that they are connected, the middle
 identification that there were barriers or
 funnels which hindered the transfer on
 information and lastly, on the right, the
 understanding that they are connected
 by ‘bridges’ (themes) which vary in size.



research has progressed, new information has been constructed, and primary and secondary sources have emerged, as is typical in a 'grounded-bricolage' approach and methodology.

1.2 OVERVIEW OF THE RESEARCH APPROACH

This research has been accomplished through a 'grounded bricolage' approach, employing six individual studies which together have contributed to the entire dissertation. Grounded-bricolage is the short-hand term this dissertation will use to describe the amalgamation of a bricolage approach and grounded theory methodology. The adaptation of this research approach is described and discussed comprehensively in the methodology chapter in section 3.2. However, it is will also be outlined briefly here and within the context of the field of research. Bricolage is considered 'a critical, multi-perspectival, multi-theoretical and multi-methodological' approach (Rogers, 2012, p. 1), with one of the first conceptualised by Denzin and Lincoln (1999) and later by Kincheloe (2001) and Berry (2004). A bricolage approach, as Kincheloe and Berry (2004, p. 2) explain, "exists out of respect for the complexity of the lived world" and is "grounded on an epistemology of complexity." It involves utilising the methods which are "at hand", rather than predetermined methods, in order to best answer the research question or focus. To clarify:

"Bricoleurs understand that researchers' interaction with the objects of their inquiries is always complicated, mercurial, unpredictable and, of course, complex. Such conditions negate the practice of planning research strategies in advance. In lieu of such rationalization of the process, bricoleurs enter into the research act as methodological negotiators." (Kincheloe, 2004, p. 3)

Therefore, bricolage is combined with grounded theory as a methodology to support this approach to research. Grounded theory is a method in that it is a process of collecting, categorising and analysing information, as well as, as a product - as theory (Willig, 2008, p. 35). In this research, it is utilised as a methodology; providing guidelines for identifying categories, creating and establishing links between them (Willig, 2008, p. 35). Grounded theory is distinctive in that the process of data collection and analysis is merged. As Willig (2008, p. 38) explains, "research moves back and forth between the two in an attempt to 'ground' the analysis in the data." This results in continuous iterations in the collection and analysis of the data; this usually involves the researcher collecting some initial data, exploring it through open coding thus resulting in the creation of links between categories, and then returning to the field to collect more data (Willig, 2008, p. 39). The focus progresses throughout the process of data collection, and the research can "draw on different data sources and use different methods of data collection" to triangulate the categories, links, and findings (Willig, 2008, p. 39). There is an apparent symbiosis between these two approaches, hence their integration into the design of the research approach for this dissertation.

Additionally, the methodologies were both chosen because of their ability to deal with complexity and the unknown. The previous description of the research context illustrates the intricacy of the field, particularly the ill-defined nature of the relationship between sustainable architecture discourse and practice. It was crucial that the research approach supported this complexity as opposed to working against it or attempting to constrain it. It was believed that the grounded bricolage approach would be able to achieve this, providing a framework and at the same time the freedom to employ different methods at different stages of the research.

Another facet of this research design is the visual and 'designerly' way in which information has been organised, processed, and analysed. Very traditional methods such as questionnaires, interviews and content analysis have been employed. However, every method has been adapted to aid my visual way of processing and to support the complexity inherent in this field. This involved a continual externalisation of the process and information; making it visual. The research focus was very much what Buchanan (1992) describes as a 'wicked problem' (ill-defined or tricky), in which both the problem and the solution are unknown at the outset. Unlike many linear scientific research procedures, this research approach foresaw and encouraged a messier and 'designerly' way of working. Lawson (2006, p. 31) describes this as "performing loops between different stages" in which "the problem and solution emerge together." The combination of a bricolage approach, grounded theory methodology, and a 'designerly' way of working, have allowed for the collection of complex and extensive qualitative and quantitative data from both primary sources (experts in the field of sustainable architecture), and secondary sources (literature, periodicals, oral and visual information). This research approach has been successful in its flexibility to navigate and follow 'leads' as they have arisen in the relationship between discourse and practice.

1.3 MOTIVATION

The grounded-bricolage approach used in this research highlights the importance of the bricoleur's or my role (as the researcher) in the process. Kincheloe (2004, p. 2) explains that "we actively construct our research methods". The researcher (me) maintains a subjective role and subsequently shapes the research by deciding which emerging leads to follow and which methods to employ. Therefore, it is important to acknowledge the impact of my motivation and background. My motivation comes from my many personal and educational experiences, as well as an ethical and cultural understanding of the natural environment combined with how it is taught in regards to architecture. Growing up in New Zealand, not only was an understanding of how the built environment affects the health and well-being of its inhabitants sorely lacking, but also the natural environment itself is severely lacking despite a huge cultural and ethical importance placed on nature. This great juxtaposition has always motivated me to understand better how buildings can contribute positively to both occupant well-being, and the health of the environments in which they reside. In addition to this, the hole in the ozone layer is something which impacted my childhood; only in

recent years have I fully understood that this was not a 'normal' experience, but rather a 'man-made' problem. As a child (and even today), on the radio, every hour with the news there is always an announcement of the 'burn-time,' and in the summer month, this varies between ten and fifteen minutes. I have vivid memories of sitting in science class and the teacher explaining why the hole in the ozone layer was positioned at the bottom of the southern hemisphere and that much of the pollutants which caused the hole came from the industrialised northern hemisphere. Even as a child, not being allowed to play outside at midday because of something someone else did on the other side of the world, felt unjust. This part of daily life has in many ways impacted the way I view sustainability in a broad sense along with my interest in the unintentional consequences of our actions. This was again exemplified during my education, through the introduction of the Brundtland report definition: "to meet the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 16). During this period, I already felt that the generation before my own had not kept up their side of the bargain and on a personal level this has been a big motivation for this research.

During my many years of university education I have studied at home in New Zealand, the United States of America, Italy, Sweden, Scotland, and during my PhD, in Wales and Denmark. Travelling and the opportunity to experience different cultures, landscapes and approaches to education has only reinforced the complexity of this relationship between the built environment and the social, cultural, and environmental context. Further to this, it has allowed me to experience the multitude of approaches and challenges which are faced in different contexts, as well as the commonalities that are experienced across the world despite geographical differences. I have seen the numerous ways in which sustainability is discussed and taught, and the many pedagogical approaches which are employed to motivate those current students making their way into architecture practice. My university education culminated in a deep interest in sustainable architecture design and theory. During my masters, while diverse and abundant in knowledge, a gap separated our theoretical courses and design studios. This initiated an interest in how sustainable theory is understood in architectural practice and was one of the commencing curiosities for my PhD. While I have spent only a short time in architectural practice myself, many of the challenges my colleagues have faced have been relayed to me, and they continue to discuss these with me. Either as someone interested in sustainability which is always having to fight for it within a practice less interested or continuously debating with colleagues who see implementing and gaining knowledge about sustainability too tricky. In short, my motivation comes not only from my personal and educational experiences but also from the experiences of others. How these experiences and motivation have affected how I position myself within sustainability and sustainable architecture are explored in the following literature review chapter specifically in section 2.2.3.

1.4 SCOPE, AIM AND OBJECTIVES

Due to the explorative and emergent nature of the research approach, the scope, aim, and objective have developed throughout the process. At the outset, these were very broad, and have progressively become more focused over the three-year period. While this section presents merely the general and initial scope, aims, and objective, the more detailed research questions and focuses will be elaborated on at later stages in the dissertation, within each relevant chapter for each study (chapters four-ten).

1.4.1 Initial Scope

This research began very broadly; hence it may be easier to clarify what this research initially did not include, rather than what it did. To start, this dissertation acknowledges that sustainability addresses many aspects of society as well as many disciplines, as discussed previously in the research context. These boundaries are often permeable; however, for the scope of this dissertation, they will not be dealt with here. An extensive amount of research and literature already exists on environmental issues, climate change, sustainability, sustainable and green building techniques, and technological advances. Consequently, these issues are not within the scope of this research. Very few limitations were applied in the first study, the contextual narrative (chapter four); instead the scope focused on understanding the content of sustainable architecture discourse, and how it related to design practices. As tentative themes or barriers (definitions, greenwashing, discourse, approaches and visual language) were constructed - as will be discussed in the next section - the scope subsequently narrowed towards these themes. As a result, issues which were only relevant to one of the paradigms were excluded from the scope; including financial cost, policy, regulations or legislation. While these themes were not chosen from the outset, the intention of this dissertation has not been to discuss the entire relationship between sustainable architecture discourse and practice, but instead to -using the research approach -establish a small section of essential and reoccurring themes which represent a 'small piece of the pie.'. Furthermore, this dissertation has not intended to conduct research that would generalise the entire field universally or find one 'truth', but rather offer several insights from a cross-section of numerous actors and sources of information. Details about the specificities of the scope can be found in section 3.2.3 in the methodology chapter. It is also worth noting that while one of the critical paradigms is discourse, this is not discourse research or discourse analysis. Equally, this research touches on history, linguistics, and semiotics, but it is not a historical, linguistic or semiotic study. History is instead used in a Foucauldian sense: not to be nostalgic or produce historiography, but to examine history to understand how it has developed; to identify ways to explain or improve contemporary situations (Foucault, 1982). Likewise, language and symbols are studied to understand how they influence the relationship between discourse and practice, rather than to study them as the focus.

1.4.2 Research Focus and Intentions

As mentioned, this dissertation aims to contribute to the field of research - specifically to sustainable architectural practitioners and knowledge producers - by providing insight into critical areas within the relationship between discourse and practice; the ambition being to better bridge these two paradigms. The overarching research focus instigating this research project was:

To understand how the gap between sustainable architecture discourse and practice may be improved and what the different ways are by which to achieve this, utilising the vast amount of existing knowledge of sustainable architecture.

From this initial focus, additional sub-aims were constructed to delimit the scope for each of the six studies. The first two initiating studies (contextual narrative and questionnaire) were broader in focus, and the last four studies (interviews, website analysis, periodical analysis and visual analysis) were more specific thus enabling them to address particular themes which were constructed from the first two studies. All six studies contribute to particular sub-areas within the overall field of research, particularly, the relationship between discourse and practice.

This research project has aimed to:

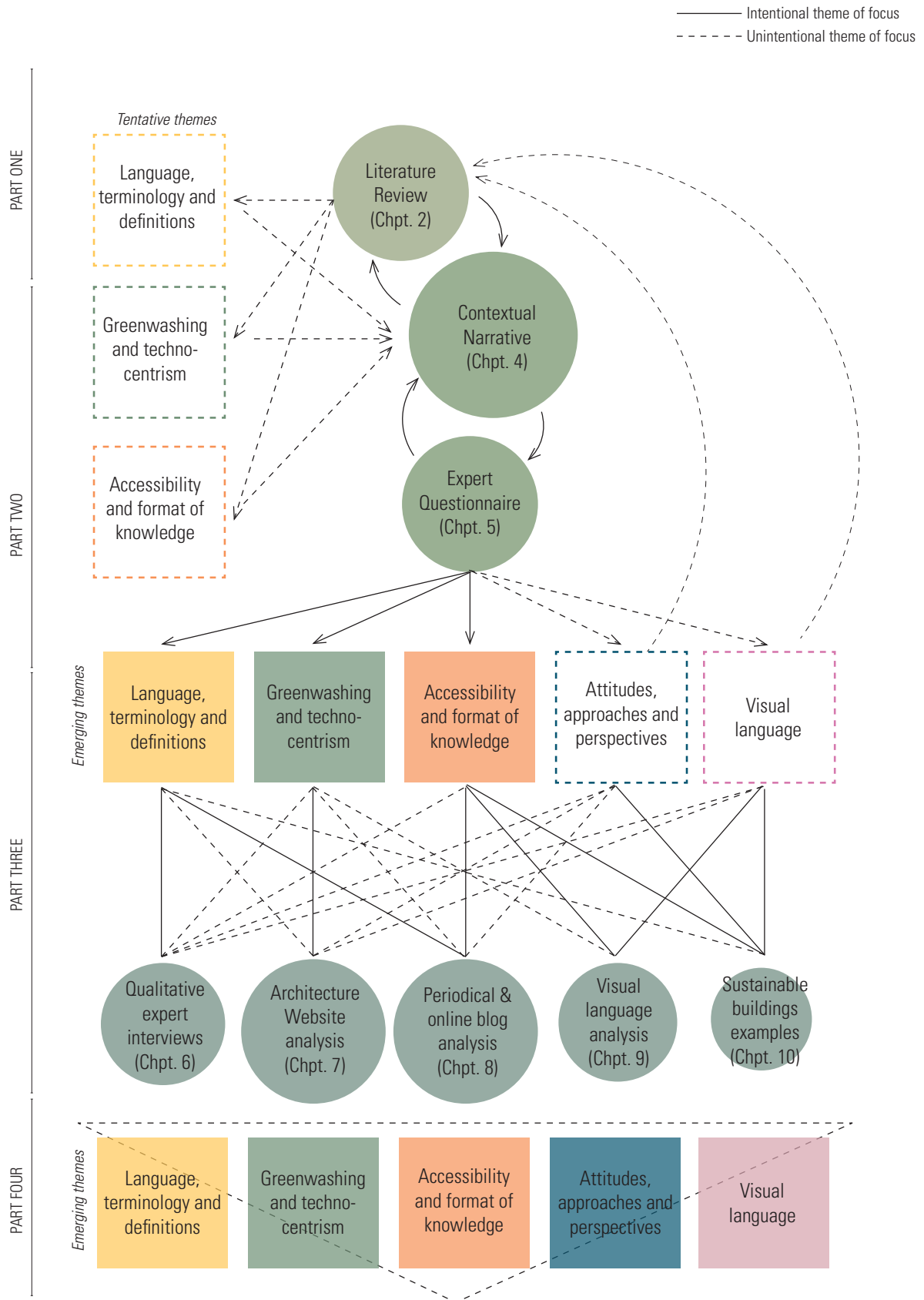
- Contribute to understanding the relationship between sustainable architecture discourse and practice by identifying key themes.
- Discover where these critical themes occur and how they are connected.
- Explicate knowledge on how these themes impact and influence the relationship between discourse and practice.

1.5 RESEARCH FRAMEWORK

The research framework is presented in figure 1.4 and intends to illustrate the different components which frame and contribute to this dissertation. While this diagram has been simplified considerably so as to be legible, this has by no means been a linear process; it has involved many iterations of going back and forward between collecting, process and analysing throughout the entire process with different studies being designed into the research approach as new tentative findings were constructed and needed further exploration. To elaborate, reviewing the literature and creating the contextual narrative identified the following tentative themes or gaps in the space between discourse and practice. These studies indicated potential areas of focus included the following topics:

- The ambiguity and vagueness of the definitions and terminology associated with sustainable architecture materialised as a reappearing challenge.
- Greenwashing and a developed focus on technology were impacting the maturity of the field.

Figure 1.4 (right) Diagram of the research framework and process: illustrating the connections between the different studies and constructed themes.



- The format and accessibility of the written discourse hinted at being a hindrance in allowing knowledge gain.

These three concerns formed the basis for the questionnaire (chapter five), which cemented their importance as critical themes and underlined an additional two tentative themes (illustrated as dashed lines in figure 1.4). These additional themes included:

- The many conflicting perspectives and approaches to sustainable architecture
- The state and stigma of the visual language

These five themes are articulated above how they were initially understood. Together they formed the basis for the additional four studies which was designed into the research with the grounded-bricolage approach. These five themes were refined and developed throughout the research process including and excluding sub-categories as they were constructed from the newer studies which included: interviews (chapter six), website analysis (chapter seven), periodical analysis (chapter eight) visual analysis (chapter nine) and the built examples probes which are not presented in this dissertation. The grounded-bricolage approach enabled flexibility for the design of these later studies with some explicitly addressing one or two themes (illustrated by a continuous line) as visible at the bottom of figure 1.4 and often unintentionally also discusses other related themes, indicated with a dashed line. This allowed me as the researcher to follow unknown leads and emphasises the overlap and interrelationships which exist between these findings within the relationship between discourse and practice.

This dissertation is presented in four separate parts within this book with an additional book containing the appendices with all the supporting information. Part One outlines the basis for the research including this introduction, followed by the literature review and methodology. Part Two articulates the first two studies which initiated the research; the contextual narrative, and the questionnaire with experts. Part Three contains the most significant body of findings from the four primary studies presented in four different chapters: the semi-structured interviews; the architectural website analysis; the periodical and blog analysis; and lastly, the visual analysis. By way of completion, Part Four discusses all of the findings together in concert, followed by the summary and conclusion chapter.

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Chapter Two

MAPPING THE TERRAIN | Literature Review

Chapter two presents a review of the available literature relating to the research focus - the relationship between sustainable architecture discourse and practice. This discussion explores key terms and positions the research concerning broader associated concepts, including; mapping the literature; sustainability; sustainable development and sustainable architecture; and between discourse and practice. Additionally, this chapter serves to position and orient the research within existing literature and the five constructed themes: Definitions, terminology, and language; greenwashing and techno-centrism; information, knowledge, and communication; approaches, attitudes, and perspectives; and visual language and identity, which form the findings. The intent is not to convey an exhaustive analysis of the five themes but to indicate ongoing research activities, literature, and concerns related to this research.

2.1 INTRODUCTION

Sustainable architecture discourse and practice is a limited and fragmented field of research. This chapter endeavours to ‘map the terrain’ of positions and context from which the relationship between discourse and practice is explored. The impact the built environment has on resources and the natural environment is well established; many books frame the discussion with facts about the forty-something percent of energy and waste that the building industry is accountable for. This is supported by Simon Guy and Steven Moore (2005, p. 15). Who explain:

“Within contemporary architectural discourse and practice, there seems to exist a wide consensus on the urgent need to promote environmental innovation in building design. It is rare to find a book about sustainable architecture that does not highlight the contribution of buildings to various forms of environmental degradation.”

This dissertation will avoid reiterating statistics which are now common knowledge within the architecture profession, hoping that the dire need for sustainable architecture is recognised and does not need to be advocated for. Instead, this literature review aims to describe and critically reflect on current knowledge which positions this contribution to knowledge in the wider field of sustainable architecture and frames the gaps and perspectives that this research attempts to contribute to. Furthermore, the purpose of this chapter is to provide a comprehensive description of the connection between discourse and practice, as well as providing the necessary background information and introducing common debates in which contribute to this connection; the intention being to illuminate how this knowledge may aid a better connection in the future.

This literature review relies heavily on existing literature within the research field, and in the case of this dissertation, there is very little cohesive or comprehensive literature directly associated to the relationship between discourse and practice. Subsequently, a broad scope has emerged and a diverse range of sources have been included in order to provide a cohesive picture of the field. Topics and themes relating to the research focus are often found scattered throughout literature. This is emphasised in figure 2.1 which illustrates the main books utilised, each with coloured post-it notes representing when one of the five different themes (definitions, greenwashing, discourse, approaches and visual language) were mentioned or discussed. This scattered information led to the creation of a ‘literature map’ (see figure 2.2) to keep track and organise sources while also illustrating the number of publications used to gather the information for this literature review, discussed in more depth in section 2.1.1.

The five themes are presented in this literature review cohesively and linearly; however, this is not representative of the actual process. A literature review can be a contentious exercise within a grounded theory methodology, as an ‘untainted’ mind is strived for when collecting data. However, within the structure of this research, a form of literature review was crucial to delimit the scope and the framework of this



Figure 2.1 Related literature: Stack of books used for the literature review with coloured tags indicating the presence of discussions relating to the five different themes.

research. Subsequently, this literature review was designed as an iterative process, as is common in a grounded theory research approach (Willig, 2008, p. 41). It required going back and forth through old and new literature sources as different themes, categories and subcategories emerged. Rather than completing the literature review at the start of the research process, different sources were often re-read multiple times through a different ‘thematic lens’ as categories were constructed.

Furthermore, some of the literature studied addresses the research focus generally, while others address only a specific theme or study. Hence, this literature review aims to outline the general discussion for the research, while some specific existing literature and research will be discussed later within the relevant chapters, and in relation to the particular study and theme to which they relate. This chapter is organised into three interrelated parts which frame this dissertation and form the basis for discussion of the research focus as summarised in the previous introductory chapter (section 1.4.2). Before beginning the main body of this chapter, an overview of the chosen sources of literature will be discussed to emphasise and frame the fragmented and overlapping nature of the literature which forms the basis for this review.

The first part (2.2) of this chapter: ‘Sustainable development, sustainability and sustainable architecture’ outlines this research and positions it within the broader field of sustainability and sustainable development. While this chapter does not go in depth into the copious debates that surround these vast topics, it touches lightly on those areas which are most impactful for this research. In this section, I will clarify the distinctions between different terms through the description of their varying developments, and position this dissertation with a pluralistic approach to sustainable architecture.

The second part (2.3): ‘Between discourse and practice,’ will delineate the research as it concerns discourse and practice in the wider sense, and more specifically, as it concerns sustainable architecture. This will be achieved firstly by articulating sustainable architecture discourse and sustainable practice independently, before framing the relationship between the two paradigms so as to indicate where this research can contribute.

The third (2.4, 2.5, 2.6, 2.7, 2.8 and 2.9) and most substantial part of this chapter: ‘Five emergent themes’, will introduce the five themes - definitions, greenwashing, discourse, approaches and visual language - that influence the two paradigms and have been constructed as a result of this research. Each section will briefly present the origins and central ideas of each theme using a diverse range of contemporary literature for each.

2.1.1 Mapping the literature

The map in figure 2.2 demonstrates the primary written sources utilised in this literature review. These are roughly positioned on the horizontal axis organised by who has written or edited the publications, from architectural practitioners (left) through to academics (right). On the vertical axis, these have been positioned

Figure 2.2 (following pages) Mapping of literature: positioned on an axis by author's profession and the quantity of practice or theory content

Feireiss, K., Feireiss, L. (Eds.), 2008. Architecture of Change: Sustainability and Humanity in the Built Environment.

Feireiss, K. (Ed.), 2009. Architecture of Change 2: Sustainability and Humanity in the Built Environment

Paschich, E., Zimmerman, J., 2001. Mainstreaming Sustainable Architecture: Casa de Paja: A Demonstration

Keeler, M., Burke, B., 2009. Fundamentals of Integrated Design for Sustainable Building

Jones, D.L., 1998. Architecture and the Environment: Contemporary Green Buildings

Yeang, K., 1995. Designing With Nature: The Ecological Basis for Architectural Design

Yudelson, J., 2012. The world's greenest buildings

Jodido, P., 2013. 100 contemporary green buildings

Yudelson, J., 2009. Green Building Trends: Europe

Williams, D.E., Orr, D.W., Watson, D., 2007. Sustainable Design: Ecology, Architecture, and Planning

Crowther, R., 1992. Ecologic Architecture: The Ecologic Perspective for Design

Bergman, D., 2010. Sustainable Design: A Critical Guide

L. Hosey 2012. Shape of Green: Aesthetics, Ecology, and Design

Yudelson, J., 2012. The world's greenest buildings

Pfammatter, U., 2014. Building for a Changing Culture and Climate: World Atlas of Sustainable

Buchanan, P., Frampton, K., 2006. Ten Shades of Green: Architecture and the Natural World

Hyde, R., Watson, S., Cheshire, W., Thomson, M., 2007. The Environmental Brief: Pathways for Green Design

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■	DEFINITIONS
■	GREENWASHING
■	COMMUNICATION
■	APPROACHES
■	VISUAL LANGUAGE

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and Case

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The Solar House:
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Pioneering Sustainable
Design

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A Critical History

depending on the content of the publication, ranging from theoretical or conceptual discussions (bottom) through to practical design principles, handbook styles or best practice examples (top). By positioning the publications on this axes, it emphasises architectural practitioners' tendency to produce more practical design principles or best practice publications, while academia tends to produce a considerable amount of theoretical discourse. In addition to the positioning of each publication, as mentioned, colours relating to the five themes (definitions, greenwashing, discourse, approaches and visual language) have been allocated by relevance. This exercise was useful for both the pragmatic organisation as well as the illustration of how these five themes overlap throughout many of the publications. This is especially true for publications positioned on the theoretical end of the axis, demonstrating at least three, if not all five, of the themes. Additionally, the map indicates how fragmented the existing knowledge is in relation to these five themes, and has initiated an objective of this literature review which entails bringing many of these fragments together so as to form the most cohesive understanding possible, and be able to articulate the gaps in the knowledge which this research study will then aim to address.

Furthermore, it is worth noting that the majority of the sources for this literature review have been selected from my university library which has led to some inherent limitations. One reoccurring limitation has been my ability to read only English literature; as further discussed in the methodology chapter (3), this influences, without choice, much of the secondary information I have been able to gather. Secondly, as my university does not have free access to an online journal database, only a select few journal articles have been accessible, and therefore books make up a prominent proportion of the literature employed. These limitations are not considered a hinderance, but are instead articulated so as to add background to the selected literature sources. This mapping emphasises that these themes are relevant in a European, American, and even Australian context and literature. The majority of the publications are from after the year 2000 with only a select few from the nineties. However, this time span is close to twenty years, demonstrating that these themes have been discussed for an extended period and are still relevant or at least unresolved to this day.

2.2 SUSTAINABILITY, SUSTAINABLE DEVELOPMENT, AND SUSTAINABLE ARCHITECTURE

Sustainability and sustainable development are fluid concepts which influence and frame the discourse and practice of sustainable architecture. They are interrelated concepts and their definitions and conceptualisation vary widely from author to author. Within the field of sustainable architecture, it is often difficult to distinguish where one concept of sustainability starts and another one stops; they are commonly used interchangeably, even when considered to be complementary and in conflict (Joost Dessein et al., 2015, p. 20). Discussing the similarities and differences between these three terms is vital as sustainable architecture is heavily informed by, and dependant on, how sustainability develops. Therefore, to aid this research, I will

endeavour to outline some critical developments in sustainability and sustainable development, accompanied by the particular interpretations which are employed, so as to clarify how these terms are used within this dissertation. In section 2.2.3 sustainable architecture as a term is summarised, in reference to how it is used in this dissertation; however, the development of this concept is discussed in detail in chapter four – the Contextual Narrative.

To initiate this discussion, some rudimentary definitions of both sustainability and sustainable development are as following:

Sustainability (Merriam-Webster, 2018):

Capable of being sustained

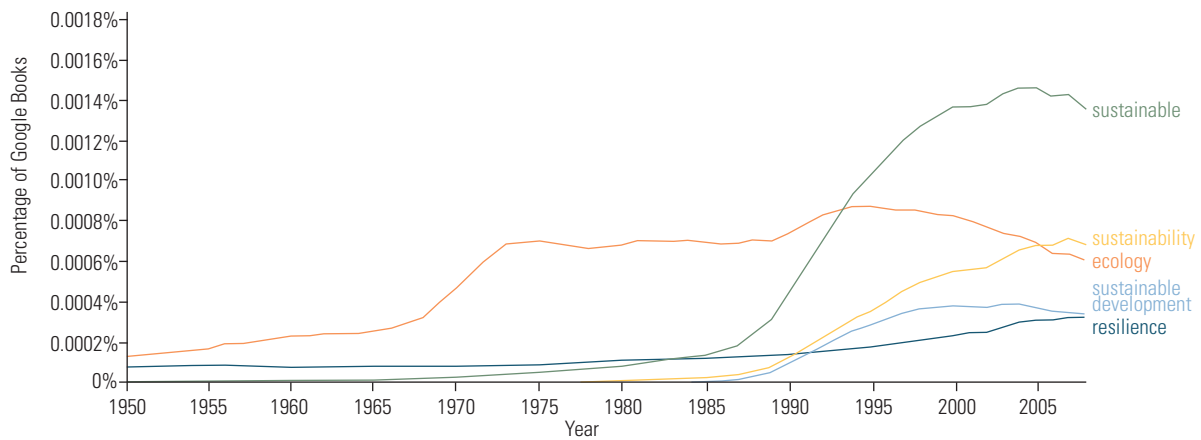
A: of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged

B: of or relating to a lifestyle involving the use of sustainable methods

Sustainable development (WCED – World Commission on Environment and Development, 1987, p. 16) as previously mentioned is: development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

One of the most pertinent distinctions between these terms from the above definitions, is that sustainability is considered as a positive and continuously overarching process for all human activity; one that binds the wellbeing of people and the ecosystem into a mutually supportive whole. The second definition characterises sustainable development as a goal for specific situations. Thus, sustainable development is a potential component of sustainability. The commonality of both concepts is that they embrace long-term, holistic, environmental, social and economic issues, of which environmental protection must hold primacy as it underpins existence, or, more plainly, survival (Dennis Rodwell, 2008, p. 57). While sustainability and sustainable development are referred to as concepts, the adjective ‘sustainable’ is employed independently from sustainable development. Dennis Rodwell (2008, p. 57) clarifies this: the adjective is now so overused that some people are apt to groan at the sound of it.

To better understand the use of these terms, Google Books Ngram Viewer data has been used to create the line graph in Figure 2.3. This particular graph exemplifies how sustainable, sustainability, sustainable development, ecology, and resilience are used in a corpus of English books between the years 1950 and 2008. Interestingly, the graph shows that the use of the word sustainable in its different forms increased from the mid-eighties; sustainable(-ility) peaked around 2006 and sustainable development slightly earlier in the early 2000s, and now all three terms are declining in use. Conversely, ecology had been used for many decades prior to 1950, and the graph demonstrates an increase in use during the seventies and then again at the start of the nineties. Similarly to sustainability its use is also decreasing, albeit more



Google Books Ngram Viewer
Between 1950 and 2008 from the English corpus with smoothing of 2

Figure 2.3 Frequency of keywords relating to sustainability: created from 'Google Books Ngram viewer' from sources between 1950 and 2008

slowly and over a more extended period. The increasing frequency of these words is not surprising when considering the social and political context of each decade, particularly the environmental movement of the sixties and seventies, and the Brundtland report published in 1987 - which is discussed shortly. , on the other hand, resilience is used with less frequency. Regardless it has been slowly increasing in use since the nineties, recently matching sustainable development's frequency, and is the only term still increasing. This graph demonstrates how terms develop over time but also highlights how differently they are used. This supports the notion that while these terms are similar, they are not interchangeable. To elaborate some differences between sustainability and sustainable development, Joost, Dessein et al. (2015, p. 22), argue that for the concept sustainability "further development is not essential which contrasts sustainable development's "sectoral interest for whom 'growth' (usually defined as economic growth) is the only way ahead". Therefore, as Joost, Dessein et al. (2015, pp. 22–23) continue, sustainability as a term has a wider set of values and objectives which can support 'de-growth', 'no growth' as well as 'growth' and may have "social equity and justice not economic prosperity as its goal." These terms have developed both in frequency and meaning; the following section will briefly outline some key events, especially since the seventies, which have shaped how we comprehend and practise sustainability today.

2.2.1 The development of sustainability and sustainable development.

This section collates key events and perspectives from the seventies, eighties, and nineties to discuss the development of sustainability and sustainable development. This will begin with the post-rationalised understandings, before the development of contemporary terms. One of the earliest references to sustainability is outlined by Djalali and Vollaard (2008, p. 35) in their extensive timeline "A Complex History of Sustainability", placing Robin Hood at the beginning, around 1000 AD. Robin Hood, while an unexpected frontrunner, resides here as a retrospective reference to the concept of social sustainability, a term that did not itself develop until the twentieth century (Merriam-Webster, 2018). Around 700 years later, in 1713, the first

comprehensively formulated concept of sustainability developed in Germany within the forestry industry (Vehkamäki, 2005, p. 4). The notion of avoiding cutting down more trees than could be replanted was established and is the most direct reference to contemporary definitions of sustainability. Throughout the nineteenth and twentieth century, there are many other retrospective understandings of the concept of sustainability. However, it is the recent history from the environmental movement in the sixties which has had the greatest influence on the contemporary understanding. Environmental degradation influenced the development of these concepts, and they have also been framed by inequality between the “rich and poor countries”. As Steele (1997, p. 6) elaborates, “the industrially rich countries have thrived at the expense of the poorer ones”. Steele (1997, p. 6) continues to highlight the dichotomy between the values and needs of each country which is an integral concept within the definition of sustainable development. To elaborate, the remainder of this section will discuss several events which have shaped the notion of sustainability and formed the notion of sustainable development.

Stockholm conference and Limits of Growth 1972

As mentioned and illustrated in figure 2.3, the sixties and seventies were framed by the environmental movement, ecology, and “growing concerns from the socially conscious” (Steele, 1997, p. 1). This culminated with the first Earth Day in 1970, raising issues of population growth, agricultural limits, global famine, pollution, degradation, greenhouse gases and the depletion of the ozone-layer (Steele, 1997, p. 1). Shortly after this, in 1972, the Stockholm Conference was held between one hundred and fourteen government delegations; this was initially designed to focus on environmental issues, but at the appeal of developing nations, discussed issues of development and specifically that economic growth of developing nations should not be diminished by long-term environmental protection. As a result, the United Nations Environmental Programme (UNEP) was formed. The UNEP commissioned the International Union for Conservation of Nature (IUCN) to prepare what is now known as the World Conservation Strategy. However, the IUCN group responsible for the strategy, consisting of mainly theoreticians and environmentalists, failed to include economics and politics which were fundamental to the process of development (Adams, 2001, pp. 59–69). The legacy of the Stockholm Conference is that the environment was placed on the political agenda, and governments started to acknowledge that technology could be damaging to the environment. In the same year (1972) - another similar report was produced by the Club of Rome, entitled ‘Limits of Growth’. The Club of Rome consisted of current and former heads of state, United Nations bureaucrats, politicians, government officials, diplomats, scientists, economists, and business leaders from around the world (Club of Rome, 2018). Limits of Growth focused on the exponential population and global economic growth; using computer simulations they predicted drastic consequences due to a finite supply of resources. Steele (1997, p. 1) propounds that several assumptions within the report have, in retrospect, been considered naïve. Despite that, the report succeeded to

popularise the term ‘zero growth’ which has been used ever since. During this period since the first Earth Day, the philosophical shift from ecology to sustainability has been “subtle but significant” (Steele, 1997, p. 3), and this shift has continued with the progression of sustainable development, moving from an “ecologically based concept to socio-economic context” (Adams p 71).

The Brundtland Commission 1987

This transition to sustainable development was intensified by the report ‘Our Common Future’, presented by The United Nations World Commission on Environment and Development (WCED) in 1987. The report, commonly referred to as the Brundtland Report, popularised the term sustainable development and positioned the concept within the economic and political context of international development, building on ideas from the 1972 Stockholm conference (Adams, 2001, p. 70). As defined previously, the Brundtland Report formed what is now the most commonly used definition for sustainable development (already provided on 39). This definition was founded on two concepts: the environmental limits due to human society’s impact, and how the environment can provide for the basic needs of developing nations (Adams 2001 p 71). This approach not only addresses poverty and merged concerns for basic needs, but, simultaneously,

Environmental and economic growth (Adams p72). These three themes are often represented by three equal and interlocking circles, as illustrated in figure 2.4. Despite the three circles being represented equally, this is not the reality; usually the economic issues are considered of far greater importance than the other two factors. Thus, I argue that, while this model has been successful in popularising the field, it needs to be employed critically and holistically with all three factors equally represented.

UN commission members differed from those in the previous commission whom wrote the World Conservation Strategy; primarily political figures, as opposed to environmentalists. Their agenda, an attempt to cultivate a worldwide understanding that, instead of being inherently contradictory, environmental aims and development aims could complement one another. Sustainable development - contrary to the debates characterised by the Limits of Growth - offered means for comprehending the potentially compatible objectives of environmental and economic development (Steele, 1997, p. 5). There were many similarities between Our Common Future and the World Conservation Strategy, however, what differed was the ability for the WCED to better engage government policymakers. Despite this, the Brundtland report lacked possibilities for how to achieve these agendas (Adams 2001 p 71).

The Earth Summit Rio 1992

The Brundtland Report influenced the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. The resulting document, ‘Agenda 21’ was a critical outcome from a conference that tried to compromise in order to satisfy tensions between various developing governments (Adams, 2001, p. 83). Steele (1997,



Figure 2.4 Sustainable development triple-bottom-line model.

p. 9) expands on this, clarifying that in order to compensate for past inequalities and reverse resource depletion, developed nations must subsidise growth in developing nations. Agenda 21 evolved from prior documents in its attempt to provide ideas for how these previous goals could be achieved. The outcome is a vast document with immense scope. Nonetheless, it is dependent on national and global economic growth. The document consists of forty sections addressing a range of concerns; one-hundred-and-twenty program outlines and one-thousand proposals. Steele (1997, p. 9) conceptualises these sections, outlines, and proposals into six subject areas:

“The quality of life on earth, efficient use of Earth’s materials, the protection of our global commons, the management of human settlements, chemical and the management of waste and sustainable economic growth.”

Steele (1997, pp. 13–17) continues, propounding that the fourth section – the management of human settlements – is of most interest to architects. In doing so, Steele highlights the destructive capacity of the construction industry and the built environment, defined as “a major source of environmental damage through the degradation of fragile ecological zones, damage to natural resources, chemical pollution, and the use of building materials, which are harmful to human health” (Steele, 1997, pp. 13–17). By way of corrective response, the report recommends several proposals that vary from using local materials and techniques, to international information exchange on all aspects of construction (Steele, 1997, pp. 13–17). Some more extensive doubts have been raised with concern to the impact or significance of Agenda 21, as inequality still increases between rich and poor nations (Adams, 2001, p. 95). However, within the discipline of architecture, Agenda 21 has succeeded in providing issues and ‘solutions’ which were directly relatable and implementable, therefore increasing interest in the concept of sustainable development so that even ‘every day architects’ could easily see how to make changes. While Agenda 21 has been successful in promoting sustainable development, it is worth noting that the document itself is vague and complicated, written in diplomatic language directed at readers who are used to policy documents. What has resulted, is that much of

Figure 2.5 Sustainable Development Goals



what the architecture discipline receives is a distilled version of the report, one that relies on those who translate the report and unfortunately, more often than not, this has produced contention and scepticism. The digestibility of the concept was further developed at subsequent UN meetings including the Kyoto summit in 1996, and further expanded on during the Rio+20 conference in 2012.

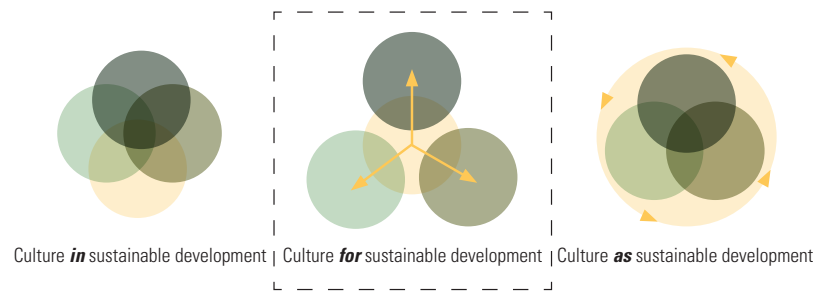
Sustainable Development Goals

In 2012, the United Nations Conference on Sustainable Development was held, commonly known as Rio+20. The Sustainable Development Goals (sdgs) illustrated in figure 2.5 were the primary outcome from the conference to be utilised as tools for achieving sustainable development (Joost Dessein et al., 2015, p. 14). The sdgs were formed after three years of consultations with one-hundred-and-ninety-three UN Member States, and were adopted as a plan for achieving Agenda 2030 (RIBA, 2017, p. 4). Sdgs are comprised of seventeen goals with one-hundred-and-sixty-nine specific targets. Goal eleven recognises the critical role of cities in addressing global challenges, and the need to make cities and human settlements inclusive, safe, resilient and sustainable (UN Web Tv, 2016). Further to this, the RIBA published document 'UN Sustainable Development Goals in Practice', highlights the unique position that architects are in, given their ability to address the majority of the goals, while also influence 'clients and other construction industry professionals' in all areas of the design and construction process (RIBA, 2017, p. 7). Also, the RIBA outline "what architects can do" in response to four overarching issues: human rights; labour laws; the environment and anti-corruption and bribery (RIBA, 2017, pp. 10–11). Interestingly, with these new goals, there has been a growing awareness and direct collaboration with institutes such as the Sustainable Development Goal Fund and the 2016 Pritzker Architecture Prize winner Alejandro Aravena. Aravena recently began a broad dialogue in which he explores the role of architecture in contemporary society, discussing many pressing issues such as the urban migration and poverty (UN Web Tv, 2016). The SDU goals indicate the transitions which have occurred from the early Stockholm conference in the seventies. It is evident that the issues raised with each conference or event have developed as society has adapted over the past nearly fifty years; with each new conference, agendas and goals have developed with increasing digestibility for all, rather than just policymakers. This desire to engage with broader disciplines is illustrated by collaborations such as the SDG Fund and Alejandro Aravena, in which clearly indicate in concrete terms how successful, award-winning architecture is directly relatable to the SDG.

2.2.2 Culture and Sustainable Development

Expanding on the previous section and the growth of the term 'sustainable development', this dissertation argues, like many others, that a 'fourth pillar' or paradigm is missing from the original three-pillar model and debate. This 'pillar' is culture. It is recognised that there are many shortcomings with the pillar model including the reduction of reality and sectorial thinking. However, this dissertation

Figure 2.6 Culture and sustainable development: Three roles of culture in, for and as sustainable development, based on the diagram by (Joost Dessein et al., 2015)



does not venture into this debate; instead it acknowledges that, while the model is flawed, it is also relatively well-accepted as a metaphor within sustainability discussions (Joost Dessein et al., 2015, p. 23). Thus, this pillar model is helpful in arguing for the addition of culture, while also positioning this dissertation within sustainable development. Joost, Dessein et al. (2015, p. 20) explain that some of the challenges faced are that both culture and sustainable development transcend between the past and future, and “are complex, contested, multidisciplinary and normative concepts.” As already alluded to, there is not one agreed-upon definition of sustainability despite the widely used Brundtland definition; this is the same as the term culture. Joost, Dessein et al. (2015, p. 20), referring to Raymond Williams (1975), states “culture is one of the two or three most complicated words in English usage”. Consequently, it is difficult when dealing with two openly contested concepts.¹ The concept of culture will only be touched upon in this section given its relevant for framing the research, however it is not a key focus. The nature of culture has evolved and may be used in many contexts; Joost, Dessein et al. (2015, p. 21) argue that culture is a “distinct intellectual discipline”, “distinct systems of thought”, “an everyday concept”, and additionally “it has public meaning and understanding.” Further, Williams (1975, p. 80) refers to three popular meanings of culture:

“culture as the general process of intellectual, spiritual or aesthetic development, culture as a particular way of life, whether of people, period or group and culture as works and intellectual, artistic activity.” (Joost Dessein et al., 2015, p. 21)

Reference to culture in this dissertation recognises all of these perspectives and understands that it is not ‘either-or’ but, instead, the possibility for both a subdivision of meaning or overlap. Likewise, this dissertation maintains that there is no single definition of sustainability or sustainable development; these terms cannot carry the same meaning over time and in all parts of the world (Joost Dessein et al., 2015, p. 24). It is for this reason that I argue that both sustainability and sustainable development cannot be understood independently of cultural context(s). This same argument is applied to the following section when discussing sustainable architecture, acknowledging and celebrating the diversity of meanings.

There are many reasons that culture is contained within the ‘social pillar’;

¹ Sustainability as a contested concept is discussed later in section 2.5

however, this dissertation understands these concepts as interlinked and reciprocal, yet with ‘distinct dimensions of sustainability’ (Joost Dessein et al., 2015, p. 25).

Joost and Dessein et al. (2015, p. 25) make a fitting analogy:

“people have for thousands of years designed their architecture to contain their specific culturally constructed lifestyles and economic activities; yet once built, the architecture in its turn shapes and changes how people live, so that their future ‘ways of living’, their culture, fit into the (by then) pre-existing structure.”

This analogy is exceptionally relevant with reference to sustainable architecture; it illustrates not only the importance of the built environment, but also how crucial cultural context(s) are in designing successful sustainable buildings. Joost and Dessein et al. (2015) outline three ways in which culture can be incorporated with sustainable development – culture in, for or as sustainable development. These three approaches are illustrated in the diagram in figure 2.6. This dissertation employs the approach of culture for sustainable development, as highlighted in the diagram, with culture at the centre of the other ‘three pillars.’ In this model, culture operates beyond itself as an influential force and as Joost and Dessein et al. (2015, p. 28) describe:

“this role moves culture into a framing, contextualising and mediating mode, which can balance all three of the pillars and guide sustainable development between economic, social, and ecological pressures and needs.”

2.2.3 Sustainable architecture

Within this dissertation, I use sustainable architecture as both a noun and a verb; as an object and a way of thinking and designing. Often sustainable architecture is also discussed as architectural sustainability or sustainability in architecture. This dissertation, as outlined in the introduction (1.1), argues that sustainable architecture is, in its own right, a field within the discipline of architecture. Personally, and optimistically, I am of the opinion that all ‘good’ architecture is sustainable and, if it is not sustainable, it is not good architecture. However, this is not widely agreed upon and does not reflect much of the literature or the way in which sustainable architecture is understood and practiced. Thus, this dissertation is framed by the position that sustainable architecture is instead a separate field within the discipline of architecture.

Nevertheless, to give a short insight: this research recognises that given the multitude of approaches to sustainable development, consequently, there are a multitude of approaches to sustainable architecture which should be culturally grounded. I position myself and this dissertation within the argument by Simon Guy and Steven Moore (2007); there is a plurality of sustainable architecture’s approaches, philosophies and ideologies. In line with a relativist understanding of the world, this

dissertation does not seek one correct understanding or approach to sustainable architecture, but rather comprehends that each understanding is dependent on the 'observer' and context of which it is situated. As Venturi et al. (1977, p. 16) exclaimed:

"I am for richness of meaning rather than clarity of meaning; for the implicit function as well as the explicit function. I prefer both-and to either-or, black and white, and sometimes gray, to black and white."

A considerable part of this dissertation is devoted to unpacking the copious meanings and consequent debates around how the term sustainable architecture is used and defined – . To start, section 2.5 in the literature review discusses this theme in-depth, and section 4.4 in chapter four examines the development of the sustainable lexicon. Nonetheless, this section aims not to define, but rather to outline, how the term sustainable architecture is used in this dissertation. Sustainable, ecological, environmental and green are often used interchangeably when discussing 'environmentally responsive architecture'. However, there are nuisances between this different vocabulary; each loaded with social and political implications (Steele, 2005, p. 6). As mentioned above, this research positions itself within the understanding that there is a plural of approaches to sustainable architecture, and therefore a plural of definitions. Steele (2005, p. 6), explains that sustainable architecture is easier to trace and define than green and ecological because of its 'institutional roots' which were outlined in the previous section. Thus, for this dissertation, sustainable architecture is used as an umbrella term encompassing green-, environmental-, ecological architecture and the other sixty-seven terms (see figure 4.21), while also acknowledging that there are many meanings which are then nestled within this broad term.

2.3 BETWEEN DISCOURSE AND PRACTICE

The relationship between sustainable architecture discourse and practice is not a well-established area of research, as the research field of sustainable architecture in itself is relatively new (Femenias, 2004, p. 109). Very few clearly defined boundaries exist. Before exploring the themes (definitions, greenwashing, discourse, approaches and visual language) which have been constructed within this research, this section will set out to describe and position this dissertation regarding discourse, practice and the relationship in between. This area of focus was not well defined when commencing this research; thus, the explorative journey of this PhD began with a focus on discourse and the different theories. However, once it became apparent that the problems did not lie solely with the discourse, but rather the relationship between these two paradigms, his changed the direction of the research from the 'what' and 'how' to the 'why', identifying what relationships existed and how they are connected. This dissertation demonstrates this journey, from the initial studies (contextual narrative) focusing on the content of the discourse, followed by collecting perspectives from practice and the iterative process between the two sources of information. The relationship, or lack thereof, between discourse and practice is

one which is mentioned but not thoroughly explored. Hackauf (2010, p. 43) states: “We see an imbalance between how much green is talked about and how much it is actually improving”. This suggests there is a considerable amount of frequent discourse but that it is not congruent to an improved state of practice. Slightly contradictory, Guy (2010, p. 22) explains that the contested nature of sustainability and the desire for a “stable knowledge base upon which to act” has been a common debate; he references Marteen Hajer’s (1995) argument that:

“if examined closely, environmental discourse is fragmented and contradictory. That is, environmental discourse is an astonishing collection of claims and concerns brought together by a great variety of actors.”

This position, argues that much of the issues lie within the discourse itself, rather than how it is used by, and within, practice. These are only a select few of the understandings of the condition of the relationship between discourse and practice. To emphasise again, there is not one established understanding of these paradigms; instead there are multiple, both overlapping and contradictory. The remainder of this section will firstly discuss and position how discourse, as a more comprehensive concept, is understood within this dissertation, and how it relates to sustainable architecture discourse; secondly, how practice is understood followed by the different structures and approaches within sustainable architecture practices; and lastly, how architecture practices gain knowledge and use discourse.

2.3.1 Sustainable architecture discourse

There is not one precise definition of the concept of ‘discourse’. However, this dissertation positions itself within the Foucauldian² understanding. From a Foucauldian point of view, discourse may be defined as a “set of statements that construct objects and an array of subject positions” (Willig, 2008, p. 112). It is these constructs which allow for certain ways of being in and seeing the world. In addition, they impact the subjectivity and experience (Willig, 2008, p. 113). Much of the literature references the Foucauldian method for discourse analysis, however, this method has not been strictly employed in this research; rather, the notion of how Foucault understands discourse has been employed so as to influence and frame various other methods and studies. For instance, Foucault’s approach to discourse also includes an “historical perspective and explores the ways in which discourses have changed over time” (Willig, 2008, p. 113). An example of this influence is in the contextual narrative (Chapter Four), exploring three perspectives on sustainable architecture discourse and how they have developed from the sixties. Besides, as

2 Michel Foucault is a French Philosopher and author of ‘The Archaeology of Knowledge,’ his notion of discourse understands that: discourse is a culturally constructed representation of reality, not an exact copy; discourse constructs knowledge and thus governs, through the production of categories of knowledge and assemblages; and discourse defines subjects framing and positioning who it is possible to be and what it is possible to do. (Foucault, 1991, pp. 53–72, 1982)

Willig (2008, p. 114) explains, Foucauldian discourse is not limited to words, but can be carried out “whenever there is meaning”. Willig (2008, p. 114), quoting Parker (1992, p. 7):

“recommends that we ‘consider all tissues of meaning as texts.’ This means that ‘[S]peech, writing, non-verbal behaviour, Braille, Morse code, semaphore, runes, advertisements, fashion systems, stained glass, architecture, tarot cards and bus tickets” all constitute suitable text for analysis.”

This is especially relevant here, as much of how this field is communicated and discussed is through drawings, photos, and built examples, as well as texts. By taking this position, this dissertation can engage with a vast range of materials - written, verbal, visual and physical objects - which contain “networks of meaning” and construct social realities (Willig, 2008, p. 124). Willig (2008, p. 124) elaborates by stating that discursive constructions (the way in which we talk about things) “have ‘real’ effect” and implications on how we experience the world. This perspective draws parallels to the famous 1944 Winston Churchill quote: “We shape our buildings, and afterward, our buildings shape us”. In the context of this dissertation, the building themselves are considered part of the sustainable architecture discourse as a product of the design process, and therefore, this quote can be extrapolated; we shape discourse, and afterwards, the discourse shapes us, not only in how we practice sustainable architecture but also in how we experience the world. Thus, the relationship between discourse and practice is a meaningful connection to explore.

2.3.2 Sustainable architecture practice

Dana Cuff (1992, p. 4), clarifies the nature of architecture practice by asking and answering the question:

“what are architecture’s professional activities and how are they customarily performed? A partial answer is that architectural practice emerges through complex interactions among interested parties, from which documents for a future building emerge.”

In addition to this, ‘practice’ may also have additional meanings. Firstly, practice in the design process sense, as outlined by Dana Cuff; the application or use of an idea or method. Secondly, practice as in the office construct – architectural practice as an architectural office. Lastly, practice as in a group of architectural practitioners. This dissertation will refer to all three of these meanings when discussing the connection between discourse and practice. However, in most cases, it will be in reference to practice as the design process. This section will endeavour to clarify this through an outline of some of the different design practice approaches and architectural office structures which contribute to the practice of sustainable architecture.

Just as there are multiple contexts, definitions and approaches, there are also

numerous ways in which to practice sustainable architecture. There is a spectrum of how sustainable architecture is practiced, from fully integrated to separate shallow approaches. At the integrated end, some offices focus exclusively on sustainable architecture (such as Architype in the UK), while in others it is a special department (such as GXN, an offshoot of 3XN in Denmark). In contrast, some only consider sustainability project by project, and, at the opposite end of the spectrum, there are offices who only engage with minimal effort. Within each office structure, sustainable architecture experts often practice in several different constructs; entire offices, departments or teams, a few in-house experts, or sometimes contracting out-of-house consultants for specific projects. Again, looking closer to the design process, the way in which different approaches are implemented or materialised in the process, differs from office to office. This is elaborated on in section 2.8 and can include: a fully integrated approach; one based on certifications; or an approach in response to policy and regulations. This variety of approaches indicates the complexity of the focus of this research. Each approach is subjective and engages differently with discourse and how this knowledge is gained and communicated. As mentioned previously, discourse influences the different ways of seeing and being in the world, and as Davis and Harré (1990, p. 35) justify:

“Once having taken up a particular position as one’s own, a person inevitably sees the world from the vantage point of that position and in terms of the particular images, metaphors, storylines and concepts which are made relevant within the particular discursive practice in which they are positioned.”

This description elucidates how vital the relationship between discourse and practice is, especially as ambiguous or fragmented discourses dominate the field; this means that the way in which those in practice with less knowledge position themselves is limited to the available discourse in which they engage with. Subsequently, this research engages with practice in real time, aiming to understand first-hand perspectives and experiences of selected practitioners using questionnaires and interviews, while also examining the built and written products of the design process as discourse.

2.3.3 How practice gains knowledge and uses discourse.

Dana Cuff (1992, pp. 4–5), builds on discourse and practice in her understanding of what practice is. She explains that practice involves routinely performing activities which suggests they “stem from routine knowledge” that means something within a specific context. Cuff continues to explain that architects rarely “refer to textbooks or procedure manuals”, instead, “practice is the embodiment, indeed the expression, of the practitioner’s everyday knowledge” (Cuff, 1992, p. 4). This has been discussed further in a 2016 co-authored conference paper “How architecture students gain and apply knowledge of sustainable architecture” by Anna Holder and myself addressing the ways in which knowledge of sustainable architecture is gained and

applied to best provide architectural practitioners with the knowledge, or means to develop knowledge, for sustainable practice. To do this, it is helpful to look at how architecture practitioners' access, develop, and synthesis knowledge within the processes of practice. The design techniques of experienced practitioners within the design professions have been shown to draw heavily on experiential and epistemic knowledge in the pursuit of novel and innovative design solutions.

Lawson (2004), drawing together secondary and primary data on how experienced designers handle information and develop ideas within the design process, highlights the way in which design expertise draws on the ability to recognise and work with 'schemata' and 'gambits' within design conversations. Schemata are spatial concepts or understandings of a set of spatial relationships. These can include knowledge of building precedents, but also evoke theories of architecture about, for example, viewing and orienting, or a particular relationship of interior and exterior, enfolded into the spatial concept. Gambits, meanwhile, recognises these approaches within the process of addressing an ill-defined design problem, referring to knowledge from experience in how to select and deploy relevant schemata, and at what time.

These techniques - reliant though they are on knowledge from past building forms and methods - can and do result in spatially, programmatically, and/or technologically innovative design solutions. Lawson (2004) articulates the relationship between design problems and design solutions as a 'messy mapping' – this is to say that there is not one clear answer to an articulated question.

Perhaps most importantly for change and innovation, architectural projects involve - through their path from brief to realisation - actors from a range of different disciplines including engineering and construction, product manufacturers, but also building finance and management, as well as specialist advisors on particular programmatic requirements of the building. Thus, the design team will draw on knowledge from these diverse fields, to be incorporated into design conversations. Practices and groups of practitioners also operate as learning communities, passing knowledge between projects from different perspectives - in terms of competencies and experiences, but also understandings of values which can change over time (Wenger, 2000). This discussion of how knowledge is drawn upon and developed through architectural projects and practice emphasises how discourses of sustainable architecture are not necessarily 'looked up' in books and directly applied. Rather, theoretical knowledge is integrated into knowledge of architectural schema, drawing on precedents or models, and discussed and incorporated through design conversations, in the form of drawn and spoken narratives shared between designers as they project and imagine the future within the specific context of the project in hand. (Donovan and Holder, 2016)

Khee Poh Lam (2011, pp. 79–88), offers another perspective directly relating to sustainable architecture, in his contribution to the Ken Yeang edited book, "Green Design from Theory to Practice" (2011a). Lam (2011, p. 82) explains that a vast amount of knowledge has been developing over the last four decades, however, this knowledge is highly technical and addresses academic and research communities

rather than practice. He continues that “the chasm between what is known and what is done become increasingly wide” with the expansion of this knowledge base (2011, p. 82). Continuing, Lam explains that the building industry has attempted to simplify the complex relationship between humans and the environment and that this has resulted in “prescriptive solutions that get codified into standards and regulations” (Lam, 2011, p. 82).

Three perspectives on how practice gains and uses both knowledge and discourse have been presented: Cuff’s proposal that practice uses the architect’s everyday knowledge; Lawson’s understanding that knowledge is gained from propositional, experiential, and epistemic knowledge; and lastly, Lam’s description of how sustainable architecture knowledge has been simplified to make it more digestible for practice. All of these perceptions highlight not only the many ways in which discourse is used and applied to practice, but also the importance of ensuring it is in the most applicable format and thus accessible for the way in which designers think and gain knowledge.

2.4 THE FIVE THEMES ADDRESSED IN THE DISSERTATION

This following section of the literature review will provide the background information needed to establish and progress with the dissertation with regard to the five main themes (definitions, greenwashing, discourse, approaches and visual language) that have been constructed as the focus of the research. Each theme will be discussed through the review of the relevant literature to provide the arguments as to why this research believed these themes were worth following, what gaps in the information needs filling and what methods and studies were chosen in relation to the research objectives. These five themes are presented here in a linear and cohesive manner; however, as mentioned in the introduction of this chapter, this does not reflect the reality of how these themes were constructed from emerging information. The literature review was an ongoing, iterative process throughout the entire three years of PhD, both gathering and comparing with primary information. As also outlined in Chapter One – Introduction (1.5), the themes were constructed at different stages in the research. These five themes were chosen as a focus for the research because of their frequent appearance in the literature as under-researched topics. While their presence was often, very few cohesive studies or research have been conducted with them and even less in relation to one another. All five themes specifically relate to the relationship between discourse and practice as defined by the scope of this research. Many other barriers exist such as economic or policy factors. However, barriers or themes such as these were not seen to be directly related to the scope connecting both discourse and practice rather they are usually barriers between architects and clients or contractors and are subsequently not included. As mentioned in the introduction, these five themes do not represent all of the possibilities, but have instead been chosen because of the overlap between many of them, combined with my belief that they are challenges which can be addressed.

The next five sections will discuss some of the key studies, literature, and debates

within the five themes. This is in order to give both context to the dissertation, as well as justify and position my PhD within the field of sustainable architecture. The next section – defining sustainable architecture – discusses the lexicon and vocabulary of sustainable architecture, elaborating on three debates regarding; the sustainable fatigue, the ambiguity of the term sustainable and the many synonyms used concerning sustainable architecture. Following this, the next section – greenwashing and techno-centrism – unfolds three debates including; the ignorance and addition of green, techno-heroism and lastly, marketing and professional pressure. The theme – accessibility of knowledge – is discussed in the section following and includes; the state of knowledge, how it is communicated and the impact of the multidisciplinary nature of sustainable architecture. Following this section – perspectives, attitudes, and approaches – are expanded on through; the confusion over what sustainable architecture is, if it is mainstream, the many different approaches and optimistic verses pessimistic attitudes. The last section and theme is the – visual language and identity.

2.5 DEFINING SUSTAINABLE ARCHITECTURE

This section will discuss the lexicon of sustainable architecture and how it is defined in literature and research. It is a topic within literature which often reoccurs, both between the lines of, and in devoted chapters. As mentioned the debate is often framed within three challenges; the sustainable fatigue, the complexity and ambiguity of the term and the many associated words and synonyms employed. These challenges will be exemplified by the discussion of two research studies, two book chapters, and fragments taken from the literature on sustainable architecture.

In many of the books examined - not to mention the countless papers and journal articles, from both architectural practice and academia – within the introduction there is a tendency to define sustainability or sustainable architecture; acknowledged that it cannot be defined or articulate that there is no agreed upon definition. Sustainability, sustainable development, and sustainable architecture are often interchangeable within these discussions, and as all of the following which is to be discussed is taken from architecturally framed literature, it is all treated in relation to architectural sustainability even if it is not explicitly stated.

While this section is framed within literature, the implications of terminology are not just a matter of academic interest. Robert Schmidt III and Simon Austin (2016, p. 5) indicate the importance of terminology in architectural practice and especially in the briefing process with clients. They highlight that precise language is critical in the earlier stages of design, as decisions taken rely on all actors ‘speaking the same language’ and miscommunication has costly implications later in the design process (Schmidt III and Austin, 2016, p. 5). The impact on practice emphasises the importance of a precise vocabulary as one of the reasons why terminology and definitions is a central theme which reoccurs between discourse and practice. However, it is essential to clarify that this chapter does not aim to find one true answer to define what sustainable architecture is; rather it aims to shed light on the multiple

challenges faced when working within a field of which a definition and understanding is elusive.

The reoccurring struggle to explicitly explain what sustainable architecture is - or in some cases is not - has been discussed some time. One critical study completed in 1994 by Sara Cook and Bryn Golton, has formed the basis for many contemporary discussions around defining sustainable architecture and also introduces sustainable architecture (green/sustainable building in their text) as an 'essentially contestable' concept (Cook and Golton, 1994). Cook and Golton refer to the 1956 work of Walter Bryce Gallie³ explaining that sustainable architecture has many of the characteristics (internally complex, evaluative in nature and signify some kind of achievement) identifiable with an 'essentially contested' concept, and they clarify that it is a concept "where there are ongoing disputes about the nature and definition which are unlikely to be resolved" (Cook and Golton, 1994). While it is unclear if they were the first to identify sustainable architecture as an 'essentially contested' concept, they are referenced, by some of the more well-known authors in the field; Simon Guy and Steven A. Moore - specifically in their 2005 book 'Sustainable Architectures: Culture and Natures in Europe and North America.' Guy and Moore's inclusion of this concept has led to it being commonly argued throughout contemporary literature. Understanding that, sustainable architecture is contested and there are multiple approaches (this issue will be discussed later in the chapter in section 2.8), and subsequently multiple definitions or not one agreeable definition is a key position which is held within this dissertation but also as the basis for much of what is to be discussed following. Turning back to Cook and Golton, their 1994 study addressing the question 'what is a green building?' and what is understood by the term, examined many facets of different terms and what they call 'subgroups' but I have defined as paradigms in Chapter one 1.1. Cook and Golton produce 'the green spectrum' in which they emphasise there is a spectrum of green thoughts from light to deep green (Sara Cook and Golton, 1995, p. 678). Cook and Golton (1994) discuss the 'inconsistencies and anomalies' of sustainable architecture definitions and perform Multidimensional Scalogram Analysis (MSA) on statements taken from eight sustainable architecture literature sources. Cook and Golton's (1994) conference paper is one of the earliest and few pieces of research directly related to the discussion of sustainable architecture terminology and definitions. One other study published in the *Journal of Environmental Studies*, title 'Environmental discourse of architecture' by Inci Basa in 2009 aims to identify the environmental discourse of architecture through the use of discourse analysis to examine statements linguistically from within the field. Basa (2009) argues "almost the entire understanding of the factual world is formed and mediated through the linguistic mechanisms in various formations" and continues that these mechanisms promote "a discursive mass of knowledge." These mechanisms are examined through statements taken from (what Basa calls) the environmental discourse of architecture and are analysed by 'clear statements,

3 Reference to Gallie work about essentially contested subjects Gallie 1956 Essentially contested concepts, proceedings of the Aristotelian Society Vol 56 167-98

vague phrases, clichés, concepts, interpretations, definitions and classifications’ (Basa, 2009). This linguistic study highlights the ambiguity in the environmental discourse of architecture and raises awareness of the importance of the ‘discursive formations’ used. While Basa argues for understanding the factual world through linguistics, I would also acknowledge that the physical built environment is contained within the discourse of sustainable architecture and is equally as important for understanding and communicating the knowledge contained within the discourse. However, in keeping with Basa’s theme, this chapter will continue from the perspective of literature, returning later in ‘Part Three’ to the visual language of the built environment in Chapter Nine.

As mentioned, there are frequent discussions relating to the ambiguity of sustainable architecture, yet very few authors address it in-depth. Two authors who have written book chapters are: Paul B. Thompson who wrote: ‘The many meanings of sustainability’ in the second edition of ‘Pragmatic Sustainability: Dispositions for critical adaptation’ edited by Steven A. Moore (2016) and ‘Defining Sustainable Design’ by Jason F. McLennan in ‘The Philosophy of Sustainable Design’ (2004). Both chapters appear at the start of each book, similarly to the many small references throughout the literature which will be discussed following. Thompson and McLennan discuss the ambiguity in two different approaches and scales. Firstly, Thompson (2016), discusses the larger concept of sustainability and sustainable development, arguing for a pluralistic understanding of the concept with architecture. He outlines and discusses not only different competing paradigms but also highlights the importance of discussing around what sustainability means. Thompson (2016) presents that in the past an action-based approach was favourable as trying to define sustainability is “a fool’s errand.” However, he contends “it is now time to visit the question of just what sustainability means” (Thompson, 2016). This chapter differs from the previous 2010 edition title “What sustainability is (and what it isn’t)” (Thompson, 2016). In this earlier edition, the contested nature of sustainability, as discussed earlier in this section, is at the forefront of his argumentation. McLennan, on the other hand presents sustainable design as a philosophy and movement and argues that it means many different things to many different people and is often misunderstood and misused. He reasons that this is because sustainable architecture still “maturing and seeking to find its footing and vocabulary” (McLennan, 2004). Continuing, he explains that the term “sustainable design is inadequate to describe the movement and philosophy behind it” (McLennan, 2004, p. 2). In conflict with this, McLennan (2004) later defines what sustainable design means for him as a philosophy, and further emphasises that it should be considered a verb rather than a noun, while in similar contention uses ‘Sustainable Design’ as a proper noun with capital letters throughout the chapter. McLennan (2004, p. 4) states that “Sustainable Design is a design philosophy that seeks to maximise the quality of the built environment, while minimising or eliminating negative impact to the natural environment”. The same interest as argued by Thompson is also present in small segments throughout the majority of the literature, as different versions of a

similar discussion. It illustrates that this is a common theme and barrier within the relationship between discourse and practice. Several facets of the discussion of sustainable architecture vocabulary and definitions have been broken into several parts and discussed together. These topics include: the sustainability fatigue; everything and nothing; and sustainable synonyms.

2.5.1 The sustainability fatigue

Michael Hensel used the label 'sustainability fatigue' at the 2012 symposium 'Sustaining Sustainability' at Cornell University in New York (Sabin, 2012, p. 88). This label embodies many of the current discussions concerning how sustainable architecture is perceived. Sustainability within architectural discussions is often described as vague, elusive, hard to define or that it is just a fashionable buzzword. Multiple authors have explained that people do not know what sustainability means⁴ (Gould and Hosey, 2007, p. 36) moreover, continue to explicate the difficulty of writing about sustainability when they are unsure of the meaning⁵ (Gould and Hosey, 2007, p. 33). Continuing, many authors reveal that even though it has become a familiar term, there is confusion⁶ and as a term sustainability has 'lost its currency'⁷ (Lam, 2011, p. 58; Scott, 1999, p. 2; Yudelson, 2009, p. Xxii). This lack of meaning or 'currency' is also one of the reasons some authors believe sustainability has become just a fashionable buzzword. Elaborating that shallow attempts at improving the environment are claiming to be sustainable⁸ moreover, this is causing suspicion of the term. Equally, other authors link the growth of its use as a fashionable buzzword with the increasing 'economic and institutional interests'.⁹ It is clear from the literature that the confusion and fatigue concerning what sustainable architecture is affects how the field progresses. However, it is unclear what the actual effect is and how it could be overcome as it the source of the vagueness is elusive. Similar to the chicken and the egg scenario, one could question if unsuccessful sustainable architecture practice and built examples create a confused lexicon or if the ambiguity of the vocabulary fosters uncertain practice? This is an area of focus which will be further explored in the coming studies, especially in the interviews in Chapter Six.

4 "All the focus groups have shown that people don't know what "sustainability" means. But, whether we like it or not, it's the word the international community has adopted." (Gould and Hosey, 2007, p. 36)

5 "One challenge with writing a book about sustainability is that we're not certain what it is. The word itself is used in so many different ways that it virtually eludes meaning." (Gould and Hosey, 2007, p. 33)

6 "With this context in mind "sustainability" has become a familiar word but one that still creates a level of confusion and uncertainty." (Scott, 1999, p. 2)

7 "The notion of sustainability has been appropriated, bandied about and misapplied by so many vested interested that it has all but lost its currency." (Lam, 2011, p. 58)

8 "Yet what is really meant by sustainability? This is among the most abused of current buzzwords. There are architects and manufacturers whose designs and products achieve only small and narrow improvements in environmental performance, and yet are claimed to be sustainable." (Buchanan and Frampton, 2006, p. 11)

9 "Sustainability as a concept may now be on the verge of becoming a fashionable buzzword because of its increasing alliance with economic and institutional interests. It would also be unfortunate if it became associated with an architectural style with all the inherent dangers that becoming a contemporary trend now implies." (Steele, 1997, p. 58)

2.5.2 Everything and nothing

Similarly to the previous argument, it is also often stated that there are as many definitions of sustainability as there are people to define them (Castle, 2001a, p. 5; Lam, 2011; Paschich and Zimmerman, 2001, p. 12; Sassi, 2006, p. 2; Scott, 1999, p. 55). Several authors argue that each person has their own slightly different definition¹⁰ and highlight how essential it is that the meaning is understood. Comparably, other authors argue that it is because of this slight differing in meaning by each person that sustainability is at risk of becoming a mere label¹¹ and that it is no longer possible to describe what it is, only what it is not.¹² Furthermore, others emphasise how the definition of sustainability and often the synonym changes with different disciplines¹³ and elaborate that it is not only a change in term but also the wider approach focus that changes with each different disciplines¹⁴. While the above authors have described defining sustainability as a fluid process that changes with each actor, other authors argue that there is, in fact, no definition and to try to define it as a 'fool's errand' as earlier stated by Thompson (2016, p. 16). The misguided nature of trying to give a single definition is reiterated by additional authors¹⁵. In a slightly different approach, some authors have highlighted that there is no irrefutable definition of what sustainability means¹⁶ and because of this, you cannot dispute it¹⁷ which some argue leads to greenwashing which is discussed later in section 2.6. Furthermore, this vague nature of sustainability has also been credited - with the creation of certifications and standards - as a way to try and measure what sustainability is.¹⁸

10 "The term [sustainability] remains elusive to many, and while a number of definitions exist, they give little indication of how to apply principles of sustainability in practice. Moreover, these definitions differ slightly, one from another, and in any attempt implement sustainable development it is essential that the meaning of sustainability be understood." (Sassi, 2006, p. 2)

11 "Sustainability has come to mean all things to all people. Increasingly misused in architecture, the term is in danger of becoming a mere label." (Yudelson, 2009, p. xvii)

12 "As sustainability enters the mainstream, becoming the accepted goal if not always practice of governments and architects alike, it seems to be slipping through our fingers. No longer an alternative route out in the cold, green architecture is, as a result, ever more elusive and difficult to define. With increasing numbers claiming it for themselves, it is no longer possible to describe it in counterpoint – purely in terms of what it clearly is not. It seems to be everything for everyone who wants it – the Queen and President of the RIBA included." (Castle, 2001a)

13 "The definition of architectural sustainability (also called ecological, biological, or "green" building) has since become as varied as the architects, ecologists, developers, and environmentalist who practice it." (Paschich and Zimmerman, 2001, p. 12)

14 "There are many different definitions of sustainability. To engineers, our definitions of working is to maximise uses of materials, skills, and energy for the benefit of mankind. That's always been our goal. Architects and society define the benefits." (Scott, 1999, p. 55)

15 "It would appear that attempting to scientifically define 'green building' by privileging specific forms of 'technically proven' environmental innovation is misguided." (Guy and Moore, 2005, p. 7)

16 "There is no conclusive definition of what "green" means." (Farmer, 1996)

17 "Theoretically, no one can take a stand against Sustainability because there is no definition of it. [...] Neither is there a history of Sustainability. The S-word seems to point to a universal idea, valid anywhere, at any time." (Djalali and Vollaard, 2008, p. 33)

18 "The term 'green buildings' itself is rather problematic since there is no clear definition of what this means. [...] In the absence of a clear definition of a sustainable design, many have resorted to equating it with certification using one of the common rating systems such as LEED, BREEAM, or Estidama's Pearls. (Aburawa, 2012)

2.5.3 Sustainable synonyms

The concept of sustainable architecture has developed rapidly since the 1960s (this history is discussed at length in Chapter Four: contextual narrative,) and with it so have the many terms. Some authors acknowledge the various forms in which sustainability is described but emphasise that while different terms are used, they hold little precise meaning.¹⁹ There are a plethora of similar terms that are often used as substitutes, interchangeably or to describe sustainable architecture. Many authors often illustrate the numerous associated terms²⁰ when trying to introduce sustainable architecture and these writers exemplify them as a synonym which sits under larger umbrella terms.²¹ These terms are nuanced in their meaning and vary in precision. However, as mentioned, they are often viewed as interchangeable despite acknowledging the differences between them.²²

The above concerns have resulted in the desire for some more recent authors to move beyond sustainable architecture in our lexicon to regenerative or resilience (Michler, 2017; Thompson, 2016, p. 17; Yudelson, 2009, p. Xxii). Others contest this in favour of maintaining a pluralistic approach to the term sustainable architecture (Thompson, 2016, p. 16) and additionally, others are exploring the possible opportunities the current vagueness of sustainability holds (Gould and Hosey, 2007, p. 36). Thompson (2016, p. 17) gives examples of the arguments of those in favour of moving on from sustainability, illustrating similar arguments to those which were discussed earlier in 'the sustainability fatigue' (2.5.1) and emphasises their claims that the sustainable approach based on the Brundtland Report has failed and come to an end.²³ In contrast to this, Steven Moore (2016, p. 284) argues not to abandon "sustainability" itself and acknowledges the importance of resilience and regeneration and but clarifies that "meaning behind these new terms can be found in the long history of pluralism that characterizes the sustainability discourse." Within the same book, this is supported by Thompson (2016, p. 17) who reiterates that sustainability is an 'essential contested concept' and we should learn from other essential contested concepts such as democracy and not select a new term. In an interview presented in the book 'Women in Green: Voices of sustainable

19 "This [claimed shallow approaches to sustainable architecture] is epitomized primarily by the ambiguous nomenclature of terms such as 'sustainable', 'bioclimatic', 'ecological', 'green', 'eco-friendly' or 'environmental', which are recurring labels that, although rarely ascribed a precise meaning, are repeatedly and undistinguishably attached to buildings in architectural competitions, magazines and debates, increasing confusion and misconceptions." (Altomonte, 2009a, p. 13)

20 "Sustainable architecture, variously called ecological, biological, green, or Gaia architecture by others." (Steele, 1997, p. 234)

21 "We use the term 'green buildings' as a unifying and neutral notion of what different actors in different context have described as 'sustainable', 'resource-saving', 'ecological', 'self-supplying', 'natural', 'healthy', etc." (Guy and Moore, 2005, p. 165)

22 "What do we actually mean when we talk about green design, sustainable design, or eco design? Generally speaking, we can apply these terms interchangeably. While there may be nuanced differences between them. I find it more helpful to think in terms of what we are trying to achieve." (Bergman, 2012a, p. 16)

23 Thompson (2016, p. 16) referencing "Andrew Zolli describes sustainability as an idea that has 'grown long in the tooth,' arguing that the new cutting edge for progressive environmental thinking will embrace the concept of resilience, rather than sustainability." (Zolli and Healy, 2013)

design’ Janine Benyus²⁴ and Nina Simons have more positive perspectives on the elusiveness of sustainable architecture and state that it offers an opportunity to give greater meaning to a term which many people already relate to²⁵ (Gould and Hosey, 2007, p. 36). It is apparent there has been a progression of terms over the last five decades with different perspectives on how to move forward, yet the implication of continuously changing or developing terms is not clear. This history will be explored in the following chapter, in the hopes of better understanding the implications that these developments have on discourse and how they connect to practice.

2.5.4 Summary

It is evident from the current literature that the topic of definitions is one that is recurring and contested; both in its meaning, and the selected author’s perception as to whether or not it should be defined. Much of the discussion focuses on the vagueness, imprecision, multitude or lack of meaning, difficulty in defining and interchangeability of different terms. These discussions acknowledge that there is contention within this theme; however, there is a gap in the existing literature concerning what impact this has on both the discourse and practice within the field. This barrier is crucial in the way we discuss sustainable architecture influences how it is practiced. Furthermore, it also impacts the progression greenwashing and directly influences the many approaches, attitudes, and perspectives which are employed. While some authors such as Edwards and Naboni (2013, p. 53) argue to “develop a common language of sustainability terms and methods,” I would contradict this as I position this dissertation to celebrate the plurality of possible approaches, which subsequently implies a plurality of language. Additionally, I would argue that within the diversity of language, greater precision needs to be employed to articulate clearly how one discusses and positions themselves within the field. To further explore, develop and describe this theme as well as the implications, three studies were designed at different stages in the research:

- Firstly, the contextual narrative presented in Chapter Four had the aim of to understanding how these terms have developed and articulate their subsequent nuances.
- Secondly, the questionnaire in Chapter Five was designed to collect a series of definitions of sustainable architecture from experts and understand the connection between them.
- Thirdly, qualitative interviews (Chapter Six) were designed to understand

24 , “Janine Benyus is a biologist, author, innovation consultant, and self-proclaimed “nature nerd.” She may not have coined the term biomimicry, but she certainly popularized it in her 1997 book *Biomimicry: Innovation Inspired by Nature*” (Benyus, 2018)

25 Janine Benyus: It’s our job now to define it. If nobody knows what it means, that’s good because we have a chance to bring the term meaning. We have to bring in the idea of flourishing – thriving instead of just striving or hanging on by our toenails. And we have to bring the idea of thriving equitably into it. . . . I don’t think it’s time to find a new word – it’s time to bring life to this one.” Nina Simons: “It is what we have. More people relate to it in some way than any other word or phrase in our lexicon. Adding greater meaning to it is our best course of action at this point – as well as being open to new terms.” (Gould and Hosey, 2007, p. 36)

how the diversity and interchangeability of terms affects the progression of sustainable architecture.

2.6 GREENWASHING AND TECHNO-HEROISM

Greenwashing is a term which is more common in the corporate and political worlds, rather than within the architectural discipline. Cathy Lang Ho (2003, p. 31), defines greenwashing as “the deliberate dissemination of disinformation aimed at presenting an environmentally responsive public image” and continues that “greenwashing is one of the more pernicious by-products of the growing and otherwise heartening general interest in sustainability.” Despite greenwashing being more present in cooperate environments, it is an issue which is prevalent in the architecture discipline and media. A comical example and anecdote of greenwashing published in the Architects’ Journal in 2010 used the greening of farfetched objects to emphasise one common argument - that greenwashing is the symptom of vague terminology.

“In 2006, the Sunday Times reported that even British arms manufacturer BAE Systems saw it necessary to promote itself as green by introducing ‘environmentally friendly’ weapons including ‘reduced lead’ bullets and rockets with fewer toxins. Perhaps not the brightest moment of company PR, but it shows that if green remains vague, it is in danger of becoming a temporary hype, which will be arbitrary in the future” (Hackauf, 2010, p. 44).

This argument closely relates to the previous discussion relating to vague terminology, and it is evident that this has a direct impact. Greenwashing is more often discussed in trade journals or online blogs as opinion pieces rather than in research within the architecture or construction industry. Despite this, it is often addressed from three perspectives: the literal greening of architecture (the addition of green roofs and walls); the visual impact of the shallow addition of technology; and the belief that certifications will reduce greenwashing.

Two sides of the ‘literal greening’ debate will be discussed. Firstly, the satirical opinions often found within popular media, such as the article ‘O’Mighty Green: A Satirical Commentary on Greenwashing in Architecture’ by Netherlands based STAR Strategies + Architecture. This was published on the online blog ‘Inhabitat’ (Meinhold, 2011) which covered the exhibition at the International Architecture Festival eme3 in Barcelona in 2011. This satirical exhibition emphasised the literal greening of architecture by photoshopping green walls over iconic buildings such as nuclear reactors, the Villa Savoye and the Pantheon. Their argument that first impressions of visual elements do not signify true sustainability is exemplified by their quote “all that glitters is not gold, and all that is green is not sustainable” (Meinhold, 2011). This refers to greenwashing as a result of buildings regularly being considered sustainable - especially by the public - simply because they have visual green elements, such as vegetated facades or roofs.

Alternative perspectives can be found, such as the conference paper ‘Sustainable

design practice and green-wash effect: The case of vegetated architecture' by Katia Perini and Fausto Novi (2014), in which they use life cycle analysis (LCA) tools to measure and quantify the environmental impact of green systems. They argue that even if it is difficult to accurately measure green walls and roofs and visually they promote greenwashing, they do contribute positively to local environmental conditions. Often the debate of greenwashing is reduced or exemplified by literal greening with few examples. However, very little actual research is available that does more than introduce to the topic of greenwashing. In addition to literal greening, technology is often provided as another cause of greenwashing; Eduardo Souto de Moura discusses the introduction of technology to architecture, combined with the newly associated labels which came with it. He explains:

“As the wall became thinner and lighter we were forced to replace mass with something else. We used machines. Some years ago, when high-tech enthusiasts transformed buildings into machines, they called them intelligent buildings and coined the phrase “intelligent architecture,” as if buildings without such systems are stupid. It’s like saying the Pantheon, which has no equipment, is stupid architecture. So, I’m quite critical when it comes to such slogans and labels attached to buildings. That’s why I’m wary of those slogan of sustainable architecture.” (Moura, 2004)

This quote signifies a divide in attitudes toward technology, as well as adding to the argument concerning labels and the subsequent consequence that they have on the associated discourse. This debate will be built upon in the following section, pursuing other discussions concerning ignorance and the addition of green, techno-heroism and, market and professional pressure.

2.6.1 Ignorance and the addition of green

As previously Introduced, the vagueness of the sustainable architecture vocabulary is attributed to both the cause, as well as the effect of some of the existing greenwashing present in the building industry²⁶ (Edwards and Naboni, 2013, p. 47; Yudelson, 2009, p. Xxii). Continuing, some argue the imprecision of the meaning is what gives actors within the building industry the freedom to claim a building as sustainable even if it is not. Yudelson (2009, p. Xxii) questions “is it incompetence or active lying at the base of widespread greenwashing – and which would be worse?” So far there is no research or literature which can answer this question. However, I posit that it is likely a combination of both. Examining additional literature shows other authors also attribute greenwashing to both a lack of knowledge and marketing ploys. Authors are suggesting a lack of knowledge as one of the issues,

26 “This is partly due to the ambiguous nomenclature employed such as sustainable, bioclimatic and green. Labels rarely associate with precise environmental performance – substituted for hard data.” (Edwards and Naboni, 2013, p. 47)

expand that it is a lack of scientific understanding²⁷ combined with the exponential growth of materials, technology, systems, and products which leads to confusion and subsequent greenwashing.²⁸ Edwards and Naboni (2013, p. 47) hint that greenwashing may not be the result of intentional marketing but out of ignorance and lack of understanding that sustainable architecture is more than ‘green features’ and because of this argument that “green claims need to be based on hard data.”²⁹ Further authors also support this push for evidence based claims³⁰, revealing that these false claims have a negative impact on the good examples in the industry (McLennan, 2004, p. 2).³¹ While some authors promote certifications systems like LEED (Leadership in Energy and Environmental Design) and BREEAM (Building Research Establishment Environmental Assessment Method) to measure the sustainability of a project to justify the ‘green’ labels given, others suggest these assessment criteria systems do not produce integrated and environmentally response design but rather what Ryan and Lewis (2006, p. 5) describe as a ‘paler shade of green’ made up of ‘elements of greenness.’ It is discussed that the presence of ‘green technology’ and features does achieve some environmental impact³² however, it is not always integrated and, in most cases, the largest impact is a visual one. McLennan (2004, p. 138) supports this stating that “if a project looked green to many people it was.” McLennan (2004, p. 8) continues to explain that these features and technology are in many ways the most tangible component as people “can more readily understand things that they can point to and identify.” Similarly, Ken Yeang (2011, p. 5) states that “from the outset, green architecture has suffered from a serious issue of imagery” and he attributes this to the ‘additive architecture’ consisting of “materials and green technologies bolted onto the building.” This discussion concerning the visual language and identity is one that became a theme at a later date, and specifically led to the creation of the visual language analysis study presented in Chapter Nine, with the initial argument from literature outlined later in this chapter.

27 “Architects often lack a scientific understanding of sustainability and therefore use these vague terms to describe their buildings in competitions, magazines, and debate, thereby proliferating confusion and misconceptions.” (Altomonte, 2009a)

28 “As new green materials, clean technological systems and eco-products become exponentially available in the marketplace; it is just as impossible to keep track of them and more importantly, to fully understand and assess the real value of each new initiative or product without a clear road map. We need to be aware of the superficiality of “greenwashing,” which is evident in many of the professional journals.” (Lam, 2011, p. 5)

29 “Some designers label their buildings, especially commercial ones, as sustainable without providing the evidence to uphold such claims.” (Edwards and Naboni, 2013, p. 48)

30 “to make this comparison; we need numbers, not adjectives.’ So, yes, we need to measure ‘sustainable,’ to be specific about benchmarks, to state clearly how far it is from ‘here’ to ‘there.’” (Maas et al., 2014, p. 250)

31 “The word “sustainable” has been applied to many buildings that do not deserve the designation, thus shrouding the few that do. For many professional a green building is something that merely incorporates a few recycled products or has good windows. This approach, as we will discuss, is not nearly enough.” (McLennan, 2004, p. 2)

32 “Until recently, it has been very difficult to judge how environmentally friendly or green a given project was. In many cases, projects were called green because of the marketing spin of the project or the reputation of the designer, not from any real scientific basis for how the building performed. For the most part, this standard was arbitrarily given, based on the presence of certain green technologies or features that most likely achieved some environmental impact reduction, but did not always guarantee great performance.” (McLennan, 2004, p. 138)

2.6.2 Techno-heroism and weakness

Some authors and their approaches promote technology as the solution many environmental issues; this is often referred to as techno-heroism. Penelope Dean's paper 'Never mind all that environmental rubbish, get on with your architecture' critically reflects on the development environmental technology or what she labels a 'subcategory of architecture' - 'green architecture or building.' Dean claims that a "sustainable subculture where technology can apparently solve all problems – has taken place; in other words, a de-disciplining by shrinkage" (Dean, 2009, p. 25). She accredits this to the contributions of Buckminster Fuller and Reyner Banham in the 1960s and 1970s. The development of this techno-focus is elaborated further in chapter four (4.5) in the Contextual Narrative; however, for now, Dean's critical understanding of green architecture as the application of 'environmental techno-science' initiates a debate which often occurs within literature. Ryan and Lewis (2006, p. 31), caution that the boundaries between green and greenwashing are precarious without grounding. This debate is often framed by the flawed nature of techno-heroism³³ and the desire to move beyond technology.

As discussed in the previous section, the desire to quantifiably measure the sustainability of a project has grown in response to the shallow approaches and the adding-on of technology that has emerged as a product of greenwashing.³⁴ This may be attributed to the fact that technology often provides data that can be measured, which has proliferated the use of technology. Acknowledging this discussion, Guy and Farmer (2005, p. 5) referencing Eric Schatzberg explain that techno-optimism is a "flawed example of ethical utopianism." McLennan (2004, p. 22), also supports this, expanding that the nineteenth-century belief that technology has the power to "cure all our ills" persist today. Bergman (2012a, p. 11) further postulates, that "since technology got us into this situation, it will get us out of it." Meanwhile, Moore (2010a, p. 151) rationalises this 'domination' of technical solutions to discourse and practice as being due to "mostly technologically framed problems".

Contrary to this support of technology, other authors appeal for approaches that go beyond technology. Rosalie Genevro (2006, p. 5) explains that much of the sustainable architecture which has been built today (especially in the USA) has focused on the technical fixes which allow us to essentially construct the same conventional buildings we are used to while consuming less energy. Building on this, Genevro (2006, p. 5) continues that what is required is to go beyond the "narrow technical and regulatory strategies" and "fully and persuasively imagine a better world." Additional authors such as Wilfred Wang (2007, p. 1), also supports this and acknowledge that while technical knowledge is necessary, it is not sufficient. Wang (2007, p. 1), particularises "the change in global climate is not caused by financial or technological factors alone and will not be solved just through financial

33 "Author Wendell Berry has lamented, 'The worst disease of the world now is probably the ideology of technological heroism, according to which more and more people willingly cause large-scale effects that they do not foresee and that they cannot control.' (McLennan, 2004, p. 23)

34 "Measures to deal with the greenwashing problem are in development." (Maas et al., 2014, p. 254)

or technological solutions.” In contrary to technical solutions, Wang (2007, p. 3) advocates for a cultural shift, making this point through the example of the ever-increasing building footprints. If these remain “larger than their ‘green’ technological advances” there are only marginal reductions in resources, and therefore no ‘good’ is done; only ‘less bad’ to phrase it in William McDonough’s terms. This argument is that technology is often considered a quick-fix and does not actually produce considerable reduction or change.

2.6.3 Marketing and the profession

It is evident that there are several approaches to sustainable architecture which differ in motivations; some approaches are driven by ethical reasons to holistically improve lifestyles and the building industry, while others respond to pressure from the profession to meet changing sustainable regulations and trends, or purely as a marketing endeavour for financial gains. Many authors acknowledge the influence this professional pressure has on architectural practice (Buchanan and Frampton, 2006, p. 4; McLennan, 2004, p. 13). This is supported by Guy, Moore and Farmer (2012, p. 73; 2005, p. 16) quoting Deyan Sudjic (1996, p.7) who suggest that ‘for any architect not to profess passionate commitment to “green” buildings is professional suicide.’ This reference is from almost twenty years ago, but the intention still holds true, with other authors also highlighting that architectural offices need to change their approach to be more sustainable to stay relevant in the market.³⁵ Often the result of approaches fuelled by professional pressure is either the previously mentioned ‘add-on’ greenwashing or claims of sustainability which very rarely live up to these declarations.³⁶ It is posited that this is often due to a lack of education, easily accessible information and time. Nonetheless, contrast to these greenwashing examples which stem from good intentions is those that see the growing interest in sustainability as an opportunity to exploit the industry for financial gain through clear misleading and false advertising or marketing. As Hackauf states: “Green is in danger of becoming pure marketing; ‘green-washing’ that exploits the current interest in green for selling products” (2010, p. 44).

2.6.4 Summary

Much of the literature presented in this section discusses the multiple factors which contribute to greenwashing, and suggested that greenwashing is the symptom of more significant issues within the wider field. Some of the reasons for the presence of greenwashing offered from the literature are; that vague terms allow sustainable architecture to be interpreted any way one likes, and subsequently, this leads to a lack of measurability, and therefore it cannot be proved one way or another. Furthermore, there is a lack of education and hence ignorance concerning what sustainable

³⁵ “No large or small firm for that matter can afford not to market their ‘green’ capabilities as they seek commissions” (Buchanan and Frampton, 2006, p. 4).

³⁶ Most professional firms nowadays claim sustainable design as a key element of their approach to architecture. However, only a few buildings recently produced have lived up to these claims, especially in relation to energy efficiency. (Altomonte, 2009b, p. 13)

architecture is, this is combined with a lack of ethical considerations and the recognition that there needs to be a cultural shift. Lastly, approaches which promote techno-heroism increase the proliferation of shallow visual discourse. Greenwashing is an important theme as it visually and experientially signifies and informs both architects and the different publics about what the industry considers sustainable architecture. This is especially relevant for those who have less extensive knowledge concerning sustainability and this sets the bar low as greenwashing is often present in the most advertised examples. Opinions within the literature establish that greenwashing is present within the field of sustainable architecture; however, some gaps in the information have been identified and include a lack of clarity concerning the extent in which greenwashing occurs, how it is actually presented and what effect it has on both sustainable architecture discourse and practice. These concerns were primarily explored through three additional studies:

- Firstly, the questionnaire in Chapter Five established areas of focus that experts have within sustainable architecture.
- Secondly, the interviews in Chapter Six presented different perspectives from experts, with concern to the effect greenwashing has on the progression of the field.
- Thirdly, and most directly, the website analysis in Chapter Seven was designed in direct response to this theme, so as to understand how sustainable architecture is presented and the extent of greenwashing on architecture websites.

2.7 ACCESSIBILITY OF DISCOURSE

The format and accessibility of information, knowledge, and discourse is a crucial theme as it influences how information is disseminated into practice. As mentioned previously, the initial aim of this research was to examine and restructure different areas of theoretical knowledge about sustainable architecture. However, it became clear very early on that the barrier was more in the accessibility and format rather than the content of the information itself. The process of completing this literature review has exemplified the different formats in which information is provided. As previously mentioned, different books range from theoretical to more handbook style publications. Similarly, different formats are used which vary from essay style writing, case studies or handbook style diagrams. Nonetheless, information within these sources has more often than not been complicated and vague, ranging from larger theoretical and philosophical debates to in depth descriptions of specific projects. Even as a researcher with previous knowledge of the subject, I was often confused and overwhelmed by the information presented. To explore this theme, this section discusses several notions related to information and knowledge in a broader sense as well as implications regarding how designers know and think. In addition to this, existing research in which relates to how information is communicated through demonstration projects is presented, followed by discussions that concern the state

of information, communicating knowledge, and how the multidisciplinary nature of sustainability impacts the discourse.

Before presenting different fragments from the sustainable architecture literature, it is necessary to outline how this dissertation understands the distinction between information and knowledge. Femenias (2004, p. 64), referencing Lundequist (1995), explains that information can be “objectified and stored, communicated or elaborated,” in sources such as written documents, drawings, and videos to name a few; contrarily, knowledge is “something that only a person can have.” Femenias (2004, p. 64) clarifies that information is constructed from a person’s knowledge but it not knowledge in itself. Furthermore, information has to be interpreted to become knowledge. This distinction is important for this theme as it helps to clarify the different measures which make up the discourse. Within the description of knowledge, Femenias (2004, p. 63), referencing Linn (1998), identifies three sources of knowledge in relation to building practices: “the production (buildings, landscapes etc.), written documents (documents from the process etc.) And the living praxis (with tools, methods, values, problems views etc.).” To elaborate, the first two sources are explicit and may be accessible to an ‘observer’ while the praxis usually involves implicit and tacit knowledge which can be difficult to explicate and be understood by an observer (Femenias, 2004, p. 63). Continuing, Femenias (2004, p. 65) drawing on Rolf et al. (1993) describes a model of four factors which is normally used to explain the transfer of knowledge and information, these include: the sender, the receiver, the information/knowledge, and the ability to express the knowledge in text (Rolf et al., 1993 p. 19). Two issues are identified with this model; firstly there may be problems with the communication. Femenias gives an example of the ‘receiver’ having insufficient pre-knowledge to be able to interpret the information communicated as the interpretation has to be made within a context.

Moreover, the problem in communication may arise due to the ‘sender’ not being able to adapt the information to the context of the receiver. This issue is seen very often within sustainable architecture, for example when a practitioner does not have enough existing pre-knowledge to be able to receive knowledge from other disciplines such as engineers or biologist and subsequently are not able to translate that knowledge into a design or a built project. The second issue which can occur is in the articulation of the knowledge in text. Tacit knowledge exemplifies this, especially when trying to describe a procedure which cannot be entirely reproduced. An example of this could be the articulation of the design process or a living praxis for any given project. These distinctions between information and knowledge and the factors which contribute to the transfer of knowledge frame how information and knowledge are connected to practice within this dissertation.

Little research exists explicitly relating to sustainable architecture; however, famous authors such as the previously mentioned Bryan Lawson (2006, 2004) and Donald A. Schön (1983) publish extensively on how designers reflect, gain and synthesise knowledge. This will not be discussed comprehensively within this dissertation, rather are acknowledged as contributing information which influences

how I as a researcher understand this theme. To give a short synopsis, Lawson (2004) acknowledges the premise that there is a “designerly way of knowing,” emphasising the critical role drawings play not only as a ‘result’ but also as part of the design process cognition and initiation. Moreover, he articulates the significance of different forms of precedents and episodic memory in forming a designerly way of knowing. Additionally, he recognises design conversations as a source of information to learn from, explicating that design knowledge is contained in both words and drawings.

Moreover, Lawson expresses that within these conversations different vocabularies are critical, highlighting that a word or phrase can convey a magnitude of shared meaning between participants such as a design team, but indicates: “This may leave designers with a problem when conversing with their clients or users who may not share this lexicon” (Lawson, 2004, p. 93). This is often the case within the entire discipline of architecture but is even more significant within the field of sustainable architecture as the lexicon is often more technical and extraordinary. This directly connects the theme ‘definitions, and terminology’ to this theme, as it is obvious that how a notion is understood directly affects how it is communicated and synthesised.

2.7.1 The state of information

There is some contention regarding the quantity of sustainable architecture information available; some authors indicate it is lacking, while others state the opposite. Some authors explain that this lack or limited range of knowledge leads to poor communication especially with consultants and further Edwards and Naboni (2013), contribute the misconception about the cost of sustainable architecture to designers that lack information. On the other hand, other authors argue that there is so much information that it is overwhelming or there is a lacking in quality information. Steele, using the analogy of Alice and the Red Queen (from Alice and Wonderland) explains we “must now run faster and faster just to stay in the same place” to describe the “exponential explosion of knowledge.” Similarly, Edwards and Naboni (2013, p. 49), adds that design time is sacrificed to filter the vast amount of information³⁷ and as a result, specialists and consultants are employed to produce a reduced body of information for practices to employ. Another argument is that there is a diverse array of sources that provide a “bewildering array of contrasting building types, employing a great variety of different technologies and design approaches” (Guy and Farmer, 2001, p. 140). Guy (2010, p. 22), referencing Marteen Hajer (1995), explains that a theme which often follows the contested nature of sustainability is the desire to find a “stable knowledge base upon which to act” which proposes that currently there is an unstable body of knowledge. Hajer wrote about this in the book ‘The Politics of Environmental Discourse: Ecological Modernization and the Policy Process’ over twenty years ago, and despite the age of this reference, it is still relevant, and if anything has changed, it is that the vast discourse has become even more fragmented and conflicting. Differently, Ryan and Lewis (2006, p. 7), state that

³⁷ “The time required to filter the sheer quantity of information available takes considerable effort and erodes design time.” (Edwards and Naboni, 2013, p. 49)

“a sustainable future demands new knowledge and renewable creativity.” Continuing, Edwards and Naboni (2013, p. 48), believe to combat this uncertainty, “robust education” is what is required. Other authors point to the format of how continuing or professional education is framed and communicated, explaining that it needs to go beyond checklists and sustainability being taught as a ‘thing’ and instead embrace it as a process, or a way “of framing the world around us” (Ryan and Lewis, 2006, p. 94).

2.7.2 Communicating knowledge

Often, two issues occur with reference to how information is communicated; this includes the complexity of the information and the sporadic coverage, and content from different media sources. Michael McDonough in reference to Albert Einstein states: “if I cannot explain my theory to a taxi driver, it is not worth a damn” (McDonough, 2011, p. 124). McDonough highlights the importance of communicating in plain language, as previously framed, adapting the information to the context of the receiver so that the knowledge produced is digestible for the average person. Authors also argue that popular media often only provides sporadic coverage of shallow overviews which do not provide in-depth sustainable architecture information and subsequently, showcase shallow approaches or undermine the rich complexity of well thought out sustainable designs (Gould and Hosey, 2007, p. 140). Women from different media interviewed by Gould and Hosey (2007) for the chapter titled: ‘What stories do we tell?’ Highlight that because of the limited coverage from mainstream media, alternative publications have attempted to address the topic more thoroughly, but there is still a tendency that the technical aspects remain dominant in the discussions (Gould and Hosey, 2007, pp. 140–141). This supports the argument that greenwashing is still present in the industry and Susan Szenasy³⁸ elaborates that, even when it is covered by the media, it is “superficial,” “rudimentary” and “much of it is lip service.” In the same interview, Penny Bonda³⁹ builds on this argument, clarifying:

“what’s happening with the media is the same thing that’s happening in the design industry right now – green is an add-on, and it shouldn’t be. It should be integrated in everything that we do” (Gould and Hosey, 2007, p. 142).

The interviewees continue, that beyond periodicals, books are also bringing more attention to sustainability, and with such a “celebrity-obsessed culture” that even Brad Pitt is hosting a green design show to draw in more viewers (Gould and Hosey, 2007, p. 144).

In addition to written sources, sustainable architecture is often communicated through people and conversations, as well as visually through drawings, diagrams,

38 Susan Szenasy is director of design innovation at Metropolis magazine

39 Penny works in the fields of environmental consulting and communications and is a prominent writer and lecturer. (Bonda, 2018)

and pictures. Buchanan (2006), describes the importance of word-of-mouth to spread interest and information about sustainable architecture especially in the United States and McLennan (2004, p. 33), elaborates on this, explaining the more built examples and precedents there are concerning what works and what does not, the more the conversations starts to change. Edwards and Naboni (2013), add caution to this, emphasising that when existing knowledge is communicated verbally and linked to specific individuals within an architecture office, there are challenges when those individual leaves and the knowledge and skill set are no longer available. Lam (2011), also explains that due to the “adversarial rather than collaborative” nature of the industry, cases of failure are usually buried rather than shared, and the experiences from the these are usually only available to the parties often involved because of “fear of professional and financial liability.” This is very important as the industry, rather than sharing this knowledge and learning from each other’s failures, is set to repeat the same mistakes. Edwards and Naboni (2013) refer to this from another perspective, emphasising the importance of case studies as opposed to guidelines as a means to share knowledge, as case studies include the process and product which produced more holistic information.

Furthermore, many authors advocate for visual communication – much like the architecture discipline as a whole - but are also wary of the limitations of this form. Scott and Andrew (1998, p. 58), emphasize the importance of visual communication, especially when communicating with other disciplines such as engineers. Gould and Hosey (2007, p. 145), support this and elaborate that there needs to be a more significant commitment of resources to illustrate stories (in media) if they are going to become an “effective educational tool.” However, again within the interviews conducted by Gould and Hosey (2007, p. 146), the interviewees acknowledge the importance and success of visual communication while also remaining cautious of its limitations, as exemplified in this excerpt:

“wig: What’s the best way to illustrate sustainable design? How do you demonstrate fresh air and human comfort in a photograph?

Bonda: You can’t take a picture of green. For that matter, there are beautiful green projects and there are damn ugly green projects. You can take a picture of a light shelf or a raised floor, but you can’t take a picture of good quality air” (Gould and Hosey, 2007, p. 146).

While this quote is about sustainable design, it is also applicable to the entire architecture discipline. However, this is supported by another interviewee who elaborates that using ‘beauty shots’ alone (especially in magazines) is actually working against sustainable architecture. Stressing that supportive material such as schematics needs to accompany photographs to give depth and richness to the information provided. This touches on a complicated debate within the paradigm, as visual communication is key to the design process and often explicates approaches and intentions. Yet, at the same time it limits the communication to the visual and tangible aspects, rather than the living praxis of sustainable architecture. This may be

adding ‘fuel to the greenwashing fire’, as discussed in the previous section.

2.7.3 Impact of the multidisciplinary nature of sustainability

Some of the complexity associated with sustainable architecture is that it intersects with many related disciplines, from engineering through to biology, and often the problems that architects face go beyond the realm of architecture and venture into another field altogether. Similarly, the information which is available extends beyond the boundary of architecture as well. This is exemplified by Guy (2012), who acknowledged the diversity of information sources when writing the article ‘Whiter ‘Earthly’ Architectures: Constructing Sustainability’:

“Heading initially towards the architecture section, I detour through geography and pick up a classic book by the American geographer David Harvey on ‘Justice, Nature and the Geographic of Difference (1996). Sociology is nearby, so I pause and discover the British sociologist Anthony Giddens is now writing about ‘The Politics of Climate Change’ (2009). Browsing the sociology of science section, I am reminded that the French ethnographer of technology Bruno Latour has written on the ‘Politics of Nature’ (2004). [...] Finally, I sit down in front of a structurally suspect tower of books to start reading. And then, I realize that I haven’t yet made it to the architecture section.”

James Steele (1997, p. 56) reiterates the multidisciplinary nature of sustainable architecture discourse, expanding:

“A burgeoning body of literature not strictly confined to construction has a direct impact on the architect’s world, and architects must be familiar with this literature to maintain professional responsibility to a wider global constituency that is increasingly demanding consideration.”

Subsequent challenges emerge from the variety of knowledge within different disciplines, because each piece of information has developed in differing, and often competing, ‘epistemic communities’ (Edwards and Naboni, 2013). This becomes even more challenging with architectural practice as what often occurs is these roles are outsourced to engineers or specialist consultants who then dominate this facet of the design process (Scott, 1998). In an interview with Emmanuele Naboni, Steve Selkowitz explains, as a result, some buildings have “environmental excellence but low architectural merit” (Edwards and Naboni, 2013, p. 47). These debates highlight the complexity of the field and emphasise the importance of having enough knowledge to be able to receive information and communicate with consultants, while also increasing the number of integrated and educated approaches.

2.7.4 Summary

The discussions in this section indicate that this theme is very vast and even more ill-defined than others; drawing on wider concepts and theories relating to education, as well as gaining, transferring and communicating knowledge. This dissertation engages these broader discussions to frame the research but focuses more specifically on the direct relationship between information, knowledge and practice.

This section was initiated by the outline of how this dissertation understood the differences between information and knowledge, three different types of knowledge and reflected on common models for how it is transferred. Additionally, it presented a short synopsis of broader decisions concerning designerly ways of knowing. Fragments taken from sustainable architecture literature were combined to form three main discussions, firstly, the state of information, supported by contradictory arguments that there is both too little and too much information and this forms an unstable knowledge base. Following this, authors statements regarding how information is communicated are presented, focusing on the verbal and visual formats which are crucial to the relationship between discourse and practice. Lastly, some of the implications of the multidisciplinary nature of information were summarised which further emphasise the complexity of the field. One of the main discussions of this theme was the diverse sources of information outside the format of written text, while this literature review has surveyed a considerable amount of literature, there is little research into how sustainable architecture is actually communicated, what sources are most commonly used by practitioners in the field and exactly how (content and format) sustainable architecture is presented in broader architecture media. To explore these gaps in the literature, four studies were utilised, including:

- Firstly, the contextual narrative in Chapter Four was completed so as to understand how discourse has developed in contemporary history.
- Secondly, the questionnaire with experts (Chapter Five) was designed to identify what sources are used to gain information and with what frequency.
- Thirdly, the interviews presented in Chapter Six aimed to understand different experiences and perspectives with concern to how experts gain and disseminate information.
- Lastly, I conducted content analysis of periodicals and online blogs to establish how sustainable architecture is discussed and what formats are used.

2.8 PERSPECTIVES, ATTITUDE AND APPROACHES

This fourth theme – perspectives, attitudes, and approaches - is one of the few themes extensively covered in existing literature, particularly with regard to approaches to sustainable architecture. Some key contributors to this topic are: Simon Guy (2010; 2012; 2005), Steven Moore (2005; 2016, 2010b) and Graham Farmer (2013, 1996; 2010, 2009). In addition, these three authors often publish together with books such as; 'Sustainable Architectures: Cultures and Natures in Europe and North

America' edited by both Simon Guy and Steven Moore (2005). Much of their literature frames the contemporary debate and has made popular the recognition that there are many ways in which to practice sustainable architecture. Guy and Farmer's (2001) article 'Reinterpreting Sustainable Architecture' outlined "Six Competing Logics of Sustainable Architecture" which developed the understanding that there is a plurality of approaches. These six logics include Eco-technic, Eco-centric, Eco-aesthetic, Eco-cultural, Eco-medical, and Eco-social. The diversity of these logics was also transformative at the time of publication, as it emphasised the holistic nature of the field outside of the predominant environmental and technical debate.

Additional authors such as Knudstrup et al. (2009, pp. 2008–9), support Guy, Farmer and Moore's position on the plurality of approaches. Knudstrup et al. Expands on this by illustrating the different dominating concerns - nature, climate, culture, technology - and design principles associated with each approach (in a Danish context). They credit the plurality of approaches to the broadness of the definition; to sustainability's umbrella-like nature. Quoting William et al. (2003), Knudstrup et al. (2009, pp. 2008–9) outline that all approaches have one of two concerns: either that "the design of buildings should fundamentally take account of their relationship with and the impact on the natural environment"; or the approach is "concerned with the concept of reducing reliance on fossil fuels to operate a building". In other words, either an eco-centric or techno-centric approach as discussed earlier.

Knudstrup et al.'s (2009, pp. 2008–9) analysis of different approaches focuses mainly on those which proceed the Brundtland report, and examines the approaches broadly, including categories such as self-sufficient, ecological, green, sustainable, bioclimatic, environmental, low-energy and solar. I found that both the approaches and dominating concerns only represented some of the possible categories. Therefore this same methodology was used to influence my own mapping of different approaches as they appeared in the various literature which were read for this review. In addition to this, a connection map (see figure 2.7) was also created to help understand the relationship between the different approaches, as this format creates the illusion that each approach is independent of one and other and the reality is there are many shared ideologies and philosophies which undertow each approach. This highlights some of the key research and literature currently occurring with relation to this theme.

For the remainder of this section this will be elaborated on evidencing additional arguments. Firstly, the different perspective -, primarily focusing on the question of 'mainstream' albeit combining this with the different discussions in order to address if sustainable architecture is a goal, target, approach, process or philosophy. Secondly, elaborating on the different understandings of approaches, including 'scales of green,' plural approaches and the integration of approaches. Lastly, some debates connected to the motivation and attitudes are outlined, and these include the discussion concerning opportunity verse constraints as well as ethical motivations. These debates are then discussed with regard to how they have framed the research and what implications they have had on the research going forward.

2.8.1 Confusion over what is sustainable architecture

Before discussing different attitudes and approaches, this section will discuss the diverse perspective of what sustainable architecture is or is not, focusing on whether sustainable architecture is or is not mainstream, and whether sustainable architecture is something that can be achieved or if it a process. There is much confusion concerning what sustainable architecture is and what it is not. Is it mainstream or is it an alternative approach? For that matter, is it an approach? A goal? A target? A philosophy or ideology? Or is it a concept? Can it be achieved and measured? Or is it only a way of thinking and a design process? Many authors unintentionally add to this confusion, with nearly all of the literature (read for this review) stating with little argument, how they perceive what sustainability or sustainable architecture is. This section will outline some of these views, and discuss what potential impact this has on the relationship between discourse and practice.

The primary debate in this sub-category is the achievability or measurability perspective within the field. Many authors argue for both sides which comes back to the fundamentals of what sustainability is for them. Authors who argue for the promotion of sustainability as a target⁴⁰ are often aligned with approaches that focus on measurable standards, such as energy or thermal efficiency.

In some cases, this results in the additive approach as discussed earlier with reference to greenwashing and the techno-centrism. This perspective has been exacerbated by the introduction of certifications such as LEED and BREEAM in the 1990s and 2000s. Certifications presented sustainability or sustainable architecture as a 'tick-box' of strategies which if incorporated labelled the building as sustainable and something which could be achieved. In opposition to this, other authors argue that sustainable architecture is not something which can be achieved, rather it is an approach or process. For example, Williams et al. (2007, p. 17) argue that

“As architects and planners, we are taught to work on a project until it is done, then move on to the next one. But design, like sustainability, is a dynamic and living process. Sustainability is not a point that when reached, all is fine. Sustainability is better thought of as a continuum, as a calculus.”

Similarly, Guy and Farmer (2001, p. 140), quoting Susan Maxman, suggest that sustainable architecture is an approach or attitude, and should just be architecture.⁴¹ As mentioned earlier in this chapter, this dissertation positions itself with this line of thought, that it is a dynamic approach to design. There are many other perspectives on what sustainable architecture is, such as, a movement or philosophy. However, these vary compared with the above debate as they are not often discussed, but rather are just stated as nouns proceeding sustainable adjectives in the introduction

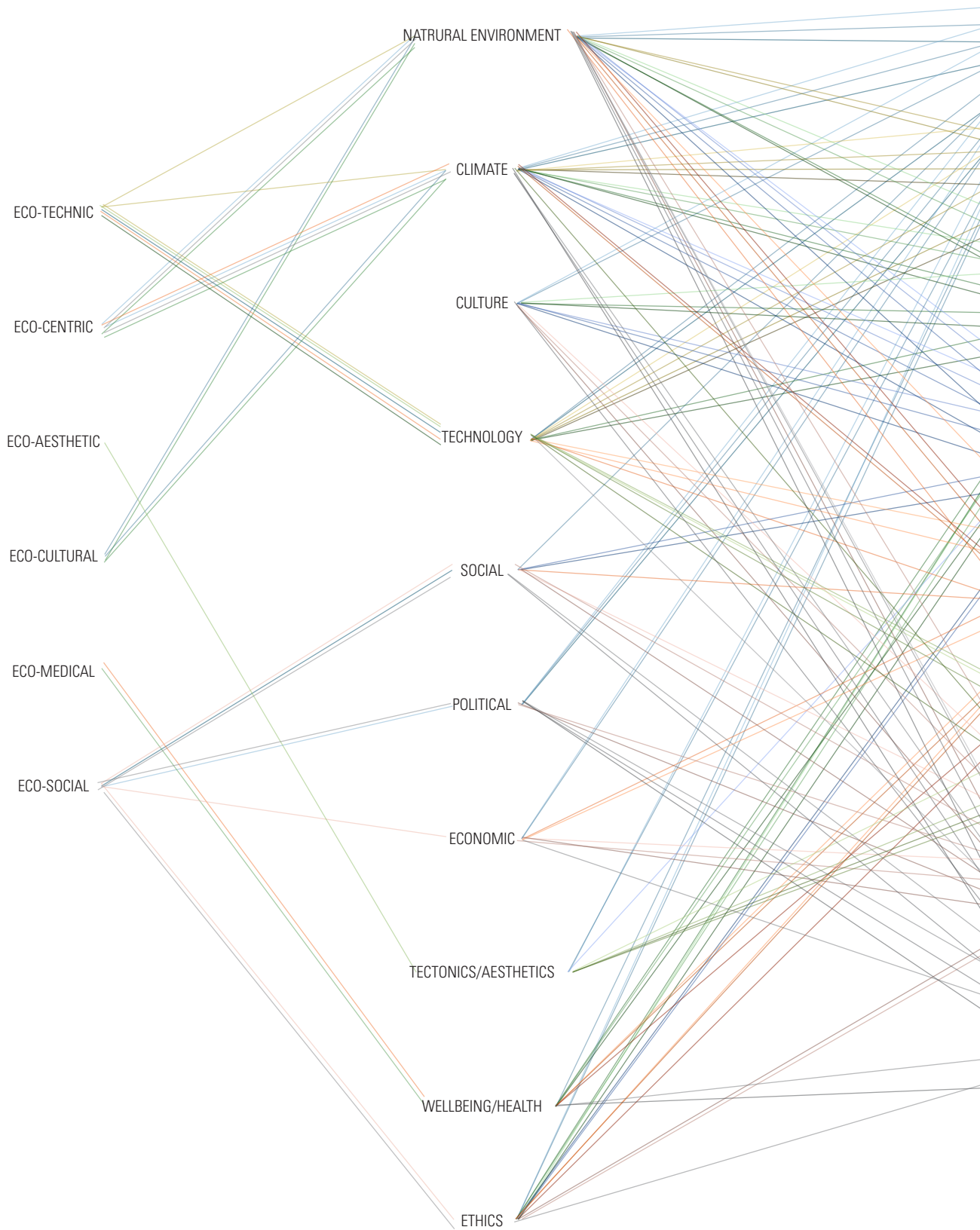
*Figure 2.7 (following pages)
Approaches to sustainable
architecture: Mapping of different
approaches to sustainable architecture
mine based on Knudstrup (2009)*

40 . It is well known that sustainability has become a much-needed target. (Hassan and Lee, 2015, p. 1267)

41 Susan Maxman has suggested that “sustainable architecture isn’t a description. It’s an approach, an attitude. It shouldn’t really even have a label. It should just be architecture. (Guy and Farmer, 2001, p. 140)

SIX COMPETING LOGICS OF SUSTAINABLE ARCHITECTURE

DOMINATING CONCERNS



APPROACHES

SELF SUSTAINING

AUTONOMOUS BUILDING
EARTHSHIP BIOSHELTERS
BIOSPHERE/BIOSHELTERS

LOW ENERGY

ZERO ENERGY BUILDING / LOW ENERGY
ENERGY PLUS / ACTIVE HOUSE
PASSIVE HOUSE
SOLAR ARCHITECTURE

ECOLOGICAL

ARCOLOGY
BIOPHILIC
ECOLOGICAL DESIGN
BIOLIMATIC

REGIONALISM

ORGANIC ARCHITECTURE
CRITICAL REGIONALISM
TROPICAL ARCHITECTURE
CONTEMPORARY VERNACULAR

SYSTEMS/LOOPS/REUSE

CYBERNETICS
CRADLE TO CRADLE
URBAN TRANSFORMATION/ ADAPTIVE REUSE
REGENERATIVE ARCHITECTURE
RESILIENT DESIGN

MODERN TECHNOLOGY

BIOMIMETICS/BIOMORPHIC
ECO-TECH
ORGANI-TECH
HIGH-TECH GREEN/GREEN TOWERS

SOCIAL

CO-HOUSING
COMMUNIAL LIVING
ALTERNATIVE/EXPERIMENTAL LIVING

SUSTAINABLE URBANISM

NEW URBANISM
ECO-CITY
ECO-VILLAGE
URBAN ECOLOGY
URBAN AGRICULTURE

DESIGN PRINCIPLES/STRATEGIES

LCA OF MATERIALS
EMBODIED ENERGY OF MATERIALS
MATERIAL RECYCLING
LOCAL MATERIALS
NATURAL MATERIALS
MAINTENANCE

INSULATION
BUILDING ENVELOPE
AIR TIGHTNESS
GLAZING
THERMAL MASS
THERMAL EFFICIENCY

ORIENTATION OF BUILDING
BUILDING FOOTPRINT
SURFACE/WINDOW/FLOOR AREA RATIO
FLEXIBILITY
PRE FAB/MODULAR

VENTILATION- NATURAL
VENTILATION - MECHANICAL

RENEWABLE ENERGY SOURCES
ENERGY EFFICIENCY/REDUCTION
DAY LIGHT
PASSIVE SOLAR SHADING
SOLAR HEATING/RECYCLING
EMBODIED ENERGY/CARBON

WATER HARVESTING
WATER REUSE
SURFACE WATER STRATEGIES
ONSITE WATER TREATMENT

FOOD PRODUCTION
COMMUNITY GARDENS
GREEN ROOFS/VERTICAL FARMING
BERMING
ECOLOGICAL PARKS/URBAN FOREST
CONNECTION TO NATURE
BIODIVERSITY
GREENING OF GREY/BROWN FIELDS
PERMIABILITY

ECOLOGICAL SANITATION
REDUCED WASTE

INDOOR AIR QUALITY
VISUAL COMFORT
THERMAL COMFORT
DESIGN FOR ALL
ACCESSIBILITY

LIFE CYCLE COST
FLEXIBILITY AND ADAPTABILITY
DESIGN FOR DECONSTRUCTION

DENSITY/ZONING
SELF SERVICING CITY
MOBILITY
REDUCE PRIVATE TRANSPORTATION
CAR FREE

MATERIALS

THERMAL

FOOTPRINT

VENTILATION

ENERGY

WATER

GREENERY

WASTE

WELLEBING

FUTURE

URBAN

to an article or book. Some examples of these are the following:

“The low-tech movement [...]” (Guy and Moore, 2005, p. 145)

“The different concepts of green building [...]” (Guy and Moore, 2005, p. 181)

“It would appear that there is a spectrum of green thought [...]” (Cook and Golton, 1994, p. 678)

This emphasises the extreme diversity of perspectives; some overlapping and others contradictory. Within each of these nouns, there are additional ways in which they can differ. For example, the plurality of approaches mentioned earlier and is elaborated shortly. While it is unclear precisely what effect this diverse uncertainty has on the connection between discourse and practice, it is evident that - even to a specialist in the field - this information is incredibly complicated and overwhelming.

Simon Guy and Graham Farmer (2015, p. 15) in their publication ‘Reinterpreting Sustainable Architecture’, have presented a variety of fragments addressing the “mainstream or not” debate. Referencing Harry Gordon (2000, p. 34), Guy and Farmer explain that “a tectonic shift in design thinking has occurred: sustainability is now becoming mainstream” and a societal norm, continuing with reference to (Castle, 2001b, p. 5), where he states that even if it has become mainstream and “the accepted goal,” it still “seems to be slipping through our fingers.” McLennan (2004, p. 33), explains that the popularity of conferences and similar events signifies that ‘green’ has arrived into mainstream architecture. Furthermore, Lauring (2010, p. 49), discussing the Danish context, explains there has been a shift from sustainable architecture as marginal phenomenon to the centre of the architecture discipline⁴². Yeang (2011a, p. 8) supports this argument that “green design” has become mainstream, but progresses further to question what version or content of sustainable architecture is becoming mainstream. Yeang (2011a, p. 8) states:

“Ask any architect about green design and you will get the same response – use of photovoltaic, wind generators, compliance with verification systems, planning as new urbanism, etc. We need to questions whether this is all there is to green design.”

This excerpt from Yeang supports the notion that sustainable architecture is becoming mainstream, yet it raises many additional issues with regard to which version of sustainable architecture is growing in popularity. Pessimistically, I would speculate that a greenwashing or techno-centric approach is what is common knowledge rather than an integrated version. With similar scepticism, James Wines (2000, p. 64) rationalises, that many people have accepted the changes and influence

42 “Indeed, there has been a remarkable shift during the last two or three year in which sustainability has moved from being a marginal and sometimes joked about phenomenon to being an indispensable part of building programs and architectural competitions, a phenomenon at the very centre of the architectural field, at least when it comes to rhetoric.”(Lauring, 2010, p. 49)

of sustainability but only “as long as the changes do not change anything.” In many ways, this refers back to the previous argument that there needs to be a cultural shift to see real change, and Wines (2000, p. 64) supports that until attitudes change sustainable architecture will remain a “curiosity in the corner” rather than “a force in the mainstream.” Additional authors such as Ryan and Lewis (2006) and McLennan (2004) support this argument and expand that often mainstreaming means continuing with the status quo with the addition of sustainability⁴³; for many designers, it is a massive learning task to shift sustainable architecture from the outside to the inside of the mainstream.⁴⁴

2.8.2 Different approaches to sustainable architecture

Scales or spectrums are often used to classify different approaches to sustainable architecture; the most common being from “light to deep green” (Cook and Golton, 1994, p. 678). This is referring to shallow (light green) approaches at one end and in-depth and integrated (deep green) approaches at the other or as Farmer and Guy (2002) phrase it “eco-centric” versus “techno-centric.” Additional scales are organised by use of technology and range from “low-tech” to “high-tech.” Another scale produced and popularised by Bill Reed (2007) and the Regenesys Institute, is illustrated in figure 2.8. Reed (2007) articulates that the scale transitions from “issue-based approaches” to “living system approaches” with conventional practice at the bottom, followed by green, with sustainable ‘neutrally’ in the middle and above they place restorative, followed by regenerative at the very top. As a side note, within this scale, I would position greenwashing approaches somewhere between conventional and green practices. Interestingly, this scale positions broader approaches against each, organised by their influence on the living systems rather the relation to nature or technology. Often these scales are used to suggest if an approach is more sustainable than another and in support of this, Gram-Hanssen and Jensen (2005, p. 182) contend that despite having a constructivist view, it is possible to objectively regard if one building is more successful than another in addressing environmental challenges. This dissertation has previously positioned itself within the notion that there is a plural of sustainable architecture(s) and this diversity should be celebrated; however, to further define this, this research supports Bill Reed’s scale positioning approaches by their integration and effect on larger living systems. While I maintain sustainable architecture should not become a dogma, to found the most significant change within the industry, the majority of approaches need to be occurring within the top half of this diagram in figure 2.8. This section will shortly present how different literature considers the development, plurality, and integration of different approaches.

It is evident from the literature and lexicon that approaches have developed and

43 “To the cynic, mainstreaming means we can continue to do exactly what we have always done, providing we put a sustainable spin on it.” (Ryan and Lewis, 2006, p. 49)

44 “[...] sustainable design has operated for a long time outside the mainstream of the design and construction industry, and so for a vast number of people it means a total shift in how their profession is viewed. For many, it means unlearning as much as it means learning new things. Old habits, as they say, die hard.” (McLennan, 2004, p. 3)

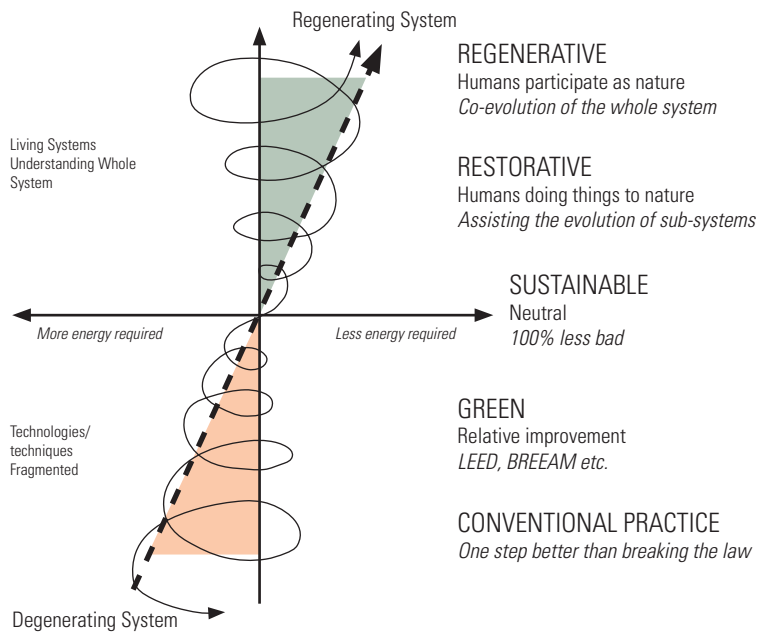


Figure 2.8 Regenerative Design Diagram: created from Bill Reed's Regenerative Design Framework (Reed, 2007)

adapted to new social contexts in recent history. This topic is expanded on at length within the contextual narrative in chapter four. Gram-Hanssen and Jensen (2005, p. 165) are one of many authors who outline how different approaches have developed from the early environmental movement in the sixties. Discussing the Danish context, they define approaches directly after the 1973 oil crisis as “green buildings as energy saving devises” followed by “ecological alternatives emerging from the grassroots,” large projects which stemmed from a commitment to the 1987 Brundtland report are described as “subsidised large-scale urban projects” and lastly, and more recently, green buildings as “market-driven consumer products.” It is evident that there is an ongoing transformation within the field as new approaches emerge in response to social, environmental and technological developments. Looking back in hindsight, from the perspective of today issues, some of these approaches have been more successful than others. Within the literature, there is an obvious captivation with these developments as they are more often than not often described. However, what is often missing is what we can learn from this progression through different approaches and how it has affected how we practice sustainable architecture today. As Bergman (2012b, p. 12) offers: “When we change how we ask the questions, the possibility of arriving at other answers emerges”.

As previously mentioned, celebrating the plurality of sustainable architecture debates and approaches has become an accepted position, made popular by publications from Guy and Framer (2015, p. 1) who articulated:

“Rather than argue that we need revolution or reformation, more or less technology, more pious behaviour, to embrace or abandon the city, or to develop clearer definition or standardisation, we want to explore, even celebrate, the diversity of contemporary debate about sustainable architecture.”

Guy and Farmer (2015, p. 6) continue to describe different approaches which exist, depending on the technological and philosophical underpinnings.⁴⁵ Additionally, Altomonte (2009b, p. 16), drawing on Guy and Moore (2007) attribute the plurality of approaches to the complexity of the problem. While Guy (2010, p. 23), referencing Williamson et al. (2003), further recognised that there is “no class or style of design which is unequivocally sustainable architecture and no fixed set of rules which will guarantee success if followed.”

Interestingly, within the literature, there is still an ongoing trend to produce, guides, rules, and check-list for each different approach. Other authors such as Winy Maas recognise the diversity of approaches and meanings, but unlike Guy, Farmer, and Moore, Maas perceive this as an issue rather than a celebration. Mass et al. (2014, p. 245) review the numerous reports, studies and lists⁴⁶ and explicate: “our world is awash in eco-information but starved of meaning.” They continue, to rationalise, referencing the extensive amount of information and approaches, which even as an expert, “it still gives me a headache trying to keep track.” The vastness of the information is a topic raised in the previous section and is a barrier which connects all three themes - definitions, information, and approaches. Within, all three themes authors describe the excess amount of information as overwhelming and thus confusing. While the immense amount of information is considered a barrier within the theme of information, knowledge and communication and it is worth exploring and addressing, it is of note to reiterate that by poisoning this dissertation within the celebration of plural approaches, the reduction or narrowing of definitions, information or approaches is not considered a viable solution to this barrier.

Another important topic often raised in the literature is that of integration. Different debates range from still considering sustainability as a positive addition to architecture, to arguing that there should be no distinction between sustainable architecture and architecture, as good architecture is sustainable. This argument is exemplified by Eduardo Souto de Moura (2004), who states in an interview:

“For me, architecture is a global issue. There is no ecological architecture, no intelligent architecture, no fascist architecture, no sustainable architecture – there is only good and bad architecture. There are always problems we must not neglect; for example, energy, resources, costs, social aspects – one must always pay attention to

45 “There are many different approaches, from those who believe in low-tech mud walls, to the enthusiasts for hi-tech mechanisms.” (Guy and Farmer, 2015, p. 6)

46 Our world is awash in eco-information but starved of meaning. Hundreds of organisations churn out a flood of reports, graphs, studies, punditry – and lists. So many lists! I’m supposed to be an expert on sustainability, but it still gives me a headache trying to keep track of: the Triple bottom line; the Three Main Components of the natural step; one planet living’s ten guiding principles; the World wildlife fund’s three forms of solidarity; the Copenhagen agenda’s ten principles for sustainable city governance; the framework of eight doorways of the sustainable schools network; the 12 indicators to follow of the earth policy institute; the 11 indicators of a sustainable city; and the ten Hannover principle promulgated by Bill McDonough. Each list is the result of deep thought by smart and dedicated people – and there is doubtless other important to-do list out there that I’ve missed. But can we please agree: enough already? (Maas et al., 2014, p. 245)

all these! [...] We can also look at it another way: there is nothing but sustainable architecture – because the first precondition of architecture is sustainability. Sustainable architecture is a tautology.”

This notion is supported by other authors who explain that sustainability is not something that should be picked and chosen⁴⁷. Rather, it should be part of everything we do as designers. Furthermore, when asked how she convinces clients, this author exclaims: “don’t convince them, just do it” (Gould and Hosey, 2007, p. 143). Moreover, other authors such as Altomonte (2009, p. 13), add that:

“this is an approach that has to be embraced since the very early stages of development of a design and cannot be left as an afterthought once the main formal and technical features of a building have already been resolved by the design.”

2.8.3 Motivations and attitudes

A reoccurring discussion in the literature concerns the negative attitudes towards sustainability. Particularly, the debate is often focused on the problem; and the view that sacrifice needs to be made to make amends for our past actions. Bergman (2012b, p. 10), refers to people who hold this opinion as “doom and gloomists” but continues to refute their arguments explaining that “sacrifice does not represent a desirable path.” Buchanan (2006, pp. 9–10), explains that sustainability needs to be regarded as an “inspiration with which to enrich and deepen our emergent culture of architecture” rather than a restriction of the “poetic potential,” continuing that once architects “cease to resist it” it will have “immense appeal.” Others such as Szenasy contribute to this debate and an interviewee from ‘Women in Green’ (Gould and Hosey, 2007), explain the importance of being “hopeful” and the power designers have to make change, emphasizing the potential depression associated with current global problems and the desire for people to be inspired (Gould and Hosey, 2007, p. 146). Guy and Moore (2005, p. 1), support this and state, “sustainability is, I suggest, evocative of optimistic, or at least good common sense.” However, in later publications Guy and Moore (2007, p. 15) highlight the negative side of the debate stating “this situation often provokes deep depression among some architects” particularly referencing the well-used example from James Wines (2000): “A major proportion of the architectural profession has remained oblivious to the magnitude of its irresponsible assault on the land and resources.” In contrast to this, other authors view this problem as an opportunity, especially for designers. Crowther (1992, p. 23) states, “when there is a problem, there is an opportunity to eliminate, lessen or otherwise solve it” and continues to highlight that unique perspectives architects and designer can provide. Similarly, Altomonte (2009b, p. 13) explains that environmental constraints can provide inspiring solutions:

47 Bonda: It should be integrated into everything that we do. Sustainability shouldn’t be something that some projects do and some projects don’t. (Gould and Hosey, 2007, p. 142)

“[...] the requirement to meet technical and environmental targets can constitute inspiring design constraints that have in themselves the potential to lead to a generation of novel architecturally significant – and thus ‘sustainable’ buildings.” (Altomonte, 2009b, p. 13)

The underlying ethical motivations are also often mentioned in literature. Simons a contributor in Gould and Hosey (2007, p. 45), declares “the carrot is stronger than the stick”. Inferring that incentives are more successful than laws and regulations. Additionally, Moore (2016, p. 284) recognises that a shift has occurred within the industry, acknowledging that “doing less bad” is no longer sufficient and projects now need to “accomplish measurable good.” This is supported by other authors who explain the guilt of “building the wrong way” has been surpassed by the benefits of integrating sustainable architecture in the design process (McLennan, 2004, p. 33). These references suggest that there is a decisive shift toward practices actively wanting to improve and being motivated by positive ethical factors rather than imposed restrictions.

2.8.4 Summary

The theme of perspectives, attitudes, and approaches has been presented in this section through the amalgamation of different references from sustainable architecture literature, with particular input from Guy, Farmer and Moore. Specific research relating to the complexity and diversity of approaches was presented in the adapted diagram in figure 2.7 and supported by the critical review of different contributions. Three different topics were collected and outlined and included the confusion concerning what sustainable architecture is, with particular reference to if it is mainstream, a goal, target, philosophy or movement, to name only a few. The different approaches were then articulated, presenting different scales and debates relating to the plurality of approaches, desires for it to be integrated and lastly, the different attitudes and motivations, shifting from negative to positive. These discussions show the variety of positions with the literature and reiterate the complexity and diversity which exist within the field. Furthermore, this section of the literature review has identified barriers which exist across several themes which are further researched in this dissertation in Part Three. It is evident that, despite there being countless approaches and perspectives, there seems to be consensus that there is a definite shift towards integrating sustainable architecture.

2.9 VISUAL LANGUAGE AND IDENTITY

Discourse on the topic of sustainable language, identity or aesthetics appears in few books, yet is frequently the discussion of magazine articles and opinion pieces from online blogs. Despite, many successful integrated projects existing, there is still a stigma that sustainable architecture is ugly. This is exemplified by authors such as Lloyd Alter al(2009) in his article “Why is so much green architecture so ugly?” For the online blog treehugger where he suggests that the field of architecture is

experiencing a design crisis and many developments look as though the design was simply forgotten. Di Carlo (2014) elaborates that existing sustainable architecture only contains ethical action but has no innovative aesthetic language. Furthermore, Lance Hosey (2012) postulates that “technology has hijacked sustainability” and that the art of architecture has been neglected in favour of focusing on the science of building (Hosey, 2007). Furthermore, Geoff Manaugh (2007) in his blog post “Architectural Sustainability”, argues that contemporary architects have become masters at the “art of ornamentalizing sustainability”. Mehaffy and Salingaros (2013) also support this notion that sustainable architecture is being adorned with shallow-technical-add-ons; they elaborate that these components are often ‘bolted-on’ without any consideration for their long-term contributions to the ongoing sustainability of the building.

Two recent books dedicated to these issues related to visual identity are “The Shape of Green” written by Lance Hosey (2012), and “Aesthetics of Sustainable Architecture” edited by Sang Lee (2013). *Aesthetics of Sustainable Architecture* brings together a collection of nineteen articles written by well-known authors relating to the connection between aesthetics and sustainability. Lee (2013, p. 8), supports the notion that sustainable architecture is a separate field to architecture and rather reductively explains that “the so-called greening of architecture has produced a new class of experts and professionals” which work in parallel with architects or work to make “a building design green after the architect’s work is done.” Furthermore, Lee (2013, p. 8), asks if architects should leave sustainability to the experts or “should every architect become familiar with sustainability simply in order to become more marketable and to get more work?” This narrow and unconvinced framing of the practice of sustainable architecture is an interesting example as I suspect it represents many perspectives of those authors who currently publish on the topic of aesthetics and sustainable architecture. Lee (2013, p. 13) continues to articulate that there is a dominant perception “that sustainable design may be accomplished by putting together a set of prescriptive parts and measures,” in other words what I have previously described as techno-centrism and greenwashing. Additionally, Lee (2013, p. 13) accredits this to “media exposure, evaluation and certification measures” which he states had raised general awareness but has promoted the marketing of sustainable architecture before the term had established “ [...] a firm footing in common architectural practice.” Moreover, Lee (2013, p. 13) suggests that the most fundamental challenge for the practice of sustainable architecture is to emphasise a “more holistic construct of sustainability” as “the appearance of sustainability has become as important, if not more than the actual substance of a given design.” This generalised perspective of sustainable architecture in my view is very limited and rather than referring to the entire field is referencing the fragment which proliferates greenwashing. I imagine that aesthetics is only more important than substance when referring to an architect whose motivations are only to be more marketable. While I believe this is not an accurate representation of practitioners within the field, this is crucial to the discussion, as opinions such as this frame much of what is published. Lance Hosey (2012) is equally pessimistic in his book, presenting

fundamental issues relating to aesthetics and sustainability. Hosey (2012, p. 2) argues that the 'green movement' has a reputation for "being all substance and no style" which is incompatible with designers focus on "image." Additionally, Hosey (2012, p. 2) maintains that "[...] many consider great design and green design to be separate pursuits, and in fact much of what is touted as "green" is not easy on the eyes. The ugly truth about sustainable design is much of it is ugly". Hosey goes on in the chapter "love it or lose it" to explain the importance of 'beauty', expanding that design needs to be inspirational and have a sensorial appeal or it will be disregarded. He clarifies:

"We don't love something because it is nontoxic and biodegradable, we love it because it moves the head and heart [...] When we treasure something, we're less prone to kill it, so desire fuels preservation. Love it or lose it. In this sense, the old mantra could be replaced by a new one: If it's not beautiful, it's not sustainable. Aesthetic attraction is not a superficial concern- It's an environmental imperative. Beauty could save the planet." (Hosey, 2012, p. 7)

2.9.1 Visual identity

There is not one cohesive visual identity for sustainable architecture. However, it is often split between two different stigma: the perceived hippy identity of the eco-centric; and the add-on-technology of the techno-centric approaches. Despite there being many successful examples of sustainable architecture, which are aesthetically beautiful and functional, there is still a stigma that sustainable architecture is ugly, or that aesthetically pleasing design is incompatible with sustainability. Authors such as Winy Maas et al. (2014, p. 20)⁴⁸, McLennan (2004, p. 228)⁴⁹, Wines (2000, p. 227)⁵⁰ all argue that many architects in pursuit of a sustainable or environmental design ignore or do not achieve an aesthetically successful building, which results in what Edwards and Naboni (2013, p. 47), described as having "environmental excellence but low architectural merit." Altomonte (2009b, p. 13) explains that this can be due to a selected focus on issues such as carbon and consumption; he clarifies:

"Conversely, not many buildings hailed for environmental excellence have impressed architecturally, whereas carbon neutrality and reduction of consumptions have, more often than not, been prioritised over creative design, quality of life and psycho-physiological comfort of occupants, thus hindering the architectural value of the building being produced."

48 "Indeed, green buildings can be beautiful – or at least remarkable. But unfortunately, these are the exceptions; the majority of green architecture is undeniably ugly. [...] Just because a building is sustainable does not mean its appearance is irrelevant." (Maas et al., 2014, p. 20)

49 "Even today, the stereotype that green buildings are less attractive get some credence as many of today's sustainable design practitioners ignore or diminish the importance of aesthetics while trying to meet environmental goals." (McLennan, 2004, p. 228)

50 "... environmental architecture has become camouflage to justify the work of some vociferously righteous, but very bad, designers."

It is evident that in some instances it seems different factors are mutually exclusive and fragmented buildings are the result. McLennan (2004, pp. 226–228), acknowledges that some designers still “cling” to this belief that it is too difficult to achieve both a sustainable and beautiful building, but continues that as the field matures, more successful examples which integrate high-performance and beauty will begin to emerge.

Interestingly, within this reference McLennan reduces sustainable architecture to high-performance which further the fragmented notion and emphasises techno-centrism. Other contributions, such as Sandra Mender from ‘Women in Green’ (2007, p. 50), adds that “you can’t draw a line between good design and sustainable design. [continuing] How can we call it great design if it ignores the impact on people and the larger environment.” On the other side of the coin, Maas et al. (2014, p. 22), advocate for this separation through citywide regulations rather than building specific, justifying “we can compensate with aesthetics for the beauty that other sacrifice in their energy efficiency.” This approach illustrates this perspective that aesthetics and sustainability cannot co-exist within one building. However, I place more trust in an architect’s ability to successfully integrate the two, and I fear this approach would only exacerbate the problem of sustainable architecture being understood as a fringe approach to architecture.

As mentioned, despite there being great contemporary examples of sustainable architecture, there is still an alternative or hippy stigma which surrounds sustainable architecture that is left over from the 1960s social movements. One author reveals that “ecological correctness is often accompanied by a sour puritanical expression, as if something has to taste bitter in order to do us good” (Sauerbruch and Hutton, 2013, p. 48). What designer Annette Stelmack⁵¹ describes as “granola and Birkenstock style” (Gould and Hosey, 2007, p. 47). Furthermore, this perception of rustic or unrefined has been described as “uninspiring” in an interview with Gould and Hosey (2007, p. 47) when asked, “what is the place of aesthetics in sustainability?” One response which was also supported by other authors such as Yudelson and Meyer (2013, p. Xxii) indicated sustainability needs to made sexy to give it a greater appeal.^{52,53} Furthermore, Spector (2011, p. 5), supports this notion, explaining: “At the outset, green architecture had suffered from a serious issue of imagery. The forms, materials and green technologies bolted onto the building form resulted in an additive architecture that was not integrated with the green design intentions and performance of the building.” This approach to sustainable architecture attempted to move away from the ‘hippy’ style but without integration has resulted in an additive or visual language which is very common especially in greenwashing today.

51 Annette Stelmack, the founding principal of Inspirit-Illc, a sustainable design consultancy firm that instils courage and life by inspiring through a fusion of environmental stewardship and creativity. (Stelmack, 2018)

52 “We have to make this sexy, irresistible, and joyful. The point is to live within the climate and celebrate that.” (Gould and Hosey, 2007, p. 47)

53 “Contemporary architects can become stars simply by claiming that they make “green” architecture look “sexy” and not “hippie.” That makes it acceptable, even desirable in a capitalist mass-consumption society with a short attention span and a guilt complex.” (Yudelson and Meyer, 2013, p. xxii)

Other authors such as Maas et al. (2014, p. 21) elaborating on this, pin-point several technologies which they describe as “signs” of a green aesthetic⁵⁴ and McLennan (2004, p. 229) concedes that despite there being successful built examples “people still think of quirky solar panels when they think of sustainable design.” McLennan (2004, p. 230), continues that these visual displays of technology iconise the building, the negative ‘flip-side’ is the result of many shallow attempts “appear to be green” and further exacerbate greenwashing. Some authors argue that this may be because many aspects of sustainable architecture are intangible and hard to visually understand, such as good air quality (Gould and Hosey, 2007, p. 146).

2.9.2 Visual Language

This dissertation has argued that built objects are included within the scope of sustainable architecture discourse, and has later defined three sources of knowledge – the production, written documents, and living praxis. Built examples as a ‘production’ source of knowledge relies on the visual language to communicate. Furthermore, this visual language has a lexicon similar to verbal or written sources, and the level of communication relies on the amount of existing knowledge the viewer has. For example, a member of the public with no prior education in architecture or sustainability may only understand features such as solar panels or green roofs, while an architect may understand the implications from the shape or orientation and an expert may comprehend more in-depth communication such as materials toxicity content and thermal bridges. Consequently, it raises issues concerning what visual ways a building communicates, and if there is a cohesive visual language and what then is included in its vocabulary. According to Hosey (2012, p. 6), sustainable techniques can be divided into two categories, the invisible and the visible. Embodied energy, material sources, toxicity and air quality, are given as some examples of ‘invisible’ considerations, while form, shape, and image are interestingly listed as ‘visible’ techniques rather than technology such as solar panels or green roofs. Hosey (2012, p. 6), explains that invisible techniques are becoming more familiar as they are easily measured and “don’t threaten artistic freedom” despite, he argues that visible techniques have a greater impact as, how a building is shaped can have an enormous effect on how it performs. Cesar Pelli reinforces the notion of invisible elements, stating: “sustainability doesn’t necessarily photograph” (Stephens, 2009).

Additionally, there is contention concerning this subject, like many of the other discussions within the field. Some stating that sustainable architecture is a style and there is a visual language and other arguing there is no style and nor should there be. Just as there are many definitions and approaches to sustainable architecture, some argue (in opposition to those who believe the hippy stigma) that there is also a diversity to the visual language employed. Authors such as Guy and Moore (2007, p. 15) support this and expand that it is growing. They justify:

⁵⁴ “So, what do we mean by ‘green aesthetics’ in architecture? We all know the signs: solar panels on the roof, maybe a small windmill, a greywater pond in the garden and a ‘natural’ look of exposed wood and raw materials.” (Maas et al., 2014, p. 21)

“There is a diversity of images of what sustainable architecture might be – that is, what it might look like, where it might be located, what technologies it might incorporate, what materials it might be constructed from, and so on – is quite bewildering, and rather than diminishing, over time appears to be accelerating.”

Similarly, Buchanan (2006, p. 6) supports this notion that there are many sustainable architectures or aesthetics. He insists, “there is no such thing as a green architecture or a green aesthetic”. Elaborating on this discussion, McLennan (2004, p. 229) voices his concern that people believed that sustainable architecture produced the same visual result and the consequence of this, is that the sustainable architecture could potentially then be “dismissed if a certain aesthetic or style was desired that seemed different than what the green aesthetic would deliver.” Another author acknowledges the diversity of visual language, but is less positive about this; Vidler (2010, p. 20) expounds:

“This valid account arrives through such as disparate assembly of design proposals revealing that the formal language of this disciplinary field is unarticulated. From boxes to blobs, trapezoids to geodesic domes, and towers to wormy buildings, we can rightfully ask: Does anything go? Are we back to eclecticism back up by cyclic explanatory diagrams or what Ray Smith coined in 1977 as “supermannerism?” Can sustainable design accept any form?”

This excerpt provides an opinion of the other side of the debate. As there is a direct connection between the visual language and different approaches of sustainable architecture, it is anticipated that there are similarities between the two. Furthermore, as there are many ways in which to practice sustainable architecture, it is expected that there are many ways to visually represent it. I too am wary of the blobs, trapezoids and wormy buildings; however, I argue that this ‘alternative’ visual language is also employed with conventional architecture, and while sustainable architecture does have its fair share of geodesic domes, I would suggest that this is an issue for the entire architectural discipline. Furthermore, I would posit that while there are many sustainable visual languages, there are some distinct characteristics and commonalities which stem from each approach’s employed strategies; such as sunrooms which developed with solar architecture and have been reimagined within passive architecture and similar contemporary approaches.

McLennan (2004, p. 229) raises the question of whether sustainable architecture is an aesthetic or style? He clarifies that for many designers there was a preconceived notion that with “sustainable design comes a prescribed style or green aesthetic, which, depending on the architect can be either a deterrent or an attraction to the movement.” He further elaborates that “green buildings have been type-caste” in the eyes of many, especially laymen, who consider them a “less than desirable structure”

(McLennan 229). In an interview on the topic by the authors of *Women in Green*, Childs supports this notion that architects dismissed sustainable architecture because they thought it was a fad or style which would fade. However, she clarifies, “it’s a process, not a style” (Gould and Hosey 51). Much of the literature which addresses the visual aspects - in particular, the debate of whether sustainable architecture is a style - refers to ‘other architects’ or ‘other designers’ or ‘others’ in general. Many opinions and generalisations are given as to how large groups of professionals view the field, but there is little research or literature to support these claims.

2.9.3 Summary

This section has discussed different opinions and discussions which have been presented concerning the visual language and identity of sustainable architecture. It is evident, as is the nature of judging something's appearance that much of the literature is based on subjective experiences or opinions and there is little research into what actually constitutes the visual language or identity of sustainable architecture. Different perceptions and stigmas have been presented in addition to how built projects can communicate information through visible and invisible features. This theme is essential as it connects both discourse and practices in many ways. Firstly, it is the product of practice, which can be extrapolated to be therefore the product of discourse as discourse and information inform practice. At the same time, the building themselves are also part of the discourse as they communicate the designer's philosophies, thoughts, and processes. There is a gap in the literature regarding explicitly what different visual identities exist, what is contained within the visual language, and what their effect is. To investigate these further, the following studies were designed:

- Firstly, within some of the interviews in Chapter Six, questions were designed to probe the effect that visual language has on the progression of sustainable architecture.
- Secondly, a specific study was designed, the visual analysis and is presented in Chapter Nine, which aimed to categorise and describe the different visual features which contribute to the visual language of sustainable architecture.

2.10 SUMMARY

This chapter has attempted to present, discuss and position this research within the broader context of the field and the broader concepts which frame this research such as sustainability, sustainable development, sustainable architecture, discourse, and practice. Following this, different fragments from the selected literature were brought together to frame the five themes which have been constructed from this research. These discussions have aimed to provide a base of information; highlighting the conflicting nature of the field as well as indicating gaps within the literature which are explored with purposely designed studies. The review of this selected literature has identified this area of research as significant and interesting as it brings together

a considerable amount of existing information and debate which is presently spread over diverse literature in fragments which are subsequently not easily accessible. Furthermore, the constructed research themes are worth further investigation as the literature indicates that they are common barrier which are identified but little further investigation has been conducted. Additionally, they are themes which have potential to better bridge the gap between discourse and practice.

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Chapter Three

PLANNING THE JOURNEY | Methodology

This chapter discusses the approach and design of the research, covering the organisation as well as the theoretical and practical aspects of collecting, organising, processing and analysing information. This dissertation is explorative and makes use of predominantly qualitative methods. An introduction will outline the 'grounded-bricolage' research approach and how it initiated. This will be followed by an in-depth discussion of how grounded theory and a bricolage approach are combined, and their implications for the research design. Continuing, the research procedure and strategy will be sketched, and finally, each of the six research methods will be discussed as they relate to the overall methodology.

3.1 INTRODUCTION

An explorative-qualitative-bricolage approach has been the basis for the methodology of this research, combined with influences from grounded theory as shortly presented (1.2). The explorative nature of this research has driven many of the research design decisions that were made. Rather than setting-off with a hypothesis or a pre-established theoretical approach, this research in line with grounded theory thinking, has encouraged constructed findings to guide and develop the research. From the offset, the research has focused on and intended to explore and understand the relationship between sustainable architecture discourse and practice. A bricolage methodology was designed to complement the explorative and grounded theory process of collecting and analysing information. Subsequently, six methods of both primary and secondary data collection have been utilised at different stages in this research, including:

- diagramming and mapping (in various forms)
- a non-statistical questionnaire with experts
- semi-structured interviews
- content analysis
- qualitative content analysis
- visual analysis

Each method has been chosen at different stages of the research to study and triangulate different findings which materialised as the research developed. Silverman and Marvasti (2008, p. 511) describe triangulation as “the comparison of different kinds of data and different methods to see whether they corroborate one another.” Triangulation has been employed as a reflective process which has required going back-and-forth comparing between different sets of methods while collecting and analysing information. Unexpected events and findings have required continuous adaptations and adjustments to the research design and consequently the knowledge and findings which have been constructed as the result of these reflections and decisions.

Firstly, to give some context to this project, this research initiated from an open-call with a specific brief developed by Aarhus School of Architecture. The title of the brief was ‘theories in sustainable architecture’ and required a project based on:

“ [...] the hypothesis that the theoretical discourse about sustainability in architecture is a highly neglected and fragmented field but nevertheless extremely relevant for further substantial progress in finding consistent design strategies.” (Aarhus School of Architecture, 2014)

It framed the project within multiple issues, of which one was the misuse of the term ‘sustainable’, which has degenerated to a “counter-productive marketing label”. The brief required the researcher (me) to:

“excavate the many layers of content and discuss the limitations of these different notions, but furthermore to investigate their historical/theoretical basis and illustrate and evaluate their practical architectural performance through built examples. [Also,] The research is intended to survey and compare systematically the different logics of sustainable architecture(-s) and building design and to contribute to finding substantial common grounds in contrast to the propaganda of sectarian ideologies. The PhD project should explore the different and partially contradicting logics of sustainable architecture(-s) and investigate ‘blind spots’ in sustainable theory building, related to space and architecture.” (Aarhus School of Architecture, 2014)

This brief formed the initial framework and shaped the broad scope and field of the research – discourse and practice - as the brief was explicitly interested in content, logic and theoretical discourse. Furthermore, it requested the investigation of ‘blind spots’ in theory, which directly led to the objective of identifying themes or barriers between discourse and practice. This brief particularly influenced the first study, the contextual narrative (Chapter Four) which was designed to map layers of content and built examples in an historical context while also comparing different logics, finding common ground and investigating ‘blind spots’ or themes that would later become the focus of the research and be explored through additional studies.

The field of study, as discussed in the introduction (1.1), is defined by the relationship between discourse and practice. It is understood and acknowledged that the nature of architecture and sustainability are both multi-, inter-, and trans-disciplinary; many actors being involved over multiple scales. However, this research has delimited the scope to the scale and profession of sustainable architecture, concentrating specifically on practices relationship to discourse. There is little research directly related to this relationship despite a large body of thorough research existing within the wider field of sustainable architecture. The field of sustainable architecture is complex both in content and methodological approaches. There are no standard methodologies for this paradigm as each research project is often influenced by other related disciplines such as anthropology and social science methods, case-studies of best practices, and quantitative measurements of technology. Often many methods are employed within one project, such as the combination of environmental engineering methods with social sciences; for example, energy production and thermal efficiency calculations with wellbeing and social observations. Similarly, a diverse range of qualitative and quantitative methods have been employed. As discussed earlier, this research initiated broadly with the desire to let the emerging content guide the methods used. While at times the metaphor ‘jumping in blindly’ seemed relevant, the framework of the ‘grounded-bricolage’ methodology has kept a rope attached (so to speak), yet has also provided the freedom to explore the complexity of the field by tailoring each method as different content and findings have

developed throughout the process.

The remainder of this chapter will discuss: the design of the research (3.2), focusing on the grounded-bricolage approach as well as the aim of the research approach, scope, positions within the research and the triangulation and richness; a description of the research procedure, strategy, and structure; and finally, each method will be outlined and discussed in section 3.5.

3.2 DESIGNING THE RESEARCH APPROACH

The point of departure for this qualitative and exploratory research was an inductive 'way of discovery'. Silverman and Marvasti (2008, p. 122) clarify that both grounded theory and inductivism are "founded on the belief that researchers cannot know from the start where their observations may lead". This has been critical for the design of the research in combining both bricolage and grounded theory; this is elaborated on the following section 3.2.1. Reyna Zipf (2016) describes her bricolage approach to designing her methodology using the metaphor of exploring and navigating through a maze. The bricolage approach was not predefined, rather stumbled upon at an early point in my research, while lost and trying to find a methodology that combined both established social science methods, and visual mapping and diagramming methods more familiar in architecture. As a novice researcher dealing with broad complexity, I was anxious to commit to a methodology; I was aware that my research was explorative and the findings grounded, and potentially unable to be predicted. This metaphor and bricolage approach offered some comfort and freedom. The bricolage approach:

"uses whatever strategies, methods, or empirical materials that are at hand to produce a bricolage, a construction whose piece's harmonious fit together to make a cohesive whole." Zipf (2016, p. 59) quoting Denzin & Lincoln (p.3), 2016).

As a research-as-bricoleur, I was able to 'take advantage of serendipitous opportunities' (Zipf, 2016) which emerged from the grounded theory approach to collecting and analysing information. This flexibility allowed me, as the researcher, to manoeuvre and cut holes in order to connect different pathways through the 'maze' of methodologies. The deliberate adoption of this bricolage approach, supported by a grounded methodology to collecting and analysing data, enabled a nebulous notion and allowed the ill-defined relationship between sustainable architecture discourse and practice to be explored without losing the complexity of the field. Further to this, the amalgamation of this grounded-bricolage approach supported my role as a novice researcher and architectural practitioner in collecting both primary and secondary information. Zipf (2016, p. 60) explains that, while being a novice researcher is challenging, it also has the added advantage of being free to 'try something different', compared with an experienced researcher who often has the temptation to resort to what they know and have experience in. There is a notion that a certain order of established methods will 'get us to the right place'; Kincheloe and Berry (2004, p. 4)

respond to this by asking 'who said research has to be done this way?'. In the case of this research, some naivety about the relationships between certain methods has led to a combination of studies which may not have been possible had this research been conducted by a more experienced researcher with greater disciplinary constraints. This being said, it does rely on the researcher's awareness that the different methods exist, giving the researcher the ability to choose the best method which is at hand (Kincheloe and Berry, 2004, p. 4). Each study has involved the combination of collecting primary (questionnaire and interviews) and secondary (books, periodicals, documents, reports, images, lectures and built examples) information, through iterations of methods. This research has sought phenomenological understandings from sustainable architecture practitioners and researchers, which have thus been supported by the internal reflective process of collecting and coding secondary data. Triangulation between these sources has been used to generate descriptive (how things are now), developmental (how they have changed over time), and correlational (the relationship between) findings.

3.2.1 Combining a bricolage and grounded theory approach

The bricolage approach is commonly discussed; 'The Savage Mind' by Levi-Strauss (1966, p. 17) was one of the first instances, describing the bricoleur as a "Jack of all trades, a kind of professional do-it-yourself[er]". Later, and akin to Levi-Strauss, Denzin and Lincoln (1999, p. 3) acknowledge that "the multiple methodologies of qualitative research may be viewed as a bricolage and the researcher as bricoleur". Denzin and Lincoln publish extensively on the bricolage approach, elaborating that a researcher-as-bricoleur "works between and within competing and overlapping perspectives and paradigms" to "produce a bricolage, that is, a pieced-together, close-knit set of practices that provide solutions to a problem in a concrete situation" (Denzin and Lincoln, 1994, p 2-3). Subsequently, this approach has employed several studies which are "pieced together" so as to form a cohesive research project which investigates the space between discourse and practice, spanning several overlapping and contentious perspectives.

Furthermore, Denzin and Lincoln continue (1999, p. 5), that there are multiple kinds of bricoleurs: 'interpretive, narrative, theoretical and political'. The pair expand that the interpretive bricoleur, similar to what is described above, produces a "pieced-together set of representations that are fitted to the specifics of a complex situation". Quoting Weinstein & Weinstein (1991, p. 161), Denzin and Lincoln (1999, p. 4) clarify; "the solution (bricolage) which is the result of the bricoleur's method is an [emergent] construction" which differs in form depending on the methods and techniques of representation and interpretation which are employed. As an interpretive bricoleur, the six pieced together studies and methods for this research have been designed along the way as a result of the decisions made as information and findings were constructed.

Gray and Malins (2004, p. 74) support this notion, highlighting that the reflective

and interpretative processes “are completely familiar to us as [design] practitioners”. They expand, describing a bricolage approach as “a complex, dense, reflective, collage-like creation that represents the researchers’ images, understandings, and interpretations of the world” (Gray and Malins, 2004, p. 74). Denzin and Lincoln (2000, p. 8), with reference to Kincheloe (2001, p. 683), clarify that the “interpretive bricoleur understands that research is an interactive process shaped by one’s personal history, biography, gender, social class, race, and ethnicity and those of the people in the setting”. This personal context adds to the unpredictability of interpretive and phenomenological findings which are constructed through this research. As the methods and tools used are not set in advance, the “choice of research practices depends upon the questions that are asked, and the questions depend on their context” (Nelson et al., 1992, p. 2), in addition to what is practical and pragmatic in that setting. Researcher-as-bricoleur appealed to this PhD as it enabled flexibility to embrace the unpredictable, miscellaneous and eclectic nature of the grounded findings which were constructed through the amalgamation of bricolage and grounded theory (discussed below). Clear decisions (such as choosing to combine these two approaches) mixed with unintentional choices (such as having mostly English language sources, and my contextual background as discussed previously in the motivation section 1.3) form the framework for which findings have been constructed.

Grounded theory first emerged in 1965 when sociologists Barney G. Glaser and Anselm L. Strauss, rather than testing hypotheses from existing theories, advocated for research which systematically collected and analysed qualitative data in order to construct theories grounded in that collected data (Charmaz, 2006, p. 2). Glaser and Strauss present ‘grounded’ as ‘discovery’; this suggests that, through the research, the researcher “uncovers something that is already there” (Willig, 2008, p. 45) and recognises the scientific observer as separate from the collected information and resultant theories. In contrast, Charmaz in her later book ‘Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis’ (2006), takes a social constructivist position and recognises that categories do not exist before the process of categorisation. Therefore, they cannot ‘simply emerge’, but are instead constructed during the process (Willig, 2008, p. 46). To expand, Charmaz (2006):

“assumes that neither data nor theories are discovered. Rather, we are part of the world we study and the data we collect. We construct our grounded theories through our past and present involvements and interactions with people, perspectives, and research practices” (Charmaz, 2006).

I position myself with Charmaz’s more recent social constructivist understandings of grounded theory, and this has been subsequently employed during this research. Constructing grounded theory has been chosen as it is compatible with the bricolage approach which also acknowledges the influences of the researcher’s background as discussed previously.

While there are divergences in the emerging or constructed nature of grounded

theory, the process of the method is similar. Glaser and Strauss articulate in their book 'The Discovery of Grounded Theory' (1999), that after data collection qualitative coding¹ is used to sort and synthesise this data. Charmaz (2006, p. 2) explains that "coding distils data, sorts them, and gives us a handle for making comparisons with other segments of data. Grounded theorists emphasize what is happening in the scene when they code data". To put simply: a grounded theory is an iterative process which aims to yield concepts that in turn will lead to categories, that in turn contain properties, form hypotheses and construct theory. This process is achieved by the collection of rich data² often in large quantities and in an unstructured manner. Furthermore, data collection is usually not purposeful as opposed to done at random, determined by relevance to the research focus; to discover categories and interrelations. This collected data is then coded by different levels of open, axial and selective coding (Strauss and Corbin, 1998). Open coding aims to yield concepts which are transformed into categories; axial coding follows open coding to re-organize data so categories can be connected; and selective coding validates relationships between core codes. Additional data gathering and subsequent coding is then:

"driven by concepts derived from the evolving theory and based on the concept of making comparisons, whose purpose is to go to places, people, or events that will maximise opportunities to discover variations among concepts and to densify categories in terms of their properties and dimensions" (Strauss and Corbin, 1998, p. 201)

Throughout the entire process, the tool of memo-writing is used to "catch your thoughts, capture the comparisons and connections you make, and crystallize questions and directions for you to pursue" (Charmaz, 2006, p. 72). Memo-writing is spontaneous and for personal use. Furthermore, memo-writing is crucial to grounded theory as it allows the development of ideas, engagement in the data, and the possibility to 'fine-tune' the data gathering (Charmaz, 2006). Willig (2008, p. 45) elucidates that the researcher shapes the process through their decisions, questions and use of methods, as well as their 'personal, philosophical, theoretical and methodological' background. As a result, this approach "constitutes one particular reading of the data rather than the only truth about the data" (Willig, 2008, p. 45).

Another divergence between these authors is the opinion on combining other additional qualitative methodologies with grounded theory. Glaser (2004, p. 2) has argued strongly against any combination and has stated that this mixing "has the effect of downgrading and eroding the grounded theory goal of conceptual theory. Charmaz (2006, p. 9), in contrast to this, has stated that "grounded theory methods can complement other approaches to qualitative data analysis, rather than stand in opposition to them" and elaborates, that sometimes only specific aspects of the

1 Silverman and Marvasti (2008, p. 507) define coding as "putting data into theoretically defined categories in order to analyse it."

2 Charmaz (2006) referencing Geertz (1973): "Rich data are detailed, focused, and full. They reveal participants' views, feelings, intentions, and actions as well as the contexts and structures of their lives. Obtaining rich data means seeking 'thick' description."

approach are used which can also be successful. Therefore, I delineated that this research would not follow the classic grounded theory methodology Glaser advocated for; instead, this research has been guided, strengthened and enriched by the inclusion and influence of grounded theory techniques and reasoning. This research has not aimed to form theory (this is elaborated on in 3.2.2) but instead aims to understand relationships and define concepts and categories. Thus, it is the collection, organisation, coding, analysis and memo writing which is actively taken from grounded theory; less so the formation of 'true theories' but rather these concepts, categories, and hypotheses.

Qualitative research, and especially the combined grounded-bricolage approach, has increased the flexibility and simultaneously offered "sharp tools for generating, mining, and making sense of data" (Charmaz, 2006, p. 15). With no pre-set theory, this research has thus, in keeping with the grounded-bricolage approach, relied heavily on the developing concepts to guide and shape continuous data collection through a variety of methods. Because of this, the initial research focus has been equally as important as the continuous data collected, as the construction of information has influenced which phenomena were explored and subsequently how they were made sense of. However, the flexibility of this methodology has meant that leads which were defined by the data have been followed, or another method of collecting data has been designed and pursued in order to arrive at what is significant without losing the complexity of the field. This blend of methodologies has been intrinsic to my research approach, enabling findings to develop from the information, while planning and allowing for flexibility to follow unexpected opportunities. On the other-side-of-the-coin, it has been crucial to be open-minded and "prepared to accept, if not embrace, changing emergent categories" (Zipf, 2016). At times, when lost in the 'methodology maze' and surrounded with self-doubt about how to navigate out, this has been daunting, and as Kincheloe (2004) noted, a researcher-as-bricoleur has to be adaptable and prepared to learn from failure.

A complementary method has been integrated into the 'grounded bricolage' research approach - mapping and visual representation. This tool has been an intrinsic part of the grounded bricolage approach and has been applied to all six methods in various ways at different stages throughout the process. It has been an essential tool for my understanding; as Charmaz (2006, p. 117) explains, diagrams can offer tangible images of our ideas through the visual representation of constructed categories and the relationships. Through several different types of mapping and visualisations, information has been analysed, maintaining data richness, complexity, and flexibility beyond describing the phenomena (Charmaz, 2006, p. 118). As well as representing relationships, connections, and overlapping information, visual representation has been used to explicitly articulate complex information within its context (Bryant and Charmaz, 2010, p. 181). With each study, the mapping, diagramming or visual representation has differed slightly, and each of these methods will be described within the associated chapter later in the dissertation.

3.2.2 The aim of the research approach

To reiterate, the aim of the grounded-bricolage research approach was to construct knowledge and findings as they developed rather than to falsify or validate a hypothesis. Therefore, from the outset, pre-planned methods were not used, but rather they emerged with new information and findings. This aim and approach to the research design also meant that the objectives, goals, and focus of the research adapted throughout the three-year process. The specific aim of this research is expanded on in the following section on the research procedure (3.2.7), however, to give a short overview, the aim and intentions were formed by both the PhD brief pre-set by the architecture school, as well as my own understanding of the topic through reviewing literature and engagement in discussions and presentations within Aarhus School of Architecture, the Welsh School of Architecture, the broader PhD environment in Denmark and international conferences. The guiding aim and overall intention of this research approach was to explore and better understand the relationship and influences between sustainable architecture discourse and practice, identifying and describing different categories of meaning. Some initial questions were used to help navigate through the methodology maze, including (Marshall and Rossman, 2010, p69):

- What is happening in the field and how and why has it developed?
- What are the salient themes, patterns or categories of meaning?
- How are these themes linked with one another?

This research involved exploring the relationship between two ill-defined paradigms of sustainable architecture discourse and practice where there is an absence of theory or distinctive boundaries. Therefore, as mentioned, an inductive approach was set as the aim to start gathering information and insights. Furthermore, the aim and purpose of combining a grounded-bricolage approach was to:

- Describe the paradigm rather than to validate or falsify.
- Allow flexibility for the most fitting method to be used to gather 'rich' information.
- Use multi-methods to 'cross-check' and triangulate findings constructed from different sources. If divergent findings were produced, these differences would provide additional perspectives and insights.
- Inform the subsequent research design.

In addition, it is important to acknowledge this stand-alone piece of research as a learning activity and doctoral education; the intention that it is a tool to develop skills of designing and managing a high-quality piece of research, while also recognising the shortcomings and paths that were navigated which led to an increased understanding.

- The aims of the research design lead to overall strategies of the research which were to:
- Design a series of research studies, tailoring the methods of material collection and analysis to best address the research focus. (Discussed in section 3.5)
- Explore secondary data to scope, explore the context and understand the development of the field. (contextual narrative – chapter 4)
- Through primary data, identify different perspectives on the relationships between sustainable architecture discourse and practice. (Expert questionnaire and interviews – Chapter 5 and 6)
- Triangulate perspectives which were constructed through the initial research process (contextual narrative, questionnaire and interviews) with those which are present in secondary sources (literature: books, journals, magazines, and built examples). (Chapter 7-9)

3.2.3 Scope

The scope and limitations of this research design have been adapted as the research has developed. As discussed previously in the introduction (1.1) and illustrated in figure 1.1 (the field of research), the scope of this research design has focused explicitly on the relationships between sustainable architecture discourse and practice. Very few restrictions were applied to this scope in the initial design of the research. However, some have emerged unintentionally, such as the language barrier. Giga mapping – which is explained later in this chapter in section 3.4.1 and 4.2.2 - was one of the first applied methods in this research and the creator of the method, Sevaldson (2011), highlights the importance of unfolding a field “way beyond what we assume is the horizon of relevance” before drawing the boundary; only once the landscape past the horizon is known can we make informed decisions in framing the problem. This approach has influenced the scope of the research design which started very broad and became more specific as the research developed. Each method of study required its scope and delimitations as discussed in section 3.4. Some of the delimitations and considerations set out in the initial research design include:

- Scale: focusing on the building scale and the immediate surroundings. This project acknowledges the importance of both the broader landscape and urban scale in addition to the smaller detailed scale, but for this research, it is limited to the building.
- Profession: there is an intentional focus on sustainable architecture professionals rather than architecture professionals in general, urban planners or landscape architects. Due to the cross-over, this included both architectural practitioners and professionals in research and academia.
- Temporal: the initial time frame was the period after the industrial revolution in the 1840s. This was successively delimited to what McLennan (2004, p.25) labels ‘the modern beginning of sustainable design’ from the 1960s to today

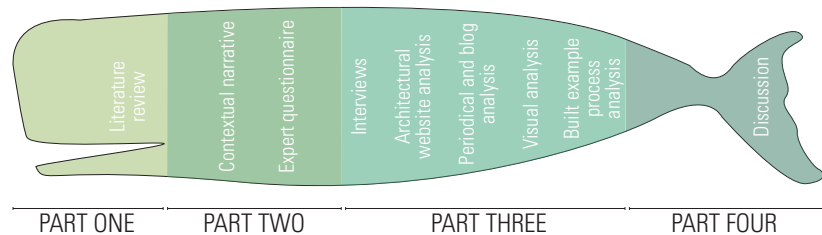
and for some of the final studies there was a further delineation and focus to the period after 2000.

- Geographical: no purposeful delimitation was set; however, unintentionally through the selection of literature and my own language constraints, one was established which included Anglo-Saxon countries and Western and Northern Europe.
- Information sources: sources were limited to literature and discourse written in English. Sources of secondary data included in this research project include books, research projects, journal articles, conference papers, reports and documentation, online blogs and articles, precedents projects, architecture websites, documented case studies, photographs, diagrams, and recorded lectures and presentations.
- Financial and logistic limits: As this PhD has been based in Denmark, there have been many restrictions for practical and pragmatic reasons concerning the project's budget and time constraints.

Scoping has followed the methodological approach of grounded-bricolage, where it is recommended that original aim and scope orientates the research and as it progresses, the focus and scope of the research narrows (Willig, 2008, p. 38). This is illustrated in figure 3.1 which is based on the 'fish model' introduced to me by Johan Vebek during a PhD seminar in 2015. He explained that often explorative research follows this model where it starts with a focus and then expands the field before narrowing down to the findings (where the tail meets the body) and then expanding it out to relate to the field of research. This fish metaphor has been altered in my research to a whale; from the outset the scope has been broad, and throughout the process, it has been gradually delimited through a series of studies as shown linearly across the whale.

3.2.4 Positions within the research

Figure 3.1
Exploratory research whale:
Adaptation of the 'exploratory fish model' which represents the scoping process of my research.



As previously expressed in the literature review, the relationship between sustainable architecture discourse and practice is not an area of research with well-established and cohesive investigations or publications. However, within the wider field of sustainable architecture, there are many diverse positions concerning research. The field covers the spectrum from realism to relativism, with research approaches ranging from strict objective and quantitative simulations and testing to subjective, qualitative social science inspired observations. As the grounded-bricolage research

approach already suggests, this dissertation is situated within the relativism end of the spectrum, positioning itself within constructivism. To reiterate, this dissertation combines tactics influenced from social sciences and architecture and includes reading (both primary and secondary sources), listening to interviews, interpreting, mapping, diagramming, drawing, coding, connecting, and writing. It is considered a creative endeavour which absorbs information from discourse, people, places, and buildings so as to generate understandings and knowledge. It is understood as an iteration of reflective processes that go back and forth between collecting, organising, processing, and analysing materials. It has included working alone with discourse, using students to test pilot methods and ideas, and bouncing ideas between colleagues and supervisors within the field.

This research employs a social constructivist paradigm of inquiry. As mentioned this is characterised by a relativist ontology in which “multiple realities exist as personal and social constructions” (Gray and Malins, 2004, p. 19). Additionally, the epistemology is subjective; knowledge is negotiated and constructed and, as Barbour (2013, p. 35) explains. “the social world exists merely in the eye of the beholder”. Similarly, Charmaz considers ‘the world’ a “product of human participation and negotiation” (Willig, 2008, p. 48) which is dynamic and as a consequence, the researcher actively constructs a particular understanding of the phenomenon under investigation (Charmaz, 2006). Furthermore, as a researcher-as-bricoleur, meaning is created rather than found and the concept of theory is considered “an explanation of our relation to the world” rather than “an explanation of the world” (Kincheloe and Berry, 2004, p. 2). Moreover, the Foucauldian understanding of discourse employed in this research is also social constructivist in orientation (Willig, 2008, p. 125) and recognises there are “numerous versions of the world, each of which is constructed through discourse and practices” (Willig, 2008, p. 126).

3.2.6 Triangulation and richness

This grounded-bricolage research approach is inherently multi-method in focus, and this is evident in the use of six different methods or studies. These studies, as mentioned, include a contextual narrative, expert questionnaire, semi-structured interviews, content analysis, qualitative content analysis and visual content analysis. By combining multiple methods to create a singular thesis, this approach aims to capture what Flick (2002, p. 229; 2007, pp. 102–104) describes as “a strategy that adds rigor, breadth, complexity, richness, and depth to any inquiry”. Triangulation is used in this research approach to help “map the terrain”; locating its position and examining the complexity of the phenomena in question from a variety of different perspectives (Gray and Malins, 2004, p. 31). The collection of information from different methods and perspectives either corroborate or refute propositions which are constructed from different methods of data analysis. The triangulation of methods and sources adds rigour and robustness. This would not otherwise be possible from a single source or method given that the available data in this field is complex, fragmented and ill-defined. The richness of this research is subsequently strengthened

by employing iterations of the six studies (contextual narrative, expert questionnaires, semi-structured interviews, architecture website analysis, periodical and blog analysis and visual analysis) which indicate overlap and thus support findings across the different studies.

3.2.7 Description of the research procedure

The diagram in figure 3.2 demonstrates a simplified version of the research procedure and the iterative process between different studies and the different constructed themes that have consequently emerged throughout the process. This process is outlined below and described more thoroughly in the following section.

The structure of the research can be summarised as the following:

- Scoping the field for tentative categories of inquiry:
- Literature review (Chapter Two)
- Gaining an understanding of these categories from the perspective of practice (both design practice and academia & research) and identifying and constructing new categories for further research:
- Contextual narrative (Chapter Four)
- Initiating a questionnaire with experts in the field of sustainable architecture (Chapter Five)

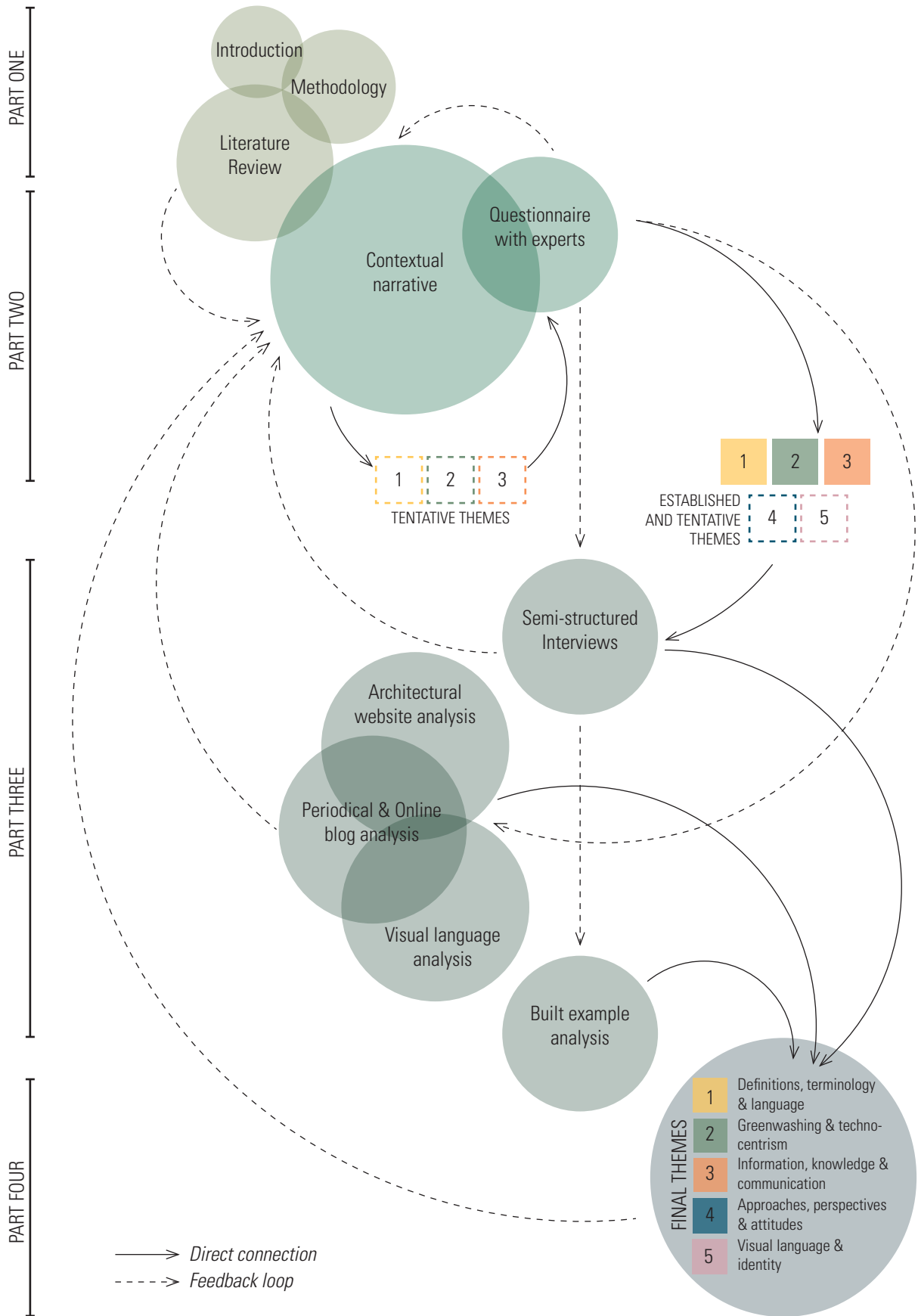
Defining, describing and explaining the patterns and relationships between categories of inquiry through four different studies.

- Semi-structured interviews (Chapter Six)
- Architecture website content analysis (Chapter Seven)
- Periodical and blog qualitative content analysis (Chapter Eight)
- Visual language content analysis (Chapter Nine)

3.3 STUDY METHODS: DATA COLLECTION AND ANALYSIS

The material collected through the six separate studies have explored five different constructed themes (definitions, greenwashing, discourse, approaches, and visual language) between discourse and practice as illustrated in figure 3.2 To elaborate, two initiating studies collected the base information used for the initial grounded analysis. These have explored the development of the literature and the subsequent discourse to create a contextual narrative and a questionnaire with experts. After the completion of the contextual narrative, I concluded that more literature could not definitively tell the story of practice and explicitly give a perspective of their relationship to the discourse. Therefore, the questionnaire for experts in the field was developed to gain understanding and expand on findings from the literature study.

Following this, the four smaller studies specifically targeted the five themes (three defined and two tentative) constructed from these two initial studies. These four studies were designed and included semi-structured interviews, conducted with



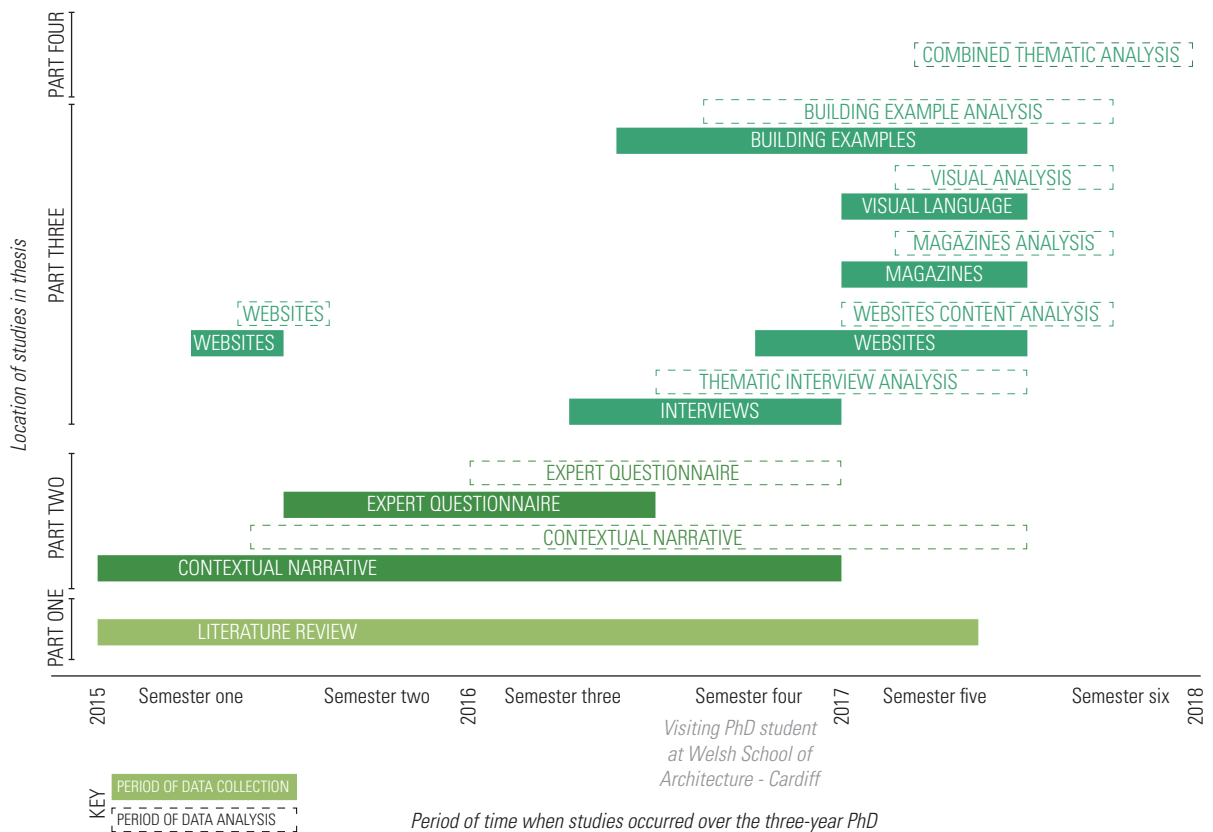


Figure 3.3 (above) Diagram of the research process: indicating when different studies commenced and were analysed throughout the three year period.

Figure 3.2 (left) Simplified diagram of the research procedure: indicating the connections between different studies and the subsequent identification of the five themes.

the aim of acquiring a better understanding of the responses in the questionnaire and to explore some of the themes which could not be answered in a questionnaire format. Some key findings from the questionnaire and interview led to a series of three content analyses of architectural websites, periodicals and blogs, and the visual language of built projects. The last of the studies was an exploration of five demonstration projects which emerged from the questionnaire and interviews. These five demonstration projects were treated as built example probes and included the collection of secondary information from the internet, site visits and drawings, combined with primary information from discussions with the architect, client, and users of the building. However, as this study was not fully articulated, despite extensive information collected and analysed; it was considered there was enough existing information and this study has subsequently been cut from the dissertation.

Together these six studies give an enriched basis for the discussion of the relationships between discourse and practice. Furthermore, the use of multiple sources and methods adds richness to the findings. While these methods will be presented in a linear order, they were by no means sequential; rather an iterative process between the different primary and secondary material. This is visible in figure 3.3 which illustrates where each study (data collection and analysis) is situated within the three-year period of this PhD research. Furthermore, the research field was expanded upon in the initial studies to gain a broad picture. Subsequently, in the four later studies the scope was narrowed through successive delimitations.

In the remainder of this section, each method will be outlined with a focus on the general implications of the study in reference to the overall methodological approach. Additionally, specifics in regard to the strategy for collecting, organising, and analysing information will be presented in the relevant chapters for each study (chapters Four-Ten).

3.4 PART TWO – INITIATING STUDIES

Two initiating studies were designed to investigate the relationship between discourse and practice; to discover and identify important categories of meaning or enquiry. The combination of these two explorative studies formed the groundwork and created the basis for further studies, utilising a broad variety of complementary methods. These two studies involved a contextual narrative which included mapping the literature and discourse as well as a non-statistical questionnaire with experts from the field.

3.4.1 Contextual narrative (chapter four)

In order to create the contextual narrative, different mapping methods have been employed to analyse and describe the development of different themes (definition, greenwashing and communication) throughout the contemporary history of sustainable architecture. Giga mapping, timelines, and concept mapping have been the main visual methods used in this study, and will be described in detail in Chapter Four. As previously mentioned, grounded theory and visual tools have many correlations; therefore, mapping has been utilised as a method as it can “give abstract ideas graphic clarity, translating complex conceptions into visual configurations of nodes and relationships that are easy to grasp” (Wang, 2007). These characteristics of mapping have enabled navigation within the field and between concepts, emphasising correlational relationships between variables. Mapping has also permitted problems to be thought through in an interdisciplinary fashion. This is essential when dealing with the multi-disciplinary nature of sustainable architecture. By examining and filtering data through mapping in a holistic manner, McCandless (2010) clarifies that patterns and connections emerge to tell a story or foster sensemaking which may only be seen when visualised. The visual aspect of mapping is essential to architects and designers as it communicates “[the] language of the eye with the language of the mind” (McCandless, 2010) in a way which is already familiar to the process of designing and synthesising. This extends beyond the architect or designer, as our brains have an incredible capacity for storing visual information (Novak and Canas, 2008). The visual quality of mapping facilitates iconic learning which involves acquiring and retaining images with high degrees of recollection.

Design synthesis, also described by Kolko (2010), is an abductive sensemaking process in which the designer attempts to organise, filter, manipulate, and clarify data into a cohesive structure. However, this is often performed privately or internally and can produce tacit knowledge. Mapping or diagramming can be, and is, commonly used during this process to act as a scaffolding to help organise, comprehend, and

structure the complexity of the data. Synthesis requires the designer to understand what are sometimes seemingly unrelated connections. Therefore, it is crucial that tacit knowledge is externalised and that the sensemaking process incorporates a variety of factors - including people, places, and events - to understand their connections and anticipate their future trajectories (Klein et al., 2006). Klein et al. (2006) continue to highlight that it is the 'story of why the elements are related' that is interesting, rather than the elements themselves, and that this is a crucial component in interpreting history. It is evident there is an affable connection between the way in which designers gain and synthesise knowledge, and how the mapping as a method facilitates this. It is important that this is translated out of the design realm of the studio and used in both history and theoretical thinking. Continuing with Foucault's approach to history, by expanding on this chapter and study, I have endeavoured to explore the processes and developments of sustainability and sustainable architecture that have led to how the field is understood today (Foucault, 1982). As discussed in the literature review (section 2.3.3), the complexity of sustainability within the discipline of architecture is often overwhelming for architectural practice, and while designers are trained to deal with complex problems, the discourse of sustainable architecture lacks clarity to allow this to materialise.

3.4.2 Expert questionnaire (chapter five)

The second method employed was a non-statistical questionnaire with 129 experts from the field of sustainable architecture. These 129 responses were from both architectural practice and academia. The aim of this study was to gather additional insight, perceptions, and attitudes on the relationship between discourse and practice from the perspective of practice (Hanington and Martin, 2012, p. 140). This study was prompted by a comment from a professor at an internal review in my first semester. After I stated that there was a disconnection between sustainable architecture theory and practice, he asked me what information I had to prove this claim. I realised then that at that point in my research all I had were my interpretations of the literature, and I needed insight directly from practice. A questionnaire method was chosen for this study as it utilised limited resources and time to provide a quick overview from many respondents. Furthermore, it filled a gap of information which could not be collected from secondary sources within the Contextual Narrative in Chapter Four.

While designing this study, I was aware of the limited information that would be provided due to the structure of a questionnaire. Therefore, the semi-structured interviews which are discussed in the following section (3.5.1) were partially designed to be a continuation of this study. As the aim for this study was not to validate a hypothesis, but rather to collect a range of perspectives, it was designed to be non-statistical and therefore non-generalisable. Instead, it offered insight into a cross-section of experts in the field. The group of respondents that I chose were experts as they offered the most relevant understandings into the three developing themes: definitions; accessibility of knowledge; and greenwashing.

Questions with multiple formats were incorporated into three parts which

corresponded loosely to the above three themes. It is acknowledged that questionnaires produce mostly quantitative information (not including responses to open-end questions), which is slightly contradictory to the qualitative nature of the overall grounded-bricolage methodology. However, questionnaires allow full anonymity which can “foster frank disclosures that a person might not wish to make to an interviewer” (Charmaz, 2006, p. 37). The previously mentioned interviews were conducted, transcribed, and ‘memoed’ while analysing the questionnaire. By carrying out these two processes contemporaneously visible in figure 3.3, it allowed not only the questionnaires to influence the interviews, but also for the initial insights from the interviews to influence how the questionnaires were analysed (Hanington and Martin, 2012, p. 140). This was a very iterative process and involved multiple readings of the questionnaire findings through different lenses that were formed during the interviews. Further to this, the literature was also used to conduct informal early triangulation between the written discourse, the questionnaires, and the interviews.

3.5 PART THREE – FOUR KEY STUDIES

Four additional studies were designed to define and describe the four constructed themes (definitions, greenwashing, discourse, approaches, and visual language) while also explaining their patterns and relationships with each other, and discourse and practice. These studies can be broken into two sections. Firstly, the semi-structured interviews (Chapter Six) which developed from the questionnaire. Secondly, three iterations of content-, qualitative content-, and visual content analysis are employed to explore architecture website (chapter seven), periodicals and blogs (chapter eight) and the visual language of sustainable architecture (chapter nine). These four studies with the interviews make up the most significant body of findings (Part Three) and their methods concerning the research approach will be discussed following. However, specifics about the collection, process and analysis of each study is presented within the corresponding chapter (six-ten).

3.5.1 Semi-structured interviews (chapter six)

This interview study was designed and conducted with fourteen participants as a continuation of the previous questionnaire study. Possible interviewees were selected from the respondents who completed the questionnaire, and each semi-structured interview occurred via Skype. These interviews aimed to both gain more insight into the responses from the questionnaire, while also exploring the three established themes (definitions, greenwashing and communication) and the two tentative themes that were constructed from the questionnaire and initial interviews. The semi-structured interviews were designed with influences by grounded theory, to further illuminate the topic while also evolve as different information was collected (Charmaz, 2014, p. 55). This following section will present the broader implications the methodological approach had on the interview design; however, the specifics of how interviewees were selected and how information was gathered, processed, and analysed will be presented in Chapter Six.

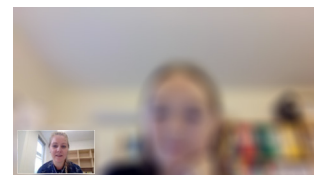


Figure 3.4 Screenshot of Skype interview: from Chapter Six.

Interviews were chosen specifically as a method as they can gain information from real life experiences and perspectives (Silverman, 2011, p. 166). In particular, semi-structured interviews were designed as a method of data collection as they are “compatible with several methods of data analysis” (Willig, 2008, p. 23). Rather than dictating the direction of the interview, this method has the capacity to allow interviewees to offer their insight, reflections, and salient perspectives (Barbour, 2013, p. 120). Sequences of themes and questions were designed into an interview guide; however, the nature of this method permitted openness to deviate from the guide and follow specific answers and emerging information (Kvale and Brinkmann, 2008, p. 124). This constructive approach was valuable in drawing from real experience while acknowledging that this is “embedded in a social web of interpretation and re-interpretation” (Silverman, 2011, p. 182).

Within Brinkmann and Kvale’s (2014, p. 58) metaphors for types of interviewers this research is positioned as a ‘traveller’ rather than ‘miner’, understanding the process of interviewing as knowledge construction rather than collection. Subsequently - Brinkmann and Kvale (2014, p. 63) expand - “knowledge is actively created” and co-authored by the interviewer and interviewee. The potential of meanings “unfolds through the traveller’s interpretations” of the perspectives (Brinkmann and Kvale, 2014, p. 58) leading to an intertwined process of interviewing and analysis. Furthermore, this is combined with a grounded theory approach of actively constructing codes in the analysis; naming data and selecting words to compose codes; and subsequently, information is influenced by what I have interpreted and constructed as significant (Charmaz, 2006, p. 47).

3.5.2 Architectural website analysis (chapter seven)

Content analysis is the method employed for this third study. Using this method I have examined how selected architectural websites discuss the sustainable approaches or aspects of their constructed buildings, identified the common themes and patterns that have emerged from the information, as well as further understood the extent of greenwashing within this media and data source. Content analysis is usually a method of textual investigation (in some cases also spoken and visual) which mostly entails merely analysing information searching for recurring instances (Silverman, 2016, p. 85). These instances are then systematically identified across the collected data and grouped through codes (Silverman, 2011, pp. 213–214). Additionally, they are usually expressed in themes, patterns, counted occurrences, words, phrases, images, or concepts.

Within this research, around 1700 screenshots projects have been collected from nearly 90 architecture offices, and instances or codes have been constructed as they have emerged from the data (Hanington and Martin, 2012, p. 40). This is visible in figure 5 which shows how instances were highlighted and visible on an architecture website screenshots.

The outcome of the content analysis is usually quantitative, counting the occurrence of words and concepts; however, this study combined both quantitative

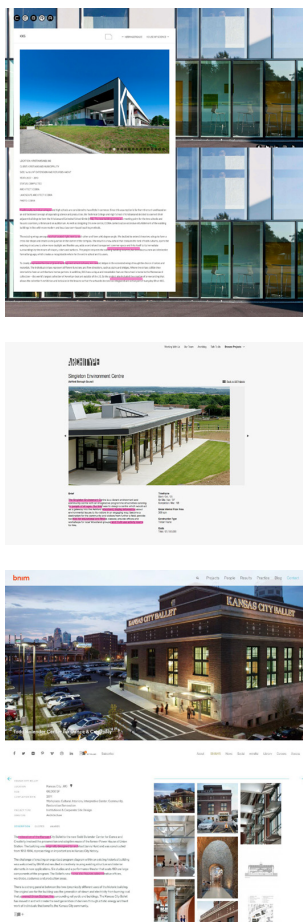


Figure 3.5 Screenshots of architectural websites: which have been colour coded to identify sustainable variables in Chapter Seven.

and qualitative methods for collection and analysis. There is a debate whether the analysis should be qualitative or quantitative. Silverman (2011) argue on the side of quantitative, while researchers such as Bruce L. Berg (2001) suggest that a blend of both qualitative and quantitative should be used. To achieve this blend, mostly manifest analysis, yet also some latent analysis, was conducted. Within manifest analysis, the researcher describes what is visible in the text, staying close to, and using, the present words themselves. In contrast, latent analysis seeks to find the underlying nature of the text through interpretation (Berg, 2001). Berg (2001) also explains that by combining the manifest analysis' frequency data with latent analysis, one is able to demonstrate a more convincing argument, allowing for the interpretation of explicit statements and implied meaning in the texts.

The grounded-bricolage approach has influenced this method of study through the purposeful selection of website and project sources, the construction of instances and codes to search for and the visual analysis to explore patterns and relationships within the collected data. In addition, the methodological approach has meant that this study has not been designed from the outset but instead chosen later, after the contextual narrative and questionnaire indicated that the theme of greenwashing and techno-centrism was significant enough for further exploration. Subsequently, this method was considered particularly relevant for this study as it acknowledged that there could be differences between claims of sustainability, and what was actually produced and articulated. Additionally, this study allowed for the collection of large quantities of public information over a short period.

3.5.3 Periodical and blog analysis (chapter eight)

A combination of both quantitative and qualitative content analysis was used to study the sustainable content of four different architecture periodicals as well as two online blogs. Content analysis has been described previously and will not be repeated for this or the next study, only including additional information when pertinent. This study emerged from findings that arose from the literature review, contextual narrative, and particularly the questionnaire which indicated a gap in the knowledge relating to the sustainable content of popular media. Consequently, it was designed to understand both the frequency in which sustainability is discussed within popular media, as well as describing the format and content which is discussed. The five years (2012-2016) of four periodicals were examined. These included: Architecture Research Quarterly; Architectural Design; Architecture Review; and Architect's Journal. As for the online blogs, one hundred of the most recent articles relating to sustainability were selected from both, ArchDaily and Dezeen. Around 25,000 pages were analysed, looking for manifest instances of keywords relating to sustainability. After identifying sections of the text which related to sustainability (as visible in figure 3.6), pages were imported to Nvivo. Then, using qualitative coding, the latent content was examined for different ways in which sustainability is constructed in the text, its shared meaning, patterns, and relationships (Willig, 2008, p. 115). Again, the quantitative nature of content analysis is at opposition with the ground-bricolage approach employed for



Figure 3.6 Example of a periodical analysis: colour coded for different instances of keywords in Chapter Eight.



Figure 3.7 Picture of the selected built examples: used in the visual analysis study in chapter nine.

this research, yet it was used for this study to reduce the number of instances and sources; it would not otherwise have been possible to extensively read every article within the timeframe of this PhD. Furthermore, content analysis created an overview of the frequency which was an interesting outcome of this study. Additionally, the coding of the text was influenced by grounded theory coding, in which codes were constructed from the content and analysed using open and direct coding.

3.5.4 Visual language (chapter nine)

This study developed from the findings of the literature review, contextual narrative, and particularly the questionnaire in which emphasised that built examples and precedents are commonly used for knowledge gain and dissemination. Despite this, there is little research or literature on what constitutes the (actual not perceived stigma) visual language and identity of the sustainable architecture. Therefore, this study was designed to complement the bricolage of studies, particularly building on the two previous content analysis studies. Content analysis was adapted to identify and code the visual features of around 170 buildings (shown in figure 3.7) from the 1960s until now that commonly appeared in literature. Similar to the previous two studies which use a version of content analysis, instances and codes were constructed from the information through the systematic examination of secondary sources of information for each example. To better understand what visual lexicon contributes to the overall visual language, I conducted an inventory of defining characteristics such as the material composition, mass, symmetry, location, function, level of technology integration and sustainable features (Hanington and Martin, 2012, p. 14). Silverman (2011, p. 328) warns that visual content analysis has major shortcomings, in that it deals with what is visible on the surface alone, this statement is valid and has been a concern for this study as individual method, as it is acknowledged that it is a shallow approach to only examining the surface. However, the design of this study is successful in gaining insight into a broad range of information which builds on previous studies and is additionally supported by their findings. Thus, construction knowledge which is rich in content despite being an overview study. Furthermore, this analysis was completed so as to enable an understanding of the buildings context and how it communicates through its material, aesthetic, and interactive qualities.

3.6 ETHICS

Only two studies - the questionnaire and interviews - required ethical consideration, as all of the secondary information sources for the other studies were publicly accessible. The participation in the questionnaire was voluntary, confidential, and all data was anonymised when processed. The participants in the questionnaire were not from 'vulnerable' (e.g., not children) sectors of society, and in addition, no personally sensitive information was collected. However, for respondents from practice, a building they have worked on was requested as part of the questionnaire which may be considered sensitive and could be used as an identifying marker. Therefore,

the responses to this question have been excluded from the chapter and appendix. Any additional identifying markers were only collected for monitoring purposes, and no IP (internet protocol) addresses were recorded by Survey Monkey. As a further precaution, all responses were aggregated into groups of the three variables. To inform the participants, the ethical considerations were briefly described in the email invitation, and these were also outlined on the introduction page of the questionnaire itself. A link was provided both in the email and questionnaire to the research website (www.sustainablearchitecture.dk) for more in-depth information. This website outlined the privacy and ethics including my name and university, sponsorship, the purpose of the research, and the extent to which answers were protected (Fowler, 2013, pp. 141–5). I gained consent by indicating that, in participating, the respondent agreed to the privacy terms and use of their responses within my PhD and subsequent publications.

For the interviews, potential interviewees were briefed about the purpose and process of the interview within the initial email invitation. This included how long it was estimated to last and the anonymity procedure. Once the interviewee agreed to participate, and before commencing the interview, participants were reminded of the purpose of the interview; how it would be used, who I was, my institution, and background. Following this, participants were asked again for their consent, permission to record the interview and I explained to them the procedure for aggregation and removing all identifying markers to ensure anonymity. Indicating that the interviews would be anonymous before conducting the interview was vital as it allowed the interviewee to open up about some aspects which they may not have done if it was not clear that it would be anonymous. There was some contention between interviewees about the level of anonymity, with some preferring to not be anonymised; however, as some information could be deemed sensitive for practitioners active in the industry, it was decided that this was crucial. Lastly, before commencing the interview, they were asked if they had any questions or concerns and before the interview was terminated, they were asked this again. This was important as it clarified any confusion, giving the participant a chance to address any trepidations or curiosities.

3.7 SUMMARY

This research aims to explore five identified themes within the relationship between discourse and practice. To achieve this, a grounded-bricolage methodological approach has been designed and employed to construct findings from a variety of primary and secondary sources. It is difficult to design a research approach when the nature of the research is ill-defined, and the problem is constructed as information is gathered. In this manner, the grounded-bricolage approach has been successful as it has allowed different paths to be followed and created as different information has been collected and findings constructed. The composition of the six different studies which form this dissertation have encompassed multiple iterative attempts of trial and error. When beginning the contextual narrative, it was not entirely clear where

this research would lead, but as I began to weave together the different studies - wrapping together different voices from questionnaires, interviews, and literature - themes started to be identified and constricted. Through the series of studies these themes have gained depth and richness. However, this has not been an easy task; juggling multiple methods, studies, and sources at the same time has required much multi-tasking and an ability to keep track and document the broader picture while simultaneously diving in deeper within some studies and sources. I recognise that there is considerable value in constructing knowledge from many sources and have thus relished the freedom of a research approach which encourages permeable boundaries between disciplines, discourse, academia, teaching, and practice. Nonetheless, I also acknowledge that my curiosity to continuously follow leads and 'see what is around the corner' can be a limitation of this research. This process has been a learning experience in self-discipline (sometimes the hard way); in knowing when to resist the appeal of new knowledge, insights, and perspectives. I have come to recognise that, as my supervisor said to me on my first day, "you can't save the whole world", and have come to accept that this dissertation is one small slice of the larger pie.

3.8 REFERENCES

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PART TWO

**The first steps |
Initiating Studies**

Chapter Four

Contextual Narrative

This introduction chapter intends to construct the initial background for the research project and form the preliminary delineation. As a context for the research a brief motivational section is included to position and orientate myself within the research. To commence, the explorative research approach is outlined and frames the initiating research focus, context and scope. This initial focus appries the general guiding framework, focus and aims for this research project which continue to delineate the subsequent chosen methods and gives an overview of the dissertation structure and contribution to knowledge.

4.1 INTRODUCTION

This first initiating study – the contextual narrative – developed with the literature review while branching out to gather a descriptive understanding of the development of sustainable architecture since the 1840s. As this study progressed, it focused more specifically on the 1960s onward. This contextual narrative was a scoping study which developed with the intention that this would elucidate what conditions and key themes exist between discourse and practice, so as these could be further investigated in later studies. This study was central to the research; as already mentioned, the field is multi-faceted and ill-defined and consequently, it has been crucial to find a path to traverse while maintaining the richness and complexity of the field. To achieve this, a combination of mapping tactics were adopted which include Giga mapping, timelines, and concept mapping – which are explained later in this chapter. The scope for these three key mapping tactics includes key world events, disasters, publications, key people and built examples. Sources of secondary data include: books; journals; lectures; video recordings; reports; documents; and built examples. The broad nature of the data sources and scope aims to provide an inclusive and inspiring contextual construction from sustainable architecture history, forming connections and patterns between information which is sometimes seemingly unconnected but equally as significant.

Mapping was chosen as a method as it aids in collecting and organising information while also clearly creating visual connections between the plethora of complex and overlapping information. Garcia (2010) explains that history is a collective field which uses records and methods of all kinds. The visual aspect of this study has also been a meaningful way to process and construct knowledge from different sources, and -as mentioned previously (3.2.1) - remains a consistent tool throughout all of the seven studies. Visual mapping tactics also encourage creative thinking and problem-solving over rote thinking (Novak and Canas, 2008). Furthermore, they support synthesis and ‘designerly way of thinking’, as a means to gather data from a variety of sources while also to showcasing this information in a graphic manner that is more accessible and supports a broad approach to the field. The outcome of this has been a series of iterative maps which provide a framework to construct a series of different contextual narratives, depending on the theme or ‘lens’ used to view the information. The first three themes (definitions, greenwashing and communication) constructed in this research have been used to filter and form the different narratives. McLennan (2004, p. 10) emphasises that “no movement or idea has just one start, but many threads of cause and effect that trickle down through the centuries”. McLennan (2004, p. 11) continues to describe history as “storytelling”, elaborating that

“it [history] contains truth but is never the complete truth as it is limited by the perspective and experience of the historian. For every event, countless beginning, countless versions of history emerge depending on who tells it and where it is told.”

This reference relates to the bricolage approach employed in this research, highlighting the importance of my experience and acknowledges that this is my understanding. The maps provide a plethora of potential histories which could be retold in many ways depending on the viewer. Consequently, this following chapter is not an exhaustive retelling, but instead will use select examples based on the available literature. Thus, many examples are not 'best cases', but ones which are commonly referred to in literature.

McLennan (2004, p. 11) gives an account of four "beginning points" of sustainability, each with a "distinct evolutionary stage." The four periods consist of "the biological beginning, the indigenous vernacular beginning, the industrial beginning, and the modern beginning." This contextual narrative initiated in what McLennan labels the industrial beginning and as mentioned was later narrowed to the fourth period from the middle of the twentieth century - the modern beginning. In continuation with the contested nature of sustainability, the history of this field can also be complicated, overlapping and contradictory at times.

Like McLennan (2004), other authors and publications have sought to map or describe the different periods and developments in the history of sustainability; specifically, sustainable architecture. Guy (2012, p. 567) elaborates that the "search for a grand narrative of architectural sustainability seems to be unresolved" despite the many attempts. He continues that these attempts "manage little more than to catalogue a confusing proliferation of movements and styles, resulting in a cul-de-sac of confusion and a rather pessimistic outlook" (Guy, 2012, p. 567). Some other key contributions - in addition to the historic chapters in McLennan's "The Philosophy of Sustainable Design" - are: Phillip James Tabb and A. Senem Deviren's (2014) "The Greening of Architecture"; James Wines' (2000) "Green Architecture"; and James Steele's (2005) "Ecological Architecture: A Critical History". Tabb and Deviren (2014) divide the past fifty years into five decades, including both the environmental awakening of the 1960s and solar architecture in the 1970s. The 1980s included conservation, preservation, historicism, contemporary vernacular, regionalism and critical regionalism. Followed by 'eco-technology' of the 1990s and 'sustainable pluralism' in the 2000s, which includes what Tabb and Deviren refer to as 'next-regeneration-green' (2014). Wines (2000) outlines the history, starting with a chapter titled "Nature's revenge: A brief survey of 20th-century green history" and continuing to "Environmental Architecture Today" articulating the many different approaches which have evolved over this period. Steele (2005), retells this history from a slightly different perspective, focusing on key architects. He starts with "Charles Rennie Mackintosh: Reinterpreting the Scottish vernacular" through twenty-three other chapters to end with "Enric Miralles: A critical response to place." Many of these historical perspectives have been mapped in the diagram in figure 4.1. This diagram has tried to track different depictions of the history as they have been discovered in literature. This has been done for my understanding rather than to disseminate to others.

Supplementary to this, authors -rather than describing - have mapped the history. Two key contributions are “A Complex History of Sustainability” by Amir Djalali and Piet Vollaard (2008), and the mappings of environmentalism by Rosi Fieldson (2004) in “Architecture and Environmentalisms: Movements and Theory in Practice”. Djalali and Vollaard (2008) start their mapping at the year 1000 and trace architecture projects, technocratic, economic, biophysical, political, moral, and bureaucratic movements as well as fiction, movies, books, and games that influence the history of sustainability. Rosi (2004, pp. 22–26) zooms in and out of her maps which start at 1600 and continue 2003 highlighting different architects and approaches to sustainable architecture in a similar ‘Charles Jencks’ mapping style also used by Djalali and Vollaard. These critical publications, combined with additional smaller inputs from others, have formed much of the basis for the mapping and retelling of the history of sustainable architecture.

Many parts of these constructions have been based on, or are made up of, excerpts taken from two papers presented at conferences during this PhD and are referenced accordingly. These papers include: “An Evolution of Sustainable Aesthetics” presented at the 2017 PLEA (Passive Low Energy Architecture) conference in Edinburgh, Scotland. This paper aimed to understand the link between different sustainable architecture movements; their labels, implications and subsequent aesthetics. The second paper: “From sustainability to resilience: an exploration of the development of sustainable architecture terminology” presented at the 2017 Living and Sustainability: An Environmental Critique of Design and Building Practices, Locally and Globally, in London South Bank University aimed to examine the transition of different terminology and buzzwords such as environmental, green, eco, sustainable and now the new term resilience in regards to architecture and the built environment. In the remainder of this chapter, direct excerpts will be indicated with quotation marks and referenced to the corresponding paper.

Before these developments are outlined, the method of mapping will be described first, followed by an outline of key events which have occurred during this period that help to frame the three additional accounts which follow. Each of the three themes is used to frame the different accounts, starting with the development of definitions and the sustainable architecture vocabulary. Secondly, the development of greenwashing and technocentric approaches. Thirdly, the development of the sustainable architecture discourse and communication.

4.2 MAPPING AS A METHOD

To achieve this contextual narrative, different mapping methods were engaged within the framework of the grounded-bricolage approach. This involved many iterations of inductive collecting, processing, and analysing information through mapping. Different scales were used to represent the history visually and to illustrate the interpretations and connections discovered throughout the analysis. Mapping was chosen as a method as it resonates not only with historical research and design thinking. Furthermore, mapping was used to add clarity to what is currently presented ambiguously and overlapping within different literature.

4.2.1 Data collection and analysis

The collecting of, diagramming of, and mapping of information for this contextual narrative was an ongoing process throughout the three-year period. It was an iterative process which involved around four months of concentrated reading and mapping at the start of the PhD process and as the research progressed more information was added different storylines were constructed. In keeping with the bricolage nature of the research different tactics were used to filter and organise the information at various stages to capture different perspectives as they arose. Nevertheless - while different tactics were used at different stages - there was considerable overlap between the collection, mapping, and analysis, with many steps in the process occurring at the same time.

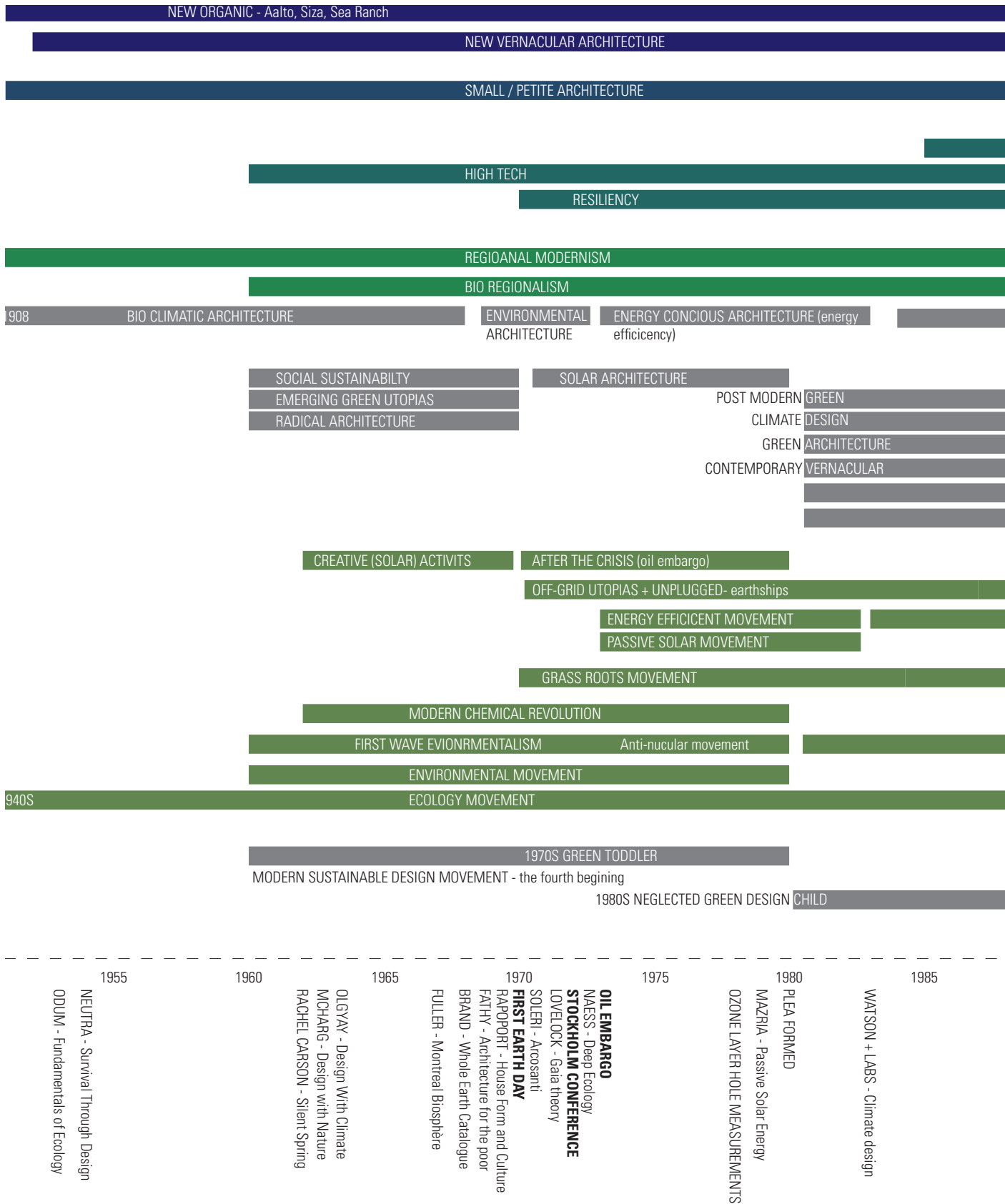
Before presenting an outline of each tactic, it is worth noting that many of these maps and histories have been created for my own processing and knowledge development, rather than dissemination or communication; only a few of them have been 'translated' to communicate with others. Therefore the majority of these are not comprehensible, and some examples will be shown only to illustrate the process of collecting and organising information, while other examples which are legible are provided in the fold-outs in this chapter. It is also pertinent to note that these maps are not intended as complete, but rather as on-going works in progress.

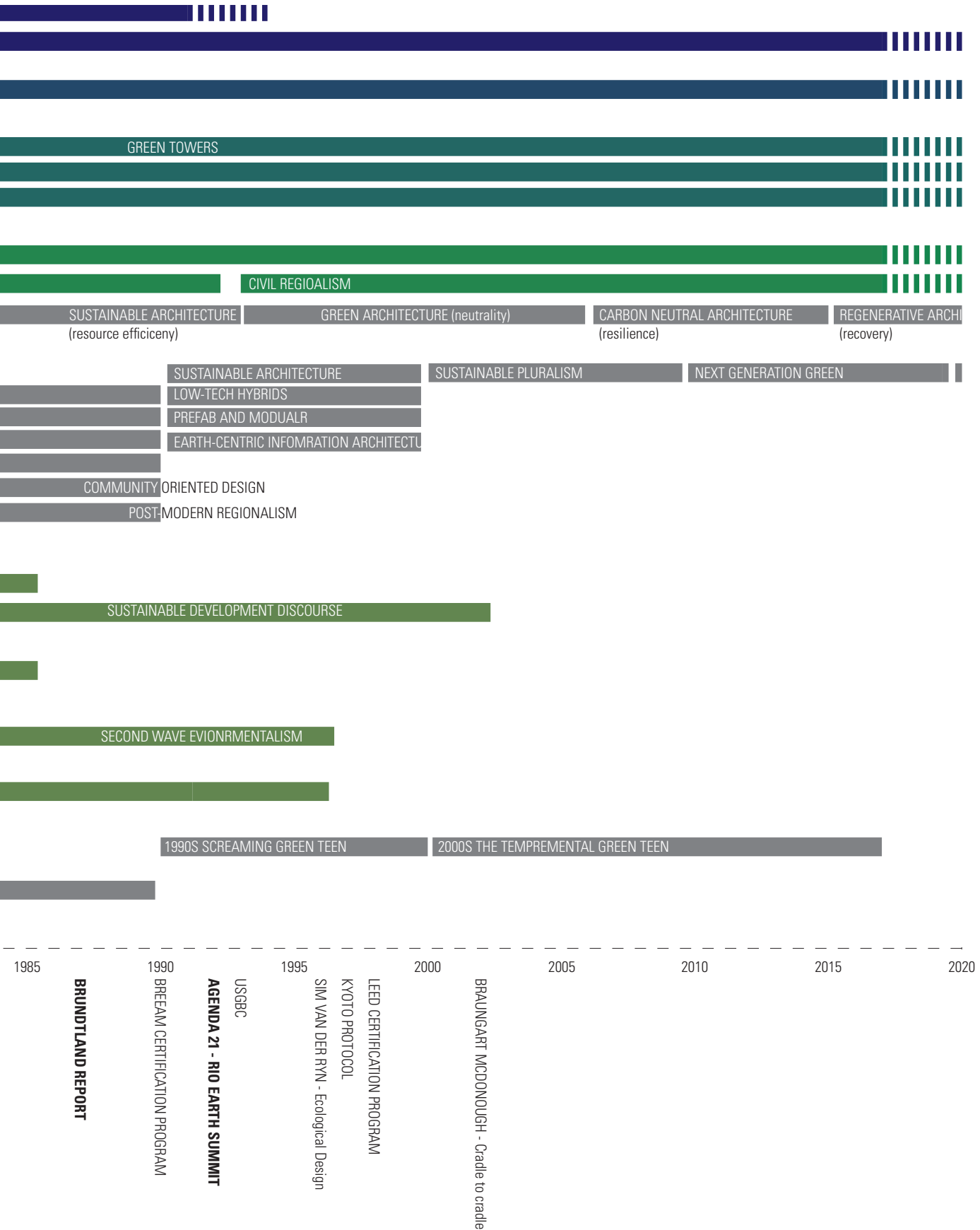
4.2.2 Giga mapping

GIGA mapping was employed in the initial phase of data collection as it is extensive, deals with multi-layers, and is scalar nature. Sevaldson (2011) the creator of this method explains that GIGA mapping can span from the global scale down to small details and "[...] draws from designerly ways of dealing with super-complexity derived from supreme existing design practices as well as refers to established perspectives in modern systems thinking". GIGA mapping creates an 'information cloud' which does not aim to tame the problems but instead attempts to acknowledge and incite the complexity and 'wickedness' of the issue. The produced information clouds are not resolved logically. This is highlighted by some rules of thumb which include: nothing is irrelevant, or uninteresting; strive for information richness; avoid hierarchy; don't brainstorm; messy is good; never start with the start; look for relations; create relations; switch media; display don't hide; and be critical (Sevaldson, 2012). These rules and visual thinking were used to produce complex Giga maps to investigate seemingly separate categories and thus find relationships between concepts which in turn frame the system. These first iterations of mapping were created merely as a method of collecting, processing, and constructing information to communicate with myself. This process was significant as it shifted the purpose of mapping from being purely representative to being a creative and generative approach, which synthesised and visualised the field of knowledge to achieve a better overview.

Initially, giga maps were created to focus on smaller concepts or sections of history. Multiple maps with post-its were created which were later converted into the

*Figure 4.1 (following pages)
Development of sustainable
architecture: Overview of different
overlapping and contradictory
understandings of how sustainability
developed since the 1960s with some
key publications running along the
bottom.*





timeline. Conversely, figure 4.2-4.5 illustrates four examples of different Giga maps created by students at Aarhus School of Architecture as part of a theory workshop run by myself in February 2016. These examples signify different ways information was processed, the map in figure 4.2 focused on Cradle to Cradle, the map in figure 4.3 - biomimicry, map in figure 4.4- tropical architecture and lastly, figure 4.5 – critical regionalism. Many of the maps produced by these students dealt with movements before 1960 and were shown to illustrate the diversity of how information was collected and constructed, rather than to provide information.

4.2.3 Timeline

To create the contextual narrative, the information from the giga maps was processed and analysed by being arranged chronologically. This information was framed with other world and general events. Timelines are often only considered at the distillation of complex histories and ideas (Rosenberg and Grafton, 2012). However, by feeding the framework with relationships and developing concepts from the giga mapping, a

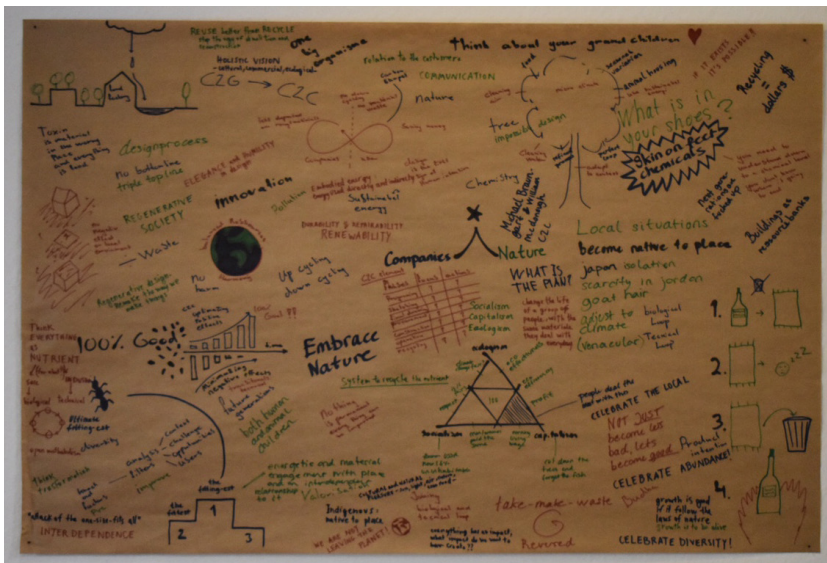


Figure 4.2 Student Giga map of Cradle to Cradle: examples of Giga maps created by students in a theoretical workshop focused on sustainable architecture in 2016. (Produced by students: Asger Rasmussen, Elsa Mencagli, Jeppe Pagels)



Figure 4.3 Student Giga map of Biomimicry: examples of Giga maps created by students in a theoretical workshop focused on sustainable architecture in 2016. (Produced by students: Lin Birk Jensen, Line Leth Kristensen, AB Severinsen, Ditte Juul Christiansen)

complex narrative began to emerge. The aim of this tactic was not only to describe the history of sustainable architecture but also to construct understandings for future projections based on the different learnings from history. Furthermore, these historical constructions have been employed not to be nostalgic, but instead to find “clues as to what we might take away in the form of approaches, contrast and rigorous rethinking of our own theories and practices distinguished from the past, but precipitated by it” (Anthony Vidler, 2010, p. 26). By translating the weighty and complicated information collected in a narrative form, different lines of thought could be constructed. The first timeline (figure 4.6) was created to act as a sketch, translating the Giga maps while also organising my notes from literature throughout the entire process. Yellow post-its were used for world events and disasters; pink for different concepts, approaches, theories and ideologies; green for various publications and documents; and orange for different built examples. This was later put into a digital format (figure 4.7) so as to form the basis for an abstracted representation for Milan Design Week 2016, as shown in figure 4.8. A legible, condensed version of the timeline presented in figure 2.6 is provided in the fold out 4.9.

Figure 4.4 Student Giga map of Critical Regionalism: examples of Giga maps created by students in a theoretical workshop focused on sustainable architecture in 2016. (Produced by students: Mathias Kanstrup, Matthew Fentem, Stig Fenger)

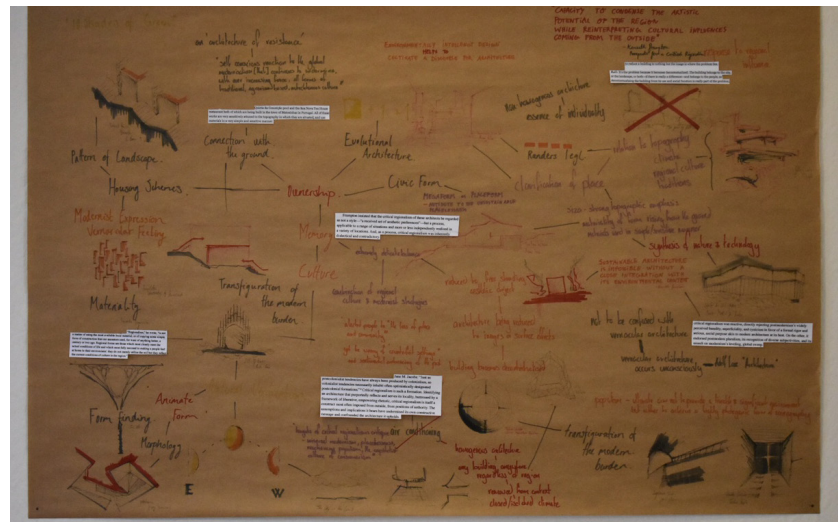


Figure 4.5 Student Giga map of Tropical Architecture: examples of Giga maps created by students in a theoretical workshop focused on sustainable architecture in 2016. (Produced by students: Marie Betzer, Julie Bundgaard, Mette Laursen)



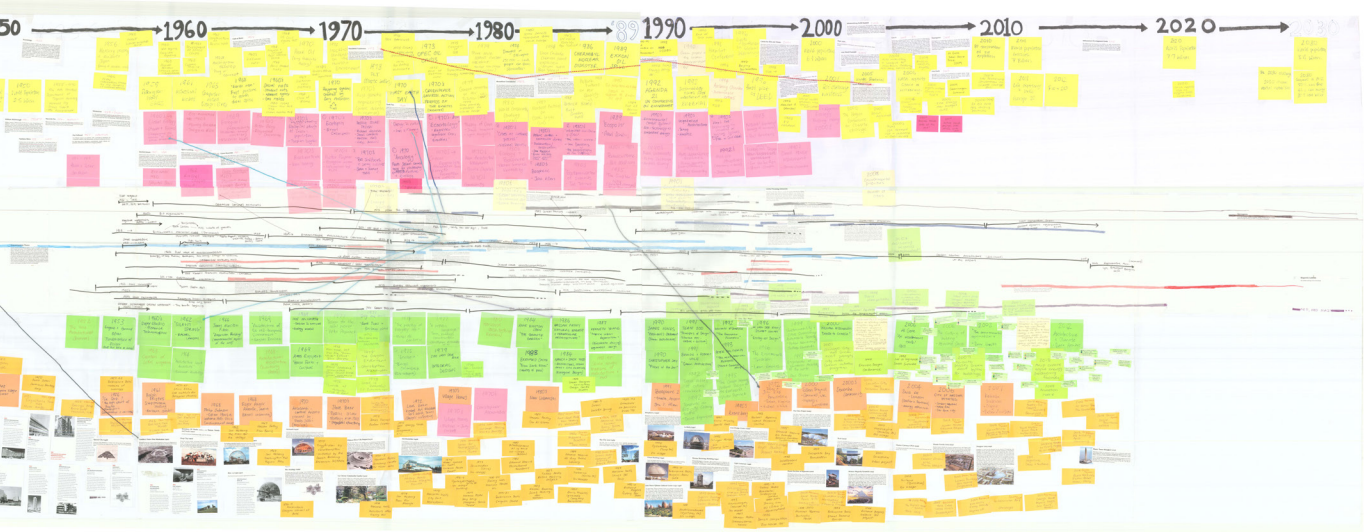


In addition to this timeline, key figures or influences were extracted to create a second genealogy narrative. This digital version was created in 2016 and can be viewed in the foldout (figure 4.10). This genealogy places key figures at their year of birth from left to right from around 1840 to the present day. Arrows were drawn between people indicating the direction of influence. In the foldout, different bands of colours have been added, the length of these bands signify the duration of their life, and the colours are used to denote which period they are from. This complex web of connections indicated that often knowledge and influence have transcended disciplines and paradigms within sustainability and architecture. It is important to note; these connections were not my interpretation but taken directly from literature.

Many iterations of each map occurred throughout the process, and these can also be viewed in figure 4.12 on the following pages. One influential iteration was an early version of this genealogy diagram which placed figures on the globe (figure 4.13 on the following page). While this diagram was not fully developed, it did highlight some key insights which influenced the scope of the research. Firstly, it indicated that many of these figures were in Anglo-Saxon or European countries which made sense due to my language restrictions, and it is inherent that there is then a subsequent focus on figures from these nations. Secondly, when attempting to place them on the map, an immediate dilemma arose: do I place them where they were born, where they lived longest or where they contributed the most? For example, Paolo Soleri was born in Italy and is considered an Italian architect, nevertheless his most well-known work Arcosanti is where he resided for many years of his life, in Arizona, USA. This dilemma indicated that there is potentially a fluidity to the mobility of architects and their knowledge, and while geographic boundaries are important, it was decided that they would not be an explicit delimitation for this research.

Figure 4.6 Timeline of sustainable architecture from 1840-2010: Yellow post-its represent events and disasters, pink - theories and movements, green - publications, orange - built examples.

Figure 4.6b Zoom-in of timeline of the 1960s-1980s



Genealogy of Sustainability

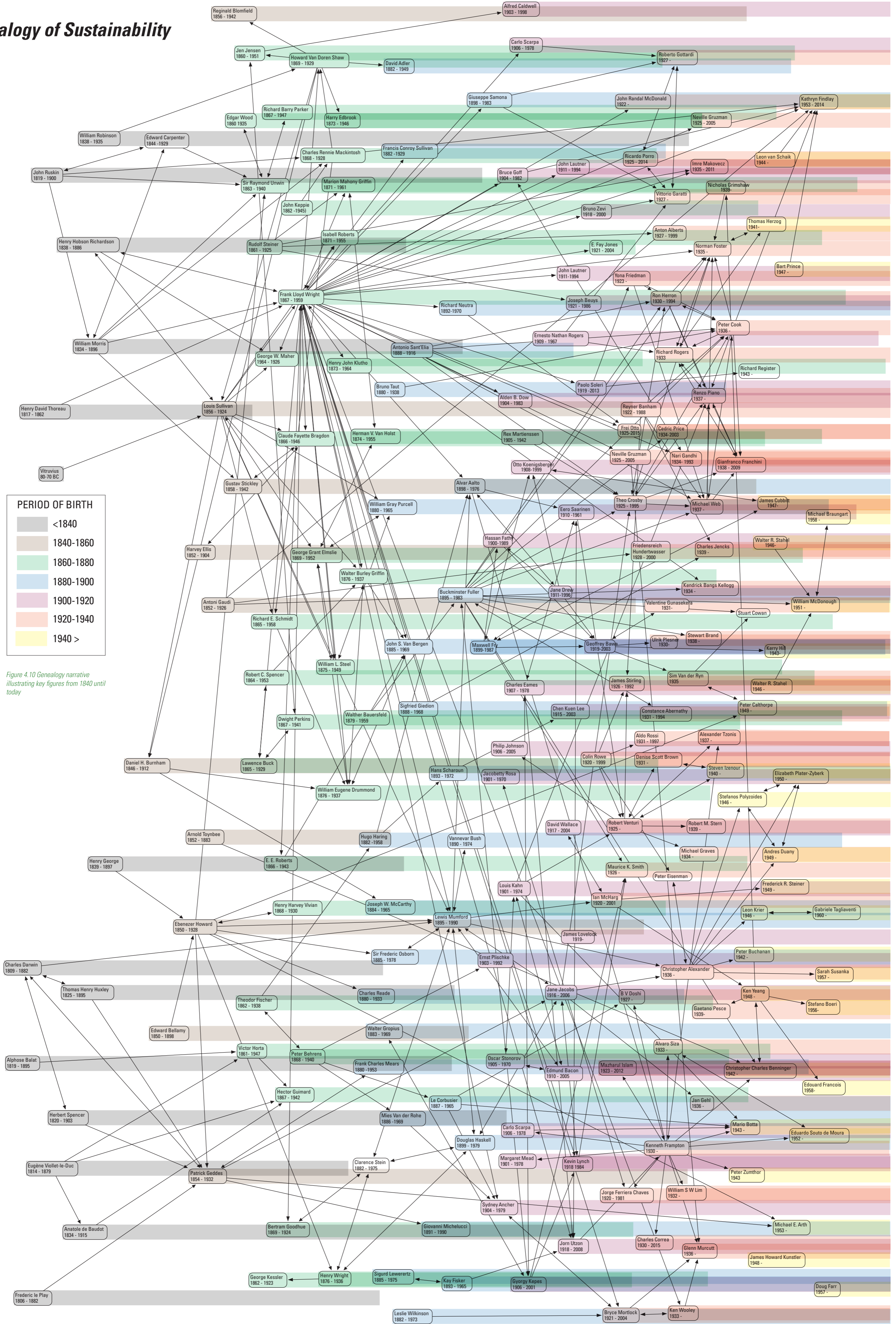


Figure 4.10 Genealogy narrative illustrating key figures from 1840 until today

Figure 4.9 Timeline of sustainable architecture

- 1990 Green Building - Future systems
- 1991: Biosphere 2 - John P. Allen
- 1992 British Pavilion Expo, Seville Spain - Grimshaw
- 1992: Village Homes - Michael + Judy Corbett
- 1993: La Bolla - Renzo Piano
- 1992: Menara Mesinaga - Ken Yeang
- 1989: Autonomous Building - Brenda and Robert Vale
- 1988: Design Center Litz - Thomas Herzog
- 1984: Halloptropf, Freiburg - Rolf Diach
- 1994: Sverre Community
- 1995: Across Fukuoka - Emilio Ambasz & Associates
- 1995: Firdonh Ecovillage
- 1996: Light Urbanism, Rotterdam - MVRDV, Jon Kristinsson
- 1986: EDITT Tower - TR Hamzah & Yeang
- 1986: Jean-Marie Tjibaou Cultural Centre - Renzo Piano
- 1999: SolarCity Litz
- 1990 Green Building - Future systems
- 1991: Biosphere 2 - John P. Allen
- 1992: Magnay House, Australia - Glenn Murcutt
- 1982: Village Homes - Michael + Judy Corbett
- 1989: Sky City 1000
- 1992: Menara Mesinaga - Ken Yeang
- 1989: Autonomous Building - Brenda and Robert Vale
- 1988: Design Center Litz - Thomas Herzog
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- 1999: SolarCity Litz

- 2005- 2040: Dongtan, China
- 2006: Container Student Hotel, Amsterdam
- 2007: Olympic Sculpture Park, Washington - Weiss/Manfred Architects
- 2008: Harmonia 57, Brazil - Trippique
- 2009: High Line, New York City - Diller Scofidio + Renfro
- 2007 - 2022: Masdar Ecocity

- 2000: Cradle-to-cradle design - William McDonough, Michael Braungart
- 2000: Green Architecture - James Wines
- 2000: Low Tech, Light Tech, High Tech - Klaus Daniels
- 2000: The HQ: Guidebook to Sustainable Design - Mendler and Odell
- 2001: Architecture in a Climate of Change - Peter Smith
- 2000: Big and Green: Toward Sustainable Architecture in the 21st Century - David Gissen
- 2003: Critical Regionalism: Architecture and Identity in a Globalized World - Koolhaas
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- 2004: Politics of Nature: How to Bring the Sciences Into Democracy - Bruno Labur
- 2005: Design for Life - Sim Van der Ryn, Stuart Cowan
- 2007: Ecological Design - Sim van der Ryn
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- 2011: Green Design: From Theory to Practice - Ken Yeang
- 1990: Eco-Tech Architecture
- 1990 - Low-tech hybrids
- 1990 - Vegetated Architecture
- 1996 - 2005: Landscape urbanism
- 1980 - Grass Roots movement
- 1980 - Critical Regionalism
- 1988 - Green Certification Programs
- 1995 - 2015: Regenerative design
- 1990: Green House Gals
- 1980 - Conservation, Preservation, Historism
- 1980 - Contemporary Vernacular Architecture
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- 2000 - Agriculture Urbanism
- 2000 - Ecological Footprints
- 2000 - Biomimicry
- 2000 - Urban Farming
- 2000 - Vertical Farming
- 2007 - Small house movement
- 2007 - Sustainable urbanism
- 2010 - Resilient Design
- 2002 - Cradle to Cradle
- 2008 - Biophilic

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- 2010: Eyjafjallajökull Eruption
- 2010: Russian Heatwave
- 2012: Portugal Wildfires
- 2017: Northern California Wildfires
- 2000: Mozambique Flood
- 2001: Gujarat Earthquake
- 2009: European Heat Wave
- 2004: Indian Ocean Earthquake
- 2005: Hurricane Katrina
- 2005: Pakistan Earthquake
- 2008: Afghanistan Blizzard
- 2008: Cyclone Nargis
- 2006: Black Saturday Wildfire (AUS)
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- 2010: BP Deepwater Horizon oil rig explosion
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- 2000: The Hague Conference on Climate Change
- 2002: Johannesburg Earth Summit
- 2002: Solar Decathlon
- 2006: Kyoto Protocol
- 2009: World Summit
- 2009: NASA reports that the ozone layer is recovering

- 1981: Crystal Cathedral - Philip Johnson, John Burgee
- 1991: Mt. Rahman, Egypt - Hassan Fathy
- 1982: Magnay House, Australia - Glenn Murcutt
- 1982: Village Homes - Michael + Judy Corbett
- 1989: Sky City 1000

- 1980: Global 2000 report
- 1983: Climatic Design Energy-Donald Watson, Kenneth Labs
- 1991: Only One Earth - René Dubos and Barbara Ward
- 1983: Earth Moves: The Furnishing of Territories - Bernard Cache
- 1982: Towards a Critical Regionalism: Six Points for an Architecture of Resistance - Kenneth Frampton
- 1991: Green Architecture: Design for a Sustainable Future - Brenda and Robert Vale
- 1992: The Gaia Atlas of Cities: New Directions for Sustainable Urban Living - Herbert Girardot
- 1992: The Hannover Principles - William McDonough and Michael Braungart
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- 1997: Eco-Tech: Sustainable Architecture and High Technology - Catherine Slosar
- 1997: Encyclopedia of Vernacular Architecture of the World: Paul Oliver
- 1997: Technology in Ecological Building: The Fundamentals and Approaches, Examples, and Ideas - Klaus Daniels
- 1997: Whole Building Design Guide
- 1998: Sustainability and Cities: Overcoming Automobile Dependence - Peter Newman

- 1990: Earthship: How to Build Your Own - Michael Reynolds
- 1990: Green Paper on the Urban Environment (EU)
- 1991: Genius Loci- Christian Norberg-Schulz
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- 2010: Russian Heatwave
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- 2004: Indian Ocean Earthquake
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- 2002: Johannesburg Earth Summit
- 2002: Solar Decathlon
- 2006: Kyoto Protocol
- 2009: World Summit
- 2009: NASA reports that the ozone layer is recovering

- 1970: Acoasanti - Paolo Soleri
- 1970: Zómes - Steve Baer
- 1971: Old Man River City - Buckminster Fuller
- 1972: Kimbell Art Museum - Louis Kahn
- 1973: Liz Christy Community Garden
- 1976: Ark Bioshelter
- 1978: Gregory Bateson Building - Sim van der Ryn

- 1981: Crystal Cathedral - Philip Johnson, John Burgee
- 1991: Mt. Rahman, Egypt - Hassan Fathy
- 1982: Magnay House, Australia - Glenn Murcutt
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- 1970 - Bioregionalists
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- 1970 - Passive Solar Systems
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- 1972 - Deep Ecology
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- 1970: Bholia Cyclone
- 1973: OPEC oil crisis
- 1973: Yom Kippur War
- 1976: Tangshan Earthquake in China
- 1986: Student Riots - Europe and North America
- 1965: Cuyahoga River, Ohio, United States catches on fire
- 1976: Amoco Cadiz oil spill
- 1978: Three Mile Island nuclear accident
- 1970: First Earth Day
- 1970: Friends of the Earth
- 1970: Recycling Symbol Created
- 1971: Greenpeace starts
- 1971: International Institute for Environment and Development (IIEE)
- 1972: UN Conference on the Human Environment and UNEP
- 1976: Worldwatch Institute established
- 1976: Habitat, the UN Conference on Human Settlements

- 1951: Svalbardok Town Hall - Alvar Aalto
- 1956: Spacell City - Yona Friedman
- 1932: Broadacre City - Frank Lloyd Wright
- 1932: Rockefeller Centre - Hood and Corbett
- 1934: Sabaudia, Italy
- 1936: Usonian Houses - Frank Lloyd Wright
- 1937: Tiesian West - Frank Lloyd Wright
- 1939: Falling Water - Frank Lloyd Wright

- 1981: The Death and Life of Great American Cities - Jane Jacobs
- 1982: Silent Spring - Rachel Carson
- 1983: Design with Climate - Victor and Alinda Olgyay
- 1983: Inventory of World Resources - Human Trends and Needs - Buckminster Fuller, John McHale
- 1984: Architecture without Architects - Bernard Rudofsky
- 1986: American Building: The Environmental Forces That Shape It - James Ritch
- 1967: Sun, Wind, Water - Ralph Knowles
- 1968: Form and Stability - Ralph Knowles
- 1968: The Population Bomb - Paul Ehrlich
- 1968: Architecture of the Well - Empires Environment - Reynar Banham
- 1969: Design with Nature - Ian McHing
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- 1973 - Zero-energy house
- 1974: Passive House
- 1976: Bioshelter
- 1977: Green Belt Movement
- 1978: Urban Ecology
- 1970 - "New Communa Life
- 1970 - Active Solar Technologies
- 1970 - Biological Architecture
- 1970 - Bioregionalists
- 1970 - Earthship Architecture
- 1970 - Passive Solar Systems
- 1970 - Solar Communias
- 1970-Off Grid Architecture
- 1972 - Deep Ecology
- 1989 - Atology
- 1974 - Eco-feminism
- 1978 - Primitaculturist

- 1970: Bholia Cyclone
- 1973: OPEC oil crisis
- 1973: Yom Kippur War
- 1976: Tangshan Earthquake in China
- 1986: Student Riots - Europe and North America
- 1965: Cuyahoga River, Ohio, United States catches on fire
- 1976: Amoco Cadiz oil spill
- 1978: Three Mile Island nuclear accident
- 1970: First Earth Day
- 1970: Friends of the Earth
- 1970: Recycling Symbol Created
- 1971: Greenpeace starts
- 1971: International Institute for Environment and Development (IIEE)
- 1972: UN Conference on the Human Environment and UNEP
- 1976: Worldwatch Institute established
- 1976: Habitat, the UN Conference on Human Settlements

- 1951: Svalbardok Town Hall - Alvar Aalto
- 1956: Spacell City - Yona Friedman
- 1932: Broadacre City - Frank Lloyd Wright
- 1932: Rockefeller Centre - Hood and Corbett
- 1934: Sabaudia, Italy
- 1936: Usonian Houses - Frank Lloyd Wright
- 1937: Tiesian West - Frank Lloyd Wright
- 1939: Falling Water - Frank Lloyd Wright

- 1981: The Death and Life of Great American Cities

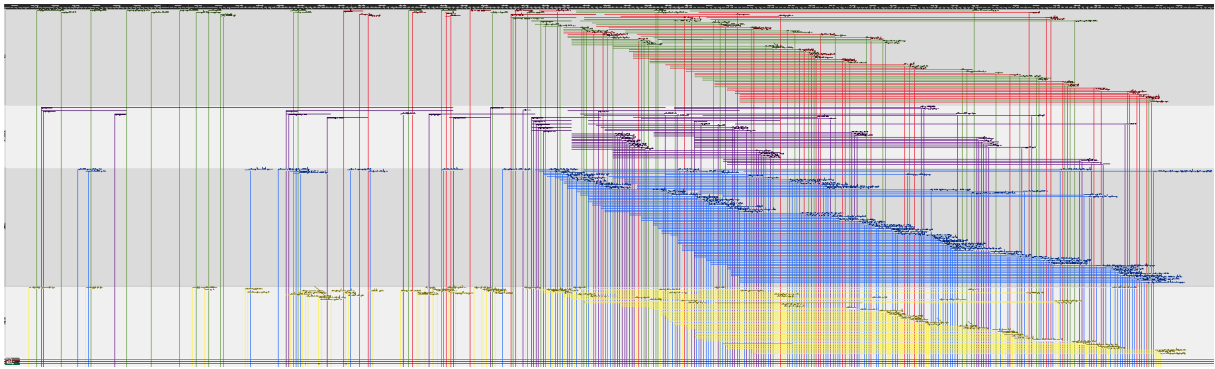


Figure 4.7 (above) Digital timeline: connecting key people and their publications and events

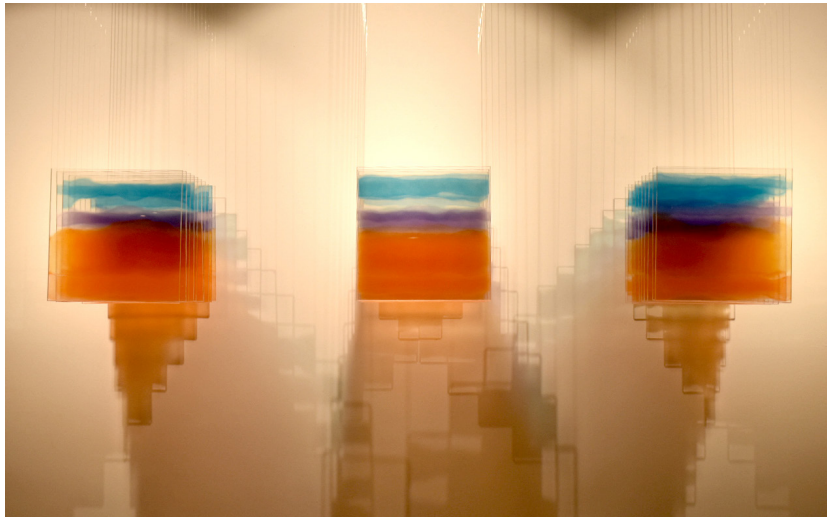


Figure 4.8 (left) 100 years exhibition: image of a portion of the exhibition which is an artistic representation of the timeline, with the colours representing different post-its. Each sheet represents one year and each row a decade. Illustrating the more vibrant the row the more things which occurred.

4.2.4 Concept mapping

As a final tactic, concept mapping was employed towards the end of the data collection and analysis. Similar to the previous mapping methods, concept mapping is defined as a graphical device to categorise and characterise information while capturing tacit knowledge (Novak and Canas, 2008). Lines represent relationships which link different concepts and are arranged in a hierarchy from most general at the top to most specific at the bottom. Relationship lines are elaborated with linking words or phrases. These cross-links represent relationships between different sub-domains within the map and are often imagined by the creator and are understood as interpretation and part of the knowledge production (Novak and Canas, 2008). Propositions can be formed which include two or more concepts that are connected with linking words or phrases, similar to memo-writing. In addition to this, concept maps may utilise 'fields' as supporting or contextual examples of events or objects which add clarity to the meaning of the concept (Klein et.al, 2006). Klein et al. (2006) describe these maps as a "picture of understanding." Concept maps support different scales which is why the method was combined with the GIGA mapping and timeline tactics. Both small critical details and the comprehensive and holistic scale of the notion can be observed within a concept map. The outline of this tactic has been used in the development of the Giga mapping and contextual narrative to reorganise and code the information into larger conceptual categories and propositions in a similar

Figure 4.11 Mapping of key figures process diagram: Example of one of many connection maps create to form the genealogy diagram in the previous fold out.

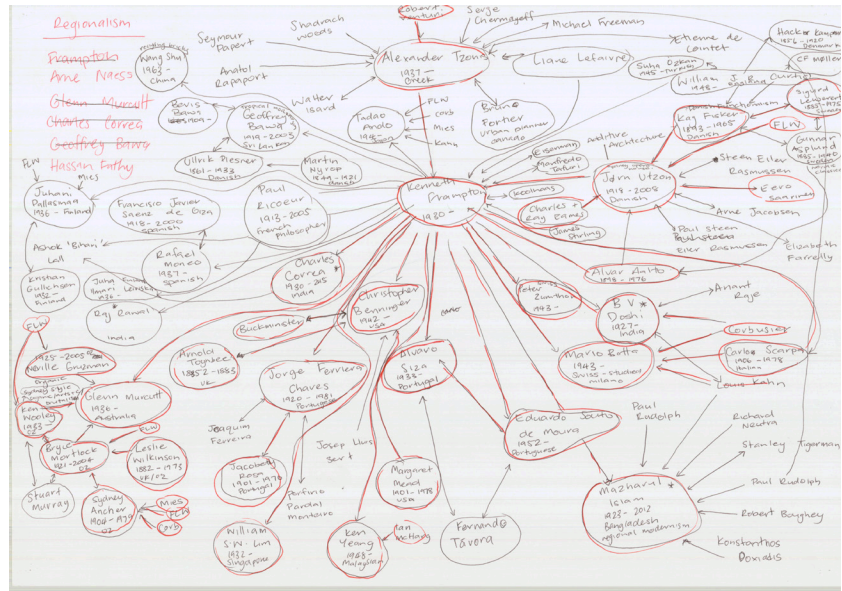


Figure 4.12 Map of the world with different key figures relating to sustainability: diagram which was used to help understand that much of the literature was from Anglo-Saxon countries.

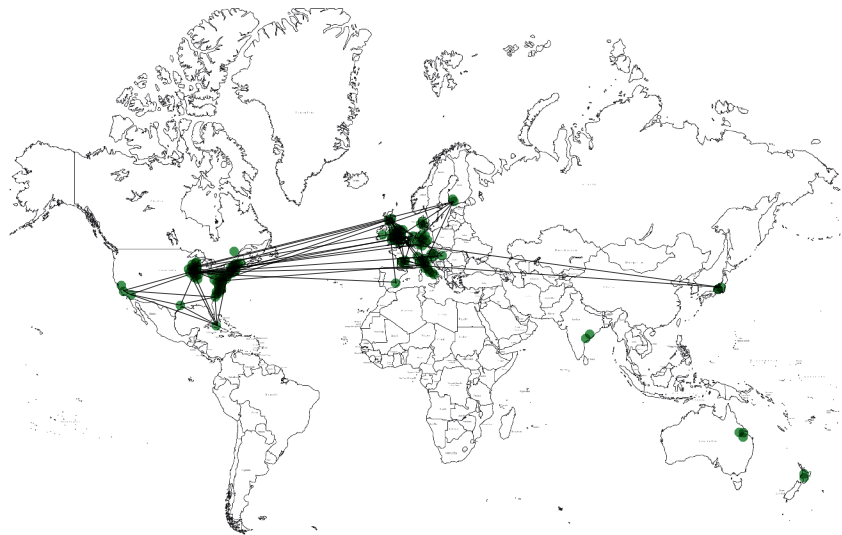


Figure 4.13 Concept mapping : example of a concept overlaid over the timeline.



way to how coding is used when applying grounded theory as a method for processing and analysing information. Klein et al. (2006) continue that as a method, the act of creation is critical and generative and as an artefact, the map is intended to show relationships. Three key themes developed from the concept mapping as already mentioned, including the topics of definitions and language, greenwashing and technology as well as the accessibility and format of knowledge. Each of these three themes will unfold the contextual narrative from the perspective of their development - thus adding to the literature review - and will therefore provide more context to support the studies which follow this chapter.

4.3 CONTEXTUAL NARRATIVES

Many eras, events, and movements in history can be post-rationalized as being sustainable in one form or another; this is a common occurrence within sustainable architecture. Retrospectively, Vitruvius along with vernacular architecture is often attributed to being the vanguard of sustainable architecture. These early approaches responded to the societal conditions of their time, built with local considerations and addressed environmental concerns out of necessity. In more recent times many issues have occurred as a consequence of the industrial revolution such as; pollution, scarcity of materials and resources which sustainability are addressed by today. It is evident that these issues are not new and have been considered within architecture far before the development of the term sustainability. While the vocabulary for this period after the industrial revolution did not yet include sustainability or sustainable architecture (Ryn and Cowan, 1996, p. 12), these notions that were addressed remain very similar to those discussed today. For example, John Ruskin (1849, p. 187), in his book 'The Seven Lamps of Architecture' writes:

“[God] has lent us the earth for our life, it is a great entail. It belongs as much to those who are to come after us, and whose names are already written in the book of creation, as to us, and we have no right, by anything that we do or neglect, to involve them in unnecessary penalties, or deprive them of benefits which it was in our power to bequeath.”

This quote, in many respects, can be compared to the Brundtland Report definition discussed earlier (section 2.2), despite being written in different context. Similarly, both emphasise the importance of maintaining our natural environment and resources for future generations (Donovan, 2017a). The natural environment has remained a crucial focus, with differences in emphasis and social contexts. Furthermore, contemporary sustainable architecture has also developed in response to many of these global events and disasters in recent history, such as the oil crisis in the seventies and hurricane Katrina in 2005. A short outline of some of the significant events and architectural responses which have shaped this field are summarised in the following section to frame and describe not only the diagrams and mappings in this chapter but also the subsequent contextual narratives. These descriptions have



Figure 4.14 Sættedammen cohousing: Denmark (Image credits: arkitekturbilleder)



Figure 4.15 Dropcity: Image of the iconic geodesic domes from the 1960s (Image credits: Clark Richert)



Figure 4.16 Geodesic dome at Dyssekilde Ecovillage: situated in Denmark from the 1990s (Image credits: Torben Klint)



Figure 4.17 Arcology: Arcosanti situated in Arizona from the 1970s (Image credit: Nikolaj Knudsen)

been constructed from existing literature, offering one brief insight into a selection of events as opposed to an exhaustive retelling of history.

4.3.1 Ecological Beginnings from the 1960s

The birth of the modern environmental movement began in the 1960s supported by influential writings from authors such as German economist, E.F. Schumacher (1973 book 'Small is Beautiful'), American ecologist Howard T. Odum and, particularly, Rachel Carson and her book 'Silent Spring' published in 1962. For the first time, it was evident that humans had a direct impact on the environment, which Carson (1962) drew attention to; highlighting the potentially harmful effect of DDT (Dichlorodiphenyltrichloroethane) and other pesticides on the environment. Furthermore, Silent Spring also addresses the relationship between man and nature which contributed to the development of the 'deep ecology' movement frontrunner by Arne Næss in the early 1970s. Furthermore, this was a decade of social activism and upheaval, and as a result, the grassroots and counterculture movements formed. Sectors of society responded negatively to high-rise congestion and suburban sprawl, with people wanting to live independently from authority. Additionally, Homes had become more than simple shelters, accommodating new technologies and equipment (Tabb and Deviren, 2014). During this period the formation of events and organisations of activists such as Greenpeace, and along with this the first Earth Day occurred as well as the creation of the recycling symbol which made the slogan 'reduce, reuse and recycle' popular, and furthermore the first picture of earth from space. Activities also extended to the political realm with the first creation of the 'green' political party in Germany (die Grünen) in the late 1970s, following which other green parties have flourished globally (Keeler and Burke, 2009, p. 26).

Two examples of different approaches to 'eco-architecture' developed in this early period, one more experimental than the other. The radical, experimental and socially sustainable architecture that formed with the counterculture movement was influenced greatly by Buckminster Fuller principles of material optimisation as well as a 'do-it-yourself' attitude. Within the USA this included Drop City an off-grid-geodesic-dome artist commune in Colorado built in 1965 and at a similar time Prickly Mountain an array of anti-establishment architecture experiments. Gordon (2008) mentions young architects were in search of new inspirations for aesthetics and form and looked to cocoons, honeycomb, seashell, spaceships, and seedpods. Buildings were constructed out of the earth, recycled or scavenged and off-the-shelf materials. Michael Sorkin (1972) in the Architectural Review stated "totem happy dome dwellers, staked out under their geodesic icons in backwoods utopias" were not going to solve the social problem of this period (Donovan, 2017a). While these small experiments have not succeeded long term, they have influenced and informed many other examples which can still be seen today.

Another example of a socially experimental approach paired with a more conventional architectural form (see figure 4.14) is one of the first cohousing communities - Sættedammen - which was built in 1972 for twenty-seven families

close to Copenhagen in Denmark. This concept influenced many other alternative social living arrangements which are still growing in popularity today and can be seen in most European countries; both conventionally integrated into communities or isolated rurally in small 'eco-villages.' Influence from both the experimental and social approaches can be seen in later approaches in the late 1980s and 1990s, such as Økosamfundet Dyssekilde in the North of Zealand, Denmark which incorporated many elements from both methods to form a new way of living. One of the different developments in Økosamfundet Dyssekilde included the do-it-yourself geodesic form, using readily available materials similar to Drop City, as well as the social co-housing aspects developed from Sættedammen (Guy and Moore, 2005, p. 172).

A second approach was more conventional and responded more directly to the climate and environment. Three key figures who influenced this approach were: Victor Olgyay who wrote 'Design with Climate' in 1963; Ian McHarg who followed with 'Design with Nature' in 1969; and the previously mentioned Paolo Soleri, who created the term 'arcology' (architecture + ecology) and designed Arcosanti, Arizona in 1970 (Sadler, 2010). Key design concerns and subsequent form for these three approaches included; building siting, orientation, natural ventilation, plan aspect ratios, on-site resources, reduced waste, access to nature, density and typological layering systems (Donovan, 2017a). In more recent years Sim van Der Ryn and Stuart Cowen (1996, p. 32) developed what they titled the "second generation of ecological design" which they explain as: "Any form of design that minimizes environmentally destructive impacts by integrating itself with living processes" (1996, p. 18). They elaborate that design "respects species diversity, minimizes resource depletion, preserves nutrient and water cycles, maintains habitat quality and attends to all the other preconditions of human and ecosystem health" (Ryn and Cowan, 1996, p. 18). During this period, significant projects were produced. These included radical utopias, bio-climatic and ecological architecture, with some more successful than others. These examples may not measure by the current sustainable standards, however, they responded to the social and political context of their time before energy usage became a more pressing concern (Donovan, 2017a).

4.3.2 Solar Architecture

Another well documented and significant event which influenced the direction of sustainable architecture was the oil embargo of the 1970s. This saw a major hike in oil prices across the world. Energy reduction in architecture was not a primary focus immediately before this. As a result, a new focus on reducing energy dependencies in buildings emerged through incorporating both passive and technological solutions. After the price of oil dropped back to within the pre-crisis range, so did the public's concern. However, building policy, codes, and requirements set during the oil crisis period remained, which fostered green technology and architecture (Raman, 2007). The romantic intentions of the previous decades started to be shadowed by more measurable approaches to reducing energy. 'Green architecture' emerged in response to this, with three main approaches; passive solar, off-grid or autonomous and

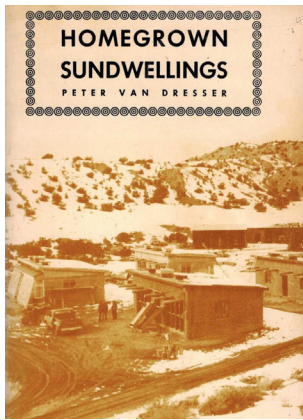


Figure 4.18 *Sundwellings*: Illustrated on the cover of Van Dresser's 1974 book *Homegrown Sundwellings*



Figure 4.19 *Earthship*, New Mexico, USA
(Image credit: Nikolaj Knudsen)

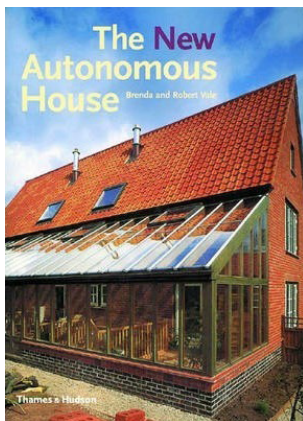


Figure 4.20 *The New Autonomous House*: Southwell, designed by Robert & Brenda Vale, 1993

regional design. Passive solar design aimed to use a combination of technological advances with passive concepts to create buildings with reduced energy consumption (Donovan, 2017a). David Wright, Phillip Tabb, and William Lumpkins were three principal architects that used orientation, passive solar systems, thermal mass (often adobe) walls, clerestories, solar shading devices, and hot water collectors in their approach.

Solar architecture experiments had a resurgence in the 1970s after the previous 1950s 'golden age' burst in around 1958 (Denzer, 2013, p. 182). Denzer (2013, p. 182) explains that during the 1960s, the "experimental zeal moved from university laboratories to backyards and workshops in the 1960s. A new generation of 'creative activist' emerged, including mad-scientist types, hippies, and dropouts. This effectively created a solar counterculture with a strong anti-establishment streak."

Denzer (2013, p. 183) continues that these "creative activist[s]" favoured indigenous traditions and "technological simplicity" over "disciplinary integration" and complex technology. One example of this is Peter Van Dresser's 1974 unprecedented "Sundwellings" in New Mexico, which consisted of four small adobe buildings with a direct gain unit, Trombe wall, greenhouse unit, and attached sunspace. This "subsequently became a popular strategy nationwide" (Denzer, 2013, p. 184). Alternatively, Steve Baer (neither architect or engineer) tried to integrate more experimental ideas such as "air collectors" into light-weight aluminium frames, utilising polyhedral structures (Denzer, 2013, p. 188). This design Baer coined 'Zomes' which were inspired by Buckminster Fuller and Baer's time at Drop City (Denzer, 2013, p. 188). These first Zomes utilised both passive and active solar energy techniques such as "water wall concepts" that MIT scientists abandoned in the late 1940s (Denzer, 2013, p. 188). These early solar approaches have been influential to many approaches, especially those at the techno-centric end of the scale.

Another approach is 'off-grid' or 'autonomous' architecture. This can be explained as buildings that operate independently from infrastructural support services such as the power or gas grid, water supply, sewage treatment, stormwater management, and communication services (Ryker, 2005). These approaches built on ideas developed within solar architecture and two different methods are often used to exemplify this approach – the experimental and more conventional. These methods as well as the following examples are only two of many and have been chosen due to their popularity. As mentioned, many more successful buildings exist. However, these are not published in standard literature. From the previous experimental buildings of the 1960s, Michael Reynolds has designed off-grid homes which he labels 'Earthships Biotechture' that are also mainly situated in rural New Mexico. Starting in the 1970s with a patent for building with cans, Reynolds Earthship followed Drop City's social initiative for do-it-yourself construction and a recycled approach to materials. He utilises tyres, cans and glass bottles incorporated with passive-solar principals in the form of rammed-earth U-shaped structures and sunspaces (Donovan, 2017a).

This is only one example from more conventional architects, Brenda and Robert Vale published "The Autonomous House" in 1975 a first-of-its-kind guide

with diagrams and pictures for creating “traditional” (in appearance) houses with energy-self-sufficient and environmentally friendly solutions (Vale and Vale, 1975). The autonomous house was not a “romantic back-to-the-land” method; rather the Vales set out “to create a shelter in which they could survive the coming doom of industrial society” (Anker, 2005, p. 542). Later in 1993, the Vales constructed the first autonomous (four-bedroom home) building in suburban Nottinghamshire, United Kingdom (Vale and Vale, 2002). This building included strategies such as passive solar gain through a conservatory, triple glazing, photovoltaics connected to the grid, rainwater collections, and composting dry toilets (Vale and Vale, 2002).

4.3.3 Green Architecture

Some authors argue that, even though the price of oil dropped in the 1980s, ongoing interests in the environment, global warming, and the ozone thinning (Edwards and Hyett, 2002) remained as well as previous building policy and awareness. Interest in building and environmentally responsive technology continued to develop during the 1980s, and green architecture became established although it was still not considered mainstream. One example could be projects such as “Biosphere 2” which was designed and constructed in the late 1980s to mimic the Earth’s biosphere with a series of biological biomes occupied permanently for two years (Anker, 2005, p. 543). Biosphere 2 was inspired by recent space travel built on autonomous approaches similar to those set out by Reynolds and the Vales but at a large scale. Additionally, the project was influenced by research from the 1960s which integrated water, energy, and food as one ecosystem (Anker, 2005, p. 543). Anker (2005, p. 543) further explains that the “scientific rationale for Biosphere 2 was to prove that ecological colonisation of space was a viable idea.” While Biosphere 2 is an extreme example of the literal integration of an ecosystem, in some respects it was successful in popularising the relationship between the built environment and larger ecosystems. Furthermore, it can be argued as successful in providing new inspiration for what a build can do, beyond being a mere shelter.

In contrast, other authors argue that the resurgence of cheap oil in the 1980s created a lull in interest towards ideas and technology from the previous decades (McLennan, 2004, p. 29; Tabb and Deviren, 2014). McLennan argues that this lack of interest reflected societal trends of the time, stating: “The eighties were a decade of decadence and consumption, politically backward in terms of the environment” (McLennan, 2004, p. 29). Furthermore, McLennan maintains that “green was no longer cool,” green materials were expensive, knowledge was scarce which led to people with good intentions making design mistakes which led to setbacks and “sick buildings” (McLennan, 2004, p. 30). Michael Luring also describes these setbacks within a Danish context, providing the example of the 1996 architectural competition “Eco-house 99.” Luring (2010, p. 54) explains the two winning projects strived for passive-solar-heat-gain with nearly 100% glass on the southern facades, inspired by conservatories and solar rooms developed in the previous decades. However, what was not taken into consideration was the improved building regulations for insulation

and glazing. What resulted was “terrible indoor climatic conditions and energy consumption [...] mostly due to immense cooling demands” (Lauring, 2010, p. 55). Lauring (2010, p. 55) continues to explain “The glass offices looked modern but were not geared for the energy critical twenty-first century”.

Consequently, Tabb and Deviren (2014) argue that this lull in the development of technologies instead created an interest in “comprehensive design”. From this, a curiosity towards culture, vernacular and regionalism emerged. Key theorist and architects Kenneth Frampton and Glenn Murcutt, developed and practiced parallel concepts; Critical Regionalism and the ‘contemporary vernacular.’ Critical Regionalism was first coined by architectural theorists Alexander Tzonis and Liane Lefaivre but was made popular by Kenneth Frampton’s altered interpretation in: “Towards a Critical Regionalism: Six points for an architecture of resistance” 1983. Frampton propounded that critical regionalism may recapture the sense of “place” which has become an endangered species due to homogeneity and the universality which stem from globalisation, mass commercialisation, optimised technology, and the internet (Frampton, 1983).

Contemporary vernacular, as understood by Tabb and Deviren (2014, p. 82), included notions such as the use of “locally available resources and tradition to address local needs and circumstances [...] that tended to evolve over time and reflected the environmental, cultural and historical context in which they existed”. One example is Australian architect Glenn Murcutt, who embraced contextual, social, cultural, climatic, and environmental conditions to produce mostly residential architecture which “touches the earth lightly” (Tabb and Deviren, 2014, p. 82). Both these concepts considered topography, orientation, light, passive and natural heating and cooling systems when designing for the geographical and climatic context of their site. During this period, the price of oil significantly impacted the architectural typologies; this created a mixture of environmental technology development, low-tech experimental, and hybrid nostalgic regional buildings (Donovan, 2017a).

4.3.4 Sustainable architecture

After Our Common Futures published the key definition of sustainable development in 1987 (discussed previously in section 2.2), the term sustainable architecture grew in popularity. This is illustrated in the Ngram graph (later in this chapter) in figure 4.22 from this point. At the same time, new and improved environmental technologies emerged along with the insertion of CAD programmes which aided in the creation of new complex, organic and unprecedented structures (Lauring, 2010, p. 57). Sustainable architecture had moved from eco and green isolated buildings on the peripheries to monumental, lightweight, highly glazed, high tech buildings in an urban setting (Lauring, 2010). Tabb and Deviren (2014) explain unlike the previous styles, sustainable architecture “did not look back to the future, but rather projected the future.” Two scales of building emerged; small-scale residential models such as Passive, Active and NetZero houses. Passive house combines passive solar strategies with stringent limits for room heating, subsequently making heat recovery mechanical

ventilation a necessary strategies (Lauring, 2010, p. 57). Active house unlike Passive house has no stipulations pertaining to maximum energy demand or required building envelop qualities; rather it must produce more energy than it consumes over the entire year (Hegger et al., 2016, p. 219). Similarly, net-zero buildings also must produce enough renewable energy to offset the amount which is consumed annually. Additionally, these three approaches are often used as measurable certifications or standards.

The second scale is much larger, with complex, high-tech buildings. An example of this is the work of the prevalent architects of this period Calatrava, Foster, Grimshaw, Herzog and De Mauron, Piano and Rogers; all of whom integrated environmental systems (often focused on energy systems) into their building designs. The literature review (section 2.8) presented a collection of discussions about the spectrum of approaches to sustainable architecture from eco-centrism to techno-centrism, and this is evident in early approaches to sustainable architecture in the 1990s. Jones (1998, p. 11) describes that there are two “profoundly opposite philosophical approaches,” elaborating that for some “salvation” can only be achieved through changes in social and cultural values, moving away from economic growth towards wellbeing. Expanding, Jones (1998) further explains that people of this approach desire for locally obtained materials and labour with a greater understanding of the closed-loop systems of resources. This approach is very similar to those of the early social and experimental approaches in the 1960s and 1970s. The opposite philosophical approach is “salvation by way of technological fix” – techno-centrism (Jones, 1998, p. 12). Jones (1998, p. 12) continues to explain that supporters of this approach believe that ecological disasters can be “avoided” through the use of technology. However, in some cases, this may have resulted in mere greenwashing rather than successfully sustainable buildings.

Inaki Abalo (2007) describes this approach as architecture of “good intentions”. As he explains, this becomes an image of sustainability which concentrates on the development of technical solutions applied to badly conceived buildings (Donovan, 2017a). At the time Abalo voiced this concern, in the early 2000s, the application of technology in some sectors was rife escalating greenwashing in the industry. In the nineties, there was an interest in the measurable, from environmental foot-printing through to the carbon counting and the signing of the Kyoto Protocol in 1997. This agreement committed many nations globally to monitoring and reducing greenhouse gas emissions, which led to national carbon goals, targets and taxes (Pearce and Ahn, 2012, p. 38). The building industry responded with the creation of organisations such as the US Green Building Council (USGBC) in 1993 that further led to the creation of certifications and standards such as LEED (Leadership in Energy and Environmental Design) similar to the already established United Kingdom based certification BREEAM (Building Research Establishment Environmental Assessment Method) in 1990 (McLennan, 2004, p. 32). McLennan (2004, p. 32) explains that the “first time there was a rigorous way to determine buildings with good environmental performance not just a list of green features.” Early editions of the rating systems

focused on energy, water, materials, indoor environmental quality and site design. Subsequently, some certifications have progressed from focusing mainly on measurable issues to a wider scope in order to reflect the variety of ecological choices. While in some instances there is still a focus on the hard-measurable issues, the assessment criteria now stretches to include: management; health and well-being; energy; transport; water; materials; waste; land use and ecology; pollution; and innovation. Since this period, many additional rating systems have also been established. These include DGNB from the German Sustainable Building Council, and the “Green Star” rating systems from the Green Building Council of Australia.

In some cases, these certifications systems intended to validate green buildings to reduce greenwashing. However, certified shallow approaches with measurable aspects grew exponentially on what were already high-tech buildings designed in isolation to their broader context. Pohl (2011) sees these as a subcategory of green high-performance buildings which are goal-based with measurable parameters for resources and energy conservation. Dean (2009) discusses this as a devolution of architecture due to the implications of applied technology from the 1980s which had led to a techno-science of building. Abalo (2007) during his presentation went on to say: “through the eyes of professional and especially students, this parade of high-tech-drag-queens hardly stimulates creativity.” With the turn of the millennium, approaches to sustainable architecture changed slightly. Buildings were no longer considered in isolated, and there was a growing interest in understanding a building in relation to the wider ecological and urban context. One approach was a growing interest in biometrics also emerged with the publishing of books such as “Biomimicry” by Janine Benyus in 1997. New information combined with the help of 3D modelling unique biologically inspired forms generated new methods (Donovan, 2017a). Biomimicry can be explained as a multi-disciplinary method of examination of natural models, systems, and processes for inspiration. The intended purpose being to solve problems created by humans (Zari, 2007).

4.3.5 Resilience and regeneration

The turn of the twenty-first century has seen an unprecedented number of natural disasters such as the previously mentioned hurricane Katrina in 2005. A result of these disasters is a growing concern for global climate change and specifically, rising sea levels. Some speculate that our efforts to remedy our impact on the environment has come too-little, too-late and we now need to design for consequent disasters. Resilient design and architecture are an advancing approach to solving current crucial problems with a future scenario perspective. Some of the arguments for a transition from sustainability to resilience include, resilience having associated flexibility and a lack of focus on the measurable. Our built environment has passed the point of sustaining, and there is now a need to address future crises and disaster scenarios, which resilience does. Resilience encompasses a positive approach that offers opportunities for designers. Lastly, there is fatigue towards the vague and emptiness of the word sustainability and its subsequent greenwashing. Minnery (2015) uses the

following metaphor to articulate the difference between sustainability and resilience: “If the sustainability movement taught all of us to reduce, reuse and recycle—to tighten our belts, as it were—then resilience calls for a belt-and-suspenders approach” (Donovan, 2017a).

With similar thinking, a regenerative approach has also become popular in recent years by Bill Reed, the Regenes Group, as well as new certifications such as Living Building Challenge. Regenerative design incorporates whole systems thinking and positions humans (not only the built environment) as co-evolving participants in an ecosystem (Reed, 2007). Reed supports William McDonough and the Cradle to Cradle understanding that sustainability is just “doing less bad” (Braungart and McDonough, 2002) and goes further to explain that “sustainability is just slower way to die” (Reed, 2009). Cradle to Cradle thinking and approaches to architecture instead of cradle to

Figure 4.21 Sustainable architecture word cloud: collection of sixty-seven terms which relate to sustainable architecture.



grave were made popular by Braungart and McDonough book with the same title in 2002. Bergman (2012, p. 18) also links this approach to the previous book “Operating Manual for Spaceship Earth” by Buckminster Fuller published in 1968. As previously outlined in the literature review (section 2.8.2), Reed (2007, p. 676) positions regenerative design on a scale starting with conventional practice, followed by green sustainability neutrally in the middle, followed by restorative, then reconciliatory, and finally regenerative at the opposite end to conventional ‘degenerative’ practices.

From the 2000s, environmental priorities have grown to encompass the health of cities, sustainable design and construction, and furthermore a growing interest in health and well-being generally (Edwards and Hyett, 2002). The increasing importance is placed on health and is epitomised by new standards such as the 2014 ‘WELL Building Standard’ launched by The International WELL Building Institute (IWBI). This aims to “implement, validate and measure features that support and advance human health and wellness” (IWBI, 2017).

Sustainable architecture has developed from complex and holistic approaches to the natural environment and society; currently, there is a pluralism of sustainable architecture approaches emerging. These approaches have developed rapidly in recent decades, as they have responded to different societal and environmental conditions, and simultaneously, to global events and disasters. This short description of the period following the sixties frames the following discussion about the development of the three initiating themes: definitions, greenwashing and communication.

4.4 THE DEVELOPMENT OF DEFINITIONS AND THE VOCABULARY OF SUSTAINABLE ARCHITECTURE

The literature review aimed to emphasise many of the debates that frame the issues relating to the language and lexicon of sustainable architecture (section 2.5). This section explores how the lexicon of sustainable architecture has developed since the 1960s; the intention being to articulate some of the differences and nuances between different terms and how that has impacted the current context. Much of this section has been adapted from a paper I wrote: “From sustainability to resilience: an exploration of the development of sustainable architecture terminology”, presented at the Living and Sustainability: An Environmental Critique of Design and Building Practices, Locally and Globally conference (Donovan, 2017b).

4.4.1 Introduction

From the previously outlined mapping and diagrams, it has become evident that the terms used, especially in publications, have evolved over the last six decades. James Wines (2000, p. 21) explains:

“The whole environmental issue suffers from problems of definition, terminology, and treatment in media exposure. The word “green” itself is in danger of becoming as over-publicized and meaningless as passé

terms like “post-modernist” and deconstructivist” became a few years ago.”

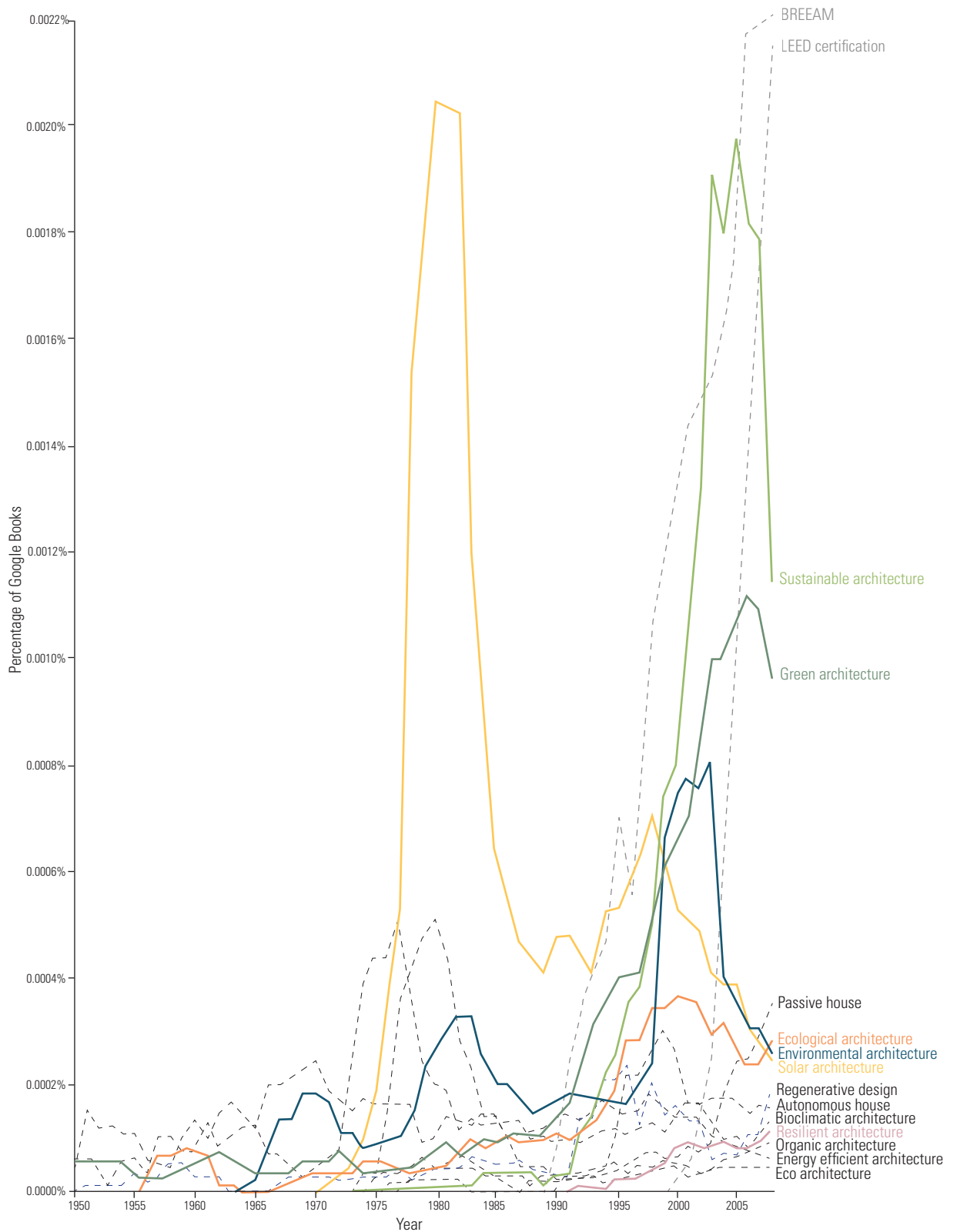
It is apparent that the descriptions and definitions of each of these terms has also transformed, just as the literature review elucidated previously with regard to the term sustainable architecture. As architecture has navigated new territories towards a ‘green sensitivity’ the architect’s lexicon has transformed from ecological (or eco), environmental, green, sustainable, and now resilience with many other terms in-between which are described shortly. The importance of terminology can be highlighted by an excerpt from Sue Thomas (2008, p. 525), in which she explains that “[...] terminology provides definition, clarity, and boundaries which may be fought or celebrated”. Albeit, this is not often the case within sustainable architecture. The terms mentioned above are used with growing frequency and often substituted for one another and employed as tautologies, thus, losing their nuance (Donovan, 2017a). This is exemplified in Ken Yeang and Lillian Woo’s (2010, p. 78) ‘Dictionary of Ecodesign’ where they define ecodesign as:

“Also known as sustainable design; ecological design of the human build environment; green architecture; green design. Managed use of an ecosystem’s processes and non-renewable resources through eco-mimicry. Its main objectives are physical and mechanical integration of built forms and infrastructure with ecosystem features and processes of a given site; prevention of resource depletion of energy, water, and raw materials; prevention of environmental degradation caused by facilities and their infrastructure throughout their life cycle; and the creation of bio integration between the built environment and natural environment. It includes any form of design that minimizes environmentally destructive impacts by integrating physically, systematically and temporally with the natural environments living process.”

Many of these ‘synonyms’ are illustrated by the word-cloud in figure 4.21. This word cloud is a subjective collage of terms that have crossed my path, yet it is in no way exhaustive. As a result, a total of sixty-seven terms relating to architecture have been arranged in approximate size depending on how I experienced their frequency. These have ranged from particular terms such as ‘carbon neutral architecture’ to very general terms such as ‘radical architecture’.

Terminology impacts the way architecture is explained, discussed and explicated; as these key terms become vaguer, there is a seemingly inherent need to define or understand the meaning of them. Consequently, the frequent misuse or imprecision of terms often increases ‘greenwashing’ and confusion by laymen, rather than progression in the field of sustainable architecture. Thus, this section intends to understand better the subtle differences between these terms through a short study of some rudimentary definition. These will be explored in the remainder of this

Figure 4.22 (right) Frequency of terms: Created from Google Ngram viewer indicating the frequency of use for specific terms.



Google Books Ngram Viewer
 Between 1950 and 2008 from the English corpus with smoothing of 2

section, starting with ecological architecture through to resilience.

4.4.2 Exploring definitions

Language and meanings evolve and transform and the sustainable architecture lexicon is a key example of this. Until recently, eco, green, sustainable, and resilience have been adjectives used to describe architecture. However - combined with the word architecture - these adjectives have now transformed into nouns: eco architecture; green architecture; sustainable architecture; and resilient architecture (Donovan, 2017a). The frequency in use of key terms is illustrated in the graph in figure 4.22. This graph was created using data from Google Ngram viewer which indicated the frequency these terms have appeared in google books from the 1950s until today. This illustrates that ecological architecture had a short peak between 1955 and 1965 and has increased since; peaking again in the late nineties. This term is discussed at the start of the environmental movement. It is arguable that the frequency is very low compared with that of solar architecture in the seventies, for instance. Conversely, this could be potentially explained by the fact that ecological architecture was often employed by 'alternative' communities, who were probably not interested in publishing their work, compared with the research institutes and architects involved in solar architecture. The term solar architecture peaked between the 1970s and 1990s, as described in the earlier section. Meanwhile, the use of 'green architecture' started to increase from the 1980s, peaking in the early 2000s after the oil crisis. 'Sustainable architecture' followed a similar trend starting slightly later - in the early 1990s after the Brundtland Report was published. Contrarily to the other trends, the term environmental architecture has peaked and dipped several times since the 1960s. growing with frequency each time. With considerably less frequency, resilient architecture has increased since the 1990s and - in contrast to the previously mentioned terms - is the only term which has not decreased in frequency in recent years. Lastly, other noteworthy terms are also included as a dashed line; it is worth noting that LEED and BREEAM in the last decade have the highest frequency of all of the terms.

Before exploring the following definitions, it is worth noting that previously I have argued within this dissertation that these terms have a multitude of definitions, especially regarding sustainable architecture. However, for the sake of this exploration, the following definitions are not provided as 'the' only definition, but rather as simple examples to understand the subtleties in how they differ. Furthermore, this exploration is not a linguistics study of method; instead, it is used to exemplify this discussion. The most basic definitions of these terms have been taken from the Online Oxford and Cambridge Dictionary; they have been analysed to understand not only the different language used to define them but also to understand the nuances in their conceptions as these new nouns are often used interchangeably as synonyms for each other. For each definition, key nouns, verb, and adjectives are highlighted to understand the primary focus, the attitude associated with the verb and how the nouns are described (Donovan, 2017a). Moreover, it is

Figure 4.23 Eco-architecture definition: taken from the English Oxford Dictionaries. (English Oxford Dictionaries, 2017a)

Definition of *eco-architecture* in English:

eco-architecture

NOUN

The application of ecological principles to architecture, typically in the design of buildings which promote environmental conservation and harmonize with their natural surroundings.
Related green architecture

acknowledged that these definitions (as nouns) have been created in recent years and may be retrospective understandings yet still relate to different periods of thinking. Nevertheless, when possible, these definitions are supported by different definitions created in earlier periods.

Starting with eco-architecture (figure 4.23) which was chosen as none of the dictionaries have a definition for ecological architecture. Lauring (2010, p. 51) elucidates that ecological architecture has never had a “convincing” definition, and that “during the seventies ‘ecological’ evolved from being a scientific descriptive term to being a normative one; one without a norm-criteria, but with lots of images and associations mostly of a rural kind”. This scientific beginning emerged from Ian McHarg thought of ecology as “the science of the relations of organisms and the environment, integrative of the sciences, humanities and the arts – a context for studies of man and the environment” (McHarg, 1969). More similar to the sustainable definition in figure 4.24 is the previously mentioned ecological design definition from Van der Ryn and Cowan (1996, p. 18): “Any form of design that minimizes environmentally destructive impacts by integrating itself with living processes.” To breakdown the definition of eco-architecture in 4.23, the key nouns are principles, architecture, conservation, and surroundings, which are described with the adjectives ecological, environmental and natural, emphasising a key focus on the natural environment. Subtle verbs like application, design and harmonise are used. The use of ‘application’ is noteworthy; application can be defined as the action of putting something into operation, or putting something on a surface (Oxford Dictionaries, 2018a). This denotes a shallow, rather than holistic, approach to the integration of ecological principles in the design process (Donovan, 2017a).

Green architecture (figure 4.24) has a similar focus on buildings and the natural environment, but denotes designing as an activity - rather than an application - of other principles or strategies, like in eco-architecture. ‘Protect’ is also employed as opposed to a more affable verb such as the previously used ‘harmonise’, which is apt considering the societal approach to the natural environment at the time (Donovan, 2017a). This analysis is contradictory how Baweja (2014, p. 42) explains Olgyay and Herdt defined green building: “as ‘examples of applied ecology,’ where architects

Figure 4.24 Green architecture definition: taken from the Cambridge Business English Dictionaries. (Cambridge Business English Dictionary, 2017)

Definition of *green architecture* in English:

green architecture

NOUN

The activity of designing buildings in a way that protects the natural environment.

Definition of *sustainable architecture* in English:

sustainable architecture

NOUN

Architecture managed in such a way as to employ design techniques which minimize environmental degradation and make use of low-impact materials and energy sources.

Figure 4.25 Sustainable architecture definition: taken from the English Oxford Dictionaries. (English Oxford Dictionaries, 2017b)

treat the construction site as an ecosystem, and the building in an ecological relationship with its site.” Rather, Olgay and Herdt’s understanding is more similar to the previous definition of eco-architecture. James Wines (2000) explains that green architecture is: “a philosophy of architecture that advocates sustainable energy sources, the conservation of energy, the reuse and safety of building materials, and the siting of a building with consideration of its impact on the environment.” This definition in my own opinion is closer to how I understand green architecture – with a focus on energy and considerations for the environment, rather than an approach integrating within an ecosystem.

In contradiction to the origin of this term, this definition of sustainable architecture has little reference to either the Brundtland or three-pillar definitions of sustainability. Resources, future generations, social or economic factors are not included in this definition as illustrated in figure 4.25. The verb manage is utilised, which can be defined as ‘administer and regulate,’ (Oxford Dictionaries, 2018b) not a verb often associated with creative endeavours such as design or architecture. It could be speculated that this influence arises from the introduction of restrictive certifications to the design process. Other unenthusiastic and constraining words used are the verb ‘minimise’ and the noun [environmental] ‘degradation’, rather than ‘natural environment’ or ‘environmental conservation’, which were employed in previous definitions (Donovan, 2017a).

This definition of resilient architecture (figure 4.26) was not taken from the online

Definition of *resilient architecture* in English:

resilient architecture

NOUN

Resilience means designing adaptable structures that can “learn” from their environments and sustain life, even in the face of disaster.

Figure 4.26. Resilient architecture definition: (Minnery, 2015)

Oxford or Cambridge dictionaries, given it is a term still in its infancy and not included in their collection. However, this version defines the term with the same rudimentary detail as the previous definitions. Aside from the noun structures, ‘disaster’ and ‘life’ are used which may show an association with future thinking. The adjective ‘adaptable’ and verb ‘learn’ can be seen to demonstrate an emphasis on the concept of change for the unforeseen (Donovan, 2017a).

These definitions overlap but are not identical. The above analysis has illustrated how these terms have transformed and differentiated over time. Variances can be seen with the use of nouns, firstly, two of the four definitions utilise secondary

principles or techniques to achieve their design goals and secondly, the environment or context is discussed with a variety of attitudes. There is a clear development with the verbs used which reflect the societal context in which each concept was established. The progression from harmonise, protect and minimise, to learn, is representative of architecture's attitude or relationship towards the natural environment (Donovan, 2017a). These definitions come from very standard sources. However, I have tried to construct and offer simple examples of the distinction between each term, highlight some of the nuances, and set a contextual frame for the following definitions which are discussed in the questionnaire in the upcoming Chapter (Five).

4.4.3 Summing up

The previous literature review indicated that sustainable synonyms are often used as substitutes and are an essential topic for sustainable architecture. This is because the language used in the discourse to describe the field has an influence on how it is understood and practiced. This section aimed to build on this discussion, to articulate the nuances between the meaning of different terms to support the notion that these terms are not interchangeable and should be used more accurately. An apparent shift has occurred within the architect's lexicon, and it can be posited that this is influenced by the societal issues through history as well as from the broader definitions from the Brundtland report and Agenda21. It is apparent that from 2001 there has been a transition towards a focus on materials and energy which is associated with the triple-bottom-line model. This has developed from the oil crisis. For the first time in contemporary history the profession was forced to consider the energy use in buildings and focus subsequently on the creation of technologies to reduce demand. Going further than this was the formation of certifications such as LEED and BREEAM which promoted a focus on the measurable hard issues of energy, materials, and resources. One key focus which has remained throughout all of the variations of definitions has been the importance of the environment. However, the attitude or approach to the environment has altered through time from conserve, protect, minimise and learn from. The implications from these different approaches can be seen in built examples from each period. It is apparent that contemporary discourse and practice struggles to understand the nuances between each definition, and their impact on the design decisions which are made.

Moreover, this section has set out not to attempt to standardise the architect's lexicon, but instead to provide a starting point for a more extensive discussion about the implications of using terms with which to discuss architecture. The development of sustainability has framed the discussion and indicated how broader definitions effect those which are used within architecture. Outlining the evolution of sustainable architecture has suggested that many of the issues architects address today have been present for many years with altering focuses. The historical overview illustrates how terms develop from societal issues and their relationship with nature. Conversely, it is worth noting that the discussion of nature and the Anthropocene is important but

not within the scope of this dissertation.

Furthermore, there is a plurality of definitions which address how architects approach designing with the natural environment and finite natural resources. Each definition offers slight nuances in how this is achieved. Understanding this is crucial in adding precision to interpreting 'sustainable' architecture in the built environment. Rather than using 'eco', 'green', and 'sustainable' as synonyms for each other, using these terms with purpose may add clarity to the profession and consequently reduce the current explosion of greenwashing. Additionally, this study has further emphasised gaps in the literature and research with concern to the diversity of definitions. Building on this study, the questionnaire in the next chapter collects data in order to construct a richer picture of the range of definitions.

4.5 GREENWASHING AND THE ADDITION OF TECHNOLOGY

4.5.1 Introduction

It has already been revealed that within the architecture discipline, the complexity of sustainability is routinely reduced to a few buzzwords or strategies – and some argue this is often a symptom of greenwashing. Moreover, the ambiguity of words such as 'sustainable', 'eco' or 'green', allows for easy manipulation of their use (Feiden and Hamin, 2011, p. 2). Greenwashing within the building industry often materialises as the application of environmentally sensitive technology to what are otherwise conventional buildings. Baweja (2014, p. 42) explicates that "the discipline of architecture has absorbed the discourse of sustainability largely through the fields of building construction technology and environmental technology, all within the larger field of science." Consequently, greenwashing can sometimes lower standards and often depreciates the endeavours of holistic and genuinely sustainable architecture. As a result, rating systems and certifications have been developed throughout the world in an attempt to combat these misleading claims, and thus to quantifiably verify a building's 'greenness'. Although rating systems have been developed in the hope of adding cohesion to the complexity of sustainability, they may be exacerbating the greenwashing problem.

The previous literature review (section 2.6) introduced some discussion with relation to greenwashing and techno-centrism. Such discussion included: ignorance and the addition of green; literal greening; techno heroism; and marketing and professional pressure. This section aims to explore how the development of the related discussions have impacted these issues in recent decades. In more recent years - especially the period from the late nineties to 2010s - it has become common that some approaches to sustainable architecture are over-run with technical-add-ons, as well as with new buildings boasting arrays of solar panels, new high-tech façade materials, and complex solar shading systems all under the umbrella of 'sustainable'. Wines (2000, p. 21) describes:

"Ecologically favourable hardware like thermal glass, solar collectors, photovoltaic panels, air filtering systems, and recycled construction

materials, which could all be used to enhance the final building-as-art statement, are usually treated indifferently as “installed” rather than “expressed” elements of design, with no clues to their sources in nature of contributions to the expanded like and communicative content of buildings.”

It is speculated that one reason for this is due to the complexity of technology, which forces the integration of sustainability from being an architectural problem to one of the environmental engineers (Scott, 1998).

This marketing trend of sustainability being viewed as an add-on is not generalisable for all of sustainable architecture. However, it is not a new notion; nearly 20 years ago Mitchell (1998) explains in a chapter in his book ‘Dimension of Sustainability’ the importance of addressing the fundamentals of sustainability in architecture, as follows:

“[...] perhaps our assumptions and ideas [about sustainability] need to be rethought – right back to their foundations. He continues [...] very often - architectural approaches to sustainability do not really get to the heart of the issue, and that we need to broaden our view if we’re to make a contribution that really matters.”

The focus on energy and technology solutions has dominated the field, and this is part of the source of this separation. Scott (1998) argues that:

“Energy has too often become the domain of either the engineer to tweak the mechanical system or its controls or become the domain of the techno-enthusiast to bolt on renewable technology without examining the larger role and form of the architecture.”

While this excerpt is taken from a publication from nearly twenty years ago, in many cases it is still relevant. There is a separation between each discipline’s role when dealing with this multi- and trans-disciplinary issue. Scott (1998) continues to explain that architects often look to technology to solve some of the environmental problems, but then relinquish responsibility for the control of these technical systems which make up an integral part of the overall building system. This raises the question as to what has happened historically that has created these shifts towards a shallower solution for such complex problems? Moreover, how has the influence of associated disciplines and technology impacted the resulting architecture? Joseph Grima (2013) exemplifies, as previously discussed in the literature review, his opinion of what is happening in the industry. He explains: “a lot of what is stated on the topic of sustainability is pretty shallow, if not downright compromised by opportunism, greenwashing and the marketing gimmicks of developers” (Donovan, 2017a).

The remainder of this section explores the influence of technology on the progression of sustainable architecture by presenting examples of the early use of

mechanical ventilation, solar architecture, the development of passive and zero-energy houses, and how learnings from these have manifested in contemporary solutions. The examples given are by no means the only examples and are not meant as state-of-the-art. Rather, they have been employed to emphasise the different development stages and approaches as presented in popular literature.

4.5.2 The development of technology in sustainable architecture

Similar to the way in which each previously explored term has nuance in meaning, each approach has developed differently in how technology has been integrated or applied in the design process and construction and this has produced a variety of solutions some more successful than others. Before the 20th century, buildings were not significant electricity users, with electric lighting, heating, and elevators relatively new endeavours. Without these technologies, buildings were at the mercy of nature and were consequently designed to defend against the outside elements (Tanzer and Longoria, 2007, p. 137). At the beginning of the 20th century, the technological innovation of using mechanical cooling within buildings had a considerable influence on the design and form of the architecture that was to follow. With the introduction of mechanical cooling, buildings now had easy control of their comfort. Similar to the twentieth-century belief by designers that science could conquer climate (Tanzer and Longoria, 2007, p. 137), Raman (2007), explains that it was thought that technology could solve all problem and remedy of the consequences of designs which no longer needed to consider environmental issues as energy was considered plentiful. One of the first examples of this technology transitioning into buildings was the New York Stock Exchange building, built in 1903. Following this in the 1930s, the Empire State and Chrysler buildings in New York City were designed with mechanical cooling but still maintained the traditional defensive attitude towards nature and the subsequent art deco forms entailed protective facades with punched openings. With oil cheap, a dramatic shift in form was made possible by mechanical cooling is best illustrated by the United Nations Secretariat Building (figure 4.27) constructed in New York in the early 1950s. There was no concern for the environment or the impact of the building, with the thirty-nine-storey single-glazed facades facing east and west, encouraging overheating. Also, the pitted-stone material chosen for the north-south walls were at risk of freeze-thaw-action and rather than changing material, thirty-nine floors of steam coils were implemented to react to the outside temperature to prevent this (Raman, 2007). The link between the architect's relationship with nature, technology and energy prices has had a significant effect on the approach and integration of sustainability in architecture, and this can also be traced through modern sustainable movements (Donovan, 2017a).

The science of ecology entered public discussions during the sixties, and as mentioned, Ian McHarg was one of the first to publish connecting both disciplines - ecology and architecture in "Design with Nature." Conversely, in these first years, ecology was employed within the science and engineering domain of architecture rather than the art. Steel (2005, p. 8) explains that ecology as "the science of



Figure 4.27 United Nations secretariat building: illustrating the east facing glass wall and south stone wall.

the relationship between all living organisms and their surroundings” is easy to understand until it is applied to buildings, then it becomes “murky.” A semantic shift occurred when ecology was applied to design, losing the original scientific definition. Instead, a normative understanding was appropriated, one that recognised that construction activities may harm the environment and consequently responded with architectural approaches which endeavoured to avoid harming nature (Lauring, 2010, p. 51). Subsequently, one standpoint was the view that technology was the solution.

Early technology appeared both as low-tech and high-tech solutions. Many low-tech methods were developed from the grassroots, eco-village examples. These included: reed beds for recycling indoor air; rainwater collection; comprehensive waste sorting; and an improved sense of community (Gram-Hanssen and Jensen, 2005, p. 176). On the contrary, many early complex technical solutions such as solar panels and cells were being developed by research teams in universities and institutes, especially in the United States in the fifties (Denzer, 2013, p. 182). This research into solar technology (at least in the US) burst in the 1960s; Denzer (2013, p. 182) tributes this to the public being disillusioned by the expensive and farfetched nature of technology. An example of this is failed schemes such as “Living with the Sun” where:

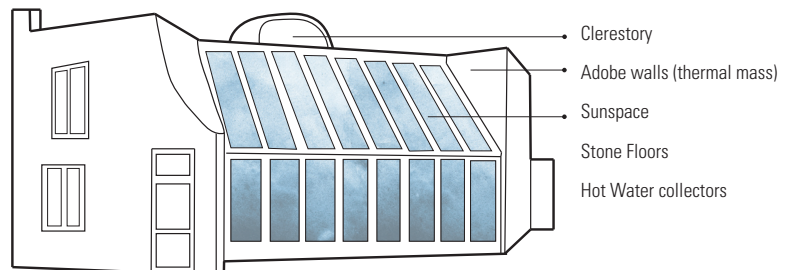


Figure 4.28 Living with the sun: House from 1957-58 illustrating early technology incorporated with buildings. (Image credit: Tony Denzer)

“Fanciful drawings of homes roofed with solar batteries [...] were taken too literally when people learned that such a roof would cost hundreds of thousands of dollars [...] interest understandably waned.” (Denzer, 2013, p. 184)

Interest in this solar technology moved to “backyards”, integrating influences from climatic sensitive vernacular principles as previously cited. During this period, New Mexico was the home for many of these new and often experimental residences in which combined everyday use of technology and climate-appropriate sizeable thermal mass – often adobe.

Figure 4.29 Vignette of Balcomb House: New Mexico 1979, illustrating key features from solar architecture



Solar Architecture
Balcomb House
Santa Fe, New Mexico, 1979

The Balcomb House illustrated in figure 4.29 by William Lumpkins in 1979 is a well-known example of solar architecture. Denzer (2013, p. 186) describes this residence as a two-storey “elbow structure” with a void space facing south – the sunspace. This sunspace is covered in thirty-seven square meters of glass, and the

two wings are bridged to enclose the sunspace internally. A thirty-five-centimetre interior adobe wall between the sunspace and living room behaves similarly to mass storage (Denzer, 2013). The sunspace grew plants to humidify the air and addition duct systems of fans sent hot air from the top to rock beds beneath the ground of interior rooms. The sunspace differed from attached greenhouses as it did not suffer from the same drawbacks such as night-time heat losses and afternoon overheating. The form and technology became visually iconic for this period and approach, with sunspaces becoming “the most significant trend in passive solar design” by the 1980s (Denzer, 2013, p. 187). The form and aesthetics of this example were designed as the subsequent results of the technology (passive and active) needed to achieve the desired energy goals.

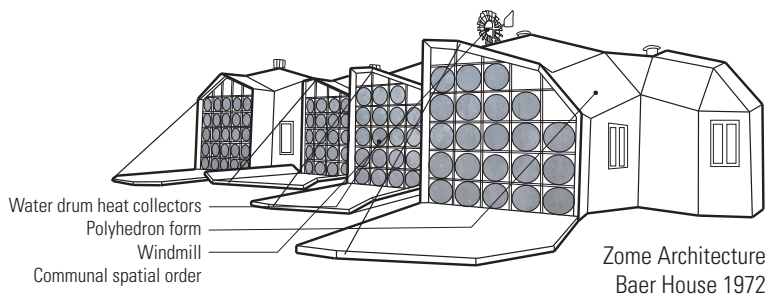


Figure 4.30 Vignette of Zome Architecture: 1972, illustrating key sustainable feature

More unconventionally, the Baer House (1971-72) by Steven Baer - illustrated at the bottom of figure 4.30 - developed from Drop City and took influence from Buckminster Fuller’s geodesic structures (Denzer, 2013, p. 187). In addition to the structural efficiency of the polyhedral form, new technology for passive and active energy generation was explored, and this included: Insulated aluminium panels similar to those used in aeroplanes and visually different from the adobe-and-glass tradition, Baer’s “drumwall” concept consisting of 55-gallon drums of water, functioning similarly to a Trombe wall without ducts, fans, plumbing or operational energy. Also, exterior panels were designed to close over the “drumwall” to reduce outward night loses. Baer’s unconventional typology created communal spatial order and Tabb, and Diverin (2014) described it as “the most recognisable form of rebellion”. These buildings were designed to explore alternative and unprecedented technology, and their aesthetics reflected these unconventional and alternative approaches.

These two examples of solar architecture, visually incorporated - and at times celebrated - the use of technology in their forms. However, this position was not held by all. American architect Malcolm Wells in a 1972 edition of Architectural Design: “Design for Survival” stated “machines should be tucked away underground where they’ll do the least amount of harm to the living land” (Wells, 1972, p. 433). Intriguingly, this quote is ambiguous in what is referred to by harm, it is posited that what is meant is ‘visual harm’ as the use of technology even when hidden does not reduce its impact. Wells used this approach in his iconic modern “earth-sheltered” architecture or what is often referred to as “gentle architecture” which is also the title of his 1981 book (figure 4.31). Again, the intention behind terms are confusing;

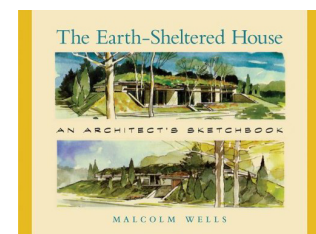


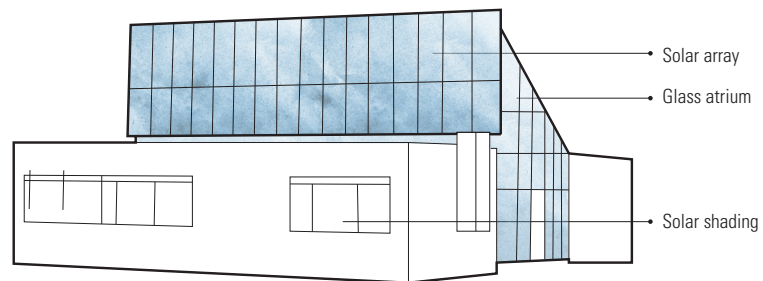
Figure 4.31 ‘Earth-Shelters: illustrated’ cover of Malcolm Wells book showing examples of his concept of earth shelters

Wells refers to his approaches as ‘gentle’ however actively cuts into the landscape which is not a gentle act. Again, I posit that this term is about the visual appearance of the buildings, rather than the approach itself. Wells (1971) writes: “The act of building, whether it involves giant hydroelectric dams or a single small home, is an act of land-destruction. Buildings destroy land for as long as they stand”. He continues to describe fifteen properties of “wildland” that buildings should emulate:

“create pure air; create pure water; store rainwater; produce its own food; create rich soil; use solar energy; store solar energy; create silence; consume its own wastes; maintain itself; match nature’s pace; provide wildlife habitat; provide human habitat; moderate climate and weather; and be beautiful.”

Interestingly, while Wells sought to hide technology and thus embedded his building within the physical landscape and its processes, these buildings, berming, and grass-roofs became as iconic as the previous sunspaces and solar approaches.

Figure 4.32 Vignette of ‘low energy-house’:1975, build in Denmark by DTU



Low-energy House
Zero-Energy House
Denmark, 1975

The interest in solar technology was explored further during the 1970s and 1980s, with a growing focus on the role that technology could have in reducing energy consumption. In 1975 Danish research group “Thermal Insulation Laboratory” from the Danish Technical University (DTU) designed the first solar-heated house in Northern Europe – the “zero-energy house”, illustrated in figure 4.32 (Gram-Hanssen and Jensen, 2005, p. 168). Gram-Hanssen and Jensen (2005, p. 168) explained this project aimed to demonstrate that a house could “be heated and provided with hot water simply through the use of solar heat, efficient insulation and recycling of heat from ventilated air” with existing technology and at a “reasonable cost.” The house gained major notoriety and became the most notable example of its time. The house consisted of two sixty-square-meter “living boxes” separated by a seventy-square-meter glass-roofed atrium (non-heated) with forty-two-square-meters of solar collectors on the south-facing vertical section of the atrium (Esbensen and Korsgaard, 1977, p. 195). The form of this house was more conventional compared to the previously outlined American solar houses from a similar period. Building on momentum gained by the concepts of zero-energy and passive houses, additional

institutes arose such as the 1996 ‘Passive House Institute’ and the 2009 founded ‘Living Future Institute’ which later launched the “Net Zero Energy Building Certification” in 2011.

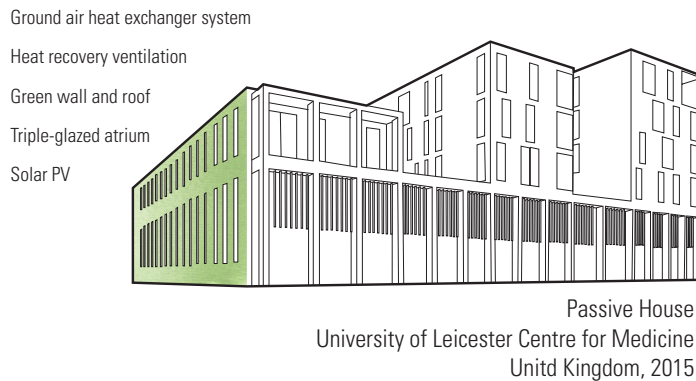


Figure 4.33 Vignette of University of Leicester: considered the largest certified passive house

Passive house has adapted from small residential models and can now be seen in large-scale urban examples such as the 2016 Centre for Medicine at the University of Leicester, illustrated in figure 4.33. This is considered the United Kingdom’s largest Passivhaus Trust certified building (Passivehaus Trust UK, 2018). Designed by Associated Architects, the 12000 square-meter building consist of two parts connected by a triple-glazed atrium. In addition, there are 150 square-meters of photovoltaic arrays, heat-recovery ventilation, and a massive green wall along one façade. Even though the scale has increased, there are commonalities between the technology used in each design (Associated Architects, 2015).

Up until 1990, many sustainable projects were often rural or suburban. However, with numerous public subsidies, many attempted the challenge of successfully translating the knowledge and principles from these projects to urban settings. Gram-Hanssen and Jensen (2005, p. 175), when describing the Danish context, explained:

“To point out good solutions from rural ecology might be one problem, but to find out which would be transferable was another. It is obvious that many of the green technologies established in rural environs could hardly be transferred unadapted to the cities.”

During this period many approaches struggled to implement learning from previous examples into contemporary building regulations and urban settings. What often resulted were projects which focused on one or two strategies, such as principles from low-energy technology or that had been grass-roots inspired (Gram-Hanssen and Jensen, 2005, p. 176). Dean discusses the implications of applied technology from the 1980s as the devolution of architecture which he argues has led to a techno-science he attributes to the influence from Buckminster Fuller and Reyner Banham and terms ‘green building’ (Dean, 2009, p. 25). The allure of technological solutions has been overwhelming, and within green architecture, this further emphasises the split between technology-based approaches (technocentric) and other more eco-centric which has created a subcategory of green-high-tech-performance



Figure 4.34 Failed green wall: Example of an unsuccessful green wall in Aarhus, Denmark, removed in 2015

buildings which are goal-based with measurable parameters for resources and energy conservation (Pohl, 2011, p. 225). The 'solarspace' as an obvious example of the application of iconic technology which has been integrated into many buildings since, but unfortunately with numerous failed attempts.

In some cases, this strategy has been applied to contexts across the world without adapting it to the local conditions and climatic zone. It has been especially contentious in countries which have extensive thermal regulations for insulation, and the integration of large glass south-facing façades has led to overheating and consequently, increased the need for mechanical ventilation and cooling. Another example of a strategy which have been applied interchangeably between climatic zones, is vegetated façades as illustrated in figure 4.34. This façade has subsequently been removed, as it failed due to an incompatibility with the technique, chosen plants, and harsh climate.

Later, sections of sustainable architecture moved from subsidies to a market-based approach in which the financial value of labelling something as 'green' began to expand; consequently, this impacted some of the greenwashing within the industry at all scales. While some grassroots initiatives and some urban renewal examples have been visually impressive, they have not always been convincing regarding reduced impacts on the environments. One reaction to this is the introduced measuring of 'greenness.' Thus, there was the development of LCA tools to calculate and compare environmental impacts in addition to previously outline certifications – LEED and BREEAM (Gram-Hanssen and Jensen, 2005, p. 180). Similarly, solution-driven approaches were created such as 'Cradle to Cradle,' net-zero- and zero-carbon buildings. These performance-based approaches operate through empirical measures - such as energy consumption, carbon, and greenhouse gas emissions - as well as resource management, LCA, indoor air quality, and waste management (Baweja, 2014, p. 42).

These two examples of sustainable architecture, as illustrated in figure 4.35 and 4.36, represent two differing approaches. Firstly, the more integrated approach of the California Academy for Science in San Francisco, completed in 2008 by Renzo Piano; and secondly, the Strata SE1 building in London from 2010 which highlights an aesthetic of technical-add-ons. Strata SE1 is a forty-three-storey apartment building in London which boast three nine-metre wind turbines at the top along with a 'bespoke' high thermal performing façade. This building is an example of an afterthought aesthetic which displays sustainable technology with no real consideration of its actual effect (Mehaffy and Salingaros, 2013). This building is a prime example of good intentions which failed. To support those three wind turbines -costing an extra 1.5 million pounds - the entire structure needed to be strengthened which required more materials and resources (Insider London, 2015). Unfortunately, while a bold idea, the wind turbines which were expected to produce eight percent of the building energy, no longer spin due to alleged noise and vibration complaints by the residents, makes the entire building more unsustainable than if they were not present to start with. The lack of holistic thinking with this example led to greenwashing (Urban75, 2011) and a

shallow, technical aesthetics which unfortunately strengthens the previous discussion that sustainable buildings are ugly and coincidentally this building was voted 'Britain's ugliest new building' by readers of Building Design Magazine (Booth, 2010). The California Academy for Science building is an example of a holistic design which incorporated both natural and environment technical solutions within a cohesive design aesthetic for an incredibly sizeable horizontal building. Solar panels, radiant floors, and ventilation systems are integrated with the large native green roof, natural ventilation, and natural light to create both an unusual form and energy efficient structure. This building has a biometric influence in the form of the green roof, which is juxtaposed with a relatively convention building below; however, this adds to the aesthetic quality. These examples of eco, green, and sustainable approaches represent only a small section of history but illustrate a narrative of the development of technology and greenwashing (Donovan, 2017a).

4.5.3 Summing up

Current theoretical developments have shifted recently - moving from individual buildings as experiments, toward understanding buildings within their broader systems. An example of this can be seen in the California Academy for Science (figure 4.36) which holistically approaches sustainable architecture, this resulting in a visually exciting building which merges nature and technology. In contrast, theoretical developments which lean heavily on the notion that technology can solve all results in building such as Strata SE1 (figure 3.35) which is a failed attempt from a good intention and without working technology it is more resource and financially expensive than is required. The development of each of these example buildings highlights a social constructivist perspective in which words, images, and artefacts have no inherent meaning; instead meaning can only be understood within the context in which it is 'consumed' and analysed. Each building cannot be visually understood without understanding the social, cultural, and political environment in which it was constructed (Donovan, 2017a).

A transition from the social activism and the science of ecology of the sixties toward a more recent commonplace understanding has occurred in this short history. As the impact buildings have on nature is becoming more evident so is the development of ways in which to solve this. Each decade visually indicates a transition of human's approach to nature; it varies in some cases from nature being an endless resource to trying to sustain nature for future generations. The form and material use have often transitioned from the alternative to more conventional. Domes and polyhedrons, frequently transitioned to organic shapes and were sometimes then surpassed by more conservative forms adorned with sustainable technology. Some key outcomes were the use of technology, materiality and size development through history. There has been a transition from the reductive perspective of the 1960s - creating efficient forms, reducing waste and environmental harm - to the reduction of energy in the 1980s in conjunction with the introduction of technology as a solution, which is still frequently prevalent today (Donovan, 2017a).

Figure 4.35 Vignette of Strata SE1:
London, 2010

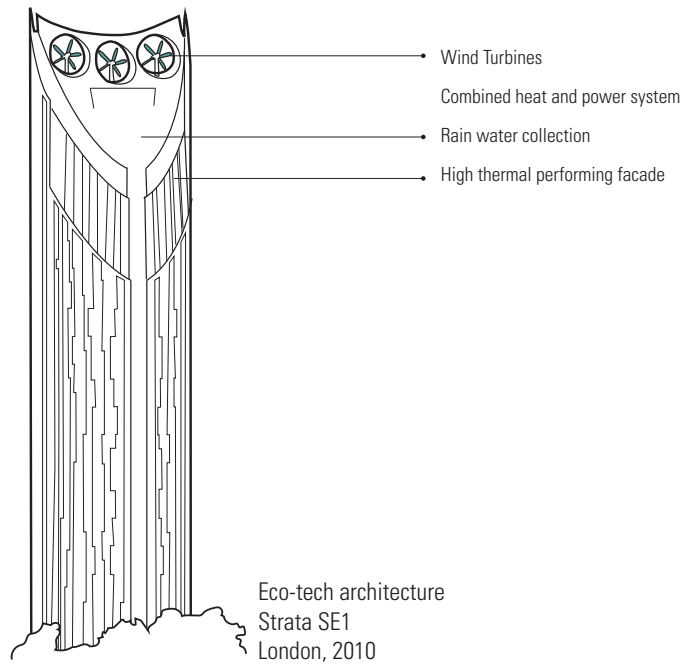
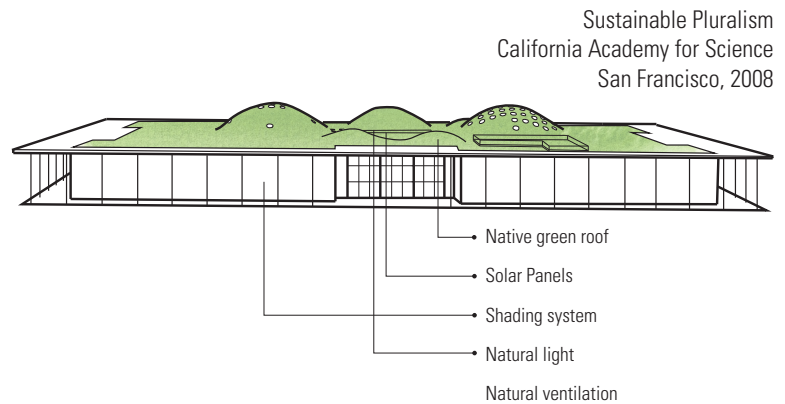


Figure 4.36 Vignette of California
Academy for Science: San Francisco,
2008



This section has outlined one way in which the development of technology and subsequent greenwashing in sustainable architecture has occurred. This discussion has been articulated through some examples of how technology changed the way buildings were designed to respond to, then neglect nature; followed by some examples of popular buildings from different periods starting with the 1960s and their relationship with technology. To understand eco architecture, the social and political context was summarized to situate the innovative and somewhat radical, social and green architecture was framed by the oil embargo that influenced the search for alternative energy solutions for architecture. Sustainable architecture was influenced by growing technologies and CAD programmes which has allowed for complex and monumental sustainable buildings which are now present in urban environments. With each of these periods of design, new approaches emerged and very often were the result of the constraints, reactions, and influences of the time. It also illustrates how social concerns and technology advancement can radically transform not only how buildings function but also how they are perceived visually (Donovan, 2017a).

While this section has indicated the negative side of technology and the subsequent greenwashing, many new integrated projects are appearing. As Wines (2000, p. 41) stated:

“somewhere in between the options of continuing the great technological onslaught and retreating to a simple nomadic lifestyle, there is probably some kind of rational and workable approach to the future.”

4.6 THE SUSTAINABLE ARCHITECTURE DISCOURSE

4.6.1 Introduction

The literature review introduced the notion that there is current contention with regard to the state and format of knowledge relating to sustainable architecture. Section 2.7 outlined some of these debates: including the complexity of the knowledge and how it is communicated; the importance of visual communication; and the multi-disciplinary nature and quantity of the information that is available. The discourse of sustainable architecture is often ambiguous and complex, with strategies, philosophies, and ideologies overlapping which impede the transfer of this information. What can often result, is a narrow understanding of shallow approaches to the field. For example, both professional and academic journals often include contributions about sustainable architecture either as built examples, highlighting different strategies or in opinion pieces about the current state of the practice. Very rarely do they include articles which explore the fundamental philosophies of the different approaches deeply. What is unclear, is how this ambiguous discourse came about. Hence this section intends to outline how some of the various written and visual discourse has developed in contemporary history, in order to question and frame some of the previously mentioned themes and barriers which have been constructed within this dissertation.

This articulation is important as information is often recycled or developed from previous notions in history, or other disciplines. Vidler (2010, p. 16) elaborates on this, explaining:

“In the history of ideas, discourses get recycled. Concepts emerge as allegedly new, though ideas undergo long journeys of migration from one epistemological field to another. In our discipline, there permission to reproduce, translate or even ‘misuse’ information, to observe and transform existing material and ideological structures, endows architecture with its creative potential.”

This is very evident in sustainable architecture discourse, which draws on and adapts information from biology, climatology, sociology, and engineering (to only name a few). Furthermore, historical information is often readapted to new situations; a prime example is the reintegration of vernacular learnings into modern environments. This leads to very complex discourse given it is very multi-faceted.

However, architects are trained to deal with complex problems and information; as Michael Lauring (2010, p. 50) explains:

“The architect is often humorously expressed- as a generalist who knows too little about everything. He or she has broad approach, where the wholeness is important, and where every part has to fit the house, as the house must fit the site and the city. In this respect, architects may have a good starting point when it comes to ecology, sustainability, and global concerns. Architects know that everything is intertwined and works together as a complex whole, and many Nordic architects are brought up with the attitude that architecture has to relate to and reflect site and society.”

Nonetheless, the discourse of sustainable architecture is often overwhelming, even for those who consider themselves experts. This section intends to explore how different topics with discourse have developed and evolved since the 1960s; these include the progression of information from disciplines in science to current specialty channels for sustainable architecture, and the progression of information through visual and built examples.

4.6.2 Development of sustainable architecture discourse

Much of the early discourse which influenced sustainable architecture was published in media outside of architecture. Considerable inspiration came from key publications within associated fields, such as the Odum brothers' (1953) textbook 'The fundamental of Ecology', followed by Arne Næss' paper in 1972 on 'Deep Ecology' in which advocates for the notion that the world is not a resources to be exploited by humans, with principles which include wilderness and biodiversity preservation; human population control and treading lightly on the earth. Following this, James Lovelock's (1979) 'Gaia Theory,' was developed after his detection (in the 1960s) of the presence of CFC's in the atmosphere and proposed that the Earth functions as a self-regulating system. At a similar time, between 1968 and 1972, Stewart Brand published the 'Whole Earth Catalog' which was an American counterculture magazine, which most notably used the first picture of earth from space on the cover of its first issue. Other seminal authors were Paul Ralph Ehrlich, an America biologist who wrote the 1968 book "The Population Bomb" which warned of the consequences of population growth and limited resources; and David Brower, an early executive director of the Sierra Club and founder of 'Friends of the Earth' in 1969. In addition to these first publications, many influential reports were also produced such as the already mentioned, 1987 Brundtland report and 1992 Agenda21. However, one important report before these, was "The Limits to Growth" in 1972, commissioned by the Club of Rome using computer simulations to gain insight of exponential economic and population growth with a finite supply of resources.

At the same time, a few designers began to publish books relating to design and the environment. These included Victor Olgay (1963) "Design with Climate"

which outlined basic principles of passive solar design and natural ventilation at a time when mechanical cooling was rising - especially in North America. (Tanzer and Longoria, 2007, p. 137). Furthermore, Olgay used biology, engineering, meteorology, and physics to derive principles and illustrate how climate management and visually sound design concepts could be harmonious. Similarly, landscape architect Ian McHarg wrote the (1969) "Design with Nature" urging urban planners to be environmentally conscious in their approaches to land use, and providing new evaluation and implementation methods. In the same year, Reyner Banham's (1969) book, "The Architecture of the Well-tempered Environment", was published in which explored the influence of environmental engineering on architecture, and argued for the consideration of technology, human needs, and environmental concerns to be fundamental to architecture.

Similarly, "Man, Climate & Architecture" by Baruch Givoni was published in 1969 and explores bioclimatic architecture through the relationship between human comfort, climate, and architecture. Givoni is also well known for his bio-climatic charts based on indoor temperatures which built on Olgay's previous outdoor charts (Givoni, 1998). Later, Sim Van der Ryn (1986) published "Sustainable Communities: A New Design Synthesis for Cities, Suburbs, and Towns" which encouraged limited dependence on fossil fuels through a discussion of land use, building design and service systems. In the 1980s, Dean Hawkes and Janet Owers also published "The Architecture of Energy" (1982) followed by Hawkes' (1996) book "The Environmental Tradition: Studies in the architecture of environment" which is a collection of essays concerning both theoretical aspects and the critical reviews of buildings. In the nineties, sustainable architecture literature exponentially began to be published (the increase of green post-its in figure 4.6 emphasis this growth), with some noteworthy books being Brenda and Robert Vale's (1991) "Towards a Green Architecture," William McDonough and Michael Braungart (1992) "Hannover Principles;" and, Ken Yeang's (1995) "Designing with Nature." All three of these authors have gone on to publish more extensively on the topic and in many cases have aided in making sustainable architecture popular and digestible for non-specialists. In the early 2000s, three previously mentioned authors - Simon Guy, Graham Farmer and Steven Moore - published extensively on the many approaches and theoretical concerns of the field in key publications such as "Sustainable architectures: critical explorations of green building practice in Europe and North America" (Guy and Moore, 2005) and "Reinterpreting Sustainable Architecture: Theories, Discourses, Practices" (Guy and Farmer, 2015) which made popular the 'six competing logics of sustainable architecture.'

In addition to an increase in published literature, many conferences and institutes emerged directly related to sustainable architecture. One example is the Passive Low Energy Architecture conference which was established in 1982. In the early nineties, Green Building Councils began to emerge globally with associated certifications systems which distilled some of the complicated information into specific themes and concerns. This reduction was successful in simplifying issues and the related

information for architects - especially those with little existing knowledge - but consequently, removed some of the multi-faceted nature which is crucial to successful sustainable architecture. In the 2000s, magazines also started to publish explicitly on sustainable architecture. Examples include Detail magazine's green issue that they have been publishing since 2011; the "footprint" column and occasional specific issues by sustainability editor Hattie Hartman in the Architect's Journal since 2008; and Ken Yeang's "Eco-files" published in Architectural Design from 2007 to 2010.

Conversely, columns relating to sustainability in periodicals is no new notion; Colin Moorcraft in Architectural Design started the unique column "Recycling" in 1971, which was later renamed "Eco-Tech" one year later. Additionally, popular media including websites and online blogs such as blogs 'Inhabitat' and "tree hugger" emerged and started to publish extensively about sustainable architecture and design. These publications and sources of information show not only an increase in frequency but also a transition in the content and format of media throughout the short history from the 1960s. Books transitioned from focusing on architecture and the environment to climate, energy, resources, autonomy, and systems. The development of information has in no way been clear, with each publication building on the previous; taking ideas and theories and elaborating on them in a new context with new technology.

Additionally - and very pragmatically - with new media and other formats of disseminating knowledge, more and more case studies and visual imagery has been incorporated into what was previous mostly black and white prints with few diagrams and even fewer images. This has changed the format of knowledge, and with growing frequency images are used to articulate what was historically descriptions and explanations. As Glen Murcutt (1995) explains in a lecture at The Architects' Association in London:

"I know, however, that you are creatures of the eyes. Don't forget, however, that as architects we are more than creatures of the eyes; there is a link between the eyes and the mind. And I think one of the greatest problems for architects in my country [...] that is, we have the best libraries of international architecture journals in the world, and of course one of the problems of these is the influence they may present and the influence maybe behind the time. I am not interested in architecture which is fashionable. Remember the past was once modern." (Murcutt, 1995)

This quote emphasises the seduction of glossy images, but also raises the interesting notion of information being out of date. It is expected that the core concepts and strategies which are present in a building would not date instantly, but it is worth remembering that even a newly published case study may be at least seven years old when freshly published. Conservatively, it may take five years, especially with more significant buildings, from initial concept to finished construction and often the publication process can take a year minimum to go through the editing process.

So, as Murcutt explains, this information may already be dated. This may indicate one of the reasons why online information is growing in popularity; because of the speed at which it can be produced and accessed. Thus, the format of information is crucial in making sure to include information which extends beyond ‘trends’ so as to support what is presented visually.

Despite this, visual information does play a crucial role in transferring information. In recent years, architecture awards have started to appear explicitly for sustainable projects. One example is the “The Global Award for Sustainable Architecture” which was founded in 2006. While not a traditional source of information, awards are very influential in raising awareness, and also in indicating what is valued as ‘successful’ sustainable architecture and which aspects of a building contribute to this. These values are often communicated through visual images of the building. Lauring (2010, p. 58) emphasises the role of visual images for inspiration, and explains:

“Architecture has traditionally been a practice rather than a science, a practice relying very much on visual images and inspiration or more directly as forms to repeat. This may explain why the idea of rural settlement as being the most ‘ecological’ or sustainable way of housing has lingered for several decades and continues to do so. The same can be said of passive solar, maintain its position as key environmental architectural element in new buildings long after heating has lost in importance compared to non-heating functions including transportation.”

This is further supported by a small study and collection of buildings in figure 4.37 and 4.38. This study illustrated the distinct visual language associated with certain approaches, which are translated through history in different contexts. The geodesic dome, popularised by Buckminster Fuller, is a common element in experimental sustainable architecture and often represents material and structural efficiency combined greenhouse technology. This visual language can be seen translated in a few examples from the top example at Expo’62 by Fuller; in Cornwall, The Eden Project by Nicholas Grimshaw completed in 2000; La Bolla by Renzo Piano in Genoa from 2001 and more recently, the Dome of Visions, which was first built in 2012 and the third version illustrated in the picture was constructed in Aarhus in 2016. Secondly, the concepts of sunrooms made popular in solar architecture (example of the 1979 Balcolm house at the top) have been translated and adapted into large-scale buildings of all functions and locations as exemplified in the Rheinelbe Science Park by Uwe Kiessler in the nineties and Ospedale dell’angelo by Emilio Ambasz & Associates in the 2000s. This concept has been developed and new technology employed; however, these buildings have implicit information of orientation, heat retention and passive solar strategies which is communicated through the visual language. However, the information provided visually in both of these examples is only available to those who have the pre-existing knowledge to be able to ‘receive’ this information. Without this pre-knowledge, the theory approaches and systems



Figure 4.37 Examples of Domed architecture: (from top to bottom) Expo67 1967 - Montreal (image credit: Ralf Roletschek) La Bolla 2009 - Genoa, (image credit: structurae/Nicolas Janberg) Eden Project 2004 - UK Dome of Visions 2015- Aarhus



Figure 4.38 Sunspace inspired buildings: (from top to bottom)
 Balcolm house 1979 - (image credit: Mother Earth News Staff)
 Science park 1995 - (image credit: Ivy Hughes)
 Ospedale dell'angelo 2008 -

which produce these visual languages may not be understood. Subsequently, only the visual elements of the dome or glass sunroom are reproduced, which unfortunately occurs in some instances of greenwashing. These two examples are quite iconic of approaches which developed in the sixties and have been translated but still maintain these archetypal visual features. Other approaches from architects such as Brenda and Robert Vale, and Sue Roaf try to integrate sustainable architecture into conventional residential forms, Roaf explains:

“The Solar House is very ordinary looking and except for the internal planning, is certainly not very ‘architectural.’ This is because the architects wanted to reach out to the person on the street and provide them with an ecological house they could relate to.” (Toy 1997, px)

This quote indicates that unconventional looking sustainable architecture is not relatable to the public. This may contribute to the argument that without pre-knowledge, the sustainable strategies and approaches which influence a buildings form are not evident and subsequently the ‘unconventional’ shape seems like a design or aesthetic decisions rather than one derived from the sustainable approach.

4.6.3 Summing up

The development of different literature within the field has been outlined so as to understand how it has developed in recent history, starting with the early influences including publications from other disciplines and followed by how these concepts were integrated into the discipline of architecture through written discourse. The written influence from other disciplines outlines the complexity of information which is being integrated into the architecture discipline. As a consequence, this may be one reason for the complexity of literature as it is trying to address concepts which are very broad, yet, are distilled and integrated into the design process with tacit knowledge. This results in very specific outcomes of which the process cannot necessarily be articulated explicitly. Furthermore, the development of different media has changed the way information is accessed and has increased the amount of visual imagery associated with different theoretical writing. In many cases, this visual language transitions through history, this is exemplified by the many examples which employ similar information and approaches which often result in similar built forms.

4.7 SUMMARY

This contextual narrative of sustainable architecture has been formed by connecting multiple strands of discourse and practice through the use of mapping tactics. It has emphasised the complex, plural, and evolutionary nature of the history and has provided some insights into how these notions may influence future trajectories within the field. It is evident that many concerns faced sixty years ago still remain pertinent. The strategies used to address these have adapted and changed in accordance with the social and political conditions. However, the philosophy and fundamentals remain seemingly unaltered. It is fair to postulate that future

endeavours will need to address these concerns, but the way in which this is done is not abound in the traditions or even current notions.

Mapping has been used to navigate through a large and complex body of information; traversing backward and forwards between reading, mapping, analysing, and writing. By using these visual mapping methods, discoveries which may not have been evident within the written text were constructed to form different connections and relationships. This underlined the notion that the “benefit of looking back in time is the ability to see the patterns and connections that may not have been originally visible” (Tabb, 2014). This approach to history has aimed to go beyond the descriptive and has attempted to construct the information to form new connections, links, and relationships in order to tell the contextual narratives. It is apparent that there are multiple stories within this narrative depending on the hierarchy different concepts are given during the mapping process. Additionally, the diverse outcomes are also influenced by the person constructing the map and interpreting the information. This highlights that with the mapping method, there will always be multiple subjective truths depending on who is looking.

The plural nature of the history illustrates one reason why there is such a struggle in finding clear and concise philosophies or approaches within modern sustainable architecture. Through the framing of the history, it is clear there are many beginnings to the history, and furthermore many perspectives and versions of those same beginnings. Approaches have developed in different time frames; often building on existing knowledge, but not always the same knowledge. Each architect’s understanding and version of similar approaches differ in many aspects. This includes how the approach is defined, its intention, its integration of technology, and its relationship to the broader architecture discipline as well as the strategies employed. It has been made clear that are many terms used as synonyms for sustainable architecture, and using them interchangeably with the same meaning has an effect on the field - contributing to the elusive meaning of different terms. The introduction, perspective, and application of technology in sustainable architecture has affected different approaches through the history - some positively and others less so.

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Chapter Five

Questionnaire with Experts

This presents a review of the available literature relating to the research focus, the relationship between sustainable architecture practice and discourse. This discussion includes; mapping the literature; sustainability, sustainable development and sustainable architecture; and between discourse and practice. Additionally, this chapter serves to position and orient the research with the constructed five themes: Definitions, terminology, and language; greenwashing and techno-centrism; information, knowledge, and discourse; approaches, attitudes, and perspectives; and visual language which forms the findings. The intent is not to convey an exhaustive analysis of the five themes but to point to ongoing research activities and concerns related to this work.

5.1 INTRODUCTION

This questionnaire with experts from within sustainable architecture allowed for specialist information to be gained concerning the relationship between discourse and practice. This non-statistical self-completion questionnaire was designed to gather significant information, rather than statistical data to understand connections and gaps from the perspectives of different subgroups of experts – practitioners, academics, and researchers. This study also aimed to apprehend whether the three previously outlined themes (definitions, greenwashing, and communication) from Chapter Four were similarly present outside of the literature, and to define the content of each theme further. The online questionnaire titled: “Sustainable Architecture: Theory and Practice”, was designed with questions based on these three themes. These questions were divided into three main parts, each relating to the different interactions between theory and practice: Part A - approach, Part B - content and Part C – dissemination. These three parts were further developed into different question styles – multiple choice, scalar, and open-ended. The questionnaire was conducted in 2016 with a purposive sampling of participants without geographical constraints. As mentioned, it was not the intention of the questionnaire to garner generalisable results, instead gaining a snapshot of a cross-section of specialists from within the field at one point in time (Neuendorf, 2016, p. 77). In addition, the questionnaire was used as an initial method to identify potential interviewees for further exploration at a later stage in the, as covered in Chapter Six.

This questionnaire built on other similar research such as the questionnaire conducted by Brian Edwards in the July 2001 edition of *Architectural Design*. That questionnaire has often been referenced by Simon Guy in papers such as “Cultures of architecture and sustainability” (Guy, 2005). This ‘Green Questionnaire’ contained four questions and was completed by prominent architects – Norman Foster, Richard Rogers, Jan Kaplicky, Ken Yeang and Thomas Herzog. Each architect was asked:

What is your, or your practice’s definition of sustainable design?
What are your key concerns as a designer interested in sustainability?
How would you judge the success of a building in the “green” age?
In what way do you use nature as a guide?

The first question relating to the definition was of most interest to my research. These five architects all demonstrated very different, and sometimes contradictory, ways of understanding and defining sustainable architecture. This ‘Green Questionnaire’ combined the conclusion of the literature review (section 2.6) that sustainable architecture is merely a buzzword with no meaning - a buzzword unable to be defined - led to designing large sections of this questionnaire so as to gather more insights into these areas of debate.

Guy (2012, p. 560, 2005, p. 469) examined the responses from these five architects, concluding that:

“the mainstream of architecture is in some disagreement about design priorities, the role of technology, the importance of aesthetics, the relationship of natural and built environments and the degree of optimism or pessimism that the current state of sustainable architecture practice should invoke” (Guy, 2012, p. 561).

Furthermore, as this questionnaire was completed in 2001, I was interested in understanding whether the complexity and contradiction in defining sustainable architecture, as done by those five architects, would still be relevant now, and how they compare. Foster uses the “less is more” and “waste not want not” proverb to frame his definition of sustainable design - “doing the most with the least means”. He advocates for “using passive architectural mean to save energy”; for conserving non-renewable fuel and subsequent pollution. Foster continues: “sustainability is about good architecture”, which involves quality of thinking, materials and functionality (Architectural Design, 2001, p. 32). Kaplicky - similar to Foster - focused on materials, performance, and energy efficiency in his definition. He states that “the fewer materials a building uses the greener it is – less resources and energy are used to produce it” (Architectural Design, 2001, p. 34). Roger’s definition: “Sustainable design aims to meet present needs without compromising the stock of natural resources remaining for future generations”, is very much in line with the Brundtland definition. Roger elaborates, “The key issues are: low energy; loose fit; resource efficiency” (Architectural Design, 2001, p. 36). Yeang also has a focus on materials and energy in his definition, and expands, “sustainable design can be defined as ecological design – design that integrates seamlessly with the ecological system in the biosphere over the entire life cycle of the built system” (Architectural Design, 2001, p. 60). Lastly, Herzog, like the others, also focuses on energy but from a slightly different angle. Herzog develops that: “sustainable design can be defined as a working method, aimed at the preservation of our natural resources while using renewable forms of energy – especially solar energy – as extensively as possible” (Architectural Design, 2001, p. 74). These understandings helped to frame some of the questions within the survey, seeking to understand if energy and materials are still a focus, and how sustainable architecture is understood today.

A more recent survey has been conducted and published by the EDUCATE (Environmental design in University Curricula and Architecture Training in Europe) program in 2012. This amassed 370 responses focusing on three topics within sustainable environmental design: in the architectural curriculum; in education and professional development; and in regulation and client requirements (Altomonte, 2012). This survey contained eighteen scalar questions and while they do not directly relate to the focus of my research - given their focus on education - there are some questions and areas of focus which overlap and can thus draw comparisons with the findings of my questionnaire; these are discussed later in this chapter in section.

The design of this method will be outlined in the following sections. This includes the questionnaire and protocol design, participant selection, the use of a pilot questionnaire, data collection, analysis, and ethics. After outlining the method, the findings of this questionnaire will be first described for different sections; selected questions will be compared and then discussed with concern to the literature review and contextual narrative.

5.2 OUTLINE OF THE METHOD

The point of departure in designing this questionnaire was the three established themes (definitions, greenwashing and communication) which emerged from the literature and contextual narrative. In addition to these themes, the questionnaire also sought to generally understand how the respondents perceived the connection between sustainable architecture discourse and practice (at the time of the survey design, this was called theory and practice). As stated, the initial design of the questionnaire identified three subgroups of experts: architectural practitioners (referred to as practice in the remainder of this chapter), academia and research (referred to only as academia in the remainder of the chapter), and other related disciplines such as municipalities and consultants. This additional 'other' category was included due to the fluid nature of the architecture profession, allowing me to branch out into other related fields. Three versions of the questionnaire were designed with language varied for each subgroup within the first two sections (Part A and B) that encompassed the core questions. The language varied subtly, replacing words such as office or department depending on the profession. However, slightly differing questions were designed within the third section (Part C) for each subgroup; consequently, only the first two sections were compared across subgroups in the analysis, as the questions differed too significantly to combine responses for Part C. However, as there were very few responses to the third 'other' subgroup and it was established that it was out of my scope, that third subgroup was disregarded.

Around twenty-six questions were designed, nineteen of which were in Part A and B; these consisted of nine multiple-choice, five five-point-scaler, three ranking and two open-ended questions. Part C consisted of five multiple-choice and three five-point-scaler questions for academia, and seven multiple-choice, one five-point-scaler and one open-ended question for practice. Every question except the open-ended questions had an opportunity for 'other' responses. A combination of question styles were used. Open-ended questions are inherently exploratory and designed to receive large amounts of content, providing the freedom for the experts to demonstrate their knowledge and offer the opportunity to gain insight on topics not previously thought of (Hanington and Martin, 2012, p. 172). However, they are time-consuming. Thus, only a limited number were used and these were subsequently supported by multiple-choice and scaler answers, being more time efficient for respondents. Furthermore, the order for multiple-choice answer options was randomised for each respondent, to mitigate the options at the top of the list more frequently.

5.2.1 Questionnaire participants

The scope of participants at this stage in the research remained very broad; the primary constraint was that participants were experts in the field of sustainable architecture. I chose to focus on experts so as to narrow the scope and gain informed information. Those considered as an expert were those very knowledgeable or skilful in the area of focus (Oxford Dictionaries, 2018). As already mentioned, no geographical limitations were applied. Consequently, as the questionnaire was provided in English, and therefore many of the potential respondents were gathered from English literature, there was an unintended narrowing of the scope to Anglo-Saxon countries, as well as Northern and Central Europe.

An estimate of respondents which would be interesting to study was calculated rough despite this questionnaire being non-statistical. To construct the number of respondents from practice and academic experts in sustainable architecture, it was first necessary to determine the population size. However, as there is no directory or registry and it is therefore not possible to form a total population size, an estimate was calculated from the number of authors and professors. This was not crucial and the sampling procedure was used more as a guideline. Survey Monkey's sample size calculator was used to calculate an estimate for the population (<https://www.questionnairemonkey.com/mp/sample-size-calculator/>) using the following input: total populations – 5000; confidence level – 95%; and margin of error – 10%. This gave the sample size of ninety-five responses. The questionnaire, therefore, aimed to gather at least one-hundred responses from chosen experts in the field.

A purposive sampling method was utilised to consciously select experts to participate as they can readily articulate their experience of the field (Fowler, 2013), and this method is often used in grounded theory (Currie, 2009). As mentioned, the list of experts was curated from literature, architecture awards lists, widely known sustainable architecture practices, networks from myself and my supervisors, as well as an open call for suggestions from multiple groups on LinkedIn. From this list, possible participants were filtered using the following criteria:

- Academics who are teaching or involved in a 'sustainable architecture' related course at a university level.
- Academics who are conducting research or publishing within the field of sustainable architecture.
- Academics who are best known for their knowledge of sustainable architecture and publications.
- Architectural practitioners working in an architectural practice which either specialises in sustainability or within a specialised sustainability team or department.
- Architectural practitioners who are registered LEEDS, BREEAM, DGNB or other sustainable certification consultants.
- Architecture practitioners who have well-known publications on sustainable architecture or built examples.
- Architecture practitioners who are promoted as a specialist or expert on the

practice's website.

- Architectural practitioners who are well-known for their knowledge of sustainable architecture.

Experts were chosen as respondents as this allowed for specialist information and qualified knowledge. For this reason, open-ended questions were included and an opportunity for 'other' answer options, so as to receive large amounts of content and provide the experts with the freedom to explicate their knowledge and expertise.

5.2.2 Data collection

Three-hundred and nine invitations to participants were emailed, and 162 responses received. Of the 162 responses, twenty-three were partially completed, and ten identified 'other profession' (not in architectural practice or academia) and were subsequently disregarded. This left 129 correctly submitted responses (response rate of forty-one percent) to be aggregated and analysed. Of the 129 responses, 62% were from practice and 38% from academia. The majority came from seven countries: Australia (7%); Denmark (14%); Germany (6%); New Zealand (12%); Sweden (6%); United Kingdom (22%); United States of America (22%). Furthermore, 11% had fewer than five responses each for the following countries: Canada; Switzerland; Netherlands; Italy, India; China; Chile; and Mexico. It is clear the number of responses was not equal from each country. However, it was clear when selecting the respondents that the total population size of a country limits the number of architects and subsequent experts in the field. Therefore, I expected that there would be differences in the number of responses from each country. In addition, professional mobility within architecture is common, and consequently many of the respondents do not reside in their country of birth. As mentioned previously in the scope, there was no intention to delimit by geography - this is evident in the responses as 66% come from Anglo-Saxon countries (US, UK, New Zealand, Australia and Canada), around 30% work in Europe (Denmark, Sweden, Germany, Switzerland, Netherlands, and Italy), and the remaining 4% are global. The third variable was office or department size: respondents from small (up to 10 employees) office or departments made up 31%, from medium (11 to 29 employees) 21%, and from large (30 plus employees) 49%. All responses were imported to Excel, aggregated, and answers weighted to address the uneven representation in some variables – country, size and profession (Fowler, 2013, pp. 135–6). As a result, all question counts were converted into percentages and thus analysed and presented in this weighted form.

5.2.3 Analysis

Questionnaires are not a method commonly found within grounded theory; however, the iterative nature of grounded theory influenced how this information was analysed. Some questions related directly to the three themes, while others aimed to probe additional unknown areas. The information was examined and described first to find

'concepts or categories', and then at a later date analysed a second time to look directly for specific themes.

In order to analyse the collected information, all responses from both practice and academia Part A and B were aggregated and analysed together. Part C was aggregated and analysed separately for practice and academia, given that the questions differed slightly, as earlier explained. To begin, descriptions of the findings were constructed from the responses without drawing inferences for the entire field. This was followed with enquiries into the correlation between some key questions, achieved by analysing how respondents answered a specific question and then subsequently responded to another question. The first analysis aimed to describe and indicate significant differences in responses with relation to three main variables: country, profession, and size. All questions were therefore filtered by each of these variables (Appendix A) and then consistencies and variances noted. If the results were consistent despite the differences in variables, the data was then considered as a whole for the second analysis. However, if there were significant variations due to the three primary variables, then this was taken into account in the next correlational analysis. When comparing countries, only the seven countries (USA, UK, DK, SWE, DEU, NZ, AUS) with more than five responses were included.

Conversely, there was no significant variance in responses from the respondents of different countries; all responses, despite this variable, were therefore used for the whole analysis. The two open-ended questions (B8 and C11) were thematically analysed using Nvivo. Findings were documented and directly led to the development of some of the interview themes and questions, as discussed later in Chapter Six. After this first analysis, some questions which did not provide interesting results or were no longer pertinent to the research, were disregarded in the subsequent analysis. As outlined earlier, each question was designed with an 'other' option; these responses were considered when analysing each question but were not introduced into the response rates.

5.2.4 Hindsight and the questionnaire

The grounded-bricolage nature of this research approach meant that the initial aims of the research changed as it progressed. Therefore, this study's purpose also changed as additional information was collected from subsequent studies. As Oppenheim (2000, p. 7) explains: "We often find that as the research takes shape, our aim undergoes a number of subtle changes as a consequence of greater clarity in our thinking". This resonates with this study as the initial aim involved exploring an area unknown, in order to delimit the scope and progress further with the overall study. An example of this is that there were only three main themes when first conducting the study, with two additional themes being introduced later. This meant that the information constructed in this study was helpful at the time of collection, as the questions were designed to answer what was at that point unknown. However, after progressing further with this research, the role and interpretation of the responses changed. Consequently, if I were to conduct the survey again, the focus and design

would be very different. Additionally, Oppenheim (2000, p. 7) continues to explain that a questionnaire can seem like a “quick” and “easy” way to gather information, but “the weakness in the design is frequently not recognised until the results have to be interpreted – if then”. This excerpt is very relevant for this questionnaire as it has been a learning progress, not only in content but also method design; as it states, no matter how much foresight I thought I had, the weakness in the design of this study was only apparent after collecting responses. For example, subsequent to the realisation that experts only give one side of the picture, and as part of the grounded-bricolage approach, this has been supported by additional methods in Part Three which collect information from broader sources.

5.3 CONSTRUCTING FINDINGS

The findings constructed from this study will be presented in three sections, as they were analysed. Firstly, a description will be provided of key findings from parts A and B, followed by a description of key findings from part C presented separately for both practice and academia. Secondly, the correlation between some fundamental questions will be presented and lastly, a discussion will be presented of the conclusions. These conclusions will be framed by the three central themes (definitions, greenwashing and communication) that were pertinent at the time of conducting this study, as well as the additional two tentative themes (Approaches and visual language) which emerged as a result of the combined insights from the contextual narrative (Chapter Four) and this questionnaire.

5.3.1 Descriptions of findings: Part A and B

From the first analysis, some descriptions of the information were constructed to form some initial outcomes. All of the tables of data can be viewed in appendix A; however, a descriptive overview is as follows:

In many cases, there are established frameworks set by offices or institutes which may influence how sustainable architecture is practiced. This is exemplified by the following questionnaire responses:

- For the respondents, specific sustainability strategies and philosophies seem to be the norm in the majority of instances, across geographies. Approximately 90% of individuals working in practices indicated that sustainability is well integrated into their activities and they have developed a sustainability strategy and philosophy. This is not the case for academia, where the number of respondents who indicated a specific and known sustainability strategy (46%) in their place of work was approximately the same as those respondents who reported there is no particular strategy (41%). Sustainability strategies appear to be clearly defined in both small and large offices, while it is often not explicitly defined for medium-sized offices. (Appendix A: QA6, p. A5), (Figure 5.1)
- Of the 88% who indicated there was a specific sustainability strategy, 78% of the respondents noted that - whether implied or clearly stated - there is a

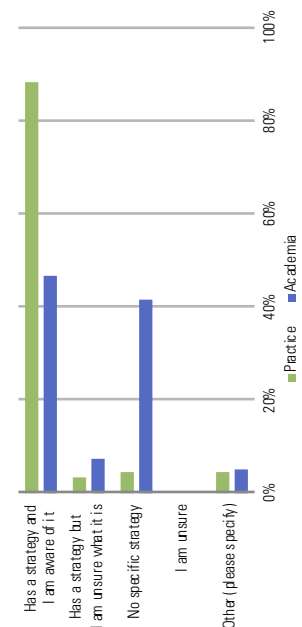


Figure 5.1 Q.A6 - Awareness of respondents sustainability agenda within their office or institute

consistent overall strategy, as opposed to one that changes project to project (occurring 20% of the time). (Appendix A: QA7, p. A4)

These responses made it clear that there is a high level of expertise displayed by the selected experts, in addition to connection, community and the possibility to achieve their agenda. These following responses were expected considering the expertise of participants:

- The majority (84%) of the population agreed that they are part of a sustainable community. This was consistent across all three variables, with 45% of the respondents strongly agreeing and 39% agreeing. (Appendix A: QA8, p. A5)
- The majority of the respondents agreed that they are in contact with other architecture offices or departments interested in sustainable architecture. This was also consistent across all three variables, with 89% of the respondents strongly agreeing or agreeing. (Appendix A: QA8b, p. A5)
- 88% of respondents rated their understanding of sustainable architecture as a four (25%) or five (63%) on a scale of one to five with five being expert understanding. (Appendix A: QB1, p. A5)
- The majority (70%) of both practice and academia respondents strongly agreed or agreed that they can achieve their sustainable agenda. (Appendix A: QC10, p. A17)

It was made evident that there is a diverse knowledge base of sustainable architecture strategies as different sub-categories and strategies were not consistent across all responses. However, passive and energy-related techniques seemed to have a higher tendency than others. This may be due to the requirements of policy and regulations, but the direct cause is uncertain.

- Of the areas of focus within sustainable architecture that were listed in the questionnaire, there was an overall focus on holistic sustainable architecture (19%) passive environmental (17%) and energy efficiency (13%).

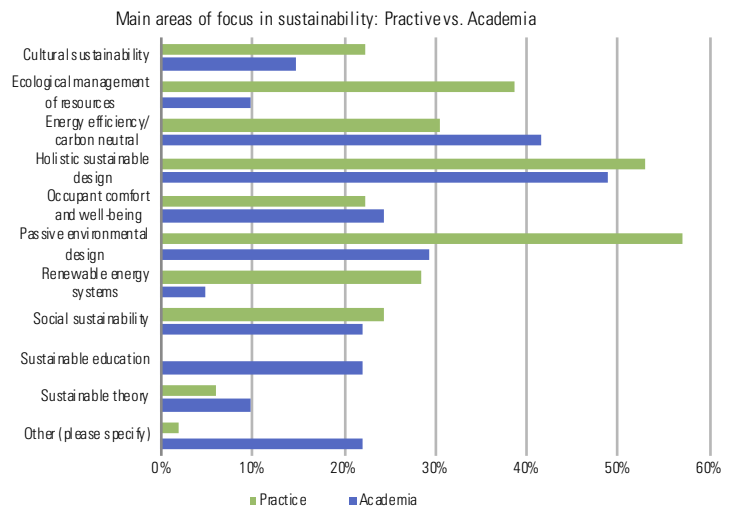


Figure 5.2 Q.A4 - Respondents areas of focus in sustainability: Green -practice, blue - academia

However, there were disparities between practice and academia for both options - energy efficiency and passive environment. For energy efficiency, academia had a higher response rate (17%) than practice (11%) which was interestingly inverted with passive environment; academia has a lower response rate (12%) than practice (20%). (Appendix A: QA4, p. A2), (Figure 5.2)

- Of the categories - technology, economic, social, aesthetic, political, environmental and cultural - the majority were considered important or very important. However, slight variances occurred in responses within countries and professions. Politics were more important in Denmark (6% not important) and Sweden (0% not important) than other countries. For example, 33% of the respondents from New Zealand and Australia found politics not important, as did 38% of the respondents from Germany. Also, economics was considered 100% important or very important from the practice respondents, while 17% of the academic respondents found it not important. Similarly, 2% of the respondents from practice found aesthetics not important, compared with 22% of the academic respondents who found it not important. (Appendix A: QB2, pp. A6-7), (Figure 5.3)
- The majority of respondents responded that they are familiar with or have knowledge of the majority of theories or approaches in sustainable architecture. The highest results included passive architecture (81%), solar architecture (79%), zero energy (79%), bioclimatic architecture (68%), reuse and recycling (68%) and passive house (66%). (Appendix A: QB3, p. A8)

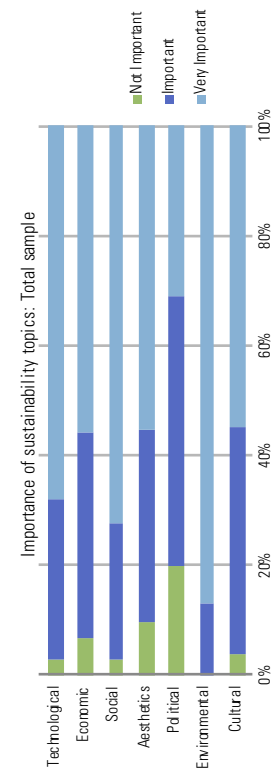


Figure 5.3 Q/ B2 - Level of importance: stacked bar-graph showing the level of importance placed on subcategories of sustainable architecture.

From the responses there were evident inclinations towards specific written sources for gathering information; however, this varied when asked to indicate the frequency of use which did not entirely compare.

- Of the total responses, the main sources to gain information about sustainable architecture were consistent across the three variables; books (80%), built examples or precedents (79%), conference and fairs (71%), professional journals (66%) and websites (66%) being the main sources. However, some slight variations arose. The respondents from practice read academic journals less (27%), while the academic respondents read both professional (62%) and academic (73%) journals. Another variant indicated was that small office or departments use academic journals (24%) and conference (52%) less than medium or large office or departments. (Appendix A: QB4, p. A8), (Figure 5.4)
- Of the total respondents, websites (35%) were the most common source for daily use to gain knowledge about sustainable architecture and built examples, with precedents most often used weekly (32%) and monthly (30%). Some variations included academia's use of journals daily (24% academic and 15% professional) compared to 0% of practice using either academic or professional journals daily. Co-workers were found to be used

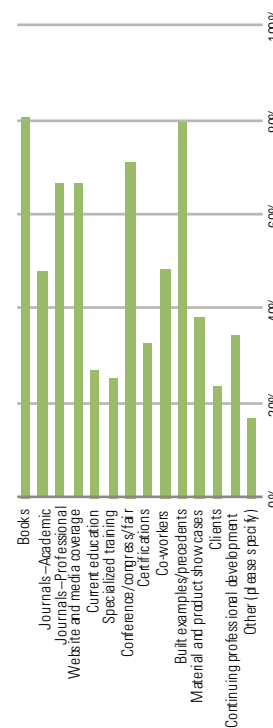


Figure 5.4 Q.B5 Sources to gain knowledge

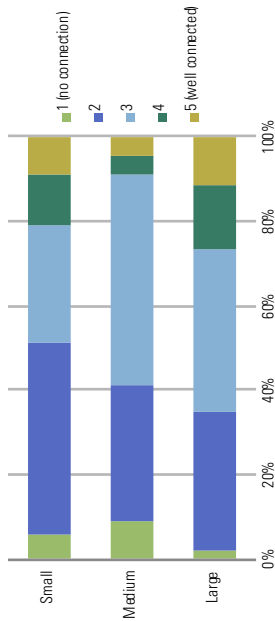
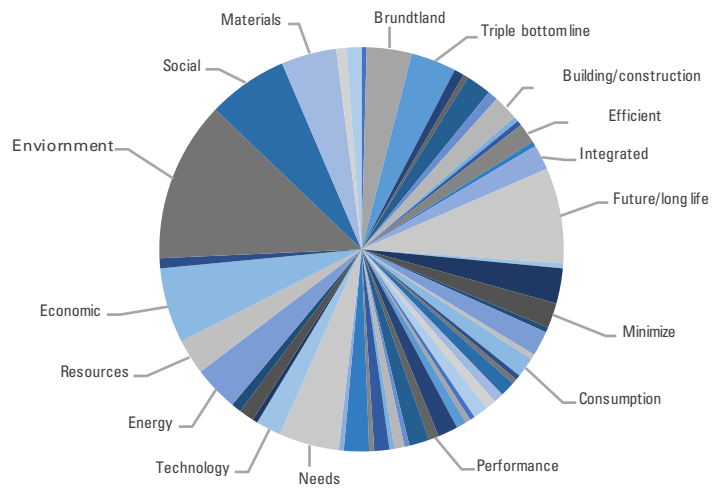


Figure 5.5 Q. B7
Perceived level of connection between knowledge and practice

Figure 5.6 (right) Q.B8 - Definitions of sustainable architecture: pie graph illustrating the diversity of responses highlighting some key themes



- From the total respondents, not one response to the open-ended question: ‘How do you define sustainable architecture?’ was the same as another, and responses often varied considerably. Some of the common themes described included: 33% referred to the theme of the natural environment, 17% referred to social themes, 16% described economic themes, 10% showed influence from the triple bottom line, and 9% showed influence from the Brundtland report. (Appendix A: QB8, p. A12), (Figure 5.6)
- When asked the open-ended question: “What do you think needs to change for sustainable architecture to progress in the future?”, common themes which emerged from the respondents’ responses were more policy/regulations/legislation (20%), increased education (13%), increased awareness (9%), increased subsidies/incentives (7%) and economic factors (7%). Some differences were noticed in the variety of themes from those in practices, while those in academia had more grouped themes. Interestingly, policy/regulations/legislation were more common in academia (30%),

compared with practice (13%). It was also evident that the progression of sustainable architecture extends outside the realm of only architecture, with 44% of responses indicating the involvement of broader society, governments, the construction industry as a whole, or other disciplines entirely. (Appendix A: QC11, p. A23)

This initial description of Part A and B indicates that only for a select few questions were their disparities between the geographic variable or the size of an office or department. The few disparities which appeared related to the size of office or department; not unexpected, especially when related to small offices and answers given such as the low use of academic journals or similar - likely due to the limited resources available in a smaller office. However, some differences in responses occurred between academia and practice. These initial findings have indicated that there are many ways in which different areas of sustainable architecture are focused on, understood and defined. These findings have also indicated that the connection between discourse (referred to as theory in this questionnaire) and design practices is an area which is not well defined and agreed upon.

- There are some discrepancies between practice and academia concerning how embedded sustainable architecture is in their office or institute, and how it is considered theoretically and practically.
- The majority of practices have sustainable architecture embedded in their office to some extent – with 88% indicating a three, four or five on a scale (one being separated, and five being fully embedded). (Appendix A: QPC1, p. 17)
- Sustainable architecture is somewhat embedded in education and/or research at the respondent's university. On a scale of one (separate) to five (fully embedded), 74% of respondents answered between two and four. (Appendix A: QAC1, p. A21)
- Respondents indicated that sustainable architecture is considered both theoretically prior and during the design phase 90% of the time, and this was consistent over all three variables. (Appendix A: QPC2, p. A17)
- Sustainable architecture is taught in both studio and non-studio environments the majority of the time (79%). (Appendix A: QAC2, p. 21)

5.3.2 Descriptions of findings: Part C

The findings from Part C will be presented below in two different descriptions; firstly encompassing responses from practice, followed by responses from academia.

- When practitioners from this questionnaire referenced a specific building of their choice, there are some common strategies, which were defined as goals. These were often set by the client and respondent; nearly half of the respondents used rating systems, and most of the respondents achieved their sustainable agenda. Some of the key findings from architectural practitioners are elaborated below:

Figure 5.9 Use of different strategies: Bar graph of strategies employed in buildings respondents identified.

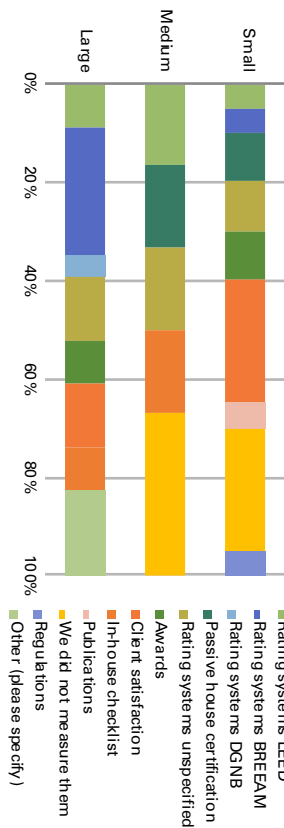
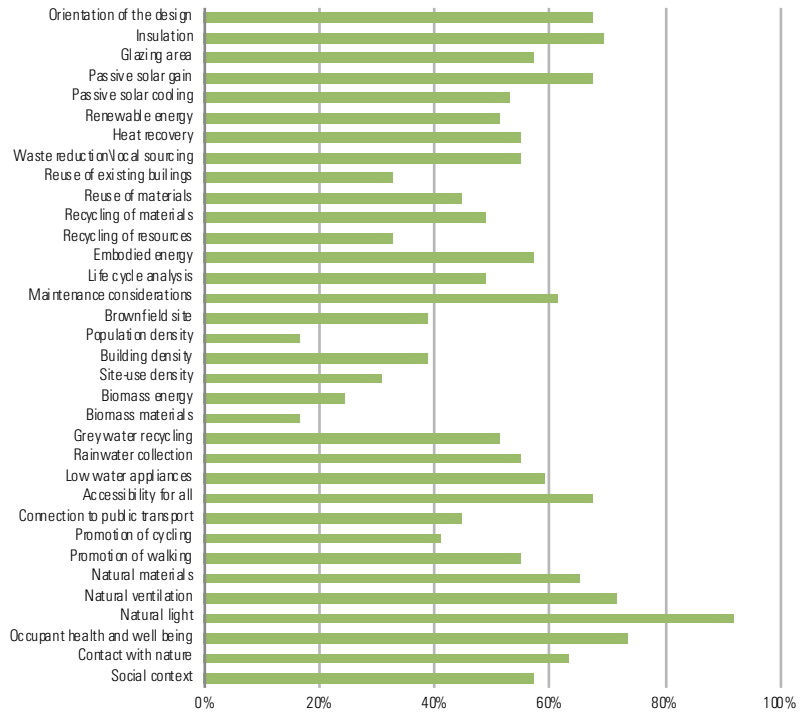


Figure 5.8 Q.PC7 - Rating systems: Graphs of systems used to rate select buildings which the respondents used as examples.

- When referring to a specific building that the respondents were involved in, the five most common types of sustainable considerations and strategies which were incorporated into the design goals in that particular building were: natural light (92%); natural ventilation (71%); occupant health and wellbeing (73%); climatic consideration (71%); and insulation (69%). This compares with the five least common: biomass energy (24%); political context (24%); population density (16%); biomass material (16%); and green roofs (10%). (Appendix A: QPC5, p. A18), (Figure 5.9)
- The respondents indicated that these considerations and strategies, as mentioned above, were most often defined by the client (73%), the respondent (61%), and the design team (57%). Responses indicated an inverse relationship between the respondent or the design team defining the considerations and strategies in large and small offices, with the respondent in small offices defining them 75%, and the design team in large offices defining them 74% of the time.
- Interestingly both building and construction law and policy only defined the considerations and strategies 14% of the time. (Appendix A: QPC6, p. A19)
- Of the respondents, 43% use some form of rating system (LEED 8%, BREEAM 14%, DGNB 2%, Passive house 6%, unspecified 12%) to measure whether the sustainable considerations and strategies were achieved. This was more often in large (52%) and medium (50%) sized offices, as opposed to small (32%). Further to this, large offices all measure in some way or another. (Appendix A: QPC7, p. A19), (Figure 5.8)
- Of the 43% of practice respondents who indicated there was a rating system used, a majority (69%) further specified that the rating system was a goal

from the outset and most often this goal was set by the client (88%). In contrast, in small offices, 50% of the time this goal was established by the respondent. (Appendix A: QPC7a, p. A19)

- The majority of respondents felt these strategies and considerations were somewhat- to fully- achieved. 24% of respondents indicating that 61-80% of the strategies and considerations were achieved between the initial design goals and construction. (Appendix A: QPC9, p. A20)
- If the sustainable design goals were not met, the most common factors which hindered the respondent were: a lack of financial incentives for sustainable designs (53%); the sustainable options are/were too expensive (43%); a lack of expressed interest from the clients (18%); and 'sustainable' products not being available in the construction area (18%). (Appendix A: QPC10, p. A20)

Academics and researchers indicated in this questionnaire that they disseminate their knowledge to different sources as well as different audiences through mostly visual methods. They are often visiting conferences and universities, and communicating with practice occurs frequently and is considered significant. Some of the key findings from architectural research and academia are:

- Respondents indicated that in the past two years the main areas which best described where they disseminate sustainable architecture related knowledge are conference (93%), academic journals (74%), and book chapters (64%). (Appendix A: QAC3, p. A21) This is interestingly compared with practice, where all of the respondents indicated that they only disseminate through architectural design or buildings, including competitions. (Appendix A: QAC5, p. A22), (Figure 5.7)
- Academic respondents reported that the most common environments they have visited in the last two years relating to sustainable architecture are conferences (90%), other universities (74%) and other research institutes (67%). (Appendix A: QAC4, p. A21)
- The respondents evidenced that the primary audience in which they disseminate sustainable architecture knowledge to, is students at their university (90%), architectural professionals in practice (74%), and students at other universities (71%). (Appendix A: QAC5, p. A22)
- The majority (86%) of academic respondents indicates that it is their own self who motivates them to disseminate knowledge about sustainable architecture. (Appendix A: QAC6, p. A22)
- The main media used by respondents to disseminate knowledge was indicated to be lecture-based teaching (93%), built examples or precedents (67%), and sustainable design strategies (67%). (Appendix A: QAC7, p. A22)
- The majority of respondents (81%) strongly agreed that it is important that sustainable architecture research is disseminated into architectural practice. While only 17% strongly agreed, and 48% agreed that there is an interest

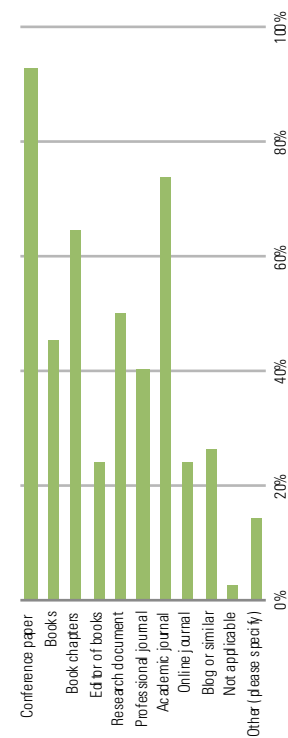


Figure 5.7
Where academia disseminates knowledge

from architecture practice in sustainable architecture teaching or research. (Appendix A: QAC8, QAC9, p. A22)

It is clear from these descriptions that sustainable architecture is considered both theoretically and in design practices, and this is evident through how it is practiced, taught, and disseminated. Findings have shown that there is a connection between the respondents' existing knowledge and what strategies they are implementing in their design. However, this also indicates that strategies with high response rates are fundamental and general, while more specific or specialist strategies are less common such as green roofs.

5.3.3 Correlation of key questions

After describing the responses to the questionnaire, some key questions were further investigated through the comparison of the results. Specific questions were filtered by chosen questions to understand if there were relationships between that particular question and another. Four questions were used to filter and examine additional questions, and the topics that these questions encompassed were: the importance of different subcategories in sustainability (technology, economic, social, aesthetics, politics, environment, and culture); various sources used to gain knowledge about sustainable architecture; the perceived level of connection between existing knowledge and how sustainable architecture is being designed and constructed; and lastly, what different approaches offices/departments use to work towards their sustainable agenda. Some of the key findings are as follows:

The level of importance of subcategories within sustainable architecture:

- Of the respondents who focus on energy efficiency/carbon neutral and holistic sustainable design in their research/teaching/practice, there was found to be a lower frequency (between 8-17% lower) of aesthetics and culture being considered very important, in comparison to the other options. Similarly, cultural sustainability and passive environmental design also received lower responses for aesthetic and culture. However, the inverse was shown to occur when renewable energy systems, social sustainability, sustainable education and sustainable theory are the respondent's area of focus; in these cases, aesthetics and culture are rated very important and occur more often (between 6-20% higher) than the other categories. Interestingly, in contrast to what one would expect, there is also little correlation between the area of focus and level of importance. For instance, only 14% of respondents who focus on the area of cultural sustainability rated the culture as very important. Further, only 26% of respondents who focus on the area of ecological management of resources indicated the environment as very important, and 24% of those who focus on social sustainability indicated social aspects as very important. (Appendix A: QB2/A4, p. A28)

- The subcategories within sustainability in which the respondent's reported as very important did not seem to have an impact on which sources respondents use to gain knowledge about sustainable architecture. (Appendix A: QB2/B4, p. A28)
- Similarly, the subcategories within sustainability which respondents find very important did not seem to impact which strategies they know. (Appendix A: QB2/B3, p. A28)
-

Sources used to gain knowledge about sustainable architecture:

- Many of the sources to gain knowledge were consistent across the areas of focus within sustainable architecture. So slight variances include: certifications were shown as only used 4% by those who focus on cultural sustainability. Those respondents who focus on social sustainability use co-workers as the most frequent source of knowledge (32%). Whereas for passive environmental design co-workers are used the least (32%). (Appendix A: QB4/A4, p. 29)
- The sources which respondents indicated they use to gain information about sustainable architecture, have little impact on the different movements, theories or concepts in which they have specific knowledge of. (Appendix A: QB4/B3, p. 29)
- A disparity was evident between where respondents from academia gain knowledge from and where they disseminate it to. Academic respondents gain knowledge from books (88%), conferences (85%), built examples and precedents (83%), academic journals (80%) and professional journals (73%); meanwhile academic respondents disseminate to conferences (93%), academic journals (74%) and book chapters (64%).
- Similarly to academia, there was also a disparity shown between where knowledge is gained and provided. Respondents from practice indicated that they gain knowledge from built examples (77%), books (76%), and websites (68%), yet only disseminate through architectural designs or buildings, including competitions.

Perceived level of connection between existing knowledge and what is being designed and constructed:

- Respondents indicated slight variations in the areas within sustainable architecture which best represent their research/teaching/practice. This was shown to depend on how connected they consider existing knowledge, and what is being designed and constructed. Holistic sustainable design and passive environmental design were consistently high across all ratings. However social sustainability (50%) proved higher for those respondents who rated the connection as one (no connection). Energy efficiency and carbon neutral were more common for those respondents who rated the connection as two (32%) or three (46%). For those respondents who believed there

is more of a connection (rating it as a four or five), occupant comfort and wellbeing (four- 40%), sustainable education (four – 30%), and renewable energy systems (five – 40%) were more common areas of focus. (Appendix A: QB7/A4, p. A31)

- The respondents' perceived level of connection between existing knowledge and what is being designed and constructed, somewhat impacts the level of importance they give subcategories within sustainability. The majority of respondents who indicated the connection at five (well connected), found economic (91%), environmental (82%) and social (73%) factors very important. Interestingly, these are the three factors from the sustainable development pillars. Similarly, the majority of respondents who rated the connection as two, three or four, mostly found the subcategories environmental (2- 90%, 3- 85%, 4- 92%), social (2- 64%, 3-79%, 4- 77%) and technological (2-67%, 3-69%, 4-77%) very important. Respondents who indicated there is less of a connection, deemed aesthetics and political subcategories not important more often than other categories by. (Appendix A: QB7/B2, p. A31)
- The respondents' perceived level of connection between existing knowledge and what is being designed and constructed as shown to somewhat impact the specific movements, theories, and concepts that the respondents have knowledge of. Respondents most frequently indicated that they had knowledge of zero energy and solar architecture consistently across all perceived connections. This was closely followed by passive architecture, which had high response rates by all except those respondents who indicated the connection as one (no connection), and passive technology which also had high response rates by all except those who indicated the connection as four. (Appendix A: QB7/B3, p. A30)
- The respondents' perceived level of connection was shown to somewhat impact the sources used to gain knowledge about sustainable architecture. Respondents who indicated there was no connection use books, academic, and professional journals the most (80%). While the remainder of respondents were more similar in their responses; the majority using books, professional journals, websites, conferences, and built examples. (Appendix A: QB7/B4, p. A30)

How offices/departments approach working towards sustainable architecture agenda:

- There were some differences shown in the level of importance that different subcategories of sustainability are given based on the how the respondent's office/department approaches working towards their sustainable agenda. Social and environmental are considered very important by the majority of respondents, irrespective of their office's/department's approach. Respondents who constitute the only person in their office/department

working towards their sustainable agenda, responded 27-38% less that technology is very important, while responding 6-20% higher that economic issues are very important when compared with respondents from other approaches. (Appendix A: QA5/B2, p. A26)

- There were some differences shown in the specific movements, theories, and concepts which respondents have knowledge of based on the how the respondent's office/department approaches working towards their sustainable agenda. Respondents, where the majority of employees work towards a common agenda (formal or informal), have knowledge of cradle to cradle, while those who work towards a common informal agenda have more knowledge of regionalism. Respondents who constitute the only person working towards their sustainable agenda have less knowledge of critical regionalism, solar architecture, and tropical architecture when compared with other approaches. While those respondents where only the sustainability team works towards the agenda, have more knowledge of tropical architecture, Earthships, and new organic architecture compared to other approaches. Those respondents who only work towards a sustainable agenda when a client requests it, have more knowledge of Passive house compared with different approaches. (Appendix A: QA5/B3, p. A27)
- There were some differences shown in the sources that respondents use to gain knowledge about sustainable architecture, and how the respondent's office/department approaches working towards their sustainable agenda. Academic journals are used more often when the approach is client specific (60%), or if there is only a team (78%) working towards the agenda. While academia and professional journals are used less (about 20%) when the majority of employees are working towards a common agenda (both formal and informal) compared with other approaches. Built examples and precedents are used between 12-25% less when the respondent is the only person working towards the sustainable agenda. However, when working alone, certifications are used 12-20% more as well as material fairs (7-14% more). Websites as a source proved relevant for all, despite the different approaches. Specialised training is lower for teams (11%) compared with if the majority of employees are working towards a formal agenda (34%). Those respondents who work towards their sustainability agenda when client specific, or when the majority of employees work toward a common agenda (formal and informal) indicated a use of clients for information 14-26% more, compared with teams or working alone.
- Interestingly, when working only when a client requests it, only 20% of respondents indicated that they use clients to gain information. (Appendix A: QA5/B4, p. A27)
- There were no considerable difference between how respondent's office/department approaches their sustainable agenda and the perceived level of connection between existing knowledge and what is being designed and

constructed. (Appendix A: QA5/B7, p. A27)

- There were some differences in the areas of focus based on and how the respondent's office/department approaches working towards their sustainable agenda. When the majority of respondents are working towards a common (formal or informal) agenda, there tends to be a higher involvement in holistic sustainable design. While cultural sustainability, sustainable education, and sustainable theory have higher responses when only the respondent is working towards their sustainable agenda. However, renewable energy is never a focus for respondents working alone, with 0% selecting this area of focus. When respondents work in a team, and are the only people in their office/department working towards their sustainable agenda, the ecological management of resources is less often the area of focus than other approaches. (Appendix A: QA5/A4, p. A26)
- In general, if respondents signified that the majority of employees are working towards a common agenda, regardless of whether it is formal or informal, responses were similar to most questions.

Filtering some additional questions by these four questions indicated that the focus of the respondents has a minor effect on how the following questions are answered, as do the sources used to gain information. However, the perceived level of connection between existing knowledge and what is being designed and constructed, was shown to impact additional responses; especially for those respondents who indicated that there is no connection. How an office or department works towards their agenda - whether it is a common agenda or project/client is specific - was also shown to affect how additional questions were answered.

5.4 DISCUSSION OF THE KEY THEMES

As mentioned earlier, after the first analysis of the questionnaire, additional studies and methods were designed to probe further into some of the findings which the questionnaire indicated as a possible field of enquiry. However, at a later date, the results from the questionnaire were revisited after gaining more information, narrowing the scope, and clarifying the different themes. This section will discuss some key results from the survey through the lens of the first three themes – definitions, greenwashing and communication - combined with information from the literature review and contextual narrative.

5.4.1 Definitions

The definitions, vocabulary, and language used when discussing sustainable architecture have been a consistent theme which has surfaced throughout the literature and questionnaire. This questionnaire aimed to address the themes raised in the literature review (section 2.5), specifically, the debate that sustainable architecture has no precise meaning, it has lost its definition, there are many definitions, or it is not definable. By asking participants to provide their definition of

sustainable architecture, this study intended to understand if these arguments were also visible in the participant's responses. It is clear that the reference as stated in the literature review (section 2.5.2) "that there are as many definitions of sustainability as there are people to define them", is supported by the diverse responses (Appendix A: QB8, p. A12) to this question, with not one answer the same as another. This emphasises that there is not one definition but a plurality of definitions. These different arguments were also supported unintentionally by one respondent, who rather than providing a definition, stated: "There are many definitions."; while another explained: "Sorry, but there are too many aspects to put in one definition". This was further emphasised with an additional participant indicating that maybe there should not be a definition, asserting: "I would not define it". Other similar responses included "It is just Architecture", with another response simply declaring it "common sense". At the beginning of this chapter, some of the findings were outlined from the Architectural Design 2001 "Green Questionnaire" completed by five prominent architects (Architectural Design, 2001). Comparing the result from my questionnaire to their responses has suggested that there may be a shift in the areas of importance placed in defining sustainable design. All five architects referred to energy in their definitions, compared with only 9% of my questionnaire respondents. Three of the five architects also referred to materials and resources, while only 11% (materials) and 7% (resources) mentioned these in their definitions. Inversely, only two of the five architects suggested the environment, and long-life or future thinking, while these two factors were most common in the respondents' definitions - 33% referencing the environment and 20% indicating long-life. This hints at a similar argument as outlined in the contextual narrative within the previous chapter; that definitions evolve with the social context in which they are constructed. This reinforces that there is no universal definition, nor should there be, and the flexibility to evolve along with its context is essential.

The responses also indicated that roughly one-third of the definitions provided describe sustainable architecture as a verb - in the sense that it is a process, either as design or an approach - while the other two-thirds understand it is a noun, describing the quality that sustainable architecture should or should not have as a built object. This suggests that, despite the variety of ways in which sustainable architecture can be explained, some contention is also evident in whether it is understood as a product or process.

The various definitions from this question were also supported by responses to additional questions that suggested that there are many factors and interests which are included under the umbrella of sustainable architecture. This was evident in the variety of responses to the question, signifying which 'theories, movements, strategies, and concepts' the respondents have knowledge of (Appendix A: QB3, p. A8) as well as the majority of subcategories of sustainability (technology, environmental, social, cultural, etc.) which are considered very important by the respondents (Appendix A: QB2, p. A7). It has been made clear that there are many understandings and definitions which are employed; however, what is not clear is

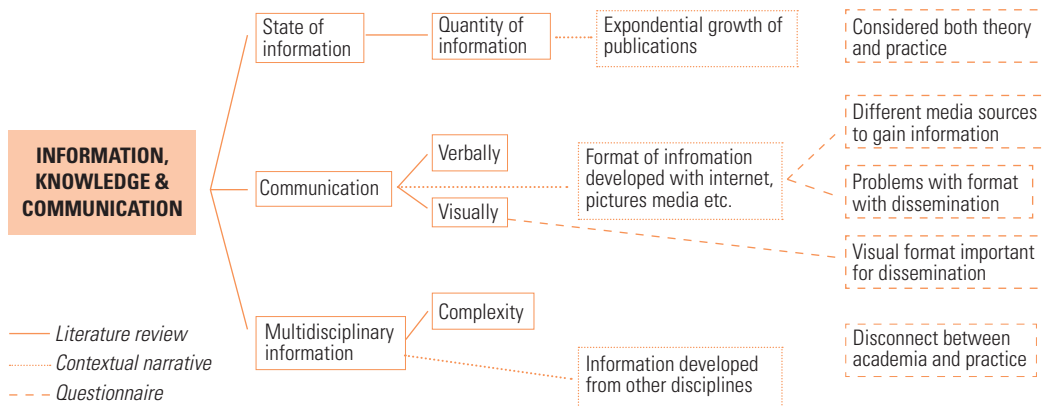
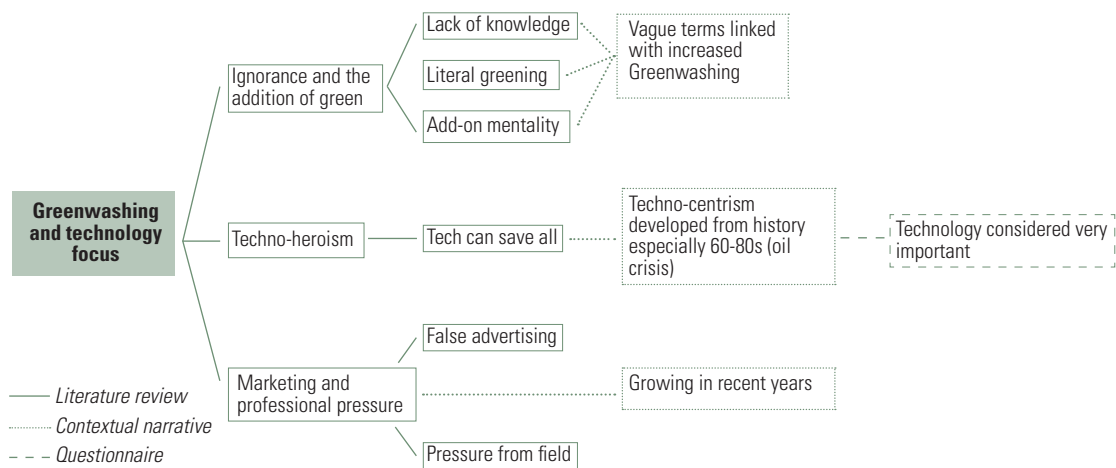
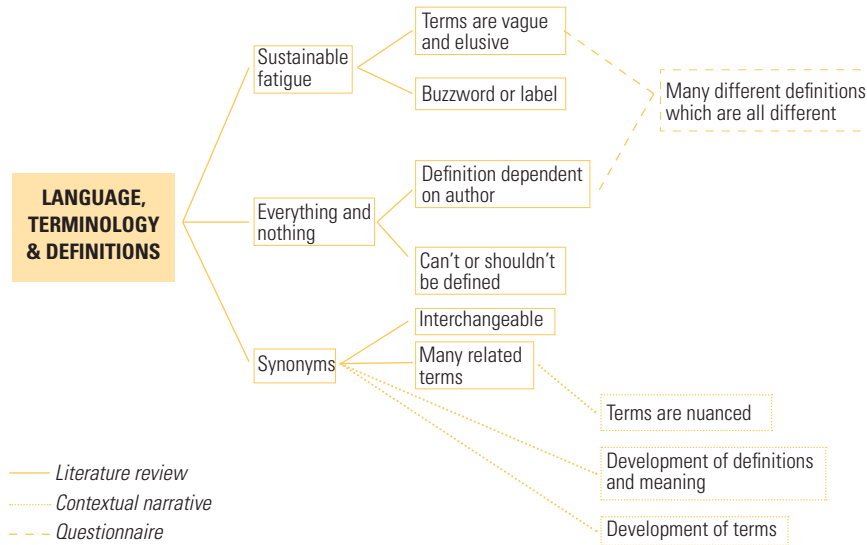
what effects and impact these multiple definitions have on the connection between discourse and practice. This is an area which will be explored through the following studies and chapters (especially interviews in Chapter Six) of this dissertation.

5.4.2 Greenwashing

Greenwashing and techno-centrism have been outlined in the literature review (section 2.6) through four central debates; literal greening; ignorance and the addition of green; techno-heroism; and, marketing and professional pressure. At the stage that the questionnaire was designed, this theme was not as clearly defined as those previously outline definitions. Therefore, instead of explicit questions that related to greenwashing, questions probed to understand what knowledge existed and how it was practiced, in order to see if there was a focus on technology or shallow additive approaches. Responses have revealed that technology is considered very important, third only after environmental and social. Technology was also shown as 'very important'; more than economic, aesthetics, politics, and culture. Similarly, many of the most commonly selected specific movements, theories or concepts known by the respondents were zero energy, passive technology, cradle to cradle, and biomimicry - all with a level of technology, and some often goals of shallow approaches which fall victim to greenwashing. Additionally, of the provided options representing the respondent's predominant areas of practice, research, or teaching – energy efficiency was the third most common; 13% more common than occupant health and well-being, and 13% higher than the ecological management of resources. Furthermore, renewable energy systems had similar response rates to cultural and social sustainability. This has suggested that these areas which often promote techno-centrism are common within the respondent's different areas of practice.

A disparity was shown between the mere 10% of respondents who indicated that green roofs were a goal for their indicated project, and the topic of literal greening discussed in the literature review. This could suggest that there is a perceived level of greenery which is not actually as common as believed in the literature. Alternatively, as the respondents are experts, there may be fewer examples of 'greening' than if the questionnaire has been completed by non-specialists. The literature review also indicated that the add-on of technology was a common issue; within the questionnaire specific technology such a solar panels was not a possible response, only renewable energy which was set as a goal in 51% of the given projects. It could be presumed that renewable energy technology is often visible, but there are no definitive results to support this. Further investigation into the amount of greenwashing and the add-on of technology is necessary and explored in Chapter Seven.

It is also worth noting that after completing this questionnaire, I realised that experts in the field might not have been the optimal respondents to probe about greenwashing, given the expectation that more holistic and integrated approaches would be practiced within this group. Instead, maybe 'mainstream' architects involved in sustainable architecture would give a better indication about the state of



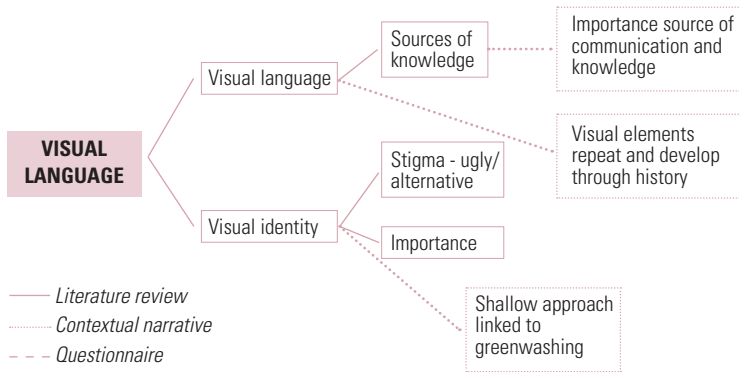
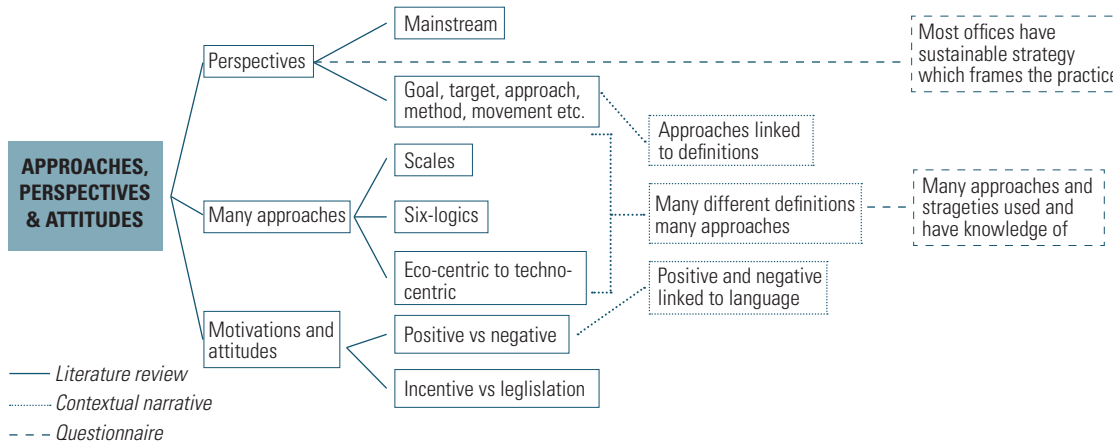


Figure 5.10 (left and above) Constructed codes: Diagram of constructed codes from the literature review, contextual narrative and questionnaire organised by themes.

greenwashing. Consequently, some of the following studies were designed with this in mind, choosing information sources which better represented mainstream architecture, including the study of architectural websites in Chapter Seven.

5.4.3 Format and accessibility of knowledge

Many questions in this questionnaire were designed to explore how practice and academia gain knowledge, and in what format, but also how and where they produce and disseminate their knowledge. These questions were designed to investigate the juxtaposition whereby some consider there is a lack of knowledge while others believe there to be too much knowledge, as discussed in the literature review (section 2.7.1).

The previously introduced survey produced by EDUCATE also addressed the usefulness of different sources in providing information on sustainable environmental design. Their survey indicated 90% of responses either agreed or strongly agreed that literature and publications were useful, followed by 81% of respondents indicating websites and media coverage (Altomonte, 2012, p. 11). These results were similar to this questionnaire; however, this questionnaire split the broader categories into more specific sources, so it is harder to compare equally. Nonetheless, it is evident that there is high interest in both surveys in literature, publications, websites and in

the case of this questionnaire, built examples and precedents (not an option in the EDUCATE survey) (Appendix A: QB4, p. A8). The respondents also indicated that on a daily basis more readily accessible sources are used such as websites, books, and co-workers (Appendix A: QB5, p. A9). Additionally, general literature is used weekly and monthly. This raised numerous questions; such as, how the content varies between these different sources? If so, is this the reason for using them at different intervals? Or is it that this frequency of use coincides with how often new issues and information is published? Or due to their availability and accessibility?

One question was also designed to understand which theories, movements and concepts the respondents had knowledge of; the responses to this question indicated that there was more knowledge of concepts which have easy to apply architecture strategies - such as solar architecture, passive architecture and technology, zero energy, passive house, and cradle to cradle - compared with more abstract theories from other disciplines such as Gaia theory or cybernetics.

The majority of respondents from practice indicated that sustainable architecture is considered theoretically before and during the design phase, while academia indicated that it is taught both in a studio and non-studio environments. This suggests that theoretical knowledge is essential and employed often; however, this contradicts responses which indicated a gap between the level of connection between existing knowledge and what is being designed and constructed. This is interesting as it may indicate that among the respondents there is a better connection than what is perceived within the broader field.

Previously the discrepancy between where knowledge is gained from by the respondents, and where it is disseminated to, is discussed. In addition to this, it is interesting that - especially for academia - there is a high percentage of respondents who, in addition to universities, disseminate to practice, the general public, non-architecture professions, and other organisations. This interest from a wide range of audiences supports the notion that sustainable is very trans-, cross- or multi-disciplinary. This also means that the knowledge disseminated needs to be communicated in a format which is accessible for architects, non-architects, and the general public. This may reveal why the dominant format that respondents selected for dissemination was lectures (93%) followed by built examples, strategies and hands-on teaching.

Lastly, the majority of respondents pinpointed that the connection between existing knowledge and what is being designed and constructed, is between only 'somewhat' and 'not connected'. This confirmed that some of the recurring themes in this research focus are barriers, or are hindering, a better connection. However, what is not clear is whether there is a 'barrier' at one, or both of the ends. To expand, whether it is the fault of the discourse and knowledge, or the integration to practice? This is something which will be explored in the next 'Part Three' of this dissertation.

5.4.4 Additional tentative themes

During both this study and the contextual narrative, two additional tentative themes

emerged: approaches and perspectives; as well as the visual language of sustainable architecture. These themes were not the focus of these studies, but will be briefly discussed below and further expanded on in the next 'Part Three.'

Approaches and perspectives

It became evident when processing and analysing the responses to this questionnaire, that in addition to the importance of definitions and vocabulary, the different approaches and perspectives are also relevant. These approaches differed between how offices or departments worked towards their sustainability agenda. Common agendas (formal and informal) were often used but also only in specific sustainable teams or only when requested also an approach used often.

The literature review (2.8) discussed at length the debates around the many approaches to sustainable architecture, and this has been further shown as evident in the many different responses to the diverse knowledge that the respondents gave, as well as their diverse interests. However, it has also been made clear that from the responses there are some concepts and strategies which are common.

Within the definitions the respondents provided, there are some perspectives and attitudes which may be read into them. As already discussed, the split between sustainable architecture as a process or product is clear, and the split between optimistic and pessimistic perspectives is also decipherable; some respondents referring to it as a "challenge", with others further along the spectrum stating "unattainable at present population levels and growth", or "an empty signifier that allows different actors to respond to complex, context-specific issues". In addition to this, a split has been indicated, with the use of words such as 'minimise' or 'reduce' used twice as often as positive words such as 'maximise', 'thrive' or 'optimise'.

Visual language

It has been made evident from the responses to the questionnaire, that a diversity of buildings is produced from the diverse approaches and knowledge. It has also been made clear that built examples and precedents play an essential role in providing information to both academics and practitioners. Hints from the questionnaire, combined with information from the contextual narrative have indicated some visual shifts and developments since the 1960s - this combined information raised interest in the visual nature of the discourse. This encouraged an inquiry into understanding what information and discourse are provided by built examples, and whether there is a cohesive visual language used and what impact does that have.

5.5 SUMMARY

This chapter and study aimed to gather and present significant information from the perspective of expert respondents, as well as understanding different connections and gaps between discourse and practice to scope this research further. Firstly, the study was introduced concerning previous points of interest from the literature review, especially the definition of sustainable architecture being considered a

buzzword, which has no meaning or is unable to be defined. This was followed by an outline of related research, exemplifying findings from the “Green Questionnaire” from Architecture Design (2001), and a summary of the survey conducted by EDUCATE. Specifics of the method were then introduced, including the selection of participants, data collection, and analysis. The majority of this paper presented and described different findings from the questionnaire. Lastly, the chapter discussed them with concern to the three themes that were vital at the time of conducting the questionnaire (definitions, greenwashing and communication) along with the additional two tentative themes (approaches and visual language) which were subsequently constructed. This study has gained crucial insight from the perspectives of practice and academia to corroborate critical themes are categories of information which were developed from the literature. Furthermore, it formed the basis for some of the future studies such as the interviews.

Key findings from this study which will be further explored in additional studies include:

- The diversity of responses within the majority of questions, with no one cohesive or overarching position or understanding. This is especially relevant in the different theories, movements, concept, and strategies the respondents had knowledge of.
- Identifying the disconnection between sustainable architecture knowledge and what is being designed and constructed.
- The diversity in definitions and influence the broader sustainable development concept has on it
- The frequent use of periodicals, websites and built examples or precedents to gain knowledge.
- The disconnection between how information is disseminated and where knowledge is gained from.
- The disconnect between academia and practice.
- The diversity of buildings where were identified as ‘best representing their definitions.’

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PART THREE

Traversing key studies

Chapter Six

Interviews

This chapter presents the semi-structured interview study with fourteen sustainable architecture experts which were chosen from respondents who completed the previously outlined questionnaire in chapter five. In this chapter, the method is explained in reference to the qualitative-grounded-theory process of collecting, organising, analysing and constructing findings. Additionally, a general discussion concerning how this method relates to the grounded-bricolage approach can be found in the methodology chapter section 3.5.1. These interviews focused on expanding the interviewee's responses to the questionnaire as well as their own experience with sustainable architecture discourse and practice. This study was designed to probe definitions, greenwashing and communication as illustrated in the diagram 6.1 but as also visible approaches and visual language were also explored inadvertently. Furthermore, all of the transcripts for this study can be found in appendix B organised by question response.

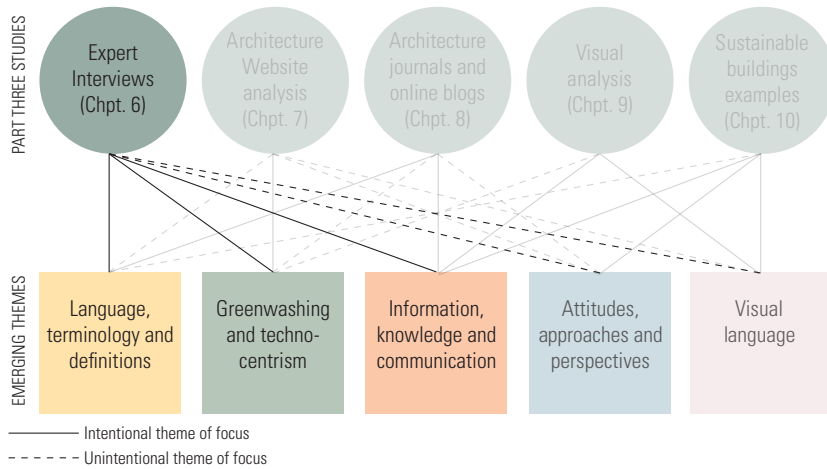


Figure 6.1 Connection between interview study and the key themes: Diagram of how this interview study addresses the five central themes of this research.

6.1 INTRODUCTION

Fourteen qualitative interviews were conducted with experts (between November 2016 and August 2017) from respondents of the previously discussed questionnaire in chapter five. These semi-structured interviews were completed primarily over Skype and aimed to gain more in-depth information, firstly, addressing the interviewees questionnaire responses, and secondly, to gather their experiences, opinions, attitudes and perceptions (Hanington and Martin, 2012, p. 102) of the three established themes – terminology and definitions; greenwashing and techno-centrism; knowledge; information and communication; and the two (at the time of completion) tentative themes; perspectives and approaches and the visual language.

To elaborate, this interview study and method was chosen as an extension of the questionnaire because this method and design offered limited insight, as it consisted of mostly closed questions. Furthermore, the questionnaire addressed and established many of the ‘what’ questions, however, the ‘why’ remained elusive. By choosing a semi-structured interview method, knowledge was able to be co-constructed by me as the researcher with the interviewees. These conversations were designed to gain insight into the interviewees ‘live world,’ describing their experiences while clarifying and elaborating on their perspectives of the topics at hand (Kvale and Brinkmann, 2008, p. 116). In this approach, as Yanow and Schwartz-Shea (2006) explain: “knowledge takes the form of explanations of how others interpret and make sense of their day-to-day life and interactions.”

Interviewees in this study have built on previous discussions introduced in the literature review and contextual narrative, adding to the constructions of different categories which form the five themes identified in this dissertation. While previous studies have offered perspectives from literature and the discourse, this study with the questionnaire has constructed knowledge with experts on the understanding of these themes, adding richness and real-life experiences of these categories and topics. Descriptions of these experiences are presented after a short overview of the method, an introduction to the interviewees and some of their questionnaire responses. The findings are then presented, firstly with the initial codes and

categories followed by a discussion organised by themes (definitions; greenwashing; discourse; approaches and visual language) and a concluding summary.

6.2 OUTLINE OF THE METHOD

Information collected in this study had two frames; firstly, the constructivist's version of grounded theory to collect, organise and code a cross-section of personal accounts and experiences. Secondly, Kvale and Brinkmann's (2008) "inter-view" notion that knowledge is co-constructed between the researcher and researched through interactions and negotiations during the dialogue (Edwards and Holland, 2013, p. 17). Grounded theory influenced how themes were used to create question topics and understand the perspectives of a selection of participants, rather than validate the questionnaire, a hypothesis or form generalisations.

The five key themes for this research have been presented prior to this chapter; however as mentioned this was not a linear process so even though it appears that themes and topics were established at the time of conducting these interviews, in reality, the boundaries of these themes were very permeable and ill-defined and through this study they have been explored and developed further, to add richness to their understanding. This study and method have been crucial to the overall collection of information as it is the only method which allowed two-way conversations between myself and the participants and the subsequent information. I was able to probe leads, ask for elaborations and gain first-hand accounts which are not possible in other methods in this research which use secondary information. To maintain some structure within the method. An interview guide was developed from the outset.

6.2.1 Interview guide

An interview guide was designed to aid in the interview process especially as I was nervous interviewing experts and elites in the field. Charmaz (2014, p. 64) advises that with a guide "you are less likely to become rattled or derailed when research participants wander." Due to my nervousness, the guide was designed in detail with an outline of topics to be covered, with a range of additional suggested questions in a scripted sequence. However, this was not binding and Silverman (2009, p. 194) elaborates, deviations from the guide are "not seen as a problem but are often encouraged," thus, my judgement was used as to the amount the guide was followed (Kvale and Brinkmann, 2008, p. 130). The guide was consulted throughout, marking of topics and highlighting those which could be disregarded as the discussion moved on (Barbour, 2013, p. 120). The questions were designed to gather descriptions of the interviewees conceptual understanding of the topic – the relationship between discourse and practice (Kvale and Brinkmann, 2008, p. 131).

For each interview, a guide was created and consisted of some key themes, which were included for all interviewees, and some questions were tailored for each person's questionnaire responses. Two pilot interviews were carried out at the start of the process to develop the interview guide and method. Firstly, with a colleague who was disregarded. Secondly after making changes, to the interviewee guide, a

subsequent successful pilot with one of the experts was conducted and has been included in the study.

6.2.2 Interview themes

The interviews were based on three broader themes (definitions, greenwashing and discourse) for enquiry, which were constructed from the outlined findings from the contextual narrative (chapter four) and questionnaire (chapter five). Additionally, and in keeping with the iterative nature of grounded theory, questions were adopted as new information was gathered to include new concepts. To start, broad questions were asked which led to more focused questions later in the process, this allowed for the collection of as many unanticipated thoughts as possible (Charmaz, 2014, p. 65).

These lines of questioning were designed to probe the already mentioned three central initiating themes, and more specifically some of the topics addressed were as follows:

- Factors which initiated an interest in the field
- Why specific topic and sub-categories are of interest and importance to the participants
- Experiences with how greenwashing became part of the industry and what impact it has
- Why different media is used for gaining knowledge
- Quality, quantity, and accessibility of existing knowledge
- Opinions on how the visual language of sustainable architecture affects the field
- Connection and collaborations especially between practice and research or academia
- Factors that influence the connection between discourse and practice
- The impact of ambiguity and vagueness of definitions
- Miscommunication and language barriers
- Experience of dissemination
- Perspectives for what is needed for the future

6.2.3 Selecting participants

Possible participants for this interview emerged from the questionnaire, but specific interviewees were not preselected. This method for selecting interviewees was purposive by default as the questionnaire selection was purposive. However, the specific interviewees were not actively chosen. To elaborate, all 40% of the questionnaire respondents who indicated they were willing to participate in a further discussion were invited for a discussion via email. Subsequently, only fourteen participants responded to the invitation, despite numerous emails, and they were all interviewed. This occurred in different collections and at different times. The first four interviews were conducted and analysed, which was followed by another round of emails invitations until the fourteen interviews were complete. Thus, the selection method was purposeful as they had been previously selected for the questionnaire;

yet, there was not further delimiting selection for the interviewees. Instead, it was only based on their willingness to be involved. This method of selection was chosen as it limited the possibilities to experts and by not actively selecting the particular interviewees, a diverse range of responses were collected, and fortunately, the interviewees reflected a broad range of perspectives and backgrounds. Of the fourteen interviews completed, seven were from academia and research, and seven were from practice. While not a purposeful delimitation, interviewees were from Denmark, Sweden, United Kingdom, United States of America and New Zealand as illustrated later in figure 6.4.

Furthermore, Kvale and Brinkmann (2008) and Charmaz (2014) indicate there are implications of interviewing experts and in some cases 'elites'. One implication is the temporal factors – "time is a resource," and therefore the informality of engaging in "leisurely" conversation may not be possible, making the interview formal and questionnaire like (Charmaz, 2014, p. 72). To avoid this, questions were planned carefully to be to the point yet not closed questions, allowing for the participants to share their "nuanced insights" (Barbour, 2013, p. 129). Additionally, 'elites' are often familiar with being interviewed; thus considerable insight into their background and biography was sought before the discussions, tailoring questions to their context, aspiring to be an "interesting conversation partner" rather than 'fact gathering' (Kvale and Brinkmann, 2008, p. 147).

6.2.4 Data collection

Interview discussions were conducted mainly through Skype and with a few exceptions, these were due to the recipient's technical restrictions, and consequently, these occurred over the phone. I acknowledged the disadvantage of lack of face-to-face contact; however, due to the circumstances of the respondent and there being no possibility to reschedule, the possibility of the interview outweighed the lack of visual contact (Kvale and Brinkmann, 2008, p. 9). The interview discussions varied in length from between thirty and forty-five minutes. With practice, I could have shorter discussions due to the time constraints of being active in an office. As stated, interviews were semi-structured and supported by a thematic guide, which was discussed in detail in section 6.2.1 (Kvale and Brinkmann, 2008). The guide developed as the interviews progressed and new lines of enquiry were followed in keeping with the influence of the grounded theory methodology. The grounded-bricolage methodological approach affected all aspects of how the interviews were conducted and subsequently how information was collected through different iterations of interviews and coding; followed by redesigning the guide and questions to probe topics which emerged from both this study and additional studies which were occurring during the same period (see figure 3.3 in the methodology chapter).

Each discussion was recorded with audio and visual data when possible. Interviews were then transcribed verbatim which has resulted in a total of around 120 pages of 'raw' transcripts. Non-linguistic features were not of interest and therefore, only what was being said (words) were transcribed. This included incomplete

sentences, false starts, 'umms and ahhs,' laughter and repetition of words which were subsequently "tidied up" after analysis (Willig, 2008, p. 27) and can be viewed in Appendix B. Following transcription, all the responses were aggregated and organised by the questions, as well as removing all identifying markers. Aggregation of the transcripts was essential to maintain as much anonymity as possible as many of the respondents are currently in active positions within an architectural practice, as discussed previously in the section on ethics in the methodology chapter 3.6.

Additionally, a 'note sheet' was kept for each interview recording key information as well as different conditions such as familiarity with me as the interviewee, technical difficulties, or context. For example, one interviewee was unwell or sometimes the time difference meant it was the one or two in the morning for me. Often the physical location of the interviewees impacted the interview, for instance, if they were in a private office, a busy common office or in one case the interviewee was out for a walk. These factors all impacted the interview and were worth noting as a reminder of the context if the conversation when analysing the transcripts.

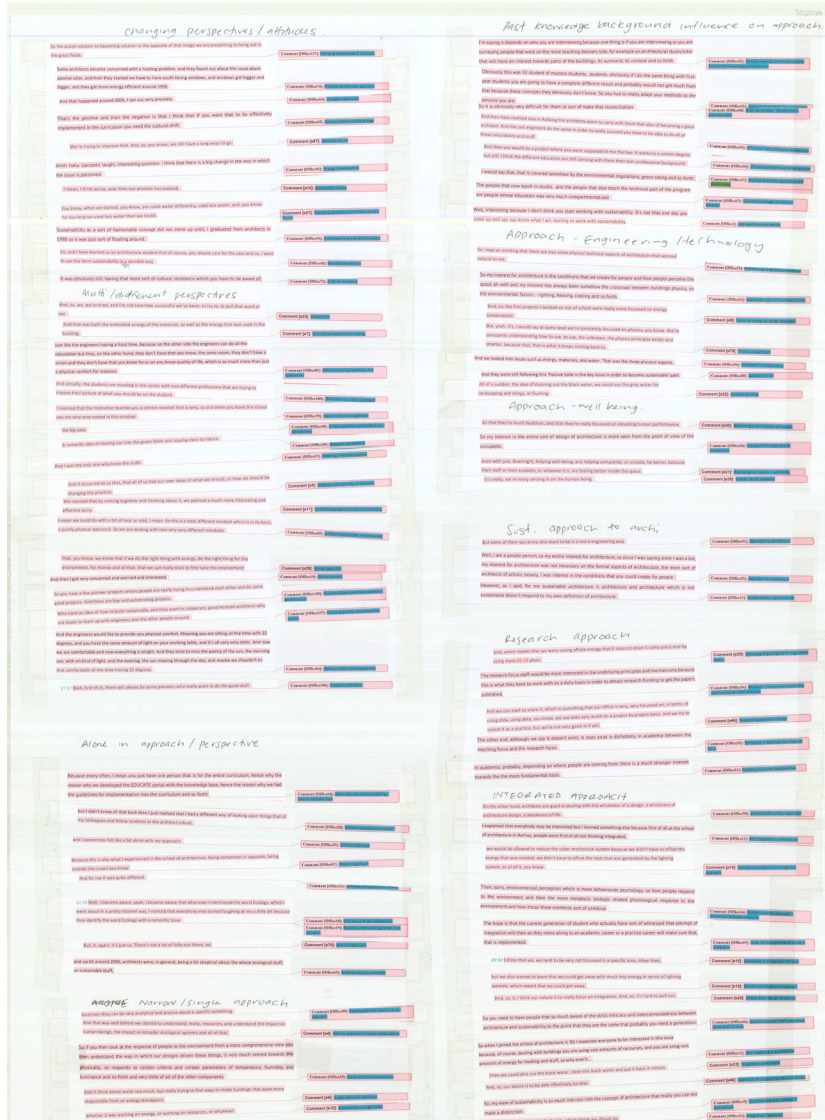


Figure 6.2 Collage of line by line coding: Example of one of six line-by-line hand coding - original size A2.

6.2.5 Analysis

According to Charmaz (2006, p. 45), there are at least two phases of coding in grounded theory: initial coding and focused coding. These phases of coding help “define what is happening in the data and begin to grapple with what it means” (Charmaz, 2006, p. 45). Grounded theory coding has previously been explained in the methodology (section 3.2.1). Nonetheless, to reiterate, the two phases of coding differ in that initial coding involves studying “fragments of data” (words, lines, and segments) while focused coding employs “the most useful initial codes and test them against extensive data” (Charmaz, 2006, p. 44).

Line-by-line coding involves labelling each line of transcripts, thus, prompting openness to the data while seeing nuances in it (Charmaz, 2006, p. 50). Charmaz (2006, p. 51) elaborates: “Through coding each line of data, you gain insights into what kinds of data to collect next. Thus, you distil and direct further inquiry early in the data collection. “Before aggregation, four transcripts were coding through line-by-line open coding with the aim to find and develop concepts, which could be used in the axial and direct (or focused) coding of the entire aggregated transcripts. During this coding, openness towards “unforeseen areas” was strived for in reading the collect information (Charmaz, 2006, p. 46). This analysis was completed in Microsoft Word and by hand. In Microsoft Word, a concept was assigned to each line or sentence using the comments tools in ‘review,’ these concepts were then colour coded by larger subcategories which would later become categories. After completion, each line was cut out, and then all four transcripts were aggregated and arranged by their colour coding and sorted by sub-categories. Examples of this process can be followed in figure 6.2 which illustrates the initial open coding process. From this process, forty-two codes were used for the axial and direct coding and are described and illustrated later in section 6.5.1.

Axial coding provided a frame to “link categories with subcategories and asks how they relate” (Charmaz, 2006, p. 61). These forty-two concepts and sub-categories were used for the axial coding of all the aggregated transcripts to find connections between different themes of information. Using the constructed codes, axial coding was completed using Nvivo, taking note of additional concepts that emerged and also writing memos. After completing the coding in Nvivo, in a similar process to the open coding, all codes were colour coded, printed and later collaged together into a hierarchy forming ‘families’ of categories and relationships. Figure 6.3 demonstrates this process of arranging the codes by hand. Doing this by hand was crucial for gaining an overview of all the codes as well as forming connections between different codes and categories from separate themes. Once this collage process produced a ‘coding tree,’ it was then re-entered into Nvivo.

The codes now in a hierarchy of categories, codes, sub-codes and concepts were then reviewed one further time to direct or focus code.

Direct or focused coding was used to sort, “synthesis and explain larger segments of data” (Charmaz, 2006, p. 57). As the transcripts were now organised in their larger categories, direct coding was more straightforward and more effective. Both the

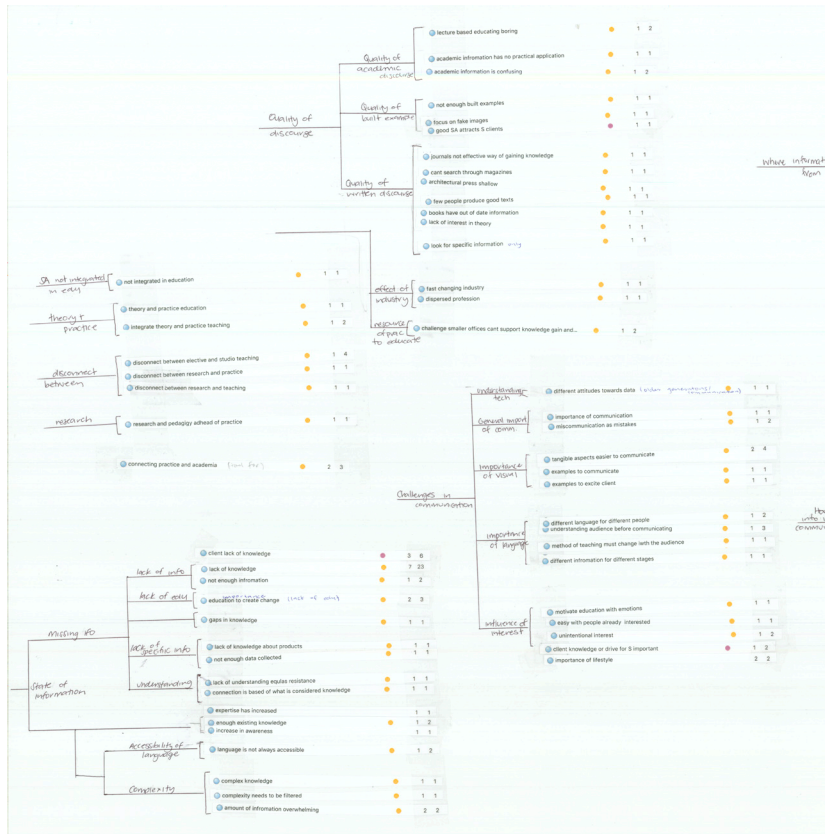


Figure 6.3 Hand coding: Example of one of three hand coding - original size A2

coding trees and the hierarchy of coding can be seen in figure 6.10 and 6.11, they show how the codes are nested within larger categories, and this will be explained later in section 6.5.2.

6.2.6 Limitations

Four fundamental limitations occurred during this study. Firstly, the limited possible respondent from the questionnaire, this was not limiting due to the quality of information rather just the sheer number of possible respondents. Consequently, getting access to interviews was difficult and time-consuming with many follow up emails; as-well-as the small the number of interviews conducted. However, as the aim of this study was to gain insight from a cross-section of experts, not to form generalisations, this small number is considered valid. It is acknowledged that it is limited, and qualitative interviews usually continue sampling until the interviewees are not telling them anything new. However, within the complex context of the field, this would need more time and resources than was available in this PhD. Secondly, as the interviews were with experts and elites, both access and time were often tricky, making some interviews rushed and not all emerging leads were able to be probed further due to the time constraints. Thirdly, technical difficulties, Skype, and location affected the interviews in different ways. It is recognised that interviews not conducted in person have implied limitations and this is further exacerbated if technical difficulties meant visual communication was lost. As a result, subtle cues and body language were not present or as visible and consequently not followed up

on. Furthermore, the location of the interviewee was a limitation and affected what was said. Interviews which occurred within open offices tended to be more reserved while those which occurred when the interviewee was alone were more critical and elucidated more ‘controversial’ information. This was not realised until after the study was complete and in hindsight. For further interviews with practice, interviews will be designed to occur outside of an active office. Lastly, grounded theorist such as Charmaz (2014, p. 59), suggest avoiding the literature review prior to entering the field, so to enter with a “fresh mind” and not to taint the first interviews, elaborating that “a naive research may inadvertently force interview data into preconceived categories, and that undermines a grounded theory study” (Charmaz, 2014, p. 63). This has many implications for this study and my research generally, as the field of research was not previously well defined, and the research explicitly focuses partly on discourse, it was not possible to enter this study with a completely fresh, untainted mind. Instead, many of the studies overlapped in the collection, processing, and analysis to avoid ‘tainted’ linear hypothesis testing, so, while themes arose prior to the interviews, they were never concrete and well-defined when commencing the study, this allowed for openness in the collection and coding.



Figure 6.4 Diagram of showing country of origin of interview participants

6.3 THE INTERVIEWEES

The interviewees varied in age, backgrounds, and gender. An equal mix of gender was strived for; however, only four of the fourteen interviewees were women, with only one from architecture practice. While there is no broader supporting evidence, this could be representative of the current number of female experts in sustainable architecture, as only roughly 20% of the possible respondents for the questionnaire were women. Of the interviewees, roughly one third were pioneers in the field during the sixties and seventies, these participants could uniquely offer first-hand knowledge of the early environmental movement. The remaining two-thirds are from a newer generation of experts, with a vast knowledge of more recent periods. All seven of the academic respondents have attained doctoral degrees in architecture. The interviewees from architectural practice, range in roles from being a founding partner of a leading sustainable practice, to being part of a sustainability team at a conventional practice. Furthermore, office profiles range from being conventional architectural practices with sustainable teams, to architectural offices, which holistically focus on sustainable architecture. Another condition that is noteworthy is the connection between academia and practice. Many of the interviewees from academia have experience from architectural practice, and many in practice also teach in universities or do research.

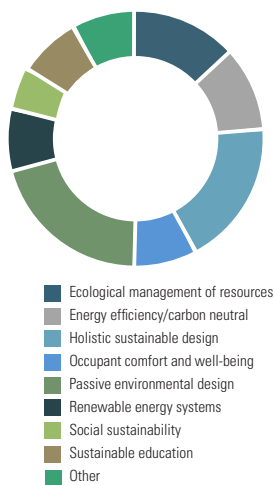


Figure 6.5 Areas of focus: Donut graph of main areas of practice or research for each of the interviews.

6.3.1 Interviewee questionnaire profiles

The following section briefly outlines some of the interviewee’s responses to key questions from the questionnaire which provide a snapshot to contextualise the subsequent interview questions and responses.

Firstly, the donut graph in figure 6.5 indicates that the fourteen interviewees

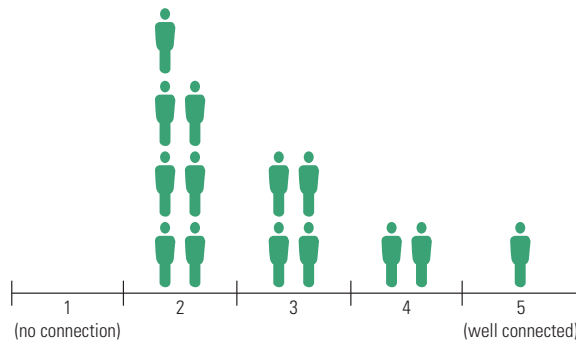


Figure 6.7 Bar graph of how interviewees rate the connection between knowledge and practice.

practice and research a diverse range of topics relating to sustainable architecture. Two common topics are passive environmental design and holistic sustainable design.

Secondly, the bar graph (figure 6.6) illustrates that all of the interviewees found the environment an important subcategory of sustainability, and interestingly, economy; social; political and cultural are considered 'not important' by one or more of the interviewees.

Thirdly, when asked how they define sustainable architecture, the interviewees responded with the following definitions (direct quotes):

- Low carbon, responsibly sourced materials and creating long-term environmental comfort and social value.
- Architecture that supports sustainable behaviour change to lower ecological footprint.
- Sustainable architecture is about design and management of buildings in a manner that increases the efficiency of resource use and decreases environmental impacts. Further, it is about designing buildings that create conditions for a societal development and for human daily life that may advance within the limits set up by the carrying capacity of the ecosystems and that, further, acknowledges a fair distribution of resources in time and space.
- Based on regenerative design.
- Architecture that gives more than it takes both in physical, social and aesthetical terms.
- It is just architecture.
- Built environment that, over time, catalyses social justice, environmental resilience, and economic stability.
- Taking responsibility for the impact we created.
- Environmentally friendly design and selection of materials.
- Green is doing less harm; sustainable is neutral, regenerative is doing good.
- Our core purpose: beautiful integrated environments that inspire change and enhance the human condition.
- Architecture that manages its own resources on site.
- The core of sustainable architecture is to inform all aspect of the design development with knowledge, in order to make it easier for the client and his consultants to make the right decisions. Architecture lives by passion and

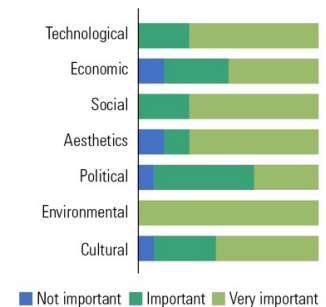


Figure 6.6 Level of importance: Bar graph of main subcategories of sustainable architecture interviews find 'not important, important and very important.'

the belief in providing society and its population with more than bricks. If this “something extra” can be integrated and qualified through knowledge, the result is a more holistic and sustainable solution.

- Regenerative.

Lastly, figure 6.7 illustrates that many interviewees rated the level of connection between existing knowledge and what is being designed and constructed in the lower region (less connected) – a three or below. With three interviewees indicating that it is well connected (four or five).

6.4 CONSTRUCTING FINDINGS

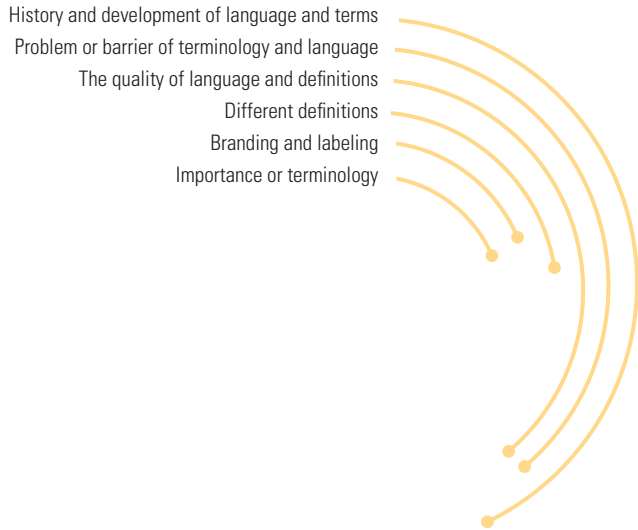
Findings are presented in two different sections, firstly the initial open coding, followed by the results of the axial and focused coding presented and discussed thematically. Starting with definitions and terminology; technology and greenwashing; information; knowledge and discourse; attitudes and perspectives and the visual language of sustainable architecture.

6.4.1 Initial coding

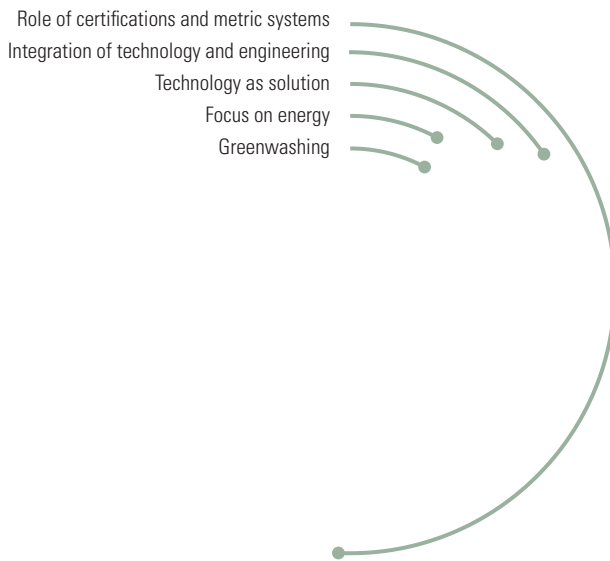
The four line-by-line coded transcripts resulted in forty-two initial descriptive categories as previously mentioned, which were later used as the basis for the subsequent focused coding. The different concepts (previously demonstrated in figure 6.2) were grouped into broader categories and then themes, which are illustrated in the following diagrams in figure 6.8. Each diagram in figure 6.8, represents one of the five key themes in this dissertation and each circle within that diagram signifies a subcategory or category. The length of the circular line corresponds to the number of concepts, which were grouped into that subcategory. This illustrates the hierarchy within not only the different categories, but also the broader themes. This diagram has been helpful illustrating responses proportionally, and also emphasised areas and questions within the interview guide which needed to be more direct. It also highlighted new leads to follow, such as the considerable number of categories relating to different approaches and perspectives. Short overviews of the diagrams in figure are as follows:

- It is evident in the diagram ‘language, terminology and definitions’ that the development of terms, the subsequent quality of the vocabulary and language, as well as the problems which arise from different terminology are essential categories and effect how discourse is discussed and communicated.
- The ‘greenwashing and techno-centrism’ diagram resulted in far fewer codes, with a focus on the role of certifications and rating systems. Consequently, more explicit questions were asked in the subsequent interviews directly relating to the impact of greenwashing and techno-centric approaches.
- The ‘information, knowledge and communication’ diagram indicated

LANGUAGE, TERMINOLOGY AND DEFINITIONS



GREENWASHING AND TECHNO-CENTRISM



INFORMATION, KNOWLEDGE AND COMMUNICATION

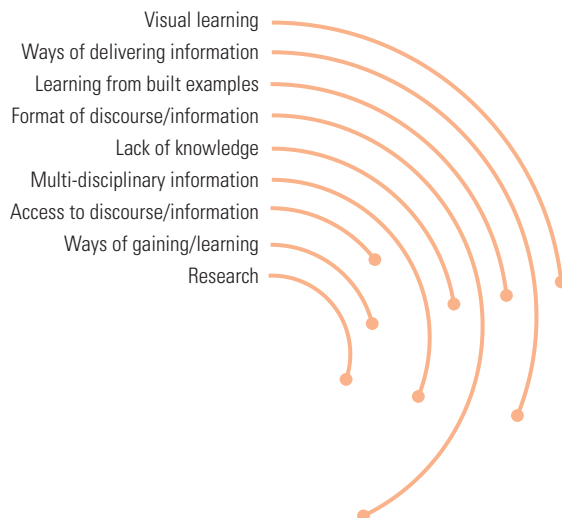
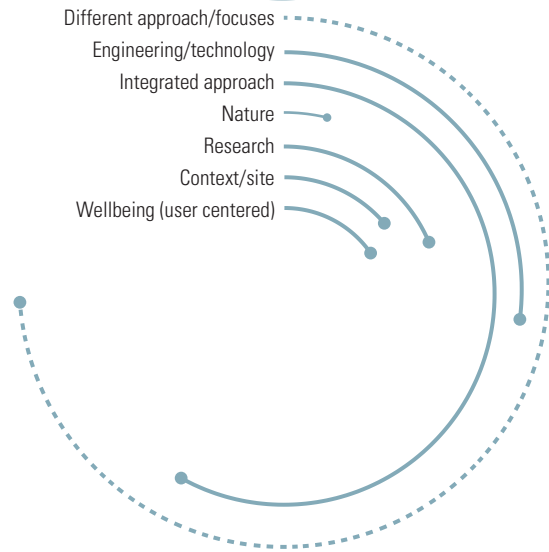
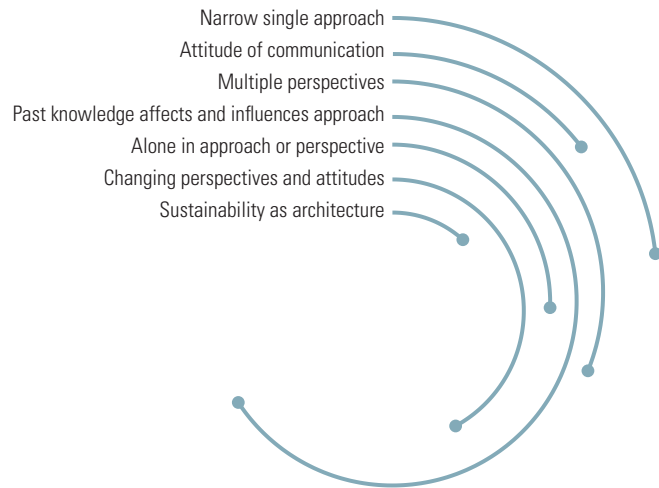
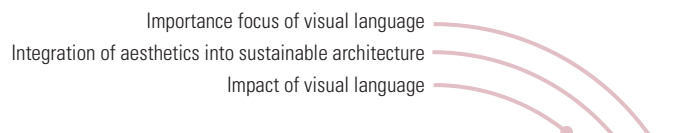


Figure 6.8 (left and right pages) Initial interview coding: diagrams showing the frequency of codes based on the line by line coding. The length of each line indicates the proportional frequency of instances the code occurred

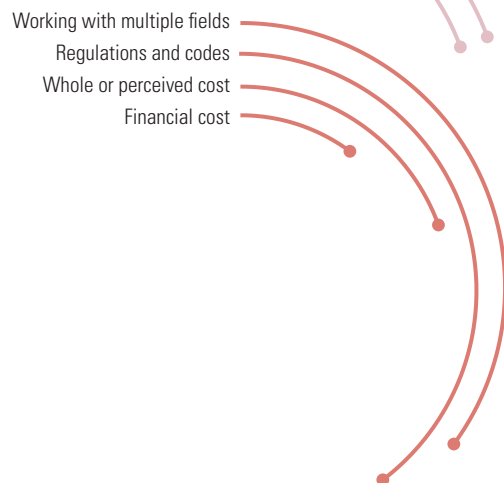
ATTITUDES, APPROACHES AND PERSPECTIVES



VISUAL LANGUAGE



OTHER



the format, multi-disciplinary nature, how information is delivered or disseminated as well as how it is gained are essential categories, especially to explore further how information is gained and received.

- Many different approaches appeared in the diagram 'attitudes, approaches and perspectives', these included narrow; technical; integrated; research-based; contextual and well-being approaches. Also, categories such as multiple perspectives and changes in perspectives and attitudes, were constructed, as many codes focused on these themes.
- No specific questions relating to the visual language were asked in these initial interviews. Despite this, codes and categories such as, the importance of visual language, the integration of aesthetics and the impact of the visual language, were constructed and would be explored with more directed questions in later interviews. These especially addressed how visual language relates to the communication of knowledge, as a knowledge source and what effect it has.
- 'Other categories' which also appeared in a few instances with this initial coding was the impact of codes and regulations, as well as the importance of considering the whole cost (not only financial but also environmental, social and wellbeing cost) and the challenges associated with working with and across different disciplines. However, as the themes are outside of the scope, they will be documented, but not extensively discussed.

6.4.2 Axial and focused coding

Nvivo was used to create a series of codes and categories based on the previously outlined initial categories from the open-coding as well as additional categories and subcategories as they emerged and were constructed. Figure 6.9 illustrates an overview of the categories organised by themes. Each colour corresponds to one of the five key themes (definitions; greenwashing; discourse; approaches and visual language) plus an 'other' category for 'certifications, regulations, policy and cost.' The size of the coloured section represents the number of codes within each theme, and each circle also represents the 'level' of coding and how they are nested within each other, from the very specific at the outer rings to the more general and broad themes at the centre. This is illustrated in more detail in figure 6.10 and 6.11 at the end of this section.

6.4.3 Definitions and terminology used in sustainable architecture

The discussion of the language, terminology and definitions was reoccurring throughout many of the interviews, through direct questions and naturally within conversations. Three main categories (language, terminology, and definitions) were constructed with nine subcategories (bottom of figure 6.11), such as the importance of the language used especially with other disciplines, the role of the architect as a translator and the miscommunication which occurs when language is vague and ill-defined. One interviewee emphasised that there is a miscommunication between

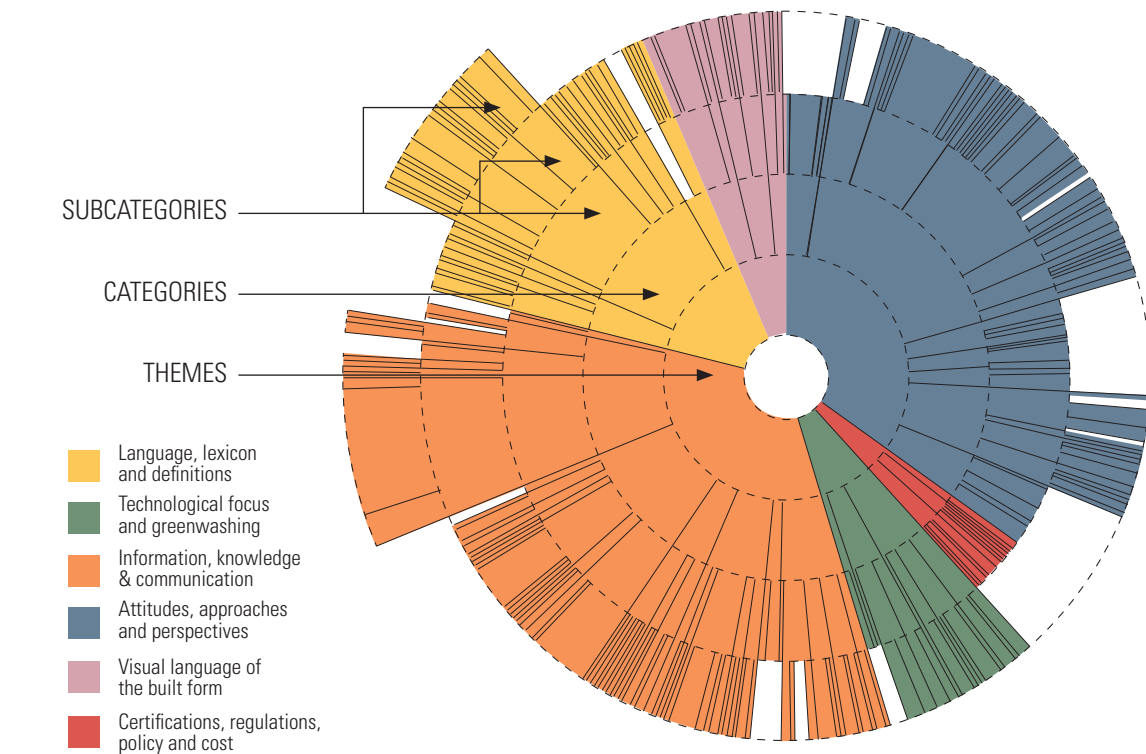
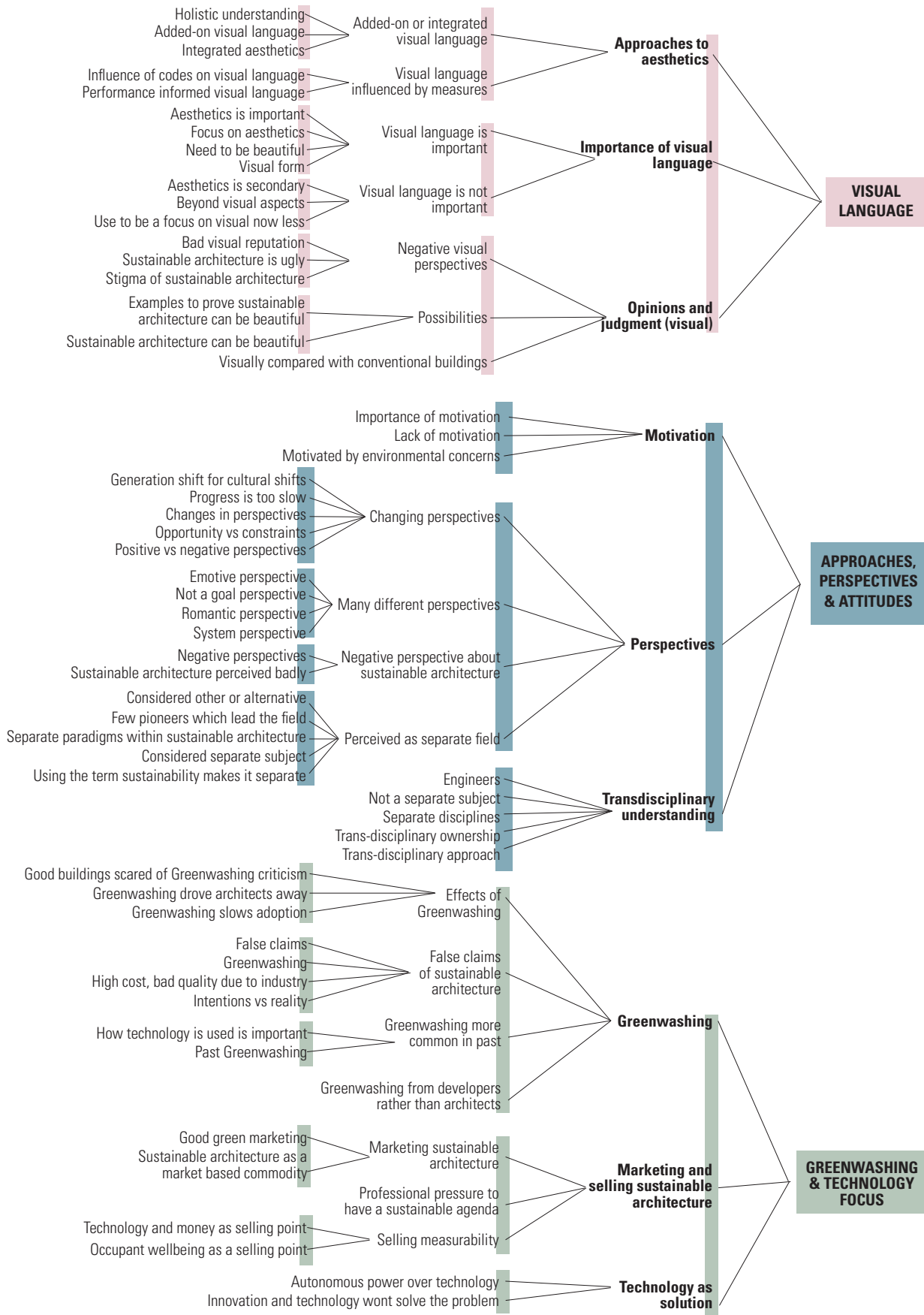
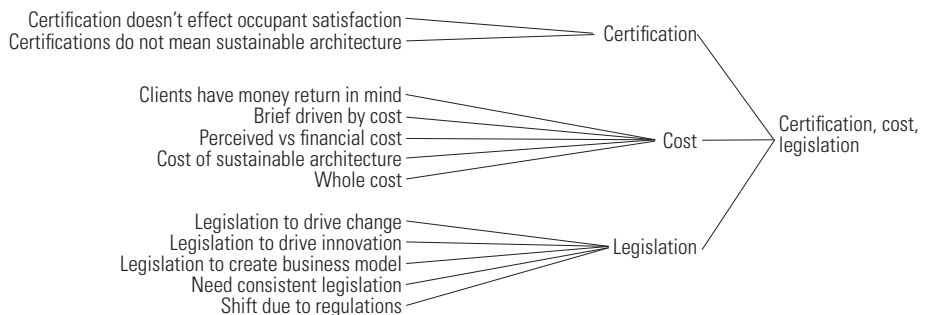
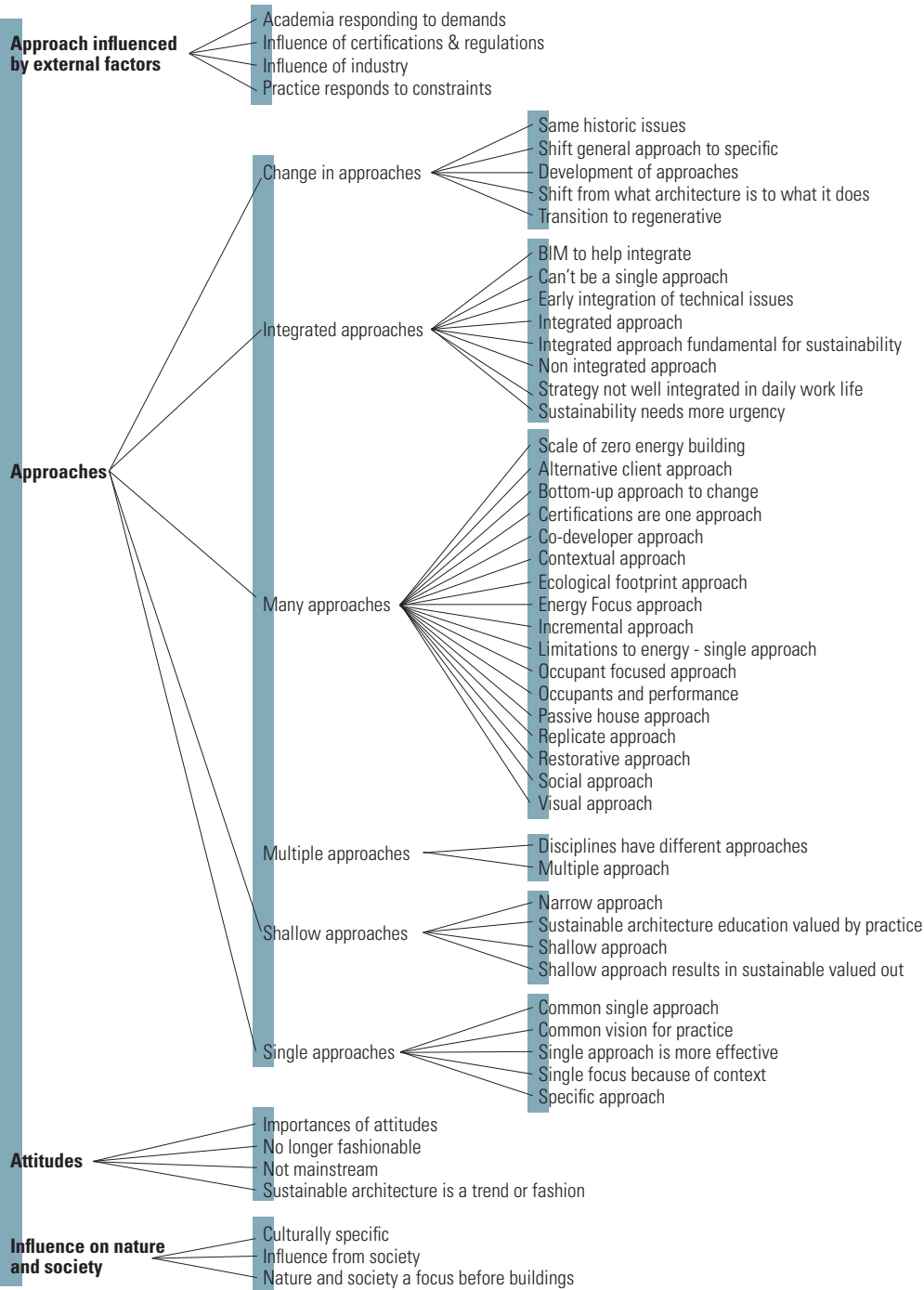


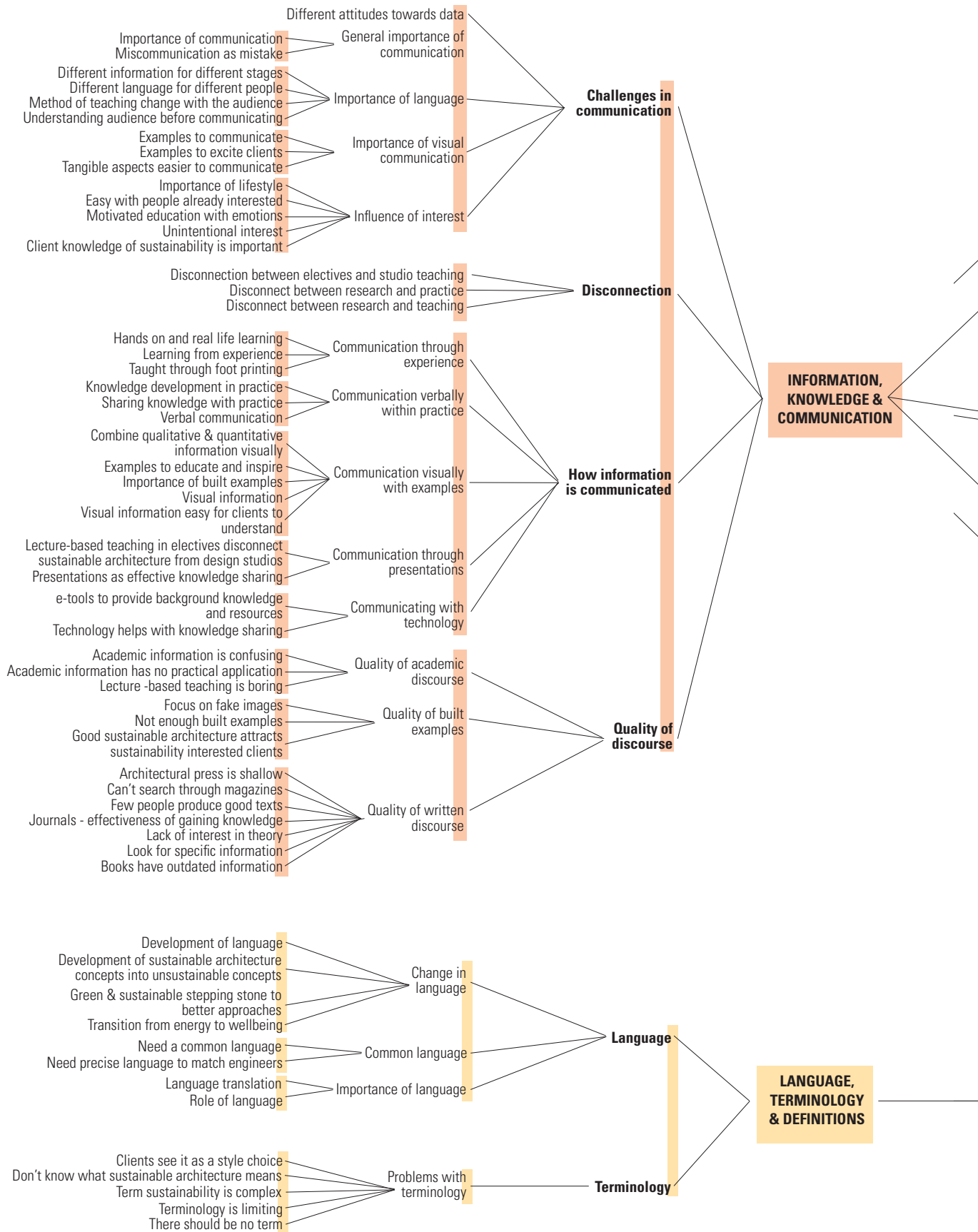
Figure 6.9 Coding frequency diagram:
 Diagram based on information
 produced by Nvivo indicating the
 frequency for each them. With each of
 the smaller segments representing a
 category or code.

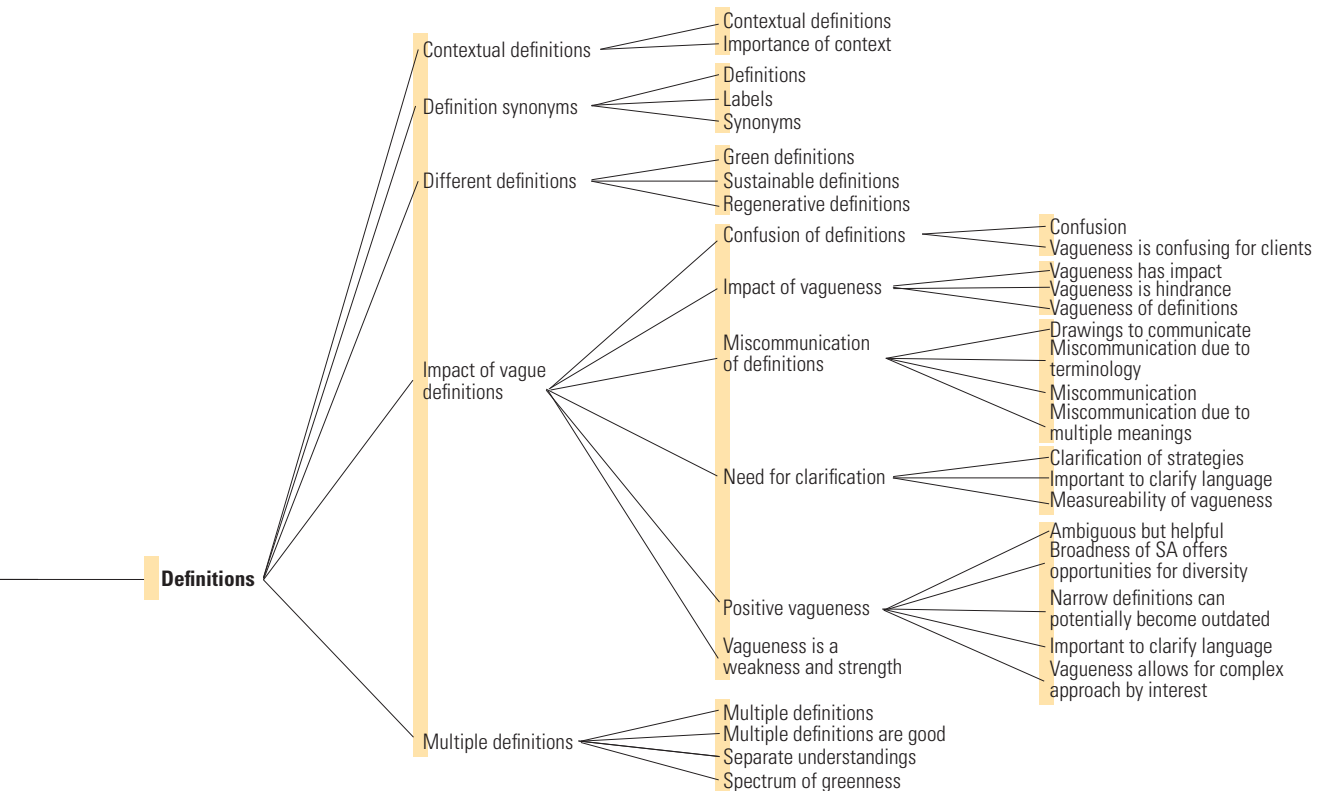
the architect and clients stating: *"I think the clients [...] don't understand what it means, what it means in general, sustainability or they might think it costs a lot of money. It depends on the client; it depends on their awareness"* (Appendix B, p. A106). While an academic interviewee explained that there is miscommunication with practice especially in reference to shallow versus more holistic approaches, they stated: *"Some architects may think that sustainable architects it's all about building performance, some may think it's all about materials. Some still think it's about adding renewable elements onto a building. Yeah, it is interesting sometimes when I talk to practitioners about what we teach, and they're quite surprised that we see such a holistic approach. You know with an impact on aesthetics"* (Appendix B, pp. A73-74). Another interviewee outlined the differences and miscommunication between architects and engineers, specifically indicating the imprecision of the architect's language and terminology as an issue. They explained: *"It is surprising that two professions [architecture and engineering], which are supposed to work that close together, how poorly they understand each other"* (Appendix B, p. A38). This interviewee further clarified that a more defined architectural language is needed: *"I think architects have to come up with a more precise language. In order to match the engineers [continuing discussing their research approach] we tried to make an architectural vocabulary that could somehow match the precise engineering part of it"* (Appendix B, p. A52). This notion of creating or needing a common language between disciplines was also reiterated by another interviewee considering students in design studios, which could be extrapolated to represent architecture practice and environmental engineering: *"We wanted to provide first of all some sort of language that could mediate between the environmental science with the more rigorous*

Figure 6.10 (following four pages)
 Coding trees: produced from the direct
 coding of all the transcripts









technical language and that of design studio" (Appendix B, p. A70). Expanding on this one other interviewee also discussing students stated: *"it is important to expose our students to people from practice. To start to get them comfortable with working with consultants, talking the language"* (Appendix B, p. A66). Building on discussions presented in the literature review, these excerpts from some of the interview transcripts emphasize that there is miscommunication within the language used by different associated disciplines, clients and contractors. This forms a barrier between discourse and practice. They further illuminate that a common language or at least common understanding, is crucial for successful integration of sustainability and in particular the more technical aspects of the field.

When discussing the specificities of the terminology, three of the interviewees indicated just how vague the term sustainability was and their perception of this. One interviewee articulated their experience of how architects can work with complexity but are unable to articulate it precisely, explaining: *"architects are good at dealing with the wholeness of a design, a wholeness of architecture design, and wholeness of life. But they are not able to talk about it because they get so fluffy. Sustainable yes, we are for it. But you know in what way. So, in general, architects tend to be very fluffy and unscientific"* (Appendix B, p. A77). Another interviewee supports the vastness of the term, and commenting on the broad nature of the term stated: *"sustainable is an alright term, but I think it is very, very difficult to, well the term sustainable opens the field so to speak, I cannot, you know hold everything because this is about everything, it's about human life, and it is about the future and the planet earth and so the subject is so broad that it needs further explanations"* (Appendix B, p. A51). This interviewee suggests that the broadness in some respects is good, but there needs to be some clarification or explanation, as similarly discussed, concerning these miscommunications. This is further supported by another interviewee, discussing their teaching - highlighting the need for using the appropriate language and terminology to communicate the topic. *"So, I've then started to really look at what people meant in terms of sustainability in order to make sure I could use the - most appropriate language to reach them. Because unfortunately I mean you need to use a certain, a certain sort of terminology to make sure that you fit with that sort of definition"* (Appendix B, p. A36).

Furthermore, one interviewee emphasized the importance of context. That some factors which are taken for granted or implicit in societal conditions so therefore are not explicated in the terminology or understanding. Further explaining his teaching, he explains: *"for instance, [students] coming from Eastern Europe, and they started asking me please could we also look into social sustainability because they didn't grow up with social sustainability, it was not self-evident, so I had to learn as a teacher ok a [region] background is not self-evident, maybe we should also deal with the issue of social sustainability"* (Appendix B, p. A51). This discussion links to the third theme relating to information, knowledge and communication and the previous discussion in the literature review about how information is transmitted. Vague

definitions and language complicate the transfer of knowledge between 'sender' and 'receiver' as the receiver needs to have extensive knowledge to be able to understand the implicit meaning with a conversation. When vague terms are used, the 'sender' must also have extensive knowledge to be able to decipher the context in which the receiver is translating the information into knowledge. The example of Easter European students requesting information concerning social sustainability emphasises this process, as the interviewee had not considered the societal context in which the knowledge was being received.

In addition to the vagueness of the terminology, interviewees, especially those who studied in the sixties and seventies reiterated that there had been a development in the terminology as previously discussed in the 'contextual narrative' in chapter four. Three examples which are highlighted in the next quotes, are the development from ecology, passive solar and bioclimatic to sustainability: *"I think in the beginning we didn't use sustainability. I think when I first started becoming aware in this sort of stuff it wasn't called sustainability it was called something like ecology"* (Appendix B, p. A35). Referring to passive solar, another interviewee explains: *"We didn't call it sustainability back then. Nobody called it that those days, it was natural building or passive solar or something like that"* (Appendix B, p. A37). While a younger interviewee describes: *"The practice was very interested in developing what they call bio-climatic architecture. And I think back in, back then, this is what about 1996 or something, people weren't really talking about sustainability"* (Appendix B, p. A34). Causally, the interviewee discussed the development of terms especially in relation to retelling how they first became interested in sustainability.

Additionally, this transition was not discussed as an issue or as a development of content, more a mere change in name or label. Conversely, some interviewees, similar to authors from the literature review, argued that there should be no separation of sustainable architecture and architecture. One interviewee explicating that term should disappear and just be a given: *"I suppose ultimately for me since I think all buildings should be sustainable, it's almost a term that should disappear. It should be taken for granted"* (Appendix B, p. A49).

Despite some interviewees explicitly acknowledging that there has been a development in terms, others still used the variety of terms as synonyms. In opposition, some of the interviewees stressed the differences between these terms, explaining: *"Today, somebody, some people might argue that those are semantics, that they're really just the same thing, but they're not really, and, because, if sustainability somehow is different, sustainability is about sustaining, which is really kind of unglamorous, it's often what we need. We don't need to be sustainable; we need to be positive. We need to be regenerative. We need to undo this damage. [...] Regenerative is solving the issue. Regenerative is undoing the damage of the past; it's fixing existing building and infrastructure, you know. And then resilience is, resilience is a whole other category and a whole other issue. So, I like separating them out as*

different things" (Appendix B, pp. A56-57). This opinion supports not only discussions in the literature review but also arguments discussed in the contextual narrative, regarding accepting that there is a diversity of terms and meanings, acknowledging that one term is not better than another, but stressing the importance of using them with precision and purpose.

Similarly, another interviewee stated: *"Well, nowadays they've become synonyms, but in the old days green building was really about, and this is my personal interpretation, green building was really about responsibility. We're designing something, we're bring something into the world, and we're going to take responsibility for it"* (Appendix B, p. A56). Interestingly, this interviewee uses of the phrase "my personal interpretation" which highlights the notion that there are many definitions of sustainability and they are personally formed. Another interviewee response also echoes this: *"Sustainability, by my definition, is really about net-zero-sub-gains"* (Appendix B, p. A56). There is an obvious need to explicate that what they are stating is from their perspective and not universal. This also links to the various findings from the questionnaire in chapter four in reference to how the respondents defined sustainable architecture (these responses can be view in appendix A, p. A12).

Many of the interviewees also discussed the different development of the definitions for specific terms, particularly sustainability. Two interviewees highlighted the progression from a focus on energy, firstly: *"Sustainability, or resilience, or whatever you call it is not only about energy. I think it's more that the issue that has been discussed since the seventies. And now everybody is aware about it"* (Appendix B, p. A42). Comparably, the second interviewee expanded on this stating that the shift has been from energy to wellbeing: *"Now, there's the new tendency, we're not talking about, in general, you're not talking about energy saving anymore, it's more about wellbeing, in the space, more about productivity but wanting the language for sustainability"* (Appendix B, p. A106). I believe this accurately represents a common transition in the field, moving from a 'green' perspective common in the nineties and early 2000s to a more holistic view of sustainability. Another interviewee explained the development of the term in their native language emphasizing that as the term was used by other disciplines, it changed in meaning: *"the ecologists took it [the term] and then they gave it back to architecture but now it means something new"* (Appendix B, p. A51).

Furthermore, one interviewee from practice emphasised that their practice has evolved, as their understanding of sustainability developed, indicating that what they thought was sustainable in the past has changed now: *"then creating sustainable designs, for what sustainable meant, what we thought it meant at the time"* (Appendix B, p. A46). However, while this transition to new meaning is considered new, some of the respondents indicated that even new understandings of sustainability, are not original; expanding that they had developed from past ideas: *"In each place, it's never been a new idea, it's always building off-of older ideas that have been there for a long time, right, so it means that in each place the definition of*

sustainability was actually quite different. Which is not to say that they were wrong, or that they weren't good, but they're historically developed, and so they end up emerging from different places and have a different trajectory" (Appendix B, p. A72). Other interviewees who also supports the plurality of definitions, reinforced this idea of contextually based definitions, giving one example of working with students: *"I said ok, that is the definition of sustainability if you had to do a campus in Brazil. And I think that by doing that I haven't imposed on them sustainability, but I have actually got them to construct the concept by themselves"* (Appendix B, p. A71). Contextually basing the meaning or definition of a term also adds to the complexity but at the same time for that group of people anchors abstract ideas in concrete situations. This also reiterates that in this scenario there are as many definitions as there are people and places. In support of this, a previous interviewee explained why multiple definitions are a positive thing: *"So just like maybe poetry, multiple definitions are good, I think, because that motivates different groups of people to take different kinds of actions in different places, and so partial truths emerge"* (Appendix B, p. A81).

It was clear from the interviews that theme of language, terminology, and definitions is not a topic with succinct and cohesive answers. Similar to the literature, questionnaire, and contextual narrative, many discussions overlapped, especially concerning the development and meaning of different terminology. It is evident that some of the causes for the confusion which surrounds the definition of sustainable architecture is the lack of precisions and understanding the context in which the 'receiver' transmits the provided information. As some of the interviewees discussed the importance of knowing your audiences so you can adapt your terminology or language, to be best able to communicate with them. It seems this is more evident in academia where participants are educated and well-practiced in communicating with audiences. Within an architectural practice, this is less obvious, and it is speculated that the close-knit working environment encourages these nuances to be exposed informally, or as established in the questionnaire, many offices have an established philosophy or strategy which may help to frame communication and reduce ambiguity and miscommunication.

6.4.4 Technology and greenwashing in sustainable architecture

During the questionnaire, there were less direct questions asked concerning greenwashing and add-on techno-centrism. The coding tree in figure 6.10 bottom left illustrates that greenwashing and the focus on technology was less apparent compared with other themes. Three main categories were constructed, which are very similar to those which were constructed within the literature review and included: greenwashing; marketing and selling; and technology as a solution, within these main categories nine subcategories where also formed with over twenty codes within these. Interviewees discussed the implications of greenwashing, emphasising the role of false claims, that often it is more present in associated industries such as products, materials or development companies, and that the architecture industry is moving on

from greenwashing. Similarly, some interviewees highlighted visible elements, selling different forms of measurability and sustainable architecture as a market-based commodity influenced the marketing and selling of sustainable architecture. One topic within the category, techno-heroism which was discussed is the role technology plays in solving different problems faced in the industry.

The previously raised topic of the impact or effect of greenwashing is supported by three different implications which were raised in the interviews; these include that greenwashing has slowed adoption, driven architects away and increase hesitation to promote good examples, in fear of being labelled as greenwashing. Many of the interviewees also suggested that presently greenwashing is not occurring as much as in the past and this is supported by one interviewee who states: *“To go back to the idea of greenwash, I think certainly in the [country] there was a period of some may be quite poorly designed buildings with sort of the added greenwash onto it, and I think unfortunately that did move a lot of architects away from the idea of sustainable design”* (Appendix B, p. A100). Another interviewee elucidates this phase, discussing their journey with marketing green features in their practice to a more holistic focus: *“I think we went through this phase in the past. We went through trying to advertise, as much as possible, visually, on green elements. And I would think that we are past that stage [...] You don’t have to have any photovoltaics or all that, it’s more like making sure that we satisfy the right, responsible, resource materials. And, we, responsible to the specific site requirements, [...] or provide a comfortable building for the users in terms of daylighting and family comfort. It doesn’t have to have all these greenwashing elements to call it green architecture; I wouldn’t say”* (Appendix B, p. A102). Similarly, this development in practice also corresponds to what was previously discussed within the development of definitions and meanings, the notion that sustainability is moving from energy to wellbeing. One other interviewee also discussed greenwashing as a past period and credited this change to the education and awareness of clients and their subsequent expectations of what sustainable architecture is: *“I think it’s very much [greenwashing effects the progression]. I think it’s more a case of that. I think it more relates to that period because now we have, the client gets more and more refined in how they perceive sustainability”* (Appendix B, p. A102). While these interviewees discuss that there is movement away from greenwashing, which may relate more to a past period, it is also worth noting that as the interviewees are experts, it is expected that they are at the forefront of the field and while there is some progress I would suggest that greenwashing is still very relevant within the broader field of sustainable architecture and architecture as a whole. Similarly, two other interviewees clarified this notion through the explanation that while architecture has moved on from greenwashing, it is still present in their experience in other associated industries such as products, materials, and developers. One interviewee explains that it is often occurring in products as the ambiguity makes it is easy to use labels without any criteria of assessment. *“[...] there is still greenwashing happening, but not as much on designs or buildings but more on products, as I see it. It is actually quite difficult to find out exactly; you say its green*

or sustainable what do you actually base it on any why" (Appendix B, p. A65). The second interviewee rationalises that greenwashing and marketing is occurring more by developers than architects because of metrics in their country. *"I think, you know, those of us in the know have seen every possible version of greenwashing you can imagine. It usually comes from, in the building industry it's usually developers more than anybody and their marketing departments who are trying to, essentially, sell these units as green lifestyle units. And, you know, that's, it's, I'm not seeing, I'm not seeing it really as much in [country] from architects and engineers. They, because, because we tend to be focused on real tangible metrics, it's, they know it's much harder, to, to get away with lying or, you know, trying to boast about"* (Appendix B, p. A101). Two other interviewees also discussed the idea of false and vague labels. The first interviewee used an antidote to emphasise that green doesn't necessarily mean good. Entertainingly they mentioned: *"Well it's interesting. A couple of weeks ago I had an intestinal infection, I looked really, really bad and people were saying you look green. So, if you sort of transplant it onto the entire green building agenda [...]"* (Appendix B, p. A79). While comical, this is a notion which was also presented in a satirical article within the literature review, which could suggest that the 'greening' of architecture has become so prevalent it is starting to be considered less serious. The second interviewee raised the issue that the broadness of the term allows for many things to fit within its meaning which means many claims can be made. They clarified: *"But I mean there is also one more thing, about the concept and the broadness and that, of course, this has opened up for all these greenwashing, [...]"* You can fit anything into this, and it isn't stringent or precise" (Appendix B, p. A50). These two quotes link greenwashing very closely with how sustainable architecture is understood and defined as a term, as well as how it is discussed and communicated.

Three of the interviewees attribute greenwashing to a market-based approach to architecture which transforms sustainable architecture into a commodity avoiding many of the pressing issues, as one interviewee explained: *"The problem is the greenwashing comes from having a market-based approach to life, really, because it's how the market is going to deal with sustainability, it's going to make it into a market, a commodity. And that's what we see happening. And of course, it actually avoids, them, thinking about what the real issues are, such as inequality, inequality in resource use, there's a whole lot of stuff that we don't talk about"* (Appendix B, p. A101). This experience is supported by another interviewee who states: *"Well, I think it comes back to this, that's what's being built in sustainable architecture is market-driven and is not engaging with real problems. That's why I think there's a lack of connection. That's a problem"* (Appendix B, p. A88). A third interviewee frames his experience with a similar issue - "first capital cost" and explicates: *"[...] there's a race to the bottom, and there's this obsession with, just, first capital cost. And, unfortunately, that obsession is still there, and because we are in a boom the cost of building has risen dramatically, so we're providing expensive crap, currently"* (Appendix B, p. A46). All three of these experiences indicate that there is a disconnect

between the significant issues addressed by sustainability and the shallow responses which on the surface attempt to acknowledge and address the problem but in reality, miss the opportunity to make a difference.

These last three examples emphasise the negative marketing which is occurring, in contrast to this; some interviewees focused on the positive examples which are occurring and the need for these projects to be better published and exemplified. One interviewee describes his experience with other architects, highlighting that greenwashing (in his experience) has created a sense of pessimistic criticism and some architects are too scared to promote their projects for fear of being labelled as greenwashing, this interviewee describes: *"So, instead what I'm seeing is almost the opposite. What I'm seeing is a lot of firms that are doing cool, great things, but they're not talking about it at all. Because they are afraid of getting any criticism whatsoever. And, so, it's really actually, kind of, annoying, because I go 'you should be telling people about this, this is amazing,' 'no, no, we don't want, we don't want an onslaught of criticism'"* (Appendix B, p. A101). This notion of fear is clarified by the interviewee who elucidates: *"So, you know, what I'm seeing is firms will work on one great [sustainable] project that they stumbled into, they did it really capably and well, and they're timid on talking about it. And, as a result, they don't get asked to do another one, and then they wonder why. And I say to them 'well, why the hell would anybody ask you to do something that you're not talking about, you're not advertising, and you've only done once?' If you want more of that, then talk about it. And, you know, it's something that's going to come up again and again in everything that you're talking about, underlying all of this, is fear. It's amazing how often they'll use fear-based words to describe reasons why they won't do something. And I'll say, 'why aren't you talking about this?', 'well, we're afraid that such and such will happen,' 'we're worried that this will happen,' 'we're concerned that,' yeah, you're fearful, just stop being chickenshit and do something, you know, do it"* (Appendix B, pp. A101-102). One other interviewee explains another experience where an engineering department has rebranded themselves as sustainable because they wanted to promote the successful part of what they were doing. They explain: *"what used to be the mechanical and electrical engineering department, they completely rebrand themselves as sustainable design. And you know, this was five or six years ago. You know they realized that that's where they wanted to position themselves, and they wanted to be able to market themselves as sustainable design, not mechanical engineering"* (Appendix B, p. A49). This interviewee further clarifies and acknowledges that the market-driven approach to sustainability has now affected a practices ability to gain work. *"I mean I find in the [country] a lot of practices realize that they have to have a sustainable agenda, or ability in order to win work"* (Appendix B, p. A101). Optimistically, this suggests that sustainability is growing in awareness, but pessimistically one can only imagine the effect this has had on increasing greenwashing and the shallow add-on of visual technology.

Discussing their experience, two interviewees consider how greenwashing has slowed the adoption of sustainable architecture. One interviewee credits this

issue to laziness, and the other explains that sustainability is not taken seriously enough within the industry. The first interviewee who discussed laziness as one issue, explains that this results in bragging and labelling of shallow attempts that exacerbate the greenwashing issue. *“Well, the greenwashing has only slowed adoption. Because what you have, is you have lazy people that aren’t that interested in learning about this, they just want to do the bare minimum. And, so, any little thing they can find to brag about they do, and then they pat themselves on the back on what a good job they’re doing”* (Appendix B, p. A101). The second interviewee uses gravity to exemplify and explain his understanding of how sustainability in architecture is not being taken seriously enough and as a result, is “diluting” the field and wasting time. *“Well I mean it’s [greenwashing] just kind of diluted it, and yet at the same time, no I would say its diluted it, and I would say that really, I liken the focus that we have, around carbon neutral to buildings, rather than greenwashing and sustainability as a whole. I liken the issue to, one of similar to, if architects were to kind of casually talk about gravity. Just casually take it on a little bit here, a little bit there, then that would be incredibly irresponsible, right? If it took on gravity sometimes and didn’t take it on other times. So, I think that it’s incredibly irresponsible if we don’t pull out of the whole sustainability greenwashing dialogue, pull out the issue of carbon and buildings’ responsibility to global warming and climate change. So, and we don’t have a lot of time to do that, so I think, I think greenwashing, generalised sustainability is kind of wasting valuable time”* (Appendix B, p. A102). These two different experiences are engaging; the first expert clarifies that it is laziness to learn, rather than laziness to create more complex buildings. This suggests the notion that the format of information needs to be as easily accessible as possible to reduce the barrier between the transfer of knowledge to practice. What is also noteworthy in the second quote, is the interviewee’s notion that broader sustainability and greenwashing are equivalent and suggests that more specific approaches such as a constant focus on carbon are a solution for improving the field.

Technology was discussed in earlier chapters in reference to techno-centric approaches and those who believe technology can solve many of the problems. One interviewee articulated their scepticism towards innovation to solve our problems through the discussion of literature from the early environmental period, they elaborate: *“[...] I was re-reading Illich from the seventies, and he was saying ‘OK, there are three things of doing things. You either re-distribute what you already have, you innovate, or you actually re-organise’ to deal with problems, and so on. And he was promoting the latter, but what he did say is that innovation has never got us out of problems. And Tainter is another good example of that, writing about the nature of collapse, because again, he says that as you keep innovating your systems get more and more rigid and hierarchical. And eventually you can afford to innovate, you don’t get enough return on your investment, and the whole system just collapses. So, innovation won’t necessarily get us out of the problem”* (Appendix B, pp. A60-61). This experience is similar to what is occurring with rating systems. Rating systems

and measuring helped to encourage sustainable architecture and have pushed the industry to improve but have now become ridged and hierarchical and while they lift the bottom they alone will not get solve the problem. One interviewee discussed how the measurability helped energy grow in popularity over things such as health; they describe: *"We have tonnes and tonnes of data and research showing that you know, a sustainably designed building can affect health outcomes. The trouble is it's usually after the fact, and it's not the architects that are measuring it, it's somebody else. So, the disconnect is that it's hard to sell the client on something that we can't measure immediately. You know, energy, if I put solar panels on your building today, I can measure that tomorrow. Yeah. That's, that's one of the reasons why energy took off so much more than other things"* (Appendix B, p. A62). Other interviewees voiced similar experiences with the ease of selling or convincing clients about measurable aspects but desire to be able to use similar methods to promote health and wellbeing with sustainable architecture. They expand: *"My dream is that I would be able to reconnect actionalities. So, for example, with energy it's easy. I can talk to any architect, any developer, any contractor and I can easily say 'hey, listen, I calculated this if you put this many solar panels on your roof your pay pack will be this.' It's very straightforward. And in such a way that they can very clearly see that it's maybe foolish not to or, 'you know what, there's a lot of trees on the site', or 'the way the roof is I can't put that many solar panels on and there's nowhere else on the site to put them' and blah, blah, blah. You know, I can just, I can very quickly and easily hit reconnect that where putting the solar panels on it pays for itself in this period of time. I would love people to do that with health. I would be able to say, 'hey, because you built in a healthy way because you avoided cancer-causing chemicals, I've managed to get you a discount on your employee health insurance plan,' and therefore there's an ROI, a return on investment and a payback that I can calculate. You're saving \$1000 a month because your health insurance premiums are less, and therefore I can show you how, in three years, healthier institutes pay for themselves"* (Appendix B, pp. A105-106). This quote relates back to the previous discussion of the visible and invisible aspects of sustainable architecture presented in the literature review and how visible features can be easier to communicate because they are tangible and a 'product' source of information. Another interviewee further clarifies this understanding by explaining how visible elements are easier to convince clients with. They expand: *"I found even with the clients who are very kind of interested, it's especially difficult when you are trying to, you can't inspire them with things like air tightness, thermal mass. It's not exciting for them. Whereas we tried to do earth hues on a project once, that didn't interest them at all. But they were interested in the windmill turbine"* (Appendix B, p. A87). Interestingly, in opposition to this, one interviewee explains a contradictory experience, enlightening that in his experience the immeasurable aspects are much easier to sell to clients than the numbers. They emphasised this experience and that of another visiting academic: *"And I always think. Certainly, when you're working in a practice environment, it's very difficult to sell sustainability to clients purely on kind of numbers or you know,*

it will save you energy. I always found it's so much better to try and sell to a client; you'll have better thermal comfort, your staff will perform better, people will be happier. You know, as opposed to saying you'll save 5-kilowatt hours per square meter per year, for a lot of clients that doesn't mean a great deal. I mean it's a concept, it was reinforced, our visiting professor is [name of professor], and she did a lovely presentation to our students last year, and she said exactly the same thing. In [name of architecture office] you've got to sell the sort of added value to clients. You can't just sell sustainable architecture on the numbers, you've got to demonstrate to the clients you know what they'll get out of it" (Appendix B, p. A40). This approach to 'selling' sustainable architecture is noteworthy, as it was surprising to hear, and it reiterates the significance of having extensive knowledge of the field, as to be able to demonstrate what clients "get out of it," I expect much understanding is required. One additional approach to this was providing a lack of information and subsequent choices, one interviewee details: *"We didn't tell them. We find that it's much easier when all we do is say 'hey, we want to make this really sustainable, are you okay with that?' and they say, 'sure, as long as you stay within the budget that, that's great.' And we left it at that. We didn't want to get, you know, city funds were involved, and state funds were involved and, you know, you start telling people too much information, and they start asking too many questions."* (Appendix B, p. A97).

Interviewees have discussed their experience with greenwashing through several themes, starting with the contention, that greenwashing is still present in the field, or as some authors explained, more prevalent in the associated disciplines such as materials and products. Additionally, interviewees credit greenwashing with the market-based approach to architecture and the effect of this is that it has slowed adoption. Furthermore, participants have adverse experiences concerning how they convince and sell sustainable aspects of their projects, with some suggesting measurable aspects, while others are advising the added value. This study has established and supported notions concerning greenwashing and techno-centrism which were previously outlined within the literature review and contextual narrative, while further illuminating different causes of greenwashing and articulating some of the implications it has on the field. This study has also demonstrated that this theme is more conflicted than previously perceived and further investigation into what greenwashing is, is missing and will be explored in the following chapter to give more supported content to the discussions presented here within this section.

6.4.5 Information, knowledge and communication

Within the theme of information, knowledge, and discourse, seven main categories were constructed from the interviewees. Within these main categories; over twenty sub-categories were formed from over seventy more specific codes (figure 6.11 top). Some of these main categories included challenges in communication; disconnections; the communication of information; quality of discourse sources; the state of information and theory and practice. Many of the codes and subcategories

within this theme were constructed from responses to questions, which were directly related to definitions, terminology, and language. There is a close connection between these two themes, and often they are intertwined in cause and effect. In the following section, different interviewees experiences and perceptions are discussed concerning overlapping and interesting categories. To read the full discussions of each interviewee, please refer to appendix B.

When asked to discuss how some of the interviewees communicate and disseminate sustainable architecture related information, a common category occurred between responses. This was the need to understand the audience and engage with them before communicating with them. The different interviewees discussed different experiences or tools to achieve this. One interviewee expanded that it was essential to engage (in their experience with students) through emotional and ethical concerns. They elaborate: *“Also, which I feel is important, that people have to be emotionally sort of moved in some way. To be able to find an activation, to act, but of course, that is a bit tricky because you can react on these global challenges either by being motivated to act, but you can also sort of give up or say it too big. Just I can’t do anything”* (Appendix B, p. A67). A similar response discusses how to change people beliefs, explaining that information must be presented in a way that connects with their understandings: *“If you expect people to be responsive to a new set of ideas that may challenge their beliefs or habits, it’s really important to take great effort to present the information or the data or the proposal in line with which, that’s theirs”* (Appendix B, p. A72). This is further supported by another response, which develops the idea of understanding the audience before communicating with them. This interviewee explains: *“[...] you have to make sure that you can reach the people that you talk to. One of my sort of, educational agenda is reach before you can teach. So, I need to understand you before I can communicate to you. Otherwise whatever I say is either just bouncing back or flying very high and so forth [...] So, obviously I mean you have to make sure your terminology, your presentation of concept is somehow adapted to people. That shouldn’t actually happen to a change in your concept and your underlying ideas which should stay the same. My thought is that you need to have that level of adaptation to your role in one way or another or the person that you are referring to”* (Appendix B, pp. A70-71). Another interviewee also supports this notion, providing a slightly different anecdote of their experience working with students in international communities. They elucidate: *“[...] I think that’s one example, you know, of when I’m in the community. Let’s say I’m in [suburb] talking to people who would rather be speaking [another language], [other language] is their first language, my [language] is not very good, I use a different kind of language. And the way I try to do that is to begin by asking lots of questions, and asking lots of questions is always about trying to understand what their vocabulary is. What do they mean by certain kinds of terms, and then how can I use those terms to make a point? To help build relationships. I think the same is true in any city because there are many different kinds of publics, many different kinds of languages”* (Appendix B, p. A73).

Continuing with the communication theme, different interviewees discussed how information was gained and communicated, with considerable focus on built examples or precedents, visual formats of communication and learning by doing. The notion of using built examples or precedents was discussed as a standard way in which to both gain knowledge and communicate especially with students and clients. One interviewee highlights a database of award-winning projects to obtain information; they expand: *“The Top 10 award winners are actually a good database that is pretty accessible and, you know, it, and, so, that’ll continue to improve. The USGBC database is pretty good. Actually, I don’t know how easy it is to access, I’ve heard mixed things. But, it’s, I know, we are, as a practice, very focused on that, in terms of how we understand data, how we collect it and understand it and apply it. But then we’re also trying to understand how we use, you know, new advances and technological tools for design to use data much, you know, much more of a better way”* (Appendix B, p. A93). Similarly, another interviewee discusses the critical role of learning from visual images and how this could limit gained information to the tangible aspects. As discussed earlier this may add to greenwashing in the profession. They explain: *“[...] architects learn by images, they tend to go for all the stuff that is clearly visible, like green roofs and stuff, and maybe like big windows facing south, because this is passive solar, something that is easy to grasp in a visual way. But, the problem is, that only some of the stuff are visible, and also it is difficult to keep up if you are only learning from images”* (Appendix B, p. A52). This predicament is important as it highlights issues which have been raised in the questionnaire (chapter five) and literature. That the sources and formats of information are crucial for in-depth learning. Visual formats are important to communicate the information to architects and designers; however, it is essential that these formats be supported by rich information and not just glossy images. This category is examined further in chapter eight – periodical and blog analysis. Continuing, built examples and precedents were often used by different interviewees to communicate the sustainable aspects of their teaching or projects, especially to excite clients. One interviewee states: *“Normally I would use precedence, and try to kind of excite the client, try to engage them”* (Appendix B, p. A67). This is supported by another interviewee who continues to support: *“A good presentation. Good examples. That would be the best way [to communicate]. Examples of other buildings that are performing really well, and they look well, and people are happy”* (Appendix B, p. A107). Another interviewee when discussing the future of sustainable architecture, states that for progress, it comes down to either legislation or examples, they clarify: *“Because I said, legislate or demonstrate. You know, if you’re gonna make it happen you’ve got to do one or, at least one of those, if not both”* (Appendix B, p. A107).

When asked to comment on the state and quality of the sustainable architecture discourse, interviewees discussed the quantity and quality of information, the diverse

range of knowledge needed and the various sources used to gain knowledge. Many of the interviewees acknowledge that there is no lack of information and on the contrary, the sheer volume can be overwhelming. One academic interviewee clarifies: *“Yes I definitely think there is no lack of information, the problem is to sort it, I mean when I started, you could know all from books, but now it is quite overwhelming. I do such a big search each year before this big course, to order new books for the library and so on, it’s difficult, I think there is no lack of information and knowledge”* (Appendix B, p. A61). This is supported by another interviewee who suggests training is important to tackle the vast amount of knowledge. They explain: *“I guess there’s always, so much knowledge, where do you start? Training is key, I would say. Being informed with the latest technologies, case studies”* (Appendix B, p. A63). When discussing the quality of information, many of the interviewees explain their experience with (especially academic) information being over complicated or too complex. One very well published interviewee even admits that even though they intend for their writing to be accessible, often it isn’t, and it is up to readers to interpret their writing to increase accessibility. To clarify: *“I will certainly admit that every time I sit down to write a new article or a new book, I say to myself, “[interviewees name], this time you are going to write it in very plain accessible language so that everyone will be able to read it and benefit from it.” And every time I try to do that I usually fail, and it’s just the nature of how I think and how I write. But, I guess I say that because I think that some authors who are writing and producing projects that in fact are more accessible are probably doing a better job of disseminating what’s needed. So, you know I guess it means that you know I’ll have to rely on other people to make what I do accessible”* (Appendix B, p. A62). Other interviewees from practice support this notion that academics especially produce and disseminate ambiguous information which is often not applicable to practice. One interviewee who is both in academia and practice clarifies: *“You know, I sit through a lot of lectures, and when they are done by academics the lectures tend to be almost deliberately confusing. I tend to be, you know, I don’t know if I’m just not that smart or I, you know, or just a simple person, but I like to speak plainly and clearly, I want my message heard, and my fellow professors tend to obfuscate things with big words. Almost to show how smart they are. I’m interested in impact and action. And not in making things more clouded”* (Appendix B, p. A63). This is reiterated by another interviewee from practice who explains: *“So, I like, you know, I want to make it as clear as possible, and academics tend to do the opposite. They want to muddy it up with things. So, you know, I’m generalising an entire group of people, I know. Yeah, so, I don’t tend to rely on them for things”* (Appendix B, p. A63). Furthermore, another academic also supports this, explaining: *“I’m in academia, I teach the sustainable design Master’s programme at [university name] But, I’m not looking at academia too often because what I find is that they are too academic. They, they tend not to have any, sort of, practical application”* (Appendix B, p. A63). In addition to this dissatisfaction, other interviewees also indicated in their experience that some written formats and media were not useful. One interviewee explained that magazines lacked depth, expanding that: *“I don’t*

find the standard sort of architectural press much use. Even detail have their green edition; I find that's ok and there are some performance figures in there, some metrics. But often I find it's such a sort of overview of the project it doesn't have enough depth" (Appendix B, p. A60). Another interviewee from practice voiced dissatisfaction with the outdated nature of books and the format of magazines, elaborating: "Well, I mean, look at my options. Anything in a book is out of date, and usually, it doesn't help the cause of using a product, it's usually just strategy. [...] Magazines are a good source, but there's no way to search it. I could find an article about it, but it doesn't sometimes it doesn't help" (Appendix B, p. A63). Likewise, another interviewee discussed the ease of gaining knowledge from experts rather than the cumbersome looking through journals. They explain: "And I've found often they were well attended and get some expert speakers in, and it's delivered, you gain the knowledge, and it sticks. And I've found that yeah that would be quite effective as opposed to you know trawling through journals" (Appendix B, p. A60). This is elaborated by one practitioner who emphasises the importance of talking and visually seeing the information. "I think training is always, is a good way. It's a good way to communicate, to learn something fast. It's not only just reading a quick article, it's nice to talk about things, to visually see something. I think it does help, yeah" (Appendix B, p. A64).

Within different interviews, discussions also included why participants use specific sources to gain information and what they recommend. Responses to this were often split with some interviewees more focused on the verbal and personal knowledge transfer, while others preferred written periodicals and websites or blogs for the speed. For instance, one interviewee stated: "I would ask questions. I mean, you know, and the other place is just peer groups, like, good architects that you've worked with, and engineers as well" (Appendix B, p. A65). This was reinforced by one practitioner who elaborated: "I am very interested in watching when the architects talk about the projects, so in the [country] for example we have the Passivhaus trust. So, I went to their conference last year, and there is just some amazing, insightful talk about projects. Now those projects have probably never been published or written up. But by watching those lectures, I've found you can learn a huge amount" (Appendix B, p. A60). This response connected both the importance of networking and build examples but also emphasised the fact that many 'state-of-the-art' examples do not make it into publications and more often than not, this information is kept internally within the project team.

Interestingly, an additional practitioner interpreted this question to focus on materials and products as information rather than design principles or concepts. They explain: "The very first place I go for anything if it's a topic that I need to brush up on quickly, the very, very first place I go is buildinggreen.com. and, that's the environmental builder's site. They're old friends of mine; essentially, they are my go-to experts for anything. And then, if they don't have an article about it, there are usually forums that I could post to and ask questions, or just, depending on what it is, I just have friends around the country that I would just ask. So, if it has to do with energy

performance then I have a whole, some friends that I would just say 'hey, have you ever tried this product and what's your feedback on it?' Friends are usually the best place" (Appendix B, p. A62). Other interviewees also support the internet as a quick, easy source to gain information; one states: "Probably Google. I Google everything" (Appendix B, p. A65), while another lists: "Where would I go? Probably journals, magazines, web, books" (Appendix B, p. A63).

In addition to these information sources, some interviewees elaborated that the need for broad interdisciplinary information and contrastingly, others give examples of very narrow topics of information within the architectural discipline. One academic elaborates: "Well, if you've read any of my work you would know that it is highly interdisciplinary, so yeah, I use architecture text cause that's what we are talking about, but the other literature that I read include fairly science and technology stuff at the top. Philosophy of technology I use a great deal, and certainly other social sciences" (Appendix B, p. A62). In contrast to this, one practitioner clarifies: "I'm a Passive House geek. I think we've found a tool. I think we found the best tool to address the issue, the most important issue facing us as a species. So, you know, that's where I look every day. I look for inspiration on architects and builders that are building to this standard" (Appendix B, p. A65). These two juxtaposing experiences illustrate how diverse, sustainable architecture can be and challenges which can occur when trying to provide both comprehensive information which transverses many disciplines and extremely narrow and focused information within the same field. From my experiences, often academics and researchers producing information are publishing on the broad end of the scale and practitioners are providing more specific cases. Unfortunately, a vast amount of information ends up hidden in bookshelves as the theoretical information is in the wrong format or too complicated for time-sensitive practice and many 'state-of-the-art' example books lack the supplementary theoretical information.

One last example when discussing information, knowledge and discourse, is a practitioner's experience with communicating with contractors and other team members. This first example is a common mistake which could occur on any building site, sustainable or not. It emphasises that there is still a lag in the industry and even with great intentions and designs, if all of the team from client to subcontractors are not clear of the sustainable intention, then often traditional 'ways of doing' are usually reverted to. The interviewee elaborates: "We built a house, all the wood was supposed to be sustainably harvested, PEFC certified wood. They had half the framing up, I'm walking through the job site, and I don't see any PEFC logos on the wood, the familiar tree and corn logo thing. And in my dumb mind, I thought 'well, what did they sand them off? Like, why would they do that?' and then, I was just so confused. And I said to the contractor 'why did you sand off the PEFC logos? That's a good thing to show'. And he goes 'what are you talking about?'; and it turns out he just didn't read the drawing. And, so, legally I could make him rip down half the house and replace

it with PEFC wood, but that doesn't actually help with the sustainability of it, right? They've already built half the framing. So, you know, from a sustainability perspective, you've made a mistake, the damage has already been done, stop what you are doing and from here on out everything should PEFC wood, obviously. But I'm not going to delay the project and create a bigger problem by having you throw all that in the landfill." (Appendix B, p. A83). This interviewee continued to describe another experience of disconnection with the example of good intentions which failed due to lack of knowledge or ignorance even within an integrated project design process which is usually considered good practice. They expand: *"The other disconnect is when, even when we have a kick-off meeting, and really what we're doing is an Integrated Project Design approach or IPD approach it's called, we have a kick-off meeting and talking about these sustainability goals at the beginning. And so, we lay them out as goals. And so, in addition to building a building that's on time, on budget and beautiful, we're also trying to build a net zero energy building, or we're also trying to build a building that has no toxins in it. Even when we do that, oftentimes there'll be a member of the team that's trying to be helpful. You know, like, and a good one is the contract will say 'we're re-using this toxic stuff that's lying around, is that good? We're re-using it'. And I go, 'yes, but it's toxic, so it's. I like where your head is and, you know, you get a gold star for trying, but I wish you had discussed it with me first. Because there were larger issues at play. So, it's usually their ignorance about something that causes the issue"* (Appendix B, pp. A83-84). These two examples of ignorance highlight more significant issues which exist within the broader building industry and signify that there is a potential for miscommunication across all disciplines involved and these can have considerable consequences. While these are close to the edge of this dissertation's scope, they have been included to emphasise the importance of this theme.

Interviewees have discussed this theme through a variety of different topics which further contribute to, and elaborate on, considerations which have previously been introduced through the literature review, contextual narrative and questionnaire. For instance, the questionnaire identified which primary sources were used by the participants to gain information and their frequency of use. Through the interviewees, the quality of these sources and experiences with them have been constructed, which especially highlight build examples, precedents and case studies as an essential way to both disseminate and gain knowledge. One of the more interesting and surprising points raised by the interviewees has emphasised the divide between academia and practice concerning knowledge transfer. As previously mentioned in the questionnaire, nearly all of the academic respondents agreed that it was important that sustainable architecture research is disseminated to practice. Around sixty-five percent strongly agreed or agreed that there was an interest from practice regarding related teaching or research. As this question was only asked of academia, this was elaborated on in the interviews with practitioners, from practice there were several perspectives which stressed that the language used by academia is vague and confusing and

subsequently not often considered useful as a knowledge source. Additionally, one academic admitted that despite their best effort, they are not able to write plainly and it is up to others to interpret his text. While it is presumed that academia is well practiced at disseminating knowledge, it is evident in these cases there is conflict in the transmission of knowledge between either academics (sender) being too complicated in their information or practitioners (receivers) not having the adequate knowledge to be able to understand, or a combination of both.

6.4.6 Attitudes and perspectives towards sustainable architecture

One of the most significant themes from the interviews is that approaches, perspective, and attitudes which before the interview study was only a tentative theme and ill-defined, during this study, this theme has developed to include the largest group of codes, including seven categories, twenty-eight subcategories and over seventy-five different specific codes (figure 6.10 middle). The seven main categories include motivations; perspectives; different approaches and attitudes; transdisciplinary understanding; approaches influenced by external factors; and influences on nature and society. Many of the transcripts coded under these subcategories and codes were also coded under other themes, such as greenwashing and techno-centrism as well as being related closely with the different language, terminology and definitions used to communicate this discourse and the information and knowledge. Four of these main categories and their subcategories will be discussed in the following section and include the importance of different motivations, the different and changing perspectives and attitudes. Lastly, the diverse array of approaches and their implications.

One of the first questions asked for many of the participants was what interested them in sustainability in the first place (see appendix B, Q1). Many of the responses to this question emphasised their initial personal motivation. In addition to these personal accounts, the general topic of motivation was also discussed throughout some of the interviews. Interestingly, many of the interviewees were introduced to sustainability through either their high school or university education, and many mentioned their final year architecture thesis or project as a significant initial milestone. Other described exposure to sustainable architecture in their early career as a main influence, while a select few articulated that interest in sustainability was a more recent development in their career. Supplementary to this, three main motivators were societal, political and environmental. This was true, especially for those respondents who attended architecture school in the seventies during the oil crisis. These three themes were elaborated on to include: population growth; limits of growth; equality; the fragile environment; the impact of building and systems thinking. One academic raised fundamental questions which connect back to how sustainability is understood, they explained: *“Well, interesting because I don’t think you start working with sustainability. It’s not that one day you wake up and say you know what I am starting to work with sustainability. It goes back to what I think sustainability is about”* (Appendix B, p. A36). In contrast to this quote, another interviewee described

their experience in architecture school stating: *“I always felt imposing sustainability into my projects, and talking then, even though we didn’t call it sustainability back then”* (Appendix B, p. A37). This interviewee uses the word ‘imposing’ which is interesting in that it conjures up images of forcing and a disconnect of sustainability within architecture. These two experiences and perspectives are vastly different and reveal the many different understandings and perspectives which can be held in sustainable architecture. To continue the discussion of motivation on a more general level, one practitioner raised the notion of being aware early in the design process. Moreover, within architectural practices, of the cultural behaviours which drive different projects and the inherent need to be reflective, they elaborate: *“we’re just talking about being reflective and purposeful around who we are as a practice. So, quite transformational stuff. And, we will carry that on and move into living systems thinking. And, yeah, so, really, it goes back to your cultures and behaviours. Your ‘why’ purpose, and the principles that drive you, as exemplified by [project name], and completely anathema and difficult to do in a very reactive, fast-moving, booming industry, but then you just continue to produce crap, so what do you want?”* (Appendix B, p. A64). Clarifying, this interviewee indicates that motivation is responsible for the gap between existing knowledge and what is being designed, they explain: *“So, there’s a huge gap, but it’s more a lack of motivation and will, really, than anything else. [...] So, there’s a gap, you can overcome it with motivational, education and engagement around projects. Making it real, bringing it into the practice, taking the time to slow down and make it part of the design process, which is really hard to do, obviously.”* (Appendix B, p. A92). This also hints, by mentioning “making it real, bring it into the practice” that the existing knowledge is currently ‘not real’ and ‘not in practice,’ it could be assumed that this is in reference to existing knowledge often being complex and theoretical and not directly relatable to practice. This indicates and supports the notion that there are issues with the way information is formatted for its ‘receivers.’

Attitudes towards sustainable architecture were also discussed from indirect questions. A considerable part of these discussions revolved around sustainability as a trend. Experiences reinforce this as previous discussions in the literature review regarding sustainability becoming mainstream. A few of the interviewees from both academia and practice gave their insight into when sustainable architecture became popular. One academic discussing his home country explains that there was a pivotal date around ten years ago when the concept was accepted by the profession: *“I can see a lot of architects are, they have now become sustainable, you read their homepages. And that happened around 2006, I can say very precisely. Because up to then, as I said before, lots of us are you know following the crowd, and up till around 2006, architects were, in general, being a bit sceptical about the whole ecological stuff”* (Appendix B, p. A52). This reference to architecture websites and how they display their interest in sustainability came after the fourth study – the architectural website analysis was designed (chapter seven) but coincidentally reinforces an

interest in how architecture firms are publicly marketing and addressing sustainability. One interviewee also supports this notion that sustainable architecture has become popular, they elaborate in a similar vein to what was previously discussed that it is the same concept only relabelled: *"Now, net-zero energy is a very fancy term for something we were doing back in the 80's, where the building is essentially just creating more energy than it's using. And I've been doing it, you know, since the 80's, but now all of a sudden it's popular"* (Appendix B, p. A44). Differing slightly, another academic declares: *"I think the energy issues are very important, even if it's a little bit old-fashioned. But, I think it's still the environment is our limitation"* (Appendix B, p. A44). This reference to energy being old-fashioned is interesting as it reinforces the previous notion that the field has moved away from singular issues (energy) to more holistic approaches (wellbeing), to sustainable architecture. The interviewee expanded on this in the discussion. A few of the interviewees describe experiences where they felt 'outside' the norm with their interest in sustainability. One interviewee described this experience from early on when they were in architecture school, recounting other student's attitudes towards what was at the time called ecology. *"I became aware that whenever I mentioned the word 'ecology,' which I went about in a pretty rational way, I noticed that everybody else started laughing at me a little bit because they identify the word ecology with a romantic issue. A romantic idea of moving out into the green fields and staying close to nature. And for me, it was quite different. So, I, you might say, I learned that they had a different mindset, that words are important"* (Appendix B, p. A42). Even though this interviewee is referring to an experience in the seventies, another interviewee still has similar experiences in recent times with opposite attitudes or judgments from their peers. In the previous quote, the students had a negative attitude towards the romantic while in the following quote the architects have a negative notion towards the scientific. The interviewee clarifies: *"So, yeah. I mean it's, foreign when, well it's not so much foreign, it's like, people look at you like you're a freak when all you're talking about is energy and BTUs and, you know especially as an architect. Architects, if I look at a building, if I look at a design and say the first thing in my head is wow that is a massive thermal bridge, architects look at you and say whatever, you know. like you've lost your creativity, you've lost your, you know, design is more than just BTUs, and they miss it"* (Appendix B, p. A86). These two experiences emphasize that some change in attitude has occurred over time and there is still a belief at least in these experiences, that sustainable architecture is not mainstream and still considered 'odd' by many within the industry. Previously, a quote was used "legislate or demonstrate". The same interviewee expanded on this statement and used a metaphor to describe what he perceives to be the large task of changing the industry's attitude. This practitioner elaborates: *"It's just like anything else, it's just, you know, it's about turning a really really big ship around. People like to do what they know. They don't like to be challenged. So, you can either, I found you can either make it happen, and when I say this, I mean transform this approach that buildings have to the environment either by legislating it, through building codes and so forth, in other*

words forcing people to do what they don't want to do, or you demonstrate it, and you inspire people by building projects that demonstrate that this is possible and that people are capable of doing it. But that takes longer. So, you know, the reason why it's not, you know, that's my answer. I mean, you know, people don't wanna change" (Appendix B, p. A94). This raises an interesting point, as currently, a large increase in sustainable building (some may argue greenwashing buildings) is due to an increase in building regulations and legislation. And often this is not supported by well-publicised examples of successful, well-integrated sustainable buildings. Consequently, one could speculate that without good examples, many 'conventional' architects do not always know how to integrate these new regulations into their conventional approaches. This results in less successful attempts at sustainable buildings.

Perspectives are like the different attitudes, in that they varied between participants discussions. Some key discussions which emerged and were constructed were the desire to change the current perceived negative perspective to a more positive one; the perception of separation; the desire to integrate; the perception of time and new generations of architects. Three interviewees voiced their opinion that we as the industry, need to start discussing sustainability positively and excitingly, rather than in a pessimistic and reductive manner. For example, one interviewee expounded: *"William McDonough once said that ah he was asked how his relationship to his wife was and he said 'well sustainable' and clearly that was not represented in a positive way, and I think that the overall sort of semantics of sustainability is all but exciting. 'Cause minimize, reduce, limit; zero everything is like ohhhhhff come on give me some more sort of excitement. Can we maximise, can we emphasise, as William McDonough said 'can we grow rather than limit'? So, I think that there is sort of a, a hint of I'm not saying negativity, not really great excitement about the entire thing"* (Appendix B, p. A54). This is supported by a second interviewee perception of sustainability as an inspiration and using better-looking buildings to excite people; they elaborate: *"One, because I don't see sustainability as a limitation, I see it as an inspiration about our design. Two, I know the only way to get them excited about it is to get them excited about the design, you know, 'look, we're going to make the project look better too.' And then, that gets them on board"* (Appendix B, p. A45). A third interviewee and academic divulges that graduates work the emotional effect of negative perceptions of the environmental crisis – suicide and explains that the restrictive demands need to be turned into positive: *"One of her students, for different reason, but not at least based on this courses about global challenges and environmental problems, which is suicide, so to think a lot about how can you turn this perspective, as you say, we have to restrain our self, we have to turn it into, and to give some hope"* (Appendix B, p. A89). These three excerpts give different perspectives on the need and desire to see sustainability within architecture as an opportunity rather than a constraint.

Similarly, one interviewee explains that sustainability as a constraint should not

be a problem for good architects and it is only bad architects who cannot see it as a positive design driver, they refine: *"I think with good architecture that should not be a problem, I think architecture is all about working with constraints, being creative, you know, why a gothic cathedral built. It was to resolve structural forces, and it derived a beauty and aesthetic. And I think for good architects, the same way, the requirements of insulation, air tightness, shading, derives a beautiful language. So, I think it could only really; I think it can only be the poor-quality architects that can't use that as a creative generator"* (Appendix B, p. A103).

A second perception is the separation of architecture and sustainable architecture. Some of the participants had experience of this in how they discussed their office, promoted their skills and taught sustainable architecture. When asked about how sustainability is integrated into their office, one practitioner explained: *"[...] we purposely don't say the word sustainable a lot, because it tends to categorise in a way that says 'they must do some projects that are sustainable and some projects that are not.' And, so we've tried, and I'm not sure how successful we've been, to try to, to pull that word or not. Even on our website, some people are confused by what they've seen on our website because sustainable doesn't, it just doesn't show up very much"* (Appendix B, p. A59). This is an interesting perception of what is occurring and the subtle inferences which occur through the different use of language which illustrates one experience of perceived separation. A second experience is much more explicit. Another practitioner explains how their practice and consultancy is separated into four themes which are based on the silos they experience within the industry. They rationalise: *"I focus on four main buckets. And the reason I call them buckets is because it's not because of me. Which, it's because the building industry silos them, and, so, I often have to, I'm often asked to do a deep dive in one of these buckets. But they don't ask any of the others, so I have to pull them in"* (Appendix B, p. A44). One last excerpt comes from academia, and is used as an example to showcase that if sustainable architecture education is still separated from architecture education, then new graduates and practitioners are only furthering this separation within the industry.

"For example, at the master level, you can choose between sustainable and not sustainable. And people who are not interested in can just go on making nice things for rich people, or whatever, without reflecting, actively reflecting. I'm not saying that they are not working, they are also working with sustainability, but you still have the chance to go through the education and only have very basic knowledge about certain aspects" (Appendix B, p. A89). This lack of knowledge for all students is an interesting notion as some of the other interviewees expressed that it may take another generation before sustainability is embedded in the industry. One interviewee states: *"But there isn't an emphasis on high-performance buildings and the importance of it. So, you know, maybe it's going to take another generation"* (Appendix B, p. A96). While a second interviewee is hopeful that their attempts to integrate environmental education will stick with them. They explain: *"That's the positive and then the*

negative is that I think that if you want that to be effectively implemented in the curriculum, you need the cultural shift. So, you need to have people that so much aware of the strict intricacy and interconnectedness between architecture and sustainability to the point that they are the same that probably you need a generation. The people that now teach in studio and the people that also teach the technical part of the program are people whose education was very much compartmentalised. So, it is obviously very difficult for them to sort of make that reconciliation. The hope is that the current generation of student who actually have sort of witnessed that attempt of integration will then as they move along to an academic career or a practice career will make sure that, that is implemented” (Appendix B, p. A70).

Interestingly, in contrast to previous considerations which indicated that the meaning of sustainability is moving away from singular areas such as energy to more holistic ones like wellbeing, when discussing approaches, three interviewees indicated the opposite, that there needs to be a shift from general sustainability to more specific approaches. One interviewee explains their scepticism in the future of the practice, explaining: *“Unfortunately, I’m a little impatient because we don’t have another generation. So, I would say that if it’s, if the focus isn’t shifted yet in the academy, from generalised sustainability to carbon neutral thinking, then we are in trouble, and I don’t think it is. I don’t think it has shifted” (Appendix B, p. A96).* In support of this transition to particular approaches, another author when discussing the impact vague terms have on the field, explains that the environmental situation is critical, so consequently, the industry first needs to be working very specifically. They clarify: *“Yeah, I mean, again if you want to take something on, you should take it on with, with focus and with rigour. So, what are we, what are the priorities here? You know? What are we doing? Why do we need to build sustainable buildings? Can anybody answer that? Yeah, well for me we need to save our planet, number 1. Yes, we need, yes, we need healthy buildings. Yes, people are, we need healthy materials, and indoor air quality needs to be good. All those things, all of those are benefits, but to me, it’s kind of like if you just had your leg amputated you either need to focus on stopping the bleeding that’s going on and then take on the other injuries that may have happened to you when you got your leg cut off. But we’re not, you know, by speaking generally about sustainability it’s kinda like saying, you know, we need to take this holistic view of what building should be going on, which I totally get, but you’re forgetting about the fact that you’re bleeding to death. You know, so I would say, I would say the vagueness is really damaging because, because you only have so much time to change the industry” (Appendix B, p. A86).* This notion is further supported by another interviewee, who shares their experience in their practice, moving from general understandings to what the interviewee explains as rigours, they clarify: *“I actually, over this time, we went from a kind of general understanding of sustainability and green building to a more rigorous approach where we built some of the first LEED platinum and gold projects in the country” (Appendix B, p. A48).* These perspectives raise issues; on the one hand, I agree that environmental degradation

is reaching critical levels, however, I disagree that specific approaches such as carbon neutral and certifications are the approaches which are going to be the most beneficial. As this dissertation positions itself within the notions of sustainability, where all factors need to be equally in play to be successful, singling focuses such as carbon, seems to be very narrow and somewhat outdated.

Furthermore, describing LEED as a rigorous approach for me personally is an oxymoron. While I accept that certifications have their place in the industry, and similar to the triple-bottom-line have been successful in popularising sustainable architecture, they are not what I would describe as rigorous approaches. Nonetheless, and moving on from my personal opinion, this may indicate that for this interviewee, sustainability and green building are very shallow in meaning. This denotes that their prior approaches and practices may have been very shallow and possible greenwashing, if the addition of certifications generates rigour. My scepticism of certifications is supported by one interviewee who states: *“I think that, that is one way of grasping it [certifications and measurability], it can be a good way, but you’re not home safe just because you are certified. So, it’s kind of a garbage in, garbage out situation I think”* (Appendix B, p. A58).

Discussions in the interviews relating to motivations, attitudes, perspectives, and approaches were discussed from different standpoints with some commonalities and differences. Similar motivations and starting points were articulated, combined with different attitudes towards the field. Many agreed that sustainable architecture is growing in popularity or as discussed in the literature review, becoming mainstream, but this is occurring very slowly across the entire industry. Some agreed that there is a current transition from techno-centric strategies such as energy to more general discussions of health and well-being. Similarly, perspectives need to change from negative to positive. Integration is critical.

Furthermore, different perspectives on different approaches to how sustainable architecture is practiced were presented. These discussions have built on current findings which were constructed from previous studies and had supported and added rich perspectives to some of the existing themes. One particular recurring theme was the diversity in perspectives and approaches, and the relationship between both. Additionally, this study has built on the constructed findings of the previous studies and further articulated and cemented approaches, attitude, and perspectives as a key theme, which is both a connection and barrier between discourse and practice. This theme is important as it focuses on the perspectives from practice; how discourse is used in practice; and the issues which arrive at this side of the research focus. This positioning differs from some of the other themes which are more concerned with the discourse side of the relationship.

6.4.7 Visual language of sustainable architecture

The theme of visual language is one of the smaller themes which was only explicitly discussed in some of the later interviews once this theme was established. Three

categories were constructed for this theme and included, approaches and the role of visual aspects; as well as opinions and judgments. Within these categories, seven subcategories were formed and twenty different codes. Each of the three categories will be presented through the perspectives of different interviewees.

Similar to arguments presented within the literature review, many of the interviewees discussed the notion that sustainable architecture still has a stigma and is perceived as being ugly. Interviewees expanded on this and discussed that with these stigmas comes a lot of scepticism from both other architects and clients. One interviewee discussing other architects, elaborates that there is still a perception of buildings being unconventional in appearance and this makes architects in their country doubtful, they explain: *"[architects] being a bit sceptical about the whole ecological stuff, or sustainable stuff, they said "ah sustainable, yeah, these like homemade houses they look funny, we do not want to touch that because we are [country] architects, we are in a minimalist tradition, we are closer to Mies van der Rohe than we are to ecological architecture for sure. So, we don't want to get our hands too greasy from this"* (Appendix B, p. A78). This stigma is also present from both architects and clients with one interviewee elaborating his experience: *"I think it got a kind of bad reputation in a way, and I think there was a bit of a sort of backlash against that. Where sort of clients and architects were saying well I don't want a building that looks like a sustainable thing"* (Appendix B, p. A97). It is interesting that there is this notion that there is a 'sustainable look.' It is often considered one which is associated with low-tech-hippy approaches which were common in the second half of the twentieth century in rural eco-villages; however, it is apparent from the diversity of approaches and literature, that there are as many 'sustainable looks' as there are contexts and approaches. Which raises the question, why is there still this hippy stigma associated with sustainable architecture? In addition to this, and as discussed in the literature review (section 2.9), there is also a stigma that sustainable architecture is ugly. The cause of this stigma is discussed by one interviewee who explains: *"So, what I mean is energy efficient buildings or net zero energy, those concepts drove to a sort of 'ugly' aesthetics where sustainability doesn't"* (Appendix B, p. A99). It is noteworthy that the specific approaches which focus on energy are considered the culprit of the "ugly aesthetic" while sustainability is considered differently. This perspective differs from a previous discussion where one interviewee felt that sustainability was aiding to the greenwashing problem while specific carbon approaches were more effective. Another interviewee discussing his role as a sustainability consultant for other architects and states: *"[...] most of the buildings are pretty fucking ugly. You know, all I'm going to do is prove it. I mean, it doesn't take much to see their, hideous designs they're so proud of. And I just point out ways to make it less ugly and, you know, what's the point of making the greatest building in the world if it's still ugly, it's not, that's still not sustainable"* (Appendix B, p. A46). This colourful quote raises two points, firstly, the subjective issue associated with 'ugliness' or 'beauty,' as the interviewee explains, he considers the buildings ugly, but his clients are proud of them. Additionally, the quote also reinforces the

significance of aesthetically pleasing sustainable buildings and that these paradigms are tantamount and need to be considered together to be successful sustainable approaches.

An additional discussion included the different approaches and perspectives towards the visual aspect of sustainable architecture. These perspectives include that there is a specific aesthetic and in contrast, more respondents argue that there isn't an apparent visual identity. One interviewee explains that there was a period where there was a specific aesthetic, they describe: *"Yeah, I mean it's very interesting. I suppose we've had a period where sustainable architecture often resulted in a kind of very specific aesthetic, often of elements that were kind of added. You know the shading, the photovoltaics"* (Appendix B, p. A97). This depiction hints towards what I would argue as a greenwashing of techno-add-on visual identity where adornment of technology is what contributes to the identity rather than the building itself. The other side of this discussion is elaborated on by another interviewee who explains that performance-based strategies are not starting to inform the aesthetics of buildings which results in buildings which are not visually obvious that they are sustainable. They clarify this position, expounding: *"[...] now for me the more interesting aesthetics of architecture are the aesthetics that are informed by performance. So, we are seeing say for example buildings were using slightly more sophisticated parametric tools maybe, the distribution of the windows, the shading. When you look at it wouldn't immediately declare to you that it is a sustainable device. But it's optimizing the performance of the building and often arriving at something incredibly beautiful"* (Appendix B, p. A97). Adding to this discussing this interviewee expands that in some cases the sense of beauty is implicit in these performance-based approaches employed: *"And I suppose [architecture practice name] again are a good example of this where you look at their buildings and you probably, it triggers a sense of beauty. And maybe we don't know why that is, and it's largely from the kind of performance of those sustainable aspects. [...] But certainly, with some of our better architects now the kind of sustainable idea it sort of embedded in the design process and sometimes it only by the lecture by the architects that you realize the aesthetic was driven by performance. There is one of our probably best sustainable architects is a practice called [architecture office], and you know I find when you look at their buildings they don't shout out sustainability. But then when you find out about them, you know so many aspects are driven by performance"* (Appendix B, p. A100).

Interestingly, this interviewee distinguishes that with 'better' architects, the sustainability of the project is embedded in the design process which insinuates that this is not the case with everyday architects or bad architects. This is intriguing as it makes one query if this is because 'good' architects have more knowledge and a better ability to deal with the complexity inherent in sustainable architecture or for other unknown reasons. To further reiterate this notion of integration, another interviewee expresses their goals concerning the integration of beauty into their systems; they explain: *"Well, I mean, I guess we try to blur the lines. We don't; we're*

just trying to make buildings and environments that, you know, I think you probably know our core purpose, which is we deliver 'beautiful integrated environments, inspire change and enhance the human condition.' And, so, we think beauty, it's just like a, you know, it's like a flower. A flower is beautiful but it's really sustainable, it really uses nature, it's a, it's in total concert with nature. And, so, our desire is to be able effectively do that" (Appendix B, p. A100). Though-provokingly, this interviewee's office explicitly tries to avoid using the word sustainable even within their core purpose, but interestingly includes beauty in these three core objectives, emphasising the importance of this within the approach to how they practice sustainable architecture. These perspectives emphasised some examples of different approaches to aesthetics, from the more shallow-techno-focused, to performance-based and integrated.

Some of the interviewees discussed the role of visual language and aesthetics with some indicating that the visual aspects are fundamental to the progression of sustainable architecture. Others in opposition arguing that there are greater considerations to value. Some of those who articulated the importance of visual concerns, argued that it represented the goals of the building, one interviewee clarifies: *"So, aesthetics is really what tells the tale about the entire function of the building on multiple levels, so I would say the aesthetics is incredibly important to communicate the sustainable goals of the building"* (Appendix B, p. A100). Similarly, another interviewee builds on this and states: *"Aesthetics, graphic imagery is very strong, so it's huge. But, I guess, it's common the world over we like pretty boxes, and some behave well, some perform badly"* (Appendix B, p. A98). The combination of these two experts indicates that there is a connection between not only the approach of the buildings and what it looks like, but also underlying goals. This reinforces the importance of considering and exploring buildings as discourse and sources of knowledge transfer. The second quote also hints at the notion that we value what something looks like despite how it performs, this is supported by another interviewee who highlights the importance of being in a 'beautiful' space: *"I think beauty could be something to focus and I enjoy to go around in an environment which is beautiful and do things. It's personal, but it's a type of care, someone cares about the environment"* (Appendix B, p. A98). Again, this indicates that 'beautiful' spaces and buildings are desirable and therefore crucial for sustainable architecture, or architecture in general.

In contrast to this, one interviewee raises the point that the debate of aesthetics is superficial and there are more important issues which should be considered. They explain: *"I don't know. I mean, it's, for me there are more important things than the aesthetics I suppose. That's to do with realising that the fact that the developed world can have the lifestyle it does is at the expense of a whole lot of people who have nothing. And so what role does aesthetics play in that? If the basic situation is underlying, it is actually a really ugly situation. We're not arguing about the right thing"* (Appendix B, p. A98). Acknowledging the wider context and its considerations is critical and also discussed by another interviewee who reiterates similar

sentiments, that it is important to be critical when discussing aesthetics and what a building looks like, they add: *“So, I think you have to be really careful about aesthetics and, you know, we need more consciousness around what we are actually looking at. You used to get endless home magazines in [country] of these isolate, picturesque spots where somebody has dumped a fucking pile of timber - excuse my French - pile of timber and cladding. At it’s this elitist, inequitable, unsustainable, you know, you’ve got to have three range rovers to get there. So, you know, call it for what it is, is what I say. Not that all my architecture friends agree with that. They’re obsessed with it. So, for architects, it’s the obsession”* (Appendix B, p. A99). These two interviewees raise the notion of ethics and aesthetics and the importance of both of these being equally present.

Furthermore, the second interviewee provides an example of a building which was not visually liked by all in this office, but that the atmosphere and feeling of the building outweighed this, they illuminate: *“When you visit that building, you can feel the [life force] of the building, and lots of our principals didn’t like the aesthetic of it, it was an [architect name], he is the [architecture office name] personal style. And I love the buildings, and when you walk in there you are lifted, and you are fed by the building. So, in a sense, I think that’s more important than aesthetics. Does the building nurture us and make us feel like it’s home, where we want to be, that our needs are being met across the spectrum? And, so, I think that building’s beautiful, I think it’s alive, and the question of aesthetics, well, yeah, talk to Donald Trump about aesthetics”* (Appendix B, p. A99). These perspectives reinforce that visual language plays an important role, but it should not be at the expense of ethics, which is a problem, not only within sustainable architecture but the entire architectural discipline.

Within this theme the least number of categories were constructed, as direct questions were not asked from the initial interviewees; however, significant discussions were raised concerning the resultant scepticism which emerges from the stigma that sustainable architecture is visually ‘alternative’ or ugly. Additionally, different approaches to the visual aspects of a building were described including performance-based and integrated which don’t necessarily create a specific visual identity. Furthermore, the role of the visual language was discussed with contrasting responses from signifying its importance in arguing it should not be more critical than ethical concerns. This study contributed to furthering the richness of information for this theme, add to categories which were constructed in the literature review. However, there is still missing information regarding the specifics on what visual language exists and if there is a visual identity, as mentioned this further explored in the visual language analysis presented in chapter nine.

6.5 SUMMARY

This study has explored notions raised in the previous questionnaire study providing further information, experiences, opinion, and attitudes from fourteen experts in the field. Additionally, this study has added richness from the perspectives of practice to

categories formed from the discourse which were constructed in the literature review and contextual narratives. Through the semi-structured and qualitative method, this study has elucidated additional conditions within the relationship between discourse and practice, specifically within the five identified themes - definitions, greenwashing, communication, approaches and visual language. Moreover, it clarified and added to the three primary themes as well as expanding and better establishing the two themes which were tentative in previous studies. The coding tree diagrams in figure 6.10 and 6.11 indicates an apparent increase in codes, categories, and themes compared with the diagram earlier in figure 6.8 at the end of the questionnaire study.

Furthermore, there was a development in themes from the initial line by line coding to the final coding tree, which emphasises how the methodological approach has impacted the collection of information as I was able to develop and follow new leads while collecting data as evidenced in the transition of coding. An example of this was the introduction of direct questions relating to greenwashing and visual language after the initial coding indicated that there was not enough collected information on these themes. A significant difference between the previous diagram in Part One, the initial interview coding and this final coding is the expansion of different subcategories and specific minor codes. This method and study were successful in its endeavour to add richness and further explore the previously identified themes. Some main discussion which was presented included:

- The diversity of definition, lack of understanding concerning what sustainable architecture means, and the subsequent miscommunication because of this.
- The sustainable architecture lexicon's incompatibility with other disciplines.
- The development of terms, changing meanings and importance for associated terms to keep their nuances.
- Impact of greenwashing on the field, slowing adoption and diluting the profession.
- Greenwashing may be the result of a market-based approach and professional pressure.
- The value and influence of technology
- Importance of communication which connects with the audience
- The diversity of knowledge sources, particular focus on the visual and oral
- Incompatibility between how academia presents information and practitioners
- A diversity of different approaches
- Importance of positive attitudes and perspectives or reductive negatives ones
- Ethical concerns in the architecture which is produced
- The visual stigma of ugliness derived from specific approaches
- Ethical versus aesthetical concerns.

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Chapter Seven

Architectural Website Analysis

This chapter presents a content analysis study of a selection of architecture offices and how they describe and market the sustainable aspects of different projects on their websites. Previous studies identified greenwashing and techno-centrism as a theme of interest; however, little research occurs on the topic. Subsequently, this study was designed specifically to address this theme and also inadvertently examines terminology, approaches and visual language as illustrated below in figure 7.1. Using a combined qualitative and quantitative content analysis method, key sustainable variables which appear in the written description of 1675 projects was collected and then analysed visually for patterns and relationships. This method is described in detail in this chapter followed by different constructed findings. Full copies of some of the diagrams created in this study can be found in appendix C, while overviews of the totals are presented in this chapter.

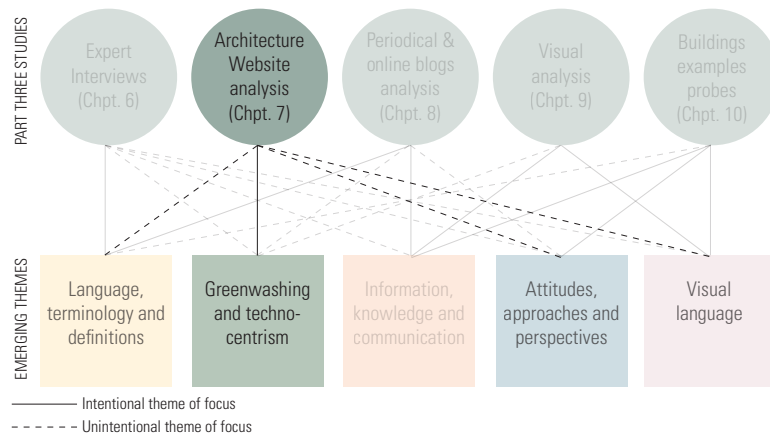


Figure 7.1 Connection between website analysis and the five studies: Diagram of how this architecture website study addresses the five central themes of this research.

7.1 INTRODUCTION

This architectural website analysis is the fourth study in the series which makes up this dissertation. This study was primarily designed to address the theme of greenwashing, however; it also addresses the themes of terminology, approaches and visual language. The objective of this study was to understand and describe how a cross-sectional group of architectural office websites describe and market the sustainability of their projects. This cross-sectional method creates a 'snapshot' of some examples within the field and examines the phenomena mentioned above at one point in time (Neuendorf, 2016, p. 77). This study was chosen as there was little existing research into the extent and effect of greenwashing despite being a topic of interest within different publications, as discussed in the literature review (section 2.6). Of the research that does exist, much of it is from the field of business or on the product and material scale rather than at the building.

In the previous literature review (Chapter Two) and contextual narrative (Chapter Four) several discussions were raised concerning greenwashing. These thoughts articulated that greenwashing and the application of technology was occurring in some instances due to the ignorance and lack of education within the profession, the vagueness of what sustainability is, and for pure marketing reasons. It was proposed that one of the reasons there is limited explicit research into the quantity and effect of greenwashing, is that just as it is difficult to quantify when a building is sustainable, it is equally challenging to state when a building is being greenwashed. There are some exceptions to this when sustainability is only a marketing ploy. However, there are many examples which are more ambiguous without knowing the architect's original goals, if greenwashing occurred for marketing reasons or unintentionally because of a lack of education or a weak attempt at sustainable architecture. To address and building on these previous studies and constructed themes of interest, this study was designed to understand better and describe:

- the extent of greenwashing by a selection of architecture firms,
- which approaches, strategies or principles within sustainability are present
- and the implications this has on the field of sustainable architecture.

To achieve this study, architecture websites were chosen as a secondary source of information as they are often used to market and advertise by offering recent accounts of different projects from the perspective of the architectural firms. Additionally, it allowed for a large sample of publicly accessible information to be gathered in a relatively quick manner which was necessary from a pragmatic perspective for this research. Furthermore, content analysis was chosen for this study as it allowed the exploration and description of information which straddled both practice and discourse. Screenshots of around 1675 projects were taken from nearly ninety architectural offices who all explicitly state that sustainability is part of their approach.

These screenshots were collected, processed and then analysed visually, this is discussed in the following section which also includes how offices and projects were selected and the limitations of this study. Following, the constructed findings are described, which include: four different profiles which was created to define how different architecture offices describe or market the sustainability of their projects. These profiles include what I describe as integrated, fifty-fifty, shallow or greenwashing. Preliminary results from this denoted that greenwashing and shallow approaches are very much present in the way architecture offices describe their projects. Additionally, the number of approaches, strategies or variables used to describe a project were counted to create a snapshot, and as a result, seventy percent of projects use very few variables (between zero and five) in the description. Furthermore, sixty-six approaches, strategies or principles were defined, with six variables re-occurring most often: these include natural light, materials, energy efficiency, sustainable (as a verb), natural ventilation and rating or certification systems. A more in depth description of these findings will be discussed later in this section (7.3) following the outline of the method.

7.2 OUTLINE OF THE METHOD PROCESS

This study uses Krippendorff's (2004) understanding of content analysis which is often used in the social sciences to explore patterns in communication in a quantifiable manner. Content analysis is employed in different methods within this and the next two studies: chapters eight and nine. Krippendorff (1980, p. 22) and Neuendorf (2016, p. 10) both outline the different approaches to content analysis and explain that they often range from quantitative measures (counting the 'qualities of a phenomenon') to more qualitative approaches. Neuendorf (2016, p. 10), also clarifies that qualitative data may have quantitative content analysis applied and visa-versa. For this study, the process of gathering and processing information has been qualitative, while the resultant outcome has been condensed and expressed through the counting of different qualities and variables. As mentioned previously, this study is cross-sectional and therefore uses descriptive content analysis which limits the conclusions to the content being studied, rather than forming generalisations (Neuendorf, 2016, p. 43). As the field of sustainable architecture and sustainability is multi-, trans-, and cross-disciplinary, a simple word frequency study was not possible, as terminology often

differs and concepts are inferred (latent) rather than being explicitly stated (manifest). For this reason, the collection of information was often qualitative, as it was often my interpretation of what was written and inferred from what was often poetic descriptions of buildings. To elaborate, within the manifest analysis, the research describes what is visible in the text, staying close to and using the present words themselves, while in contrast, latent analysis seeks to find the underlying nature of the text through interpretation (Berg, 2001).

To test this method, a pilot study was completed in 2015 with architectural office websites in Denmark. The pilot study focused on fifteen offices and was used to help form the constraints for collecting and processing the offices and projects that were to be studied and the different variables that would be 'counted.' Additionally, the pilot test also ascertained what types of information could be collected and if this was going to be a useful study to provide interesting information. This pilot study provided fruitful first insights and was later repeated with several other countries including the United Kingdom, the United States of America, Australia, New Zealand and was repeated with the updated procedure for Denmark. Denmark was chosen to be re-evaluated at the same time because some firms had changed their websites and a more rigorous process for collecting and recording the information was developed during the pilot study.

7.2.1 Data collection

Data collection in this study differs from the previous interview (chapter six) and questionnaire studies (chapter five) as the communication between me (as the researcher), and the data is 'one-way' (Krippendorff, 1980, p. 26). Krippendorff (1980, p. 26) elaborates that the reality and context are provided with the information and so the researcher is unable to attain feedback or manipulate. Krippendorff (1980, p. 26) goes on to explain the importance of making the context of data explicit as this context is constructed by the analyst and their knowledge of the conditions which surround the information. Therefore, to be explicit, the context of this information is based on my knowledge of the field of sustainable architecture, the framework of the industry in the country in which the firm is based as well as what the architectural firm chooses to articulate on their websites. Furthermore, this study is framed by the scope which includes:

- Sustainability (green or environmental) is explicitly stated as a part of the architectural offices approach, philosophy or interest.
- Up to twenty architectural offices are chosen per country when possible.
- The architectural office is active and has at least ten constructed projects after the year 2000.
- Projects must be constructed after 2000 and at the building scale rather than urban, landscape or details.
- In the case there are more than twenty constructed projects, the newest twenty are chosen.
- Only the written description of each project is used for analysis.

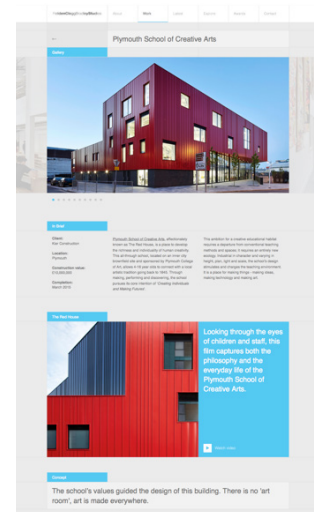


Figure 7.2 Example of a coded screenshot from FBC studios in the UK

Screenshots of each projects were taken throughout 2017. These were coded using Adobe Acrobat to highlight and record which variables were used to describe and explain the sustainability of each project, as illustrated in an example in figure 7.2. Projects after 2000 were chosen as it was speculated that they would represent the most current approaches of the architectural offices have to sustainable architecture, this was crucial when trying to understand greenwashing presently. The ambition was to collect twenty projects from twenty different architectural office websites from several central countries (USA, UK, DK, SWE, DEU, AUS and NZ), which emerged from the questionnaire. However, this, was not always possible due to the scope and time limitations. Subsequently Sweden and Germany were cut from the data collection as it was too complicated with the different languages to find a considerable number of valid architecture offices.

7.2.2 Selecting offices, projects, and variables.

To gather information a non-probability approach was employed (Neuendorf, 2016, p. 89). Offices were chosen using internet search engines, searching for 'sustainable architecture offices [country].' While it is acknowledged that this process may not represent the 'best' or most well-known offices, due to time constraints and pragmatic reasons this was decided as the fastest and easiest way to collect offices as it narrowed and organised the search instantly to websites which at least mentioned the word sustainable and architecture together. One of the outcomes of how this study was designed, is that not all the selected offices are necessarily producing sustainable architecture despite stating that they do, this further supports the intention of this study to understand the greenwashing and false marketing in the field. However, this also means that not all projects are 'sustainable' but are still included in the source collection. As mentioned, the selected offices and subsequent projects create a cross-sectional 'snapshot' but are not an absolute representation of the field.

In Excel, each project was recorded with the project name, construction date, size, function and different sustainable variables (e.g., energy efficient, natural light, solar panels, ecological, biodiversity). In keeping with the grounded-bricolage methodology which frames this dissertation, variables emerged from the information rather than being predefined. This approach is supported by Neuendorf (2016, p. 108), who describes the process in which the researcher immerses themselves qualitatively in the content, explicating that this allows "variables to emerge inductively from the message pool, and the investigator is well-grounded in the reality of the messages." Furthermore, after the pilot study, it was decided that only the written descriptions of each project would be analysed. It was thought that Images would be biased to sustainable strategies which are easily tangible, example; green roofs and solar panels. Additionally, when variables were collected, they were only counted once, even if they were mentioned numerous times in the description of a project.

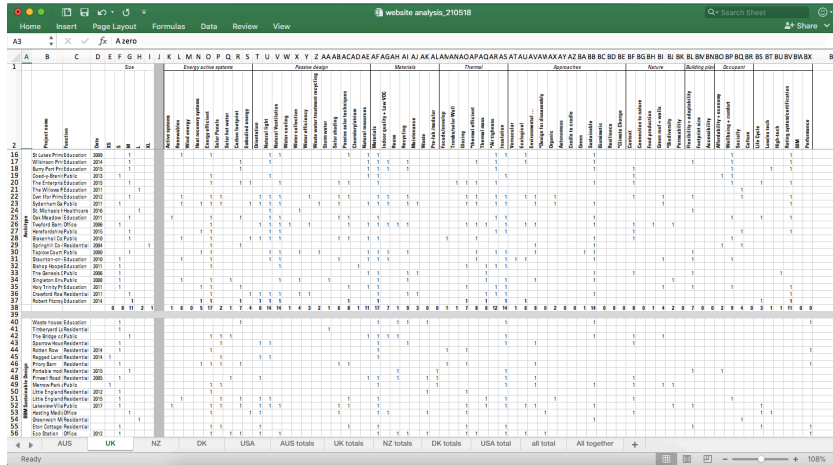


Figure 7.3 Screenshot of data collection processes in Excel

7.2.3 Analysis

To analyse the collected information, counts from Adobe Acrobat were placed in Excel under each variable for each project as illustrated in an example screenshot in figure 7.3. The variables were then grouped into broader categories across the top. Using the Excel ‘conditional formatting – colour scales’ function, then all spreadsheets were converted into colour gradients. This is illustrated in figure 7.4, where it is visible that each count is now represented by a coloured square for each project.

Following this, for each project counts were tallied and each countries spreadsheet was filtered from most to least variables. Patterns and relationships between variables were then examined. Additionally, each architectural office was analysed and coded with a category depending on their approach. Four categories of offices were formed from the data and included ‘integrated, fifty-fifty, shallow and greenwashing.’

Lastly, from the data collection and diagrams, four levels of information were produced, this included individual projects, the sum of each office, the average of each country and the totals. All four levels of knowledge were organised firstly alphabetically by office name, type of project, size of projects and lastly by each of the sixty-six variables. This systematic approach aimed to gain understandings of trends and patterns by “extrapolating differences into new situations” (Krippendorff, 1980, p. 37). As in all the studies, it was crucial for my understanding to view this information diagrammatically and visually to be able to ‘see’ the constructed patterns and connections, these large diagrams were then printed and annotated with memo-writing to articulate propositions and form categories of information as visible in figure 7.5.

7.2.4 Limitations

There are many limitations to the method of content analysis. However, four of the main issues which were faced in this study were: language barriers and translations, my knowledge of the context, the iterative process of emerging coding and the validity of the information provided on the websites.

Firstly, as some of the offices chosen were from non-Anglo-Saxon countries, some

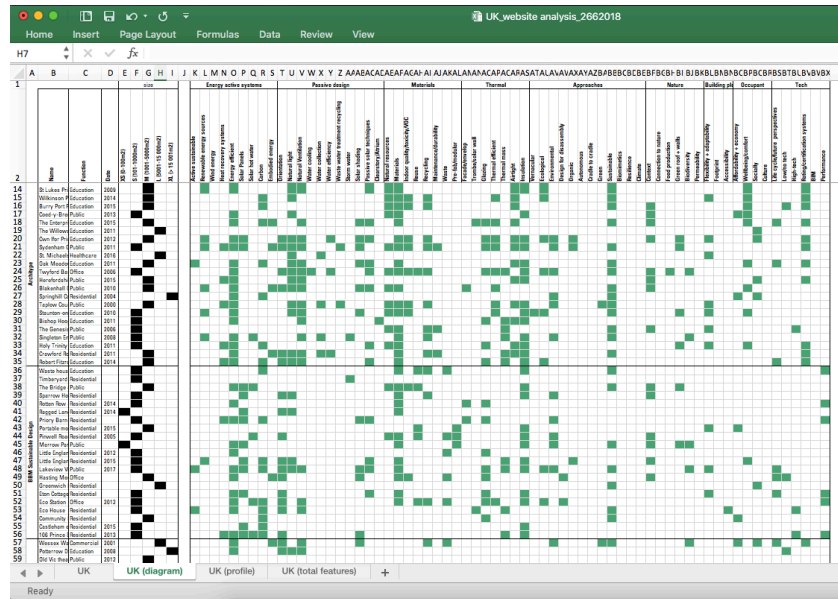


Figure 7.4 Screenshot of a colour coded diagram of content analysis in Excel

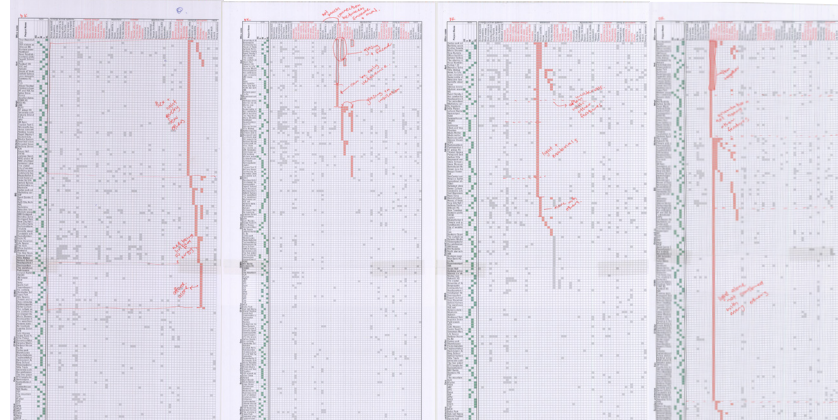


Figure 7.5 Example of the different filtering of the diagrams for analysis.

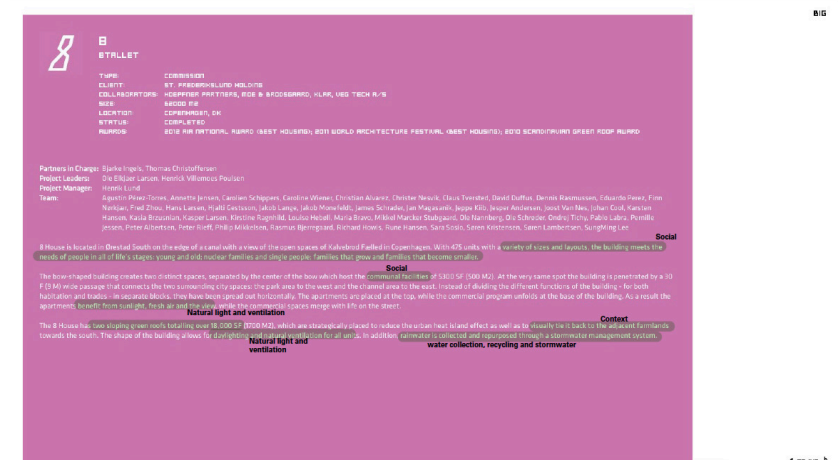


Figure 7.6 Example of how a project was coded vs. what was explicitly described

of the websites were in their native language. Thus, Google Translate was used to translate these web pages, however, while this tool does a reasonable job, it is not always correct, and consequently, some discrepancies may be present between the original and translated version. To overcome this, when any text was unintelligible (this did not occur often), a colleague was asked to check the original text and

translate if needed.

Secondly, the qualitative approach to this content analysis relies on my understanding and knowledge of the field and context of the collected content. Krippendorff (1980, p. 26), describes “how the analyst’s knowledge partitions his [or her] reality” explaining further; it is the interest and knowledge of the analyst which determines how the context is constructed and realized. This is crucial as the content is placed within this context and consequently the inferences produced are dependent on the constructs of this context (Krippendorff, 1980, p. 28). An example of how I understood and translated the provided information and subsequently coded it (for one project), is illustrated in figure 7.6. This example emphasises how my knowledge influences the collection of information in this study.

A third limitation developed due to the emerging nature of the coding and counting of different variables. As new variables emerged, the previously coded content needed to be re-examined for the newly introduced codes. After the pilot study and existing knowledge of the field, this was expected to be time-consuming and cumbersome; therefore, initial coding included offices from all countries in order to trial and develop as many variables from the outset. Despite this, some variables still emerged later and required all the previous content to be quickly scanned to check for new codes. This was achieved by using advanced word search in Adobe Acrobat for all the sixty-six variables at the end of the process. By doing this at the end, it double checked my coding as well as highlighting new variables which may have been missed when searching manually.

Lastly, this study relied on architecture offices providing truthful descriptions and content for collection and analysis. In some cases, this was a limitation as there were minimal descriptions of the projects and in a few instances no description at all. It is also acknowledged that not all offices describe the sustainability of their projects even when there may be good examples of an integrated project. Consequently, even though an office may not mention the sustainability of a project, this does not explicitly mean they were unsustainable. Therefore, this study offers a subjective indication of the level of greenwashing but is not an absolute perspective.

7.3 CONSTRUCTING FINDINGS

Findings from this study were constructed from three different analysis approaches. Firstly, general conclusions more significant from the overview of all the projects. Secondly, totals were calculated to understand the frequency of mentioned variables and to profile different architectural offices. Thirdly, projects were filtered vertically by a series of variables to understand relationships and patterns within the collected data. Figure 7.7 illustrates the combined totals of all of the collected projects (between 10 and 20) for each architecture office and is organised by country. From the left, the country name is provided followed by the architectural office’s name (in alphabetical order from top to bottom). Next, to this, grey-scale squares represent the number of projects collected for each size (extra-small, small, medium, large and extra-large). The darker the square, the higher the frequency of projects at that size.

Figure 7.7 (left) Diagram of totals for each architecture office organised by country.

Similarly, the green squares in the main body of the diagram illustrate the number of variables collected for each architectural office, with the darker squares representing, a higher frequency. Lastly at the bottom of the diagram in blue, is the combined total of all the collected data. For uncondensed diagrams, which show the collected information for each project, please see appendix C. To examine this information further, general findings will initially be presented (7.3.1) to outline and frame a more in-depth discussion of greenwashing (7.3.2) and techno-centrism (7.3.3) which will follow.

7.3.1 Description of findings

It was evident from the outset when collecting information that there were significant differences in how architecture offices present information on their websites. Very quickly, it became clear that despite all the offices explicitly stating they were interested and engaged with sustainability, for many it was not a representation of their actual work and speculated to be for marketing purposes. This was visually obvious in all the diagrams, at all scales for this study. When examining the diagrams at the project scale (see appendix C) each project differs drastically in the number of variables employed. Furthermore, without visually differentiating offices with lines, it is clear where one integrated office stops, and another shallower office starts. This is highlighted in figure 7.8 which illustrates one of the first printed diagrams of the Australian offices (in alphabetical order from top to bottom), even though there are no lines on the diagram it is clear where different offices start and stop. This initial finding prompted an analysis and coding of varying office profiles. As mentioned these four profiles included integrated, fifty-fifty, shallow and greenwashing. To elaborate, only around ten percent of all offices were coded as 'integrated.' Integrated in this context means that the majority, if not all the projects for an individual architecture office had many variables of a diverse range. Hence, it is believed that sustainability is integrated into their entire practice. One example of this could be Architype from the United Kingdom, which is presented in figure 7.9 and demonstrations that many variables are used across all twenty of the selected projects.

The second code was 'fifty-fifty,' and this was given to architecture offices which had a combination of both projects with many and very few variables. It is posited that architectural practices which were coded as fifty-fifty, operate designing both sustainable and non-sustainable projects. Around 35% of offices were coded as fifty-fifty, and one example of this could be Brooks Scarpa from the United States of America. It is evident in their diagram (figure 7.10) that some projects have many variables while others have zero or very few.

The third code used was 'shallow,' and this was applied to nearly 50% of all firms and represented practices that used very few variables to describe many of their projects. This emphasises that many architecture offices either do not specify the sustainability of their projects in-depth, are shallow attempts at sustainable architecture or are greenwashing. One example of this shallow approach is Gottlieb Paludan Architects from Denmark who states: "We want to contribute to creating

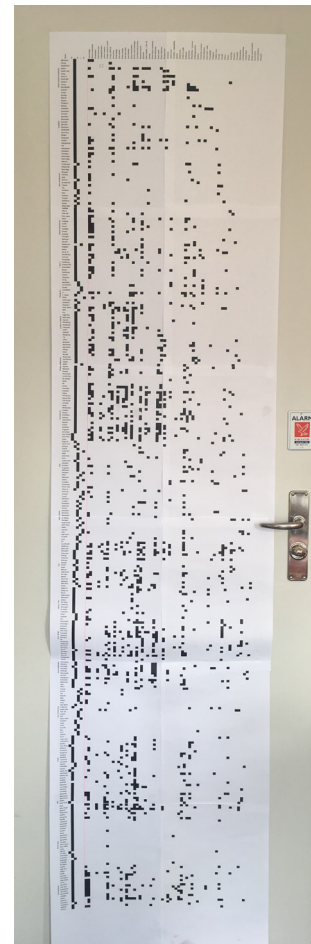


Figure 7.8 Example of the first printed diagram of Australia which emphasises the differences within offices

Figure 7.9 Example of an integrated office – diagram of coded Archetype from the UK

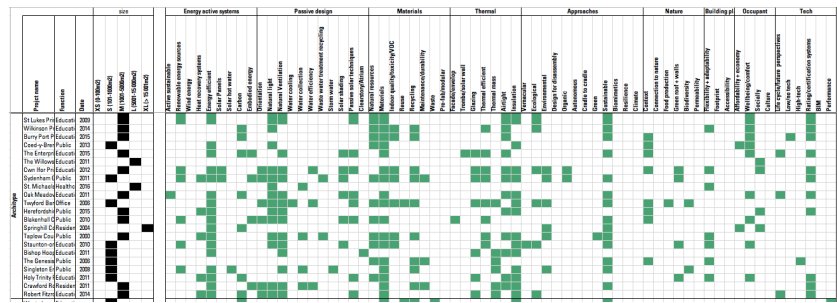


Figure 7.10 Example of a fifty-fifty office from the USA where some projects are sustainable, and others are not

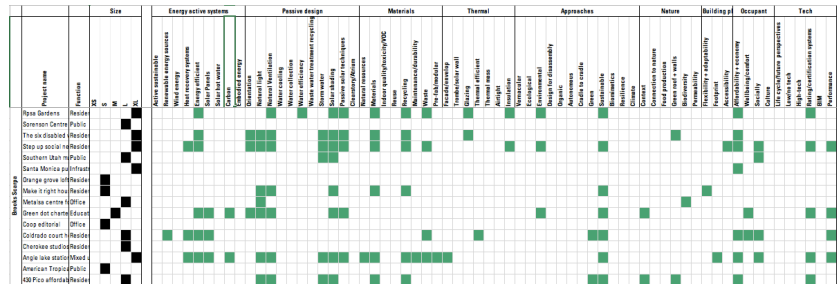


Figure 7.11 Example of a shallow office - Gottlieb Paludan Architects from Denmark

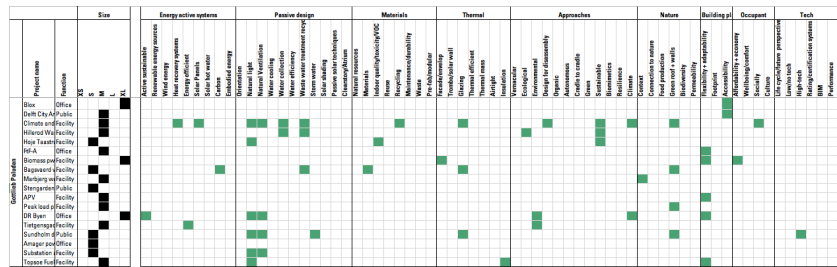
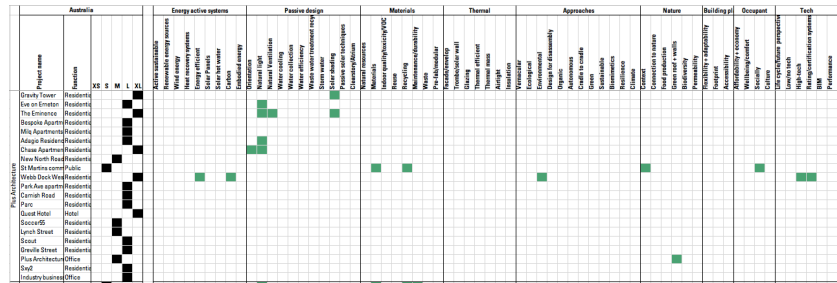


Figure 7.12 Diagram of Plus Architecture from Australia which is an example of an office coded as 'greenwashing.'



a more sustainable world. We do that partly by working actively with sustainability in all our projects and partly by measuring and minimizing our own environmental impact” (Gottlieb Paludan Architects, 2018). However, figure 7.11. illustrates how the discussion around sustainability for each of their projects (with very few variables) conflicts with their statement that sustainability is “in all our projects.”

The last category was ‘greenwashing’ and this indicated architecture offices who used very few or no variables to describe their projects despite indicating it was part of their approach. Nearly twenty percent of offices were categorised as ‘greenwashing,’ and one example of this is Plus Architecture from Australia who state on their website: “Plus Architecture strives to deliver developments that incorporate a high standard of ecological sustainability. Plus continually support clients to complete highly sustainable buildings. Social responsibility is also a primary focus for Plus architecture: using minimal resources, preserving natural elements,

and Passive sustainability to bring the best results for not only the clients but the users, its neighbourhood, and the community.” (Plus Architecture, 2018). However as revealed in figure 7.12 this office does not extensively practice sustainability or at the very least describe it in their projects. This is one example of an office which markets themselves as a “sustainable” practice which is presumed to be merely greenwashing.

These four categories of offices show different degrees in which sustainable architecture is integrated into the architecture practice. It illustrates that while there are different approaches, there are very few offices which are fully committed to sustainable architecture and many which state interest but do not produce or describe their architecture as sustainable. Interestingly, these inferences also relate to the previous questionnaire, where respondents from practices indicated the extent (on a scale of one to five) sustainable architecture is embedded in their practice. Only twelve percent rated it as little to not embedded while sixty-one percent indicated it was mostly to fully integrated. These questionnaire results are almost inverse to how the different architectural offices have been coded for this study. This could suggest that there is a considerable difference between how experts consider the integration of sustainable architecture in their practice compared with ‘conventional’ practices or there are significant discrepancies for the perceived embeddedness and the reality. This is of course based on the frequency of variables indicating how an office is practicing sustainable architecture.

Following this first analysis, the variables were summed for each project and then filtered by the total. This analysis process supported the previous descriptions of different office profiles, with more than seventy percent of projects described with zero or between one and five variables. Subsequently, only nine percent of projects were described with more than ten variables. Around sixty-five percent of the offices had at least one project with ten or more variables which indicates that there is knowledge or awareness of the possible variables; therefore, it can be posited that there are many offices which have awareness but do not implement this into the majority of their projects or at the very least describe it.

Initial suppositions after analysing for different relationships and patterns is that the size and function of a project have little impact on how these projects were discussed. Surprisingly, no overarching patterns emerged when filtering by both size or function. Some differences did occur between countries, which is posited to emerge from the industry context in which the office operates. For instance, within the Danish context, energy efficient buildings which are well insulated with efficient glazing is a norm and reflected in the building codes which demand very high levels of thermal efficiency. Subsequently, many of these ‘norms’ are not discussed with many of the Danish projects. It is speculated that this could be because these features are not considered extraordinary, and accordingly not explicitly mentioned. Thus, when analysing the Danish diagram, it looks as if there are fewer variables discussed; however, when considering the context in which this information is situated, it is evident that these features are not absent physically, they are just not mentioned.

Additionally, the green roofs and vegetated walls are discussed more in a Danish context; this could also be posited as a direct relationship to a 2010 policy adopted by the Copenhagen Municipality which mandates green roofs on all new buildings with roof slopes of less than thirty degrees (Proefrock, 2010). Conversely, within the New Zealand and Australian context, solar shading and passive solar are variables which are frequently mentioned in comparison to other variables. It can be assumed that this is due to the hot climate in which these countries reside, combined with the sun's harshness as a result of the hole in the ozone layer which makes these variables more common. Interestingly, natural light is common in all countries and the most frequently mentioned variable in all of the countries except the United States in which it is the third. Other variables which are common in many of the countries are materials, natural ventilation, energy efficiency, sustainable (as a verb) and rating or certification systems.

Additional variances were present for different countries and will be briefly described, but as mentioned the full diagrams are visible in Appendix C organised by country. To elaborate, Australia and New Zealand had very few offices categorised as integrated. Australian, Danish and United States offices were coded mainly fifty-fifty or shallow, while ninety percent of New Zealand offices were coded shallow or greenwashing. Moreover, both New Zealand and Australia had many smaller and extra-small projects as well as the majority of projects were residential compared with the other countries. Denmark and the United Kingdom had a reasonably even mix of sizes with mainly medium, large and extra-large projects. The United Kingdom had the most offices coded as integrated and fifty-fifty and also had the most projects coded with sixteen or more variables. The United States had more large and extra-large projects and was also coded more often than other countries with certifications, sustainable (as a verb) and energy efficiency. It is evident that the geographical context of the industry plays a role in how different offices market or discuss their approach to or the sustainability of their projects. Knowing the industries in these countries somewhat, these differences were not unexpected. It is an interesting discussion to understand if for instance, the United Kingdom has more integrated offices because there are actually more integrated offices with projects described with many variables, or if the industry is more aware, and sustainability is valued more which results in architectural offices having more industry pressure and subsequent understanding to emphasise these aspects of their practices and projects. In this instance, it is supposed that for the United Kingdom, it is a combination of both factors. Moreover, it was previously acknowledged in the literature and interview chapter, that there is pressure to include sustainability in one's practice to remain competitive in the market and I further speculate from this study that this is the case for many of the offices categorised as shallow or greenwashing. To elaborate, while many of these practices state that sustainability is a crucial part of their approach or practice, I would suggest the intention behind these claims are more a 'we can do it, but we usually don't' scenario.

7.3.2 Greenwashing and techno-centrism

Within the previous studies, the theme of greenwashing has often emerged, as mentioned, interviewees discussed the professional pressure to adopt sustainability in practice and also the diluting effect it is having on the field. What was not apparent, was the extent it is occurring and this has been the purpose of this study.

Two different versions of greenwashing will be discussed, firstly, offices claiming to practice sustainable architecture and secondly, the application of technology or shallow approaches with claims of being sustainable. In addition to coding all of the different variables, a screenshot of each office's 'claim' to integrate sustainable architecture was saved to contextualise the data collection for each office. Some excerpts have previously been described; however, they will be elaborated on here as they significantly showcase the extent of the greenwashing. One example is, is the United States office, William Rawn Associates. On their website, under their 'sustainability tab' they promote that they are ranked the number one sustainable firm in the United States, additionally they also state that 100% of their architecture and designers are LEED accredited professionals (figure 7.13). With advertising and claims such as these you would expect a diverse array of sustainable projects; however, this is not the case. For this study, the fifteen 'feature projects' from their website were first examined with an additional five projects. Figure 7.14 illustrates the coding of these projects and as you can see very little aspects of sustainability are discussed. Two projects mention their LEED accreditation, of which one of these projects has an additional eight variables mentioned. Furthermore, two projects are described as sustainable with no other mention of any aspects. This example emphasises the disparity between claims of being an office which practices sustainability, even being the number one sustainable office, but the reality is very different. One would imagine that if every architect and designer had been LEED accredited and subsequently has at least some knowledge of sustainable architecture, then more than two in twenty projects would be certified. It is acknowledged, as previously mentioned, that a lack of description does not necessarily mean they are unsustainable. However, the fact that two projects do mention their LEED certification and all of the projects were listed with their awards, if more projects were certified then it is likely they would also be listed. This example has been selected because the number one ranking emphasises the disparity between claims and actual production; however, they are only one of many offices which state a commitment to integrating sustainability into 'all' of their projects but then very few are actually described as sustainable.

There were few relationships and patterns between the different variables. This was surprising as it was expected that greenwashing would be very present in the relationship between different variables, especially the connection between the number of variables used and which ones they were. Conversely, this was quite random and no distinct patterns were observed. For instance, before completing the study, I had the hunch that energy efficiency or rating systems would often appear as one of the only variables for a project; however, this was not the case. More often than not, energy efficiency appeared in combination with five or more other variables,

is exemplified in the selected information from the United Kingdom, which has a considerable number of public and civic projects, and subsequently carbon as a variable is mentioned on average ten to fifteen percent more often than in other countries. However, this is not surprising as the United Kingdom has well-known ambitious carbon-reduction policies in place, especially for the construction industry. To understand these country-specific variances, the total variable counts for each country were calculated as averages per number of projects, as illustrated in figure 7.15. To elaborate on this further, the United Kingdom also mentioned airtightness and insulation more often than other countries, while Australia had an increased number of passive solar and water harvesting strategies. Both of these tendencies can be connected to the climatic condition of the country. Furthermore, for the selected projects from the United Kingdom and United States, renewable energy, energy efficiency, facades and envelopes and thermal efficiency were more common than in other countries. In the United States, water efficiency, stormwater management, rating or certifications, performance and sustainable (as a verb) were mentioned considerably more. Interestingly, it is evident that specific strategies are mentioned more often than general terms or approaches such as sustainable, environmental or Cradle to Cradle to name only a few. However, of the more general terms used, sustainable and environmental were considerably more frequent than others. From a lexicon perspective, this indicates that these terms are still prevalent with architectural practice and terms such as 'green' or 'eco' are less so.

7.4 SUMMARY

The content analysis of architecture websites is a study which builds on initial findings from some of the previous studies. From a selection of architecture websites, this study endeavoured to explore the extent of greenwashing; identify key approaches and strategies which are employed to describe projects and what the implications of these are for the field. To frame this chapter and the subsequent findings, the content analysis method was first outlined, articulating how information was collected, processed and visually analysed through a series of large diagrams. Following this, an overview of initial findings were described, with particulate reference to the coding of different approaches from integrated to greenwashing. Relationship and patterns within the different variables were presented followed by a thematic discussion of greenwashing and techno-centrism within the constructed findings. This particularly addressed the disparity between some architectural offices' commitment to practicing sustainable architecture and the subsequent buildings which are actually produced. Some main findings from this study include:

- The identification of offices who claim to practice sustainable architecture but do not describe their projects with the associated terminology or strategies.
- Identifying varying levels of approaches to practicing sustainable architecture (integrated, fifty-fifty, shallow and greenwashing)
- Understanding that the majority of projects were described with very few of

Figure 7.15 (right) Average total counts per country

Chapter Eight

Periodical & blog Analysis

The periodical and online blog study is presented in this chapter. This study is the fifth in the series and the second iteration of content analysis which makes up this dissertation. Five years of four popular architecture periodicals and two online blogs have been analysed using quantitative and qualitative content analysis to understand what sustainable architecture related information is presented in conventional media. Specifically, this study was designed to examine what terminology and language are used as well as the format and accessibility of this information. Subsequently, greenwashing and different attitudes, approaches, and perspectives were also analysed.

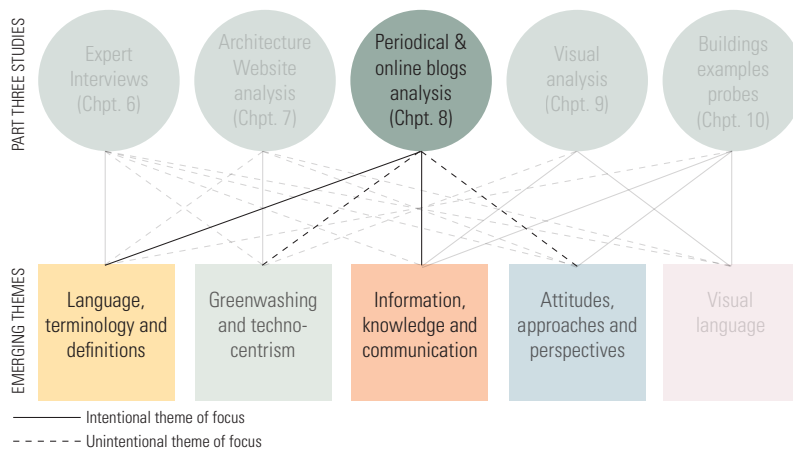


Figure 8.1 Connection between periodical and the five themes: Diagram of the different themes which are directly and indirectly addressed in this study

8.1 INTRODUCTION

This qualitative content analysis study was conducted following the questionnaire and interview study presented in chapters five and six. Participants of the questionnaire indicated the different sources (books, periodicals, online media, built examples, etc.) and frequency of use to gain sustainable architecture knowledge. The findings inspired this study to understand further what information is actually published in different sources, especially those used on a daily and weekly basis. This was the initiating purpose of this study; to understand and evaluate the amount and also content of the information provided to architectural professionals through the conventionally written discourse of periodicals and online blogs. Resultingly, this qualitative content analysis was designed and carried out with four periodicals covering a five-year period from 2012 to 2016. These magazines and journals included Architecture Research Quarterly, Architectural Design, the Architect’s Journal and the Architectural Review. Additionally, one-hundred articles from each online architectural blog ArchDaily and Dezeen were also collected as sources of information to analyse. This equated to approximately 307 periodicals (24 500 pages). Each periodical was skimmed through manually and then digitally, searching for keywords to conduct both qualitative and quantitative content analysis.

Many specialty books exist on the topic of sustainable architecture; however, there are very few specialty magazines, journals and online blogs which are not commonly known or accessible to the architectural community. Furthermore this study is critical, as little research has been completed concerning the amount of content of sustainable architecture discourse that exists either broader architectural or specific forums. One study was found which uses a similar method to understand the content of a well-established sustainable architecture conference proceedings PLEA. In 2017, at the Passive Low Energy Conference (PLEA) in Edinburgh, Scotland, Sara Alsaadani presented a paper titled: Deciphering the code of ‘sustainable’ architecture; Exploring the discourse of PLEA 2014. She aimed “to explore what is meant by the term ‘sustainable’ architecture,” using the previous PLEA proceedings as the source of information. The findings of this research revealed that the term sustainable architecture was broadly contested and had an extensive range of associated

meanings. She concluded that the word sustainable in architecture discourse was broad and this mirrored the range of tools and methods which are available to the architecture profession to achieve their sustainable agenda, expanding that the:

“pluralist interpretation of ‘sustainability’ is what allows architects worldwide to create a rich tapestry of architectural heritage that not only responds to but also weaves together aesthetical, technical, contextual and humanistic considerations.”

This study relates to multiple themes (definitions, communication, approaches and greenwashing) within this research (figure 8.1) and builds on discussions presented previously within the literature review (section 2.7) concerning the quantity of the information; the communication of knowledge orally and visually; as well as the multidisciplinary nature of the discourse. However, it is discussed here as it emphasises a broader interest in understanding the content of our discourse. Oral, visual and written methods are used to describe, understand and communicate different positions within the discipline of architecture. Bryman (2012), emphasises the importance of language for constructing accounts of the world, as with each description we inherently select vocabulary from the available corpus and subsequently construct a version of the world as we particularly understand it. This is supported by Gill’s (2000) who acknowledges that the result of these decisions establishes “one version of the world in the face of competing versions.” Therefore, this study is attempting to understand not only what language and lexicon are selected but also what interpretation of the ‘sustainable architecture world’ is being told.

The purpose of this study is to understand and evaluate how sustainable architecture is discussed in popular architectural discourse and so expanding on the previous questionnaire study in chapter five. In this study, this was achieved by exploring the content of the discourse related explicitly to sustainability. This study was unique in that it offers a glimpse into a circular loop of knowledge sharing and what could be argued as state-of-the-art as many of the authors who write the content are in architectural practice and research. Thus, it is assumed they are reporting on best practice and subsequently, what the audience of these publications are receiving, should then be considered representative of what is popular in the field. Some guiding objectives for this study include:

- Understand the quantity and frequency of sustainable related information provided through the four mentioned periodicals and the two online blogs.
- Understand the different (sustainable) content and themes which are presented
- Describe what lexicon is used to describe this content?

The remainder of this chapter consists of an outline of the qualitative content analysis method, focusing on the selection of sources, data collection, processing, and visual analysis. Following, the findings are presented in two parts, firstly, the frequency of



the keywords and their implications and are described; and secondly, select examples from the thematic analysis are discussed concerning definitions, terminology, and language; greenwashing and techno-heroism; and information, knowledge and communication.

Figure 8.2 Collections of periodicals used for this study

8.2 OUTLINE OF THE METHOD

A qualitative content analysis was chosen as the most appropriate and beneficial technique to understand the sustainable content of selected architectural periodicals. Descriptions of content analysis have been previously presented in the methodology chapter (section 3.5.2) and the previous website analysis in chapter seven (section 7.2). This study differs from the previous as it uses a more extensive combination of qualitative and quantitative tools. Both 'tally sheets' are created to determine specific frequencies of manifested content, and latent content is thematically coded (using grounded theory) to form categories. This blending of manifest and latent content is controversial; however, this study positions itself within Berg's (2001) understanding of the method, supported by Babbie (1998), where they believe that procedures related to each part of the content are valid and reliable, restating: "perhaps the best resolution of this dilemma about whether to use manifest or latent content is to use both whenever possible" (Berg, 2001, p. 243). To reiterate, within the manifest analysis, the research describes what is visible in the text, staying close to and using the present words themselves, while in contrast, latent analysis seeks to find the underlying nature of the text through interpretation (Berg, 2001). Berg (2001) also explains that by combining the frequency of the manifest analysis with the latent analysis, a more convincing argument is demonstrated. For the manifest content, seven different terms were chosen to collect data for and these included: Bio(logical), resilience, environmental, eco(logy), green, sustainable and 'other.' The other category included BREEAM, LEED, energy, carbon, climate change, wellbeing and recycle.

8.2.1 Selecting information sources

An informal survey of colleagues was conducted to understand what magazines, journals, and blogs were regularly used to find information about sustainable

architecture. As my university does not have access to an online journal database, there were pragmatic restrictions to the selection of periodicals, which included considering if our library had the physical copies of the entire five-year period. The four chosen periodicals included: Architecture Research Quarterly, Architectural Design, the Architect's Journal and the Architectural Review. After completing the first phase of data collection which consisted of manual skim-reading of each issue (outline following), I gained access to an online journal database to which made the digital copies available. Subsequently, the method was altered, as now each journal could be re-checked using a word search in Adobe Acrobat. The two online-blogs are; Archdaily and Dezeen, which are the two most popular architecture websites according to Alexa which ranks the popularity of every website in the world. While each publication came from a suggestion from colleagues, they were examined first to make sure they were suitable, and a description of each publication is as follows:

Architecture Research Quarterly (ARQ)

- ARQ is a scientific journal which started in the 1980's and is edited by Adam Sharr, Newcastle University, United Kingdom and published in English by the School of Architecture of the Pontifical Catholic University of Chile. There are four issues per year which are released quarterly, and their content includes "building design, urbanism, history, theory, environmental design, construction, materials, information technology, and practice" (Cambridge Core, 2018). It is considered: "essential reading for practitioners in industry and consultancy as well as for academic researchers" (Cambridge Core, 2018).

Architectural Design (AD)

- AD is an UK architectural journal, founded in 1930 and now published by John Wiley & Sons. Issues are published monthly with a theme and "each title is edited by an invited guest-editor, who is an international expert in the field" (Wiley, 2018). AD is described as combining "topicality of a newsstand journal with the rigour and production qualities of a book" and covers diverse themes which include architectural history, the environment, interior design, landscape architecture and urban design (Wiley, 2018).

The Architectural Review (AR)

- AR is an international architecture magazine started in 1896 which is published in English by Metropolis International, United Kingdom. Edited by Christine Murray, issues are published monthly, and articles cover the built environment – which includes landscape, building design, interior design, and urbanism – as well as theory of these subjects. It is described as: "A curated selection of the best architectural ideas in the world to inspire your mind and feed your soul" (The Architectural Review, 2018).

The Architect's Journal (AJ)

- AJ is an architectural magazine also published in London by Metropolis International. Also, edited by Christine Murray, issues are published weekly

and is described as supporting “the architecture industry on a daily basis with in-depth news analysis, insight into issues that are affecting the industry, comprehensive building studies with technical details and drawings, client profiles, competition updates as well as letting you know who’s won what and why” (The Architect’s Journal, 2018).

Archdaily

- Archdaily is an online blog started in 2008 and is: “the world’s most visited architecture website” (Alexa, 2018) with 10 million visits monthly. The site’s editor-in-chief is David Basulto who curates and from publicly suggested architecture projects, news suggestions, and building product recommendations. Three additional versions of the website exist in Spanish, Portuguese and Chinese.

Dezeen

- Dezeen is an online magazine which was launched in 2006 and is described as the: “world’s most popular and influential architecture and design magazine” (Dezeen, 2016) with 2.5 million visitors monthly. Dezeen is edited by Marcus Fairs and aims to publish “a carefully edited selection of the best architecture, design, and interiors projects and news from around the world” (Dezeen, 2016).

8.2.2 Data collection and processing

This study involved two different sets of secondary information from the two different types of sources; printed periodicals and online blogs. While both sources are used for this study, they were collected, processed and analysed slightly differently due to their different formats. Consequently, each source will be described and outlined separately in the following section. To start, for the periodicals, two phases of data collection occurred as has been mentioned previously. Firstly, each publication was collected physically and browsed firstly for special ‘sustainable or green’ editions

Figure 8.3 Example of Excel sheet collecting information for Architect’s Journal

Architect's Journal										Count							Count per page						
Year	Volume	Issue	Special issue	#Pages	#Articles	#Sustainable Features	Page location of	#pages (article)	Issue name	Sustainable	Green	Ecology	Environmental	Resilient	Biological	Other	Sustainable	Green	Ecology	Environmental	Resilient	Biological	Other
2012	235	1	no	66	10	0			2012_235_1	13	2	1	4	0	0	4	0.20	0.03	0.02	0.06	0.00	0.00	0.06
2012	235	2	no	66	14	0			2012_235_2	5	2	1	2	0	0	3	0.08	0.03	0.02	0.03	0.00	0.00	0.05
2012	235	3	SP	66	10	0			2012_235_3	21	2	0	0	1	2	2	0.32	0.03	0.00	0.00	0.02	0.03	0.03
2012	235	4	no	58	12	0			2012_235_4	8	3	6	5	0	3	21	0.14	0.05	0.10	0.09	0.00	0.05	0.36
2012	235	5	no	66	11	0			2012_235_5	4	1	0	1	0	3	21	0.06	0.02	0.00	0.02	0.00	0.05	0.32
2012	235	6	no	66	6	0			2012_235_6	8	2	1	2	0	0	4	0.12	0.03	0.02	0.03	0.00	0.00	0.06
2012	235	9	no	58	10	0			2012_235_9	1	2	0	1	0	2	6	0.02	0.03	0.00	0.02	0.00	0.03	0.10
2012	235	10	FP	66	10	9	56 60-66 59 70	18	2012_235_10	25	21	4	10	0	4	6	0.53	0.32	0.06	0.15	0.00	0.06	0.09
2012	235	11	FP	66	10	3	64 66-72 74	8	2012_235_11	7	4	1	7	1	0	12	0.11	0.06	0.02	0.11	0.02	0.00	0.18
2012	235	12	no	82	8	0			2012_235_12	15	1	0	3	0	0	9	0.18	0.01	0.00	0.04	0.00	0.00	0.11
2012	235	13	no	66	10	0			2012_235_13	3	0	1	1	0	0	1	0.05	0.00	0.02	0.02	0.00	0.00	0.02
2012	235	14	no	66	10	0			2012_235_14	6	1	2	1	0	0	10	0.09	0.02	0.03	0.02	0.00	0.00	0.15
2012	235	15	FP	66	10	4	52 53 54-58	8	2012_235_15	22	3	4	5	1	5	18	0.33	0.05	0.06	0.08	0.02	0.08	0.27
2012	235	16	no	58	10	0			2012_235_16	6	0	0	4	0	2	7	0.10	0.00	0.00	0.07	0.00	0.03	0.12
2012	235	17	no	58	10	0			2012_235_17	0	0	0	0	0	0	2	0.00	0.00	0.00	0.00	0.00	0.00	0.03
2012	235	18	no	146	6	1	52	1	2012_235_18	35	0	3	6	4	0	15	0.24	0.00	0.02	0.04	0.03	0.00	0.10
2012	235	19	no	54	10	0			2012_235_19	8	0	0	1	1	1	6	0.15	0.00	0.00	0.02	0.02	0.02	0.11
2012	235	20	no	62	11	3	44 45 54	3	2012_235_20	29	8	5	11	0	1	22	0.47	0.13	0.08	0.18	0.00	0.02	0.35
2012	235	21	no	58	10	0			2012_235_21	5	3	0	2	0	0	4	0.09	0.05	0.00	0.03	0.00	0.00	0.07
2012	235	22	no	55	10	0			2012_235_22	5	3	1	1	0	1	5	0.09	0.05	0.02	0.02	0.00	0.02	0.09
2012	235	24	FP	78	10	4	56 60-68 58 59	13	2012_235_24	41	22	1	14	6	3	15	0.53	0.28	0.01	0.18	0.08	0.04	0.19
2012	236	1	no	58	10	0			2012_236_1	4	0	4	1	0	0	9	0.07	0.00	0.07	0.02	0.00	0.00	0.16
2012	236	2	no	58	10	0			2012_236_2	3	2	1	1	0	0	4	0.05	0.03	0.02	0.02	0.00	0.00	0.07
2012	236	3	no	66	10	0			2012_236_3	4	2	2	3	0	2	4	0.06	0.03	0.03	0.05	0.00	0.03	0.06
2012	236	4	FP	90	10	5	20 77 78-81 82 9	9	2012_236_4	30	24	3	12	0	3	21	0.33	0.27	0.03	0.13	0.00	0.03	0.23

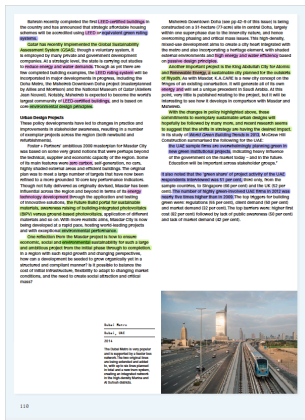


Figure 8.4 Example of a colour coded periodical page indicating where different keywords emerge – highlighted colours correspond to different keywords: Light green – sustainable, blue-green, pink – other, dark green – environmental.

followed by checking if they had specific articles which focused on sustainability. Following this, all pages were skim read focusing on the titles and subtitles looking for manifested references to sustainability both explicitly and implicitly or any associated keywords such as green, eco, bio, ecology and environmental. When keywords were found, the page was scanned, and the section highlighted to be coded at a later date. Additionally, while skim-reading, any additional mentions of the topic were also recorded even if these keywords were not present.

The second phase occurred later when digital access was gained; this resulted in the second round of data collection to both check that the previous collection was thorough and to gather any additional instances which were missed. As the publications were in PDF format, this search was completed by using the advanced search function in Adobe Acrobat Pro using the same previously mentioned keywords. The results were exported and compared with the previously scanned pages, and the combined information was then entered into an Excel spreadsheet for further analysis as demonstrated in figure 8.3. For each instance, the immediate section or paragraph was highlighted (see figure 8.4) and that page was then imported into Nvivo for coding and analysis. During this procedure, it was understood that often keywords doubled-up in references, footnotes or figures. Therefore, it was decided that instances within the references, acknowledgments, notes, figures or magazines descriptions would not be included in the frequency count. This process involved searching through 307 issues, 3247 articles and 24455 pages of publications.

Similar to the magazines, the online architecture blogs were collected by searching for keywords. Each online blog was collected in June 2017, using each website's own internal search engine with the word 'sustain(able),' further filtered by relevance. The first one hundred articles were collected from each blog and then following the same process. Keywords were used to search the articles. In total two-hundred articles were gathered (from both blogs) which resulted in 705 A4 pages. A slight difference between the method of data collection was that with the online blogs the articles were first filtered by the theme of sustainable architecture. This decision was made as the number of articles on each blog were vast, and many articles were often unrelated to architecture, and they varied daily. For example, there are over 400 000 articles on Archdaily, and while this varied the method of collection slightly, it was necessary for pragmatic reasons. The outcome of this is both sources cannot be analysed and directly compared; consequently, the findings are presented separately.

8.2.3 Selecting keywords

As the chosen publication sources were not specific to sustainable architecture, some keywords were needed to help reduce the amount of information collected. This provided both an overview of manifested frequency but also delimited the instances to be thematically analysed. The keywords were very broad and could be split into two hierarchies, in the hope of collecting both the manifested and latent content for analysis. The two hierarchies included keywords directly related to sustainability and

secondly, other associated words. The first group included the keywords: sustainable, green, environmental, eco(logy), resilient and bio(logy). As mentioned, this group was significant in counting the frequency of manifested content directly related to sustainable architecture. The second group of associated keywords included: energy, carbon, footprint, recycle, wellbeing, LEED, and BREEAM. These associated keywords were highlighted to understand better the specificities of the manifested content but also to help find other latent content which may not have explicitly mentioned, one of the first keywords, but were referring to the topic.

The first group of keywords was searched for in their root form using the stemming function in Adobe Acrobat Pro, for example: sustain, sustainable and sustainability or eco, ecology, ecological and ecologically. One exception to this was environmental which was searched for specifically in its adjective or adverb form - environmentally. This occurred, as the noun form -environment - is used in many instances within architecture discourse which was unrelated to the topic of sustainability. Also, keywords were only highlighted when they were directly related to the topic of sustainability and not in every instance. For example, energy was only highlighted in references to resources and not concerning physical or mental energy. When highlighting and counting instances, when the same word occurred more than once in a sentence it was highlighted as one instance and only counted once.

8.2.4 Analysis

The outcome of the data collection resulted in two different types of information. As mentioned the quantitative search for manifested instances of sustainable architecture and the associated terms produced excel sheets of frequency counts (figure 8.3) and pages with highlighted instances which were then imported into Nvivo (figure 8.4). These figures were totalled, converted to averages-per-page and bar graphs were produced to compare different keyword and overall frequency within each issue visually and across all the information collected. These graphs can be viewed in the Appendix B. These findings were used to create an initial overview of 'sustainability in numbers' from all of the publications and further delimit the information which would be used for the second thematic analysis.

The latent analysis was conducted with grounded theory coding to discover underlying meaning and themes in the text. Using a JavaScript action in Adobe Acrobat, the highlighted pages with mentions of any of the keywords were extracted into a document for each year and each magazine or journal. This produced 4967 pages (around 20% of the total pages) of PDFs which were then imported to Nvivo for thematic coding. This second inductive analysis was qualitative in nature. No predetermined codes were used, instead, as with a grounded theory methodology, codes were constructed as they emerged from the information. Codes were then grouped into sub-codes which formed concepts and categories which attempted to describe the underlying theme of each keyword instance.

8.2.5 Limitations

While qualitative content analysis is considered to be a rigorous and valid method (Berg, 2001), some limitations embedded in this study are relevant to outline.

Although this research does not aim to be generalizable for all periodicals or written discourse, this issue is always relevant, especially when discussing the chosen sources. As it is a relatively small sample of magazines and journals, over a short period and only two-hundred articles from two online blogs, the outcome of this study cannot be assumed to represent all of the written architecture discourse. Thus, findings intend to give a glimpse or snapshot of a cross-section of popular written discourse. Additionally, as all sources are in English and the majority while read internationally are published in the United Kingdom, this again limits the representation of the findings as inadvertently, many contributors are then from a European context. Like many of the other studies, another limitation is my own involvement in the collection, processing, and analysis of the information. While it is advantageous in qualitative content analysis to have knowledge of the subject, it is essential that this context is acknowledged as previously outlined in this dissertation. Consequently, immense efforts were undertaken to be rigorous, especially using digital search tools in the collection and processing of the information. However, during the analysis, my previous knowledge and understanding of the field inadvertently impacted on the way in which I coded, categorised and constructed different information.

8.3 CONSTRUCTING FINDINGS

The constructed findings for this study will be presented in two different sections, firstly a description and overview of the findings from the manifest content – the frequency of terms. Secondly, different themes and categories from the qualitative part of the content analysis are framed and presented within the five central themes – definitions, greenwashing, communication, approaches and visual language.

8.3.1 Sustainability in numbers

Within the 307 selected issues published by the different periodicals, there were 3247 articles, of which 189 were explicitly relating to the field of sustainable architecture which is less than six percent. Additionally, these 189 articles consisted of around 580 pages which are less than two percent of the total number of pages.

However, of the 24 455 total pages, 4967 pages contain one or more of the keywords which equates to around twenty percent. These numbers indicate that while there is very little published within these selected issues explicitly concerning sustainable architecture, the selected keywords still manifest within other articles. Figure 8.7 illustrates the frequency of different keywords in the selected periodicals proportionally. To elaborate, ‘sustainability’ in its different forms was the keyword mentioned the most with 3852 instances. This was closely followed by the ‘other’ category which included the associated terms - BREEAM, LEED, energy, carbon, climate change, wellbeing and recycle.

The third most frequent keyword was ‘environmental’ which across all sources was mentioned nearly half as many times as ‘sustainable’. Interestingly, ‘sustainable’ and ‘environmental’ were also the two general keywords which appeared in the

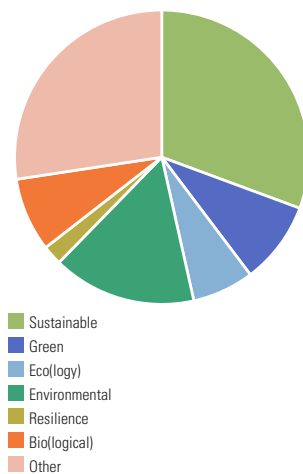


Figure 8.7 Pie graph showing the total frequency of different keywords

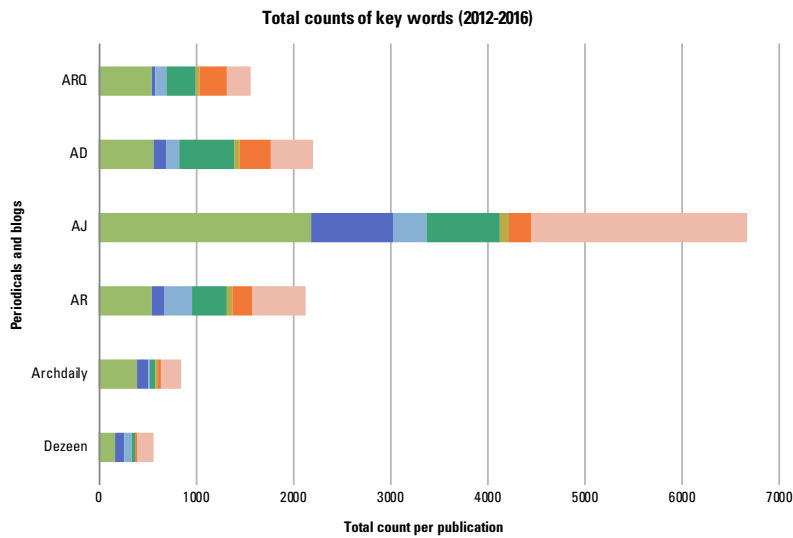


Figure 8.5 Graph showing the total count of keyword for each periodical and blog

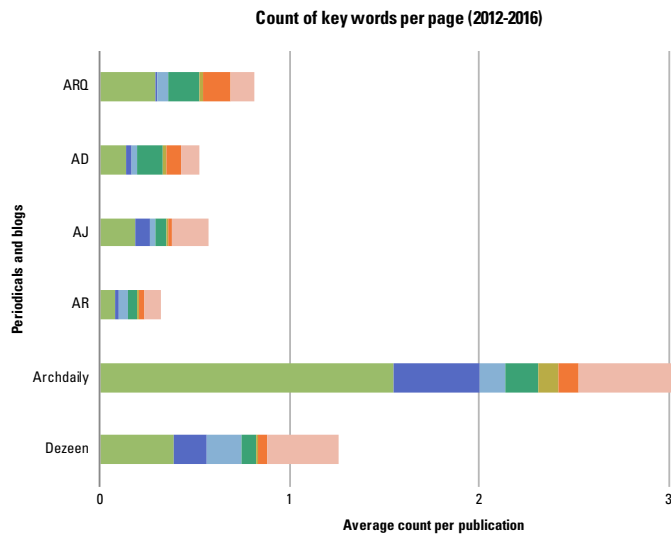


Figure 8.6 Graph showing the count of keyword per page for each periodical and blog

website analysis in the previous study. Continuing, each of the different terms appears in similar proportions in each of the different periodicals. Some small variations are visible in figure 8.5 and 8.6 which illustrates the keyword total per periodical and average count of per page. ‘Environmental’ appears slightly more often in Architectural Research Quarterly, and within Architectural Design environmental and sustainability occur a similar amount. Similarly, ‘other’ terms appear in similar numbers to ‘sustainability’ in the Architect’s Journal and Architecture Review. The Architect’s Journal is a magazine directed at architectural practice, and it was evident that rating systems such as LEED and BREEAM appeared often which most likely attributes to the high number of ‘others.’ Additionally, these two graphs highlight the frequency differences between the different periodicals and also the online blogs. It is interesting how much the graphs change between the total count and the average count per page. This distinction is important, as already mentioned, different periodicals publish at different intervals and differ drastically in the number of pages. This is most notable in the Architect’s Journal (AJ) where there are the most total instances of the keywords. However, when calculated per page it is drastically

decreased to less than once per page. This is inverted when it comes to the online blogs, where there are few total instances collected but with ArchDaily this is more than three times the amount of a magazine when compared per page. The online blogs follow similar trends to the periodicals concerning the frequency of different terms. Sustainability occurs the most with 565 instances across the 200 articles. Differing slightly from the magazines and journals the term 'green' appears more frequently within the selected articles from the online blogs

When examining figure 8.8 and figure 8.9, at first glance it appears that the frequency of manifest content had increased in 2013 and has been decreasing since then; however, when filtering the information by counts per page, this view is no longer valid, and the discrepancy is mostly due to the Architect's Journal which has in fact followed this trend. Interestingly, Architecture Research Quarterly has fluctuated and in 2016 has increased the number of instances considerably. In contrast, the Architectural Review has decreased in instances since 2012, and Architectural Design has consistently fluctuated. Additionally, the number of instances is directly dependent on if the specific issues contain a particular article or if it was a specialty

Figure 8.8 Graph of total count of keywords per year

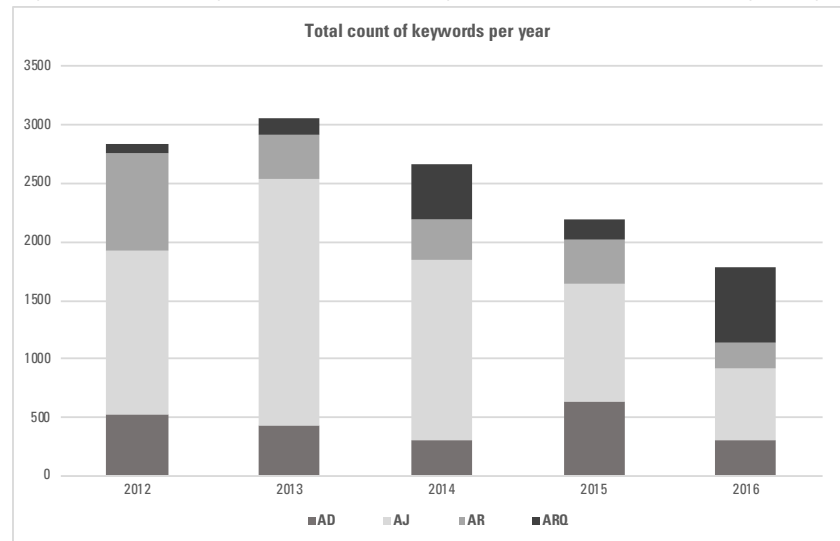
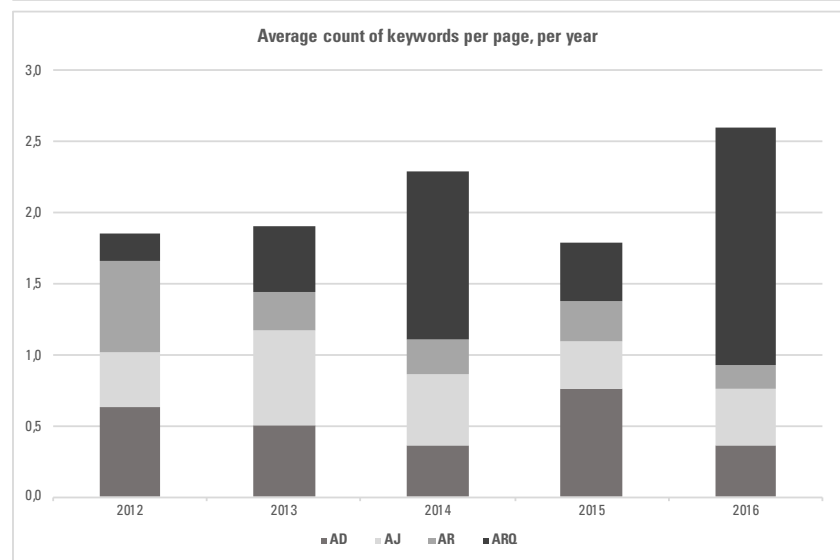


Figure 8.9 Graph of average count of keyword per page per year



issue concentrating on sustainability. This can be exemplified by the graphs provided in the Appendix D where it is apparent in the number of instances which issues contained a sustainability related article or was a specialty issue.

8.3.2 Thematic Analysis

Thematic coding for this study was extensive and produced a vast array of categories and themes, many of which were out of the scope of this research. These were subsequently disregarded, and the following discussions are presented as examples of some of the categories which were formed through this analysis, rather than an extensive representation. These discussions are framed by the five central themes and attempt to both build on previous arguments presented in the dissertation while also exploring the thematic content of the publications. As there were very few articles directly concerning sustainability, much of the content consisted of short descriptions of how different items were sustainable, ranging from architecture to bathroom fittings. Built examples, both built and unbuilt, were more often in the content compared to written texts or articles. This was particularly relevant within AJ and AR where buildings are often presented through the discussion and review of different awards, especially the RIBA yearly awards. How different information appears will be discussed following, concentrating on definition, terminology and language; greenwashing; and information, knowledge and communication.

8.3.3 Definitions, terminology and language

Different codes were constructed to categorise how sustainable architecture is discussed particularly the definitions, terminology and the language used. Similar to notions discussed in the literature reviews, within the publications there were also many statements concerning the ambiguity of the term sustainable and its definition; that it is difficult to define as well as the notion of interchangeable synonyms. For instance, Hattie Hartman in a 2012 issue of Architectural Design states, "Every project and product claims to be more sustainable, more pioneering and more innovative than the last. This gives sustainability – no matter how one defines it – a bad name. Sustainability means something different to everyone." (Hartman, 2012). This is evident in the content of the different publications; the term sustainability is used in entirely different contexts and with very few explanations of what is meant. In saying this, there are some commonalities across some of the journals. For instance, Hattie Hartman is the sustainable editor for the AJ and often contributes to the journal on a monthly basis. This means that her positions are consistent across many of the different issues and can be used as a base to compare the different contributions. However, this is only evident if you are a regular reader and would not be comprehensible if only picking up an issue sporadically as much of her position is implied within the articles and reviews.

In addition to there being multiple definitions, the ambiguity of the definition was also raised in many instances and often argued that this is an issue that needs resolution. For example, Thornton (2012) in the AJ explains: "This thinking [social,

economic, environmental] is essential to bring clarity to the elusive definition of sustainability [...]” Moreover, this quote raises a similar topic which was present in many of the instances in which sustainable architecture was attempted to be defined. That is the standard definitions which stem from sustainable development. On the few occasions that the term was defined, it was often concerning the triple-bottom line, as used above, or a version of the Brundtland definition. However, while there were a few contributions which raise these issues of clarity and plurality, the majority of ‘sustainable’ instances are as an adjective to describe another concept. This occurred in most instances when the term was not used within a specific article dedicated to a topic related to sustainability. Authors rarely articulated specifically what was meant or understood by the term, and it is speculated that this frequent use of sustainable and sustainability as a blanket term, only serves to increase the ambiguity. Primarily as an adjective within these publications, it is used to describe:

Systems, society, future, goals, objectives, logic, initiatives, measures, solutions, economic growth, perspectives, movements, species, legacy, business models, growth, funds, communities, hubs, environment, parks, ecosystems, areas, cities, planning, homes, design, houses, skyscrapers, territories, buildings, the act of building, construction and architecture to only name a select few.

It is interesting that within architectural magazines there is this diversity of sustainable things or thoughts, and it is no wonder that there is confusion concerning the definitions and meaning of the term if it can be a goal, a species, an area or architecture without elaboration. Furthermore, it is worth noting that many of the later nouns related to the construction and design industry were more present in ARQ while many of the others were spread throughout the other three periodicals and blog. In addition to sustainable as an adjective, it is also used in reference to different conceptual forms, including sustainably (the broader notion), sustainable development, sustainable design, sustainable architecture and environmental sustainability. Again, the differences between these terms was very rarely articulated, and it is speculated in many instances that they are used without deliberation.

Concerning the other related terms, ‘eco’ or ‘ecology’, they were used less relating to architecture and more often associated with larger scales (eco-towns, eco-cities) especially within landscape architecture, urban planning or often within the advertising of different ‘eco-products.’ Similarly, the use of the term ‘resilience’ was often linked to climate change rather than the general discussion of sustainably. Additionally, it also appeared that resilience was used with more rigour and purpose. Interestingly, other associated words such as energy and carbon were present without any mention of sustainably. This could indicate that these concerns are no longer considered, only within the context of sustainable architecture but are also beginning to be discussed by the broader architecture discipline. Furthermore, the use of BREEAM and LEED were also very common especially within AJ and AR. The discussion around these rating systems often occurred in two ways, firstly, in the

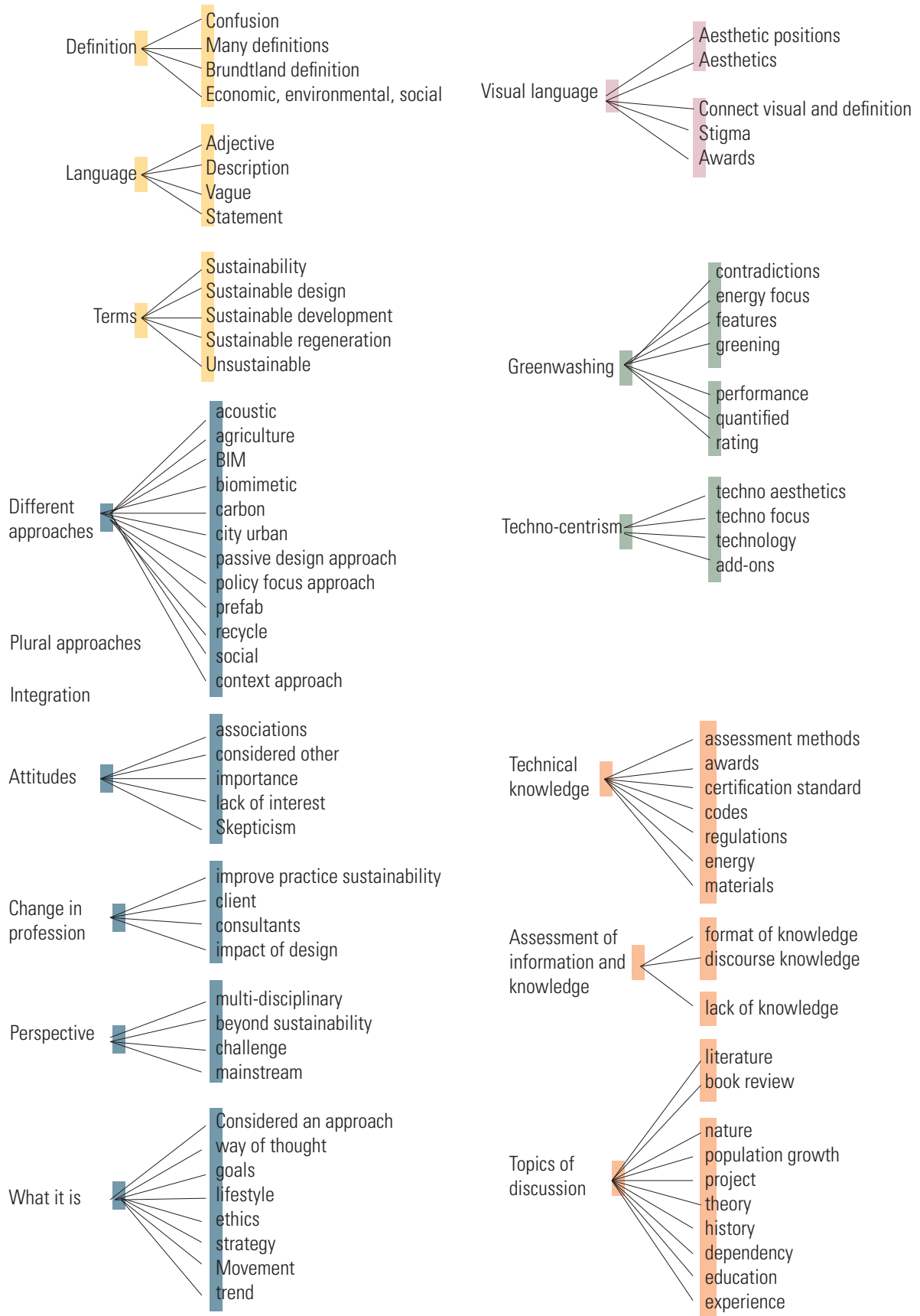
description of a project, especially within the awards related articles and sceptically, often in offhanded comments such as “[...] But it’s probably a very good building, in a BREEAM Excellent kind of way” (Olcayto, 2012). The contradiction will be unfolded in the coming section.

8.3.4 Greenwashing

Greenwashing and techno-centrism were very evident in the different publications, not only in frank critical discussions of its presence and impact on the industry, but also within content which contradicted reflective arguments. These inconsistencies were often visible concerning the discussion and presence of certification, policy and regulations, greening, and the add-on of technology which will be expanded on. One of the most obvious contradictions appeared in how contributors discussed certification systems especially BREEAM and LEED. There was frequent scepticism concerning their role in the industry, for instance, one author in the AJ states: “Experts tend to agree that BREEAM Excellent and Outstanding rating did little to ‘add value,’ and that clients seem unwilling to pay more for greener buildings” (Waite, 2012). Similarly, another author explains: “I cannot understand how both the original and revised NPPF drafts were received with a general, ruddy-cheeked optimism because of a few tick-box references to architectural quality, sustainability, and local consultation” (Jay Merrick, 2012). These two quotes represent a common line of debate which was present especially within AJ and AR where BREEAM and LEED were discussed more often. Interestingly, the majority of instances when these certifications were mentioned, was in a general blanket statement indicating that the rating had been received but often there was no further explanation of how or with what approaches. For instances: “The project has received a BREEAM sustainability rating of ‘very good’” (Hartman, 2012). In many ways, the use of BREEAM and LEED is similar to how sustainability is used without clarification, and it is evident that this imprecision adds confusion, further exacerbating the scepticism towards, in this case, certifications.

Greening was also an intriguing concept which appeared with many of the periodicals. Greening was used as an accepted verb for the addition of sustainable aspects and particularly vegetation. Opinions differed towards the concept with some using the term, critically reflecting on sustainable architecture while others used it freely in discussions such as ‘greening the grey’ (Steven Tomlinson, 2012, p. 107). With the more sceptical use of the term, the greenwashing qualities were often insinuated, for example: “Sometimes these are thoughtfully integrated; too often these ‘greenings’ offer nothing more than visual benefit, requiring excessive water irrigation and human management” (Emma Flynn, 2016, p. 23). Whereas other authors state: “building envelopes, roofs, and façades – has been targeted as an opportunity for additional greening” (Cruz and Beckett, 2016). The use of the word ‘additional’ before greening is interesting as it implies that it is not an integrated consideration, rather the application of vegetation as an envelope or façade treatment. The concept of ‘green equating good,’ as previously discussed in the literature review and

Figure 8.10 (right) coding tree of thematic coding of the periodicals and blogs.



interviews, is also raised within the selected publications with frequent facetious comments such as: “Is a park sustainable just because it has grass? Is the myriad of suburban sprawl sustainable, because everyone has a garden?” (Hoolachan, 2014, p. 345). In saying this, within the publications, there was more cynicism associated when the word green was used compared with other terms, which may be a result of the proliferation of greenwashing in the industry.

One last example taken from the publications is the technical add-on approach that emerged as a result of techno-heroism. In many instances where this occurred, it was not so much within the actual architecture examples themselves, but in how they were discussed. Often, holistic buildings which I know to be more than conventional boxes adorned with technology were discussed concerning only the ‘extra’ sustainable technology despite being integrated approaches. Additionally, there were also many examples where they were just shallow attempts resulting in certified conventional buildings with slightly better energy savings. As well as being present in the content, the add-on approach was also critically reflected on by different contributors such as Jeremy Till in the AJ footprint column. Within his work on scarcity, he challenged the premise of a “narrow technical approach” to sustainable architecture where he accuses the profession of being “to the idea that adding more and more shiny artefacts to the world [is] the supreme act of the architect” (Till, 2012, p. 70). Interestingly, this is contradicted by another architect who states “I’d like to be the first sustainable architect” (Sarut, 2012). Furthermore, these examples reiterate the apparent divide in the practice of sustainable architecture, between those who wish to change the consumerist culture and lifestyle and those who wish to sustain the current unsustainable ways of practicing architecture, notwithstanding their good intentions.

8.3.5 Information, knowledge and communication.

The content and information concerning sustainable architecture within these select periodicals and blogs was vast, diverse and often ambiguous. The thematic analysis indicated that many of the past opinions discussed within the literature review were valid. Sustainability is discussed often considering the sources; however, what is discussed is rarely with any substance and more often blanket statements as noted in the previous sections. The associated topic and themes which sustainability is discussed with, are incredibly vast and have been illustrated in a short coding tree presented in figure 8.10. These themes in figure 8.10 were all coded as topics which were discussed with sustainability or one of the other keywords. They cover definitions, language, terms, different approaches, attitudes, perspectives, changes in the profession, different ideas about what sustainable architecture is, the visual language, greenwashing, techno-centrism, technical knowledge, assessment of the information, as well as different specific topics of discussion. Many of the subcategories within these themes are contradictory and overlapping, this supports previous notions about the state of knowledge. Despite the wide range of publications examined to come to these conclusions, there is little wonder that

people are overwhelmed and confused by the information they are receiving, as in most cases, every new article or instance is discussing sustainability from a different perspective or in reference to a different topic.

Within the ARQ there is a small debate which I think represents common opinions or understandings of the current level of written sustainable architecture discourse. Within his article Graham Farmer (2013) claims:

“Any cursory review of published research into built environment sustainability tends to suggest that, beyond the relatively narrow parameters of engineering design, there is little scholarship to date on the kinds of design-based practices that might contribute to addressing environmental concerns. Indeed, in much of the sustainability literature, the view of architectural design is homogeneous and limited; presented either as a challenge of rational, prescriptive problem solving or alternatively as an instrumental means of specifying technologies that satisfy predefined environmental targets.”

This paper is later reviewed by another contributor who disagrees with Farmers assessment of scholarship and states:

“While it is not my own specific field of design research, it is still hard to ignore the plethora of commentators in the design and sustainability field over the last decade. I would suggest that, next to the publication of architectural monographs on individual architects, books on sustainable architecture crowd the bookshelves and websites of most design publishing houses and bookstores. Whether any of these books are actually contributing to raising global awareness about sustainable development within the architecture profession is, of course, harder to measure. Clearly, though, the field has expanded rapidly since my own architectural education in the 1980s when the term ‘sustainability’ had little currency” (Braham, 2013).

I would argue that these two opposing opinions generally represent the differences held by experts in the field and non-specialist. I would position myself with Farmers assessment of the discourse, and after extensive research into existing literature for this dissertation, I would argue that quantity does not equal quality. While there is, as the reviewer argues, a vast number of publications, many do not explore the fundamentals of the field with any rigour.

One last short overview concerns the format of knowledge. Each of the different publications uses different ways to communicate sustainable architecture based on their format and readership. For instance, ARQ is much more academically inclined compared with AJ or the online blogs. Additionally, the different periodicals frequently have ‘speciality issues’ such as AJ which has a monthly ‘green’ issue, and ARQ has a continuous ‘environmental’ section in their journal. Within ARQ, articles

are often theoretically expanded on with less direct applicability to practice. Whereas, AJ, AR or the online blogs communicate much more frequently with opinion pieces, awards, reviews of buildings and practice, as well as case studies. The proportion of images to written text within these publications is often on the side of images. The role images play in communicating information has been discussed previously and is extended on in the following chapter. An example of this is when Jones (2012), when reviewing a building which he does not consider to 'look like a sustainable building', he states: "That this is a green building attaining 'Excellent' on BREEAM standards is not self-evident, for the boreholes and solar collectors remain unseen, and measures to conserve heat and control solar gain do not shout." This reiterates that there is an association or expectation of the visual identity and language of sustainable architecture.

Additionally, what this also highlights is the 'invisible' or implicit information which is often in sustainable buildings. This also supports the notion that basic knowledge of the field is needed to be able to 'receive' the transmitted knowledge from buildings or the 'sender.' Without this prior knowledge, the 'receiver' is not able to fully comprehend what is communicated and this is applicable for both visual communication as well as the previously mentioned use of certification terms and sustainability as unexplained statements. What is understood by these is limited to what the reader has prior knowledge of and unfortunately this is often limited to shallow or techno-centric approaches.

8.4 SUMMARY

Within this chapter, the study of four periodicals and two online blogs content has been presented. Discussions were first framed by the outline of the method, followed by selection of information sources, keyword selection, the collection, processing and analysis procedure. Two different iterations of constructed findings were presented. Firstly, the frequency of keywords is discussed, outlining general findings and different relationships between the keywords and different publications. Following this, examples of the thematic analysis are presented, expounding on the imprecision and confusion associated with the definition and understating of different terms as well as the presentation of some of the many topics sustainability is associated within these publications.

Following this, greenwashing is explicitly explored though certifications accompanied by an elaboration of techno-add-on approaches. Lastly, the literature quality versus quantity debate was presented, as well as the discussion of the formation of information and the transfer of knowledge, particularity through built examples. This chapter has built on previous studies and their subsequent findings and presented understandings and evaluation of not only the amount but also the content and format of a selection of information which is provided to architectural professionals. It is apparent from this study that the information provided is often inadequate regarding quality and in many cases exacerbating confusion and the ambiguity of the field.

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Chapter Nine

Visual Language Analysis

The exploration of the visual language of sustainable architecture is presented in this chapter, which marks the second to last study in a series which makes up the main body of this dissertation. This study was designed in response to the growing themes and barriers related to visual language and identity. Around one-hundred and seventy buildings were examined using visual content analysis to understand the different visual languages that are employed and subsequently communicated. Figure 9.1 illustrates the themes that were addressed within this analysis, specifically the information, knowledge, communication and visual language, with the process subsequently analysing greenwashing, technocentrism, and approaches.

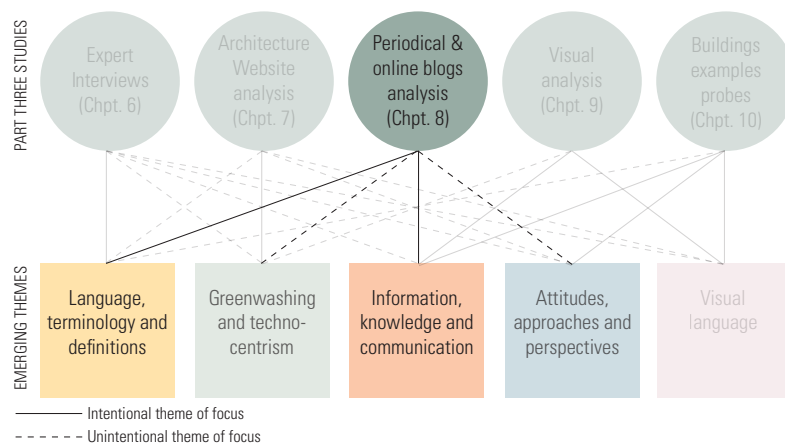


Figure 9.1 Connection between periodical and blog analysis and five themes: Diagram of the different themes which are directly and indirectly addressed in this study

9.1 INTRODUCTION

The topic of visual language and identity within this dissertation has often been presented within the discussion of other themes or identified as a controversial and a contested barrier. This theme was not constructed within the initial phases of this research, but subsequently, it reappeared often and was later considered diverse enough to be discussed in its own right, rather than as a sub-category of the other four central themes. Three reoccurring sub-themes have been constructed within previous studies and include the visual language and identity of sustainable architecture, the associated negative visual stigma associated and buildings as discourse.

Subsequently, this visual content analysis study was designed to build on previous studies to explore and understand the visual language and identity of sustainable architecture while also exploring the visual development through a selection of examples from the 1960s until today. It aimed to understand better if different opinions were valid; such as the 'alterative' stigma or application of technology.

This study intends to describe and systematically compare the physical characteristics of the selected buildings and is not interested in discussing the visual merit of the buildings - if they are ugly or not – as this is a matter of taste. Furthermore, this analysis does not argue for the discovery of one visual identity, or for that matter a right or wrong visual identity, rather only to explore the various visual ways these buildings differ, what influences this and what impact it has.

I will begin this chapter by explaining the method designed for this study, focusing on the criteria used to select built examples from the literature, the process of collecting and processing information followed by a description of the two variations of visual analysis. The second half of the chapter consists of the constructed findings, which are presented in two separate discussions. Firstly, the broad findings from the coding are described, articulating patterns and relationships between the series of visual variables. Secondly, a selection of built examples is used to exemplify and discuss some of the constructed themes. Finally, a summary of this study concludes this chapter.

9.2 OUTLINE OF THE METHOD

As with the previous two chapters, this study employed the use of content analysis, although rather than collecting written variables or keywords, the physical characteristics of selected examples of sustainable architecture were studied. As previously mentioned in section 2.3.1, buildings are considered to be part of the sustainable architecture discourse and information is subsequently through a buildings visual appearance. This study builds on the previous contextual narrative as well as a questionnaire, and through mapping and historical narrative, identifies and collects key examples of sustainable architecture, particularly within the timeline mapping (figure 4.6). Furthermore, respondents from the questionnaire identified that built examples and case studies were used nearly eighty percent of the time to gain knowledge about sustainable architecture. Additionally, respondents from practice only disseminated their knowledge of sustainable architecture through built examples, design and competitions. These combined results prompted the design of this study in order to understand the types of information that can be communicated through built examples, and subsequently explored concerns emerging from literature review and interviews regarding an associated stigma relating to the visual qualities of sustainable architecture.

Figure 9.2 Selection of buildings which make up this study, - organised from oldest in the top left to newest in the bottom right.



9.2.1 Selection of buildings

One-hundred-and-sixty-one buildings constructed from 1960 until recent years were chosen as the information source for this study as illustrated in figure 9.2. As mentioned, some buildings were previously identified in prior studies, and additional buildings supplemented these from the literature. This study intended to collect at least ten buildings to analyse for each decade; however, it should be noted that the number of buildings within a period increases as we consider more recent buildings. Buildings were chosen from literature and the questionnaire to reduce the scope to projects which are considered to be exemplary. This method of selection has resulted in an interesting array of examples which I may not have collected had I used a different method. Selecting projects this way provided me with common examples that other architects would observe if they were to read about sustainable architecture. Subsequently, buildings were only chosen if they appeared in two or more different literature sources, or were identified by an expert in the questionnaire. Some of the additional literature sources included popular books such as “The World’s Greenest Buildings: Promise Versus Performance in Sustainable Design” by Yudelson and Meyer (2013) or “100 Contemporary Green Buildings” by Philip Jodidio (2013), which both claim to contain best-case examples.

Furthermore, all projects were required to be at the building scale rather than landscape, urban, or smaller scales. Again, no geographical constraint was designed into this method; although the nature of much of the literature being written in English resulted in a dominance of examples from Anglo-Saxon countries. To begin, a sample size of two-hundred examples was collected and considered to be both large enough and feasible to process within the constraints of this dissertation. Subsequently, this number was narrowed to around one-hundred-and-sixty due to a lack of adequate information. This collection of examples is by no means representative of all sustainable buildings or an exhaustive list, but provides enough variety to identify connections and relationships. Specific building types or examples were not strived for; instead, an assortment of associated information emerged from the literature. As visible in figure 9.3 and figure 9.4, the age and the size of the buildings differed, and were not proportional, but have been taken into consideration when analysing the information. Furthermore, figure 9.5 gives a small glimpse of the different locations of each project and emphasises the diversity of contexts, which is also contemplated in the analysis process where it does not deter from the meaningfulness of the study.

9.2.2 Data collection and processing

Information regarding each of the selected buildings came only from secondary sources. This included information regarding each building collected from readings as well as a series of interior and exterior photos, diagrams, and sketches. This was important as I had the chance to visit only a small number of the buildings; thus, this information created the context and subsequent understanding necessary to later code each project. Following the selection of buildings and collection of information, necessary information of each building was then recorded in Excel (figure 9.6) and

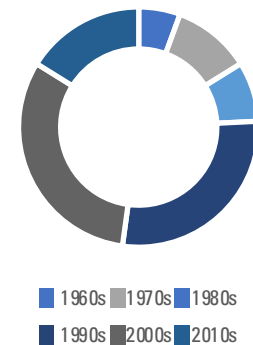


Figure 9.3 Pie graph showing what percentage of buildings are from each decade



Figure 9.4 Graph indicating the proportion of different building sizes



Figure 9.5 Map of where the selected buildings of analysis are located

included, when possible, the year of construction, architect, location, approach, building name, size, function, and cost. Following this, an inventory of the visual language was broken down into themes of inquiry, which included both manifest and latent content. In this study, examples of manifest content could be solar panels, whereas features whose purpose is predominantly decorative, such as vertical gardens or green roofs, can be considered latent content. The broader manifest and latent categories included, site, location, relationship to nature, level of technology integration, form, mass, transparency, symmetry, sustainable elements and façade materials. Each project was then coded depending on the presence of these different variables, and when observed, they were marked in the Excel sheet. Rather than some categories being absolute, scales were used to indicate a level of inclusion which is discussed soon in section 9.3.1. Furthermore, the different variables were not set from the start but were constructed as they emerged within each of the different buildings. Additionally, it is acknowledged that this study is not exhaustive in the number or variety of examples selected and that the coding highlights mainly superficial elements of the example; it was not however designed as an aesthetics study, but instead, one to explore visual language and identity.

Figure 9.6 Screenshot of how information was collected and recorded in Excel.

The screenshot shows an Excel spreadsheet with a table of project data. The columns include project ID, name, location, architect, year, and function. To the right of the text columns is a large grid of cells, many of which contain small colored squares (red, green, blue, yellow) indicating the presence or level of various variables for each project. The grid is organized into several vertical sections, likely representing different categories of variables.

9.2.4 Analysis

The information that was recorded in Excel was then converted to a coloured diagram similar to those of the previous diagrams in chapter seven of the architecture website analysis. Using the ‘conditional formatting’ tool, colour scales were applied to the counts of different variables thereby producing a long (2.5 m) visual diagram which can be seen in Appendix E. In order to analyse this data I took into account first impressions of the entire diagram while also considering the associated images. Due to the cumbersome nature of the diagram, however, the analysis was challenging and therefore only the coded information was used for the further filtering and analysis. Moreover, each broader category was converted into a different colour to help distinguish between variables. The diagrams were subsequently filtered by each category and variable as illustrated in figure 9.7. This process produced twelve individual diagrams all with different hierarchies and was then examined for connections and relationships between the different variables. The maps were then

printed at a smaller scale and studied by hand using a screen in order to isolate and describe different strands of information, illustrated in figure 9.8. This process was similar to grounded theory line-by-line coding in which each line was coded to form tentative themes which could then be examined against all of the remaining data. After completing this, the large, full diagram with pictures was re-examined with a more direct-coding perspective, looking for the codes and descriptions that were constructed in the previous process.

9.2.5 Limitations

There were three critical limitations with this method; firstly, as motioned, this was not an in-depth study of each building. Instead, it focused on the visual identity and the language used to communicate the sustainable aspects within each building, consequently limiting the information and conclusions which can be drawn from this study. Secondly, as the buildings were not visited in-person, understandings are based on other people's images and drawings which can be focused to frame or highlight certain aspects of a building. Additionally, especially within popular media, photos are often taken as 'glamour shots,' thus potentially hiding the reality of the visual appearance. Furthermore, as not all aspects of sustainable architecture are visible or tangible, other people's descriptions or diagrams limit the understanding and possible coding which can be completed. Finally, my involvement, as in all of the previous studies, effects how I choose, collect, understand, process, and analysis the various elements in this study. It is also reliant on my knowledge of sustainable architecture and architecture generally to be able to identify variables and form connections between them.

9.3 CONSTRUCTING FINDINGS

Findings for this study were constructed through the visual mapping of different visual elements from a selected series of built examples from popular literature. To initiate the discussion some descriptions of the findings revealed through line-by-line coding and filtering information is presented first, followed by an exploration of some more specific examples within the larger diagrams. To begin the discussion, a few constructed observations of how different variables have developed from the first building in the 1960s, until the last in 2016, are as follows:

Sustainable buildings were smaller in size during the earlier periods of the sixties. Additionally, these buildings have predominantly moved from rural to urban, and green to brownfields, over time. Also, during this earlier period, there were more examples of residential and demonstration houses which have since transitioned into more offices, combined with a general increase in building size over the years. During the sixties and seventies, alternative or experimental approaches to technology were more frequent, whereas more integrated approaches became more recurrent in later years. Furthermore, the use of recycled materials and earth has decreased during this period, while glass and steel have increased. Similarly, buildings have become more transparent and symmetrical while there has been a simultaneous increase in

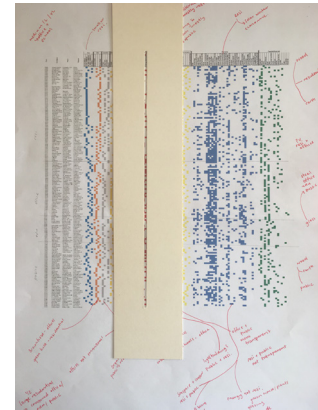


Figure 9.8 Examples of how each row was examined individually using a filter.



Figure 9.7 Examples of the filtering and analysis process including memo writing.

technology, energy, solar water, HVAC, water treatment, solar shading, green roofs, glazing, and façade over time. One theme however that has remained consistent throughout this time is the presence of passive solutions which emerged from solar architecture. Each of these categories, which were the focus of an analysis diagram, will be discussed in the following sections.

9.3.1 Description of constructed findings

The descriptions of the diagrams constructed from the different filtering process, illustrated previously in figure 9.7, will be articulated in the different groups which cluster each of the different visual variables. It is worth reiterating that these findings only represent these select buildings, and are therefore considered indications of, as opposed to a representation of all, sustainable buildings.

SIZE (Appendix E, p. A136)

The size of each project was recorded as part of the necessary information and then divided into five different categories: extra-small (0-100 m²), small (101-1000 m²),

medium (1000-5000 m²), large (5001-15000 m²) and extra-large (bigger than 15000 m²). The coding of these categories was based on information collected from the literature about each building. In very few cases, this information was not provided, and in turn, an educated guess was made. Firstly, nearly half of the selected buildings were extra-small or small in size, and subsequently, nearly half of these buildings were constructed before 1990 and included all but eight building examples from the periods before 1990. Smaller buildings were often residential, situated more often on rural green-fields. On the other hand, however, larger buildings could frequently be seen in urban settings and on brownfields. It can be concluded that the larger the project, the less connection there was to nature, while the presence of photovoltaics and technology became increasingly common. Alternative building forms were more common on smaller projects, while organic, unsymmetrical features, and wooden materials were often present on both small and medium projects. Moreover, glazing and facade treatment were less frequent for small buildings, while greenery, plants, and passive elements were recurrent across all sizes. This indicates that there has been an increase in size over time, and there is a connection between size and urban environments which therefore impacts the context and type of building.

SITE AND LOCATION (Appendix E, p. A137)

Site and location were collected in two categories; firstly, site was coded on a scale of one to four with one being brownfields, and four being green fields. Secondly, locations were coded with the variables urban, suburban, peri-urban and rural. These categories were chosen to best explore the previous dialogue that sustainable architecture is often considered to be rural eco-villages. For the selected buildings, there was an even mix between brown and green fields as well as urban and rural locations. The visual diagrams indicated that there was a direct relationship in the selected buildings (as expected) between site and location, evident through urban projects often being built upon brownfields, while residential buildings can be seen more frequently on green or virgin sites. Offices and conventional buildings with technology were more frequently urban and on brownfields, while additionally there was an increase of greenery, façade or envelope technology as well as steel and glass materials in urban and brownfields.

Interestingly, rural projects were more alternative in their use of technology, often encompassing lighter structures which are less symmetrical. Furthermore, geodesic, organic and domed forms were more common in rural settings, with organic shapes more particular on green sites. Moreover, wood and earth materials were popular on green fields, and interestingly, external greenery was less present with examples situated on green sites as well as rural and suburban settings. Lastly, passive elements were consistent across all sites and locations. It is evident from the examples chosen that smaller rural projects fit the stereotype of being less conventional, more alternative, buildings, especially as many of these buildings are from the environmental movement period. However, this also indicates that there are very different approaches for buildings depending on the relationship to their physical

context.

RELATIONSHIP TO NATURE (Appendix E, p. A138)

This category was a continuation of the previous site and location categories; it was included to understand what physical connection different buildings had with nature, especially if they were integrated or if they had no relationship at all. Coding for this theme was on a scale of one (no connection) to five (in nature), and as indicated in the coding, there was a reasonably even divide between these variables. There is an apparent link amongst the connections between nature, location, and site with greater connections more visible in less urban settings. Essentially, the greater their relationship with nature, the lighter, more organic, and less angular the structure was. Additionally, the closer the building is to nature, the more water collection features and green roofs it had. Conversely, conventional buildings with technology were more frequent when projects had less relationship with nature. Furthermore, mechanical ventilation, glazing technology, and the use of steel and glass materials were all more present the further away from nature. These are similar to those found within site and location, consequently emphasising the influence the physical context has on the subsequent design and building.

FUNCTION (Appendix E, p. A139)

Function or purpose was another primary variable which was collected. Variables included residential, offices, retail, education, pavilions or demonstration buildings, public, healthcare and industrial/factory buildings. The four primary functions for the selected buildings were (in order) residential, office, public, and education.

As expected, office and schools were most often medium, large and extra-large in size. From the selected projects, offices and public buildings were more transparent and more frequently were conventional buildings that made more intensive use of technology. The materials steel and glass were common in offices, education and public buildings, whereas wood and earth were more recurrent materials for residential and public buildings. Additionally, public and residential buildings were often lighter in mass, less transparent, and had sunspaces, conservatories, and photovoltaics. Moreover, residential buildings were often also organic with alternative technology including solar hot water collectors; however, variables such as energy, greenhouses, glazing, façade treatment, and vertical greenery were not frequent in residential projects. The influence of different functions was expected as different purposes allow for different levels of experimentation, for instance in residential buildings the client is more likely to be the user, and thus the designs can subsequently be tailored to their unique needs and desires, which is not necessarily the case in buildings which serve many different needs.

LEVEL OF TECHNOLOGY INTEGRATION (Appendix E, p. A140)

Five levels of technology integration were chosen as variables: convention, buildings with technology, hybrid, integrated sustainable technology, and alternative or

experimental. These variables were coded based on their visual impression and additional knowledge and were chosen to understand if the level of technology affects the presence of other visual aspects. From the selected buildings there was an even mix of structures within each of the given levels of technological integration. Selected buildings with experimental and integrated technology were often rounder in form, where they also often included geodesic, organic and dome forms, whereas these were not present with buildings with technology. Solar panels, water collection, greenhouses, and sunspaces were present in all levels except conventional projects, with the same also remaining valid for the use of steel. On the other hand, wood was used on all but conventional buildings with technology. Glass, energy, water treatment, atriums, façade and envelopes, recycling, and social variables were all present in buildings with technology, hybrids, and integrated examples. It is evident that there are correlations between the level of technology integration and the visual aspects the building contains sustainable features, and the materials used. Generally, the more alternative the technology, the more diverse the shape and form was, combined with more 'natural' materials.

FORM (Appendix E, p. A141)

For this category, buildings were coded based on their rudimentary form and variables included, angular, round, biomimetic, geodesic, organic and domes. The coding of the different forms was included to understand if there was a common form and the frequency of 'unconventional' shapes, which are often voiced as being part of the visual 'hippy' stigma. The majority of the buildings were angular or had major angular elements, sometimes combined with other round or organic forms. Only around fifteen percent of all of the selected buildings had round, biomimetic, geodesic or organic form alone, and of this fifteen percent, around half were constructed after 1990. Angular buildings were often large or extra-large, modular, and also the only form of building to contain photovoltaics, HVAC, BIM, energy, water treatment, glazing, and external greenery variables. While small organic buildings were less symmetrical than round or geodesic, examples of organic and round buildings were less transparent than geodesic projects which mostly made use of plastic materials.

MASS (Appendix E, p. A142)

The mass of the selected buildings was roughly evaluated on a scale of one to five, with one being light and five being heavy. The majority of the buildings were coded between a two and four, with a similar number coded one and five. Buildings which were lightweight were often small in nature and were often greenhouses. Recycling and wood were often coded within this variable. Heavier projects were often larger, not in nature, and contained bricks, concrete and rammed earth materials. Additionally, water treatment, green roof, external greenery, thermal mass, and insulation were present in heavier buildings. Furthermore, there was a slight relationship between mass and transparency. Many of the coded relationships for this category are expected and presumed to be present in the broader architecture

discipline, such as the relationship between materials and mass. Additionally, the presence of features such as thermal mass, insulation and green roofs is logical as these are indicative of heavier mass.

TRANSPARENCY (Appendix E, p. A143)

Coding for transparency was a similar process to that of mass and symmetry. Buildings were coded on a scale of one to five, with one being transparent, and five not transparent. Similarly to mass, the majority of the buildings were coded between two and four. This category related heavily to the amount of glazing that was present within the buildings, evident in the relationship between glass, used as the primary material, and the building's transparency. Additionally, there was an evident correlation between mass, transparency, and symmetry, where the more transparent the building, the more symmetrical it often was. Examples with organic forms were less transparent than others. Additionally, sustainable elements such as green roofs, thermal mass, and insulation were also present more often in less transparent projects, which also used materials such as earth and concrete. Whereas examples which were coded more transparent featured greenhouses, sunspaces, clerestories, and photovoltaics, often making use of plastic, glass and steel materials.

SYMMETRY (Appendix E, p. A144)

The category of symmetry was chosen to understand, as previously mentioned, the stigma that sustainable architecture is often unconventional in shape. It was therefore decided that symmetry could be employed as an indicator of this, and a scale of one (symmetrical) to five (unsymmetrical) was used to code this category. Around twenty percent of the selected buildings were coded as four or five, indicating that they were quite unsymmetrical. Additional relationships between variables included the less transparent a building, the more likely it was to be unsymmetrical. Residential alternatives and organic formed buildings with a connection to nature in rural settings were also often more unsymmetrical. Sustainable features often coded with unsymmetrical buildings were water treatment and green roofs, as well as the use of earth and concrete materials. The coding of this category suggests that many of the buildings which support the notion that sustainable architecture is unconventional (through a lack of symmetrical) are often small-scale experimental buildings in rural settings and only represent a small portion of the examples collected for this study.

ELEMENTS AND FAÇADE MATERIALS (Appendix E, p. A145)

Thirty-one different sustainable features or elements were collected in order to form a category that ranged from high-tech to low-tech solutions, including different technological innovations, passive strategies as well as social and wellbeing considerations. Additionally, sixteen different materials were collected to form a category for façade materials. Examples of these variables include natural materials, human-made technology, and plants. These variables, however, will not be described extensively, as many of the relationships between these and other categories have

already previously been discussed. The most common elements were different passive strategies followed by energy-saving technologies like photovoltaics; materials and elements such as glazing, façade and envelope treatment, insulation and thermal mass. Additionally, the three most common façade materials were wood, steel, and glass. Moreover, the impact of these will be discussed in the following section 9.3.3.

9.3.2 Visual language and identity

From the second round of analysis, different examples were pulled out, and alternative hierarchies were created. Numerous variations of different connections were created depending on the 'filter' used to arrange them. One example which will be discussed in this section is the relationship between different approaches and the following visual language created. Different approaches and strategies relating to solar architecture and shading were used to select sixteen examples as illustrated in Figure 9.10. From the left column, four examples which use strategies inspired by sunspaces, prevalent in solar architecture, are presented; in the second column are four examples of Passivhaus or zero energy buildings. This approach was chosen as it relates to the earlier solar architecture. In the third column, four examples are provided which have prominent solar shading strategies, and in the fourth column are examples with active solar shading similar to that of the static shading in the previous examples. These examples support the notion that while there is not one cohesive, sustainable architecture visual language or identity, there are some reoccurring elements which can be derived from different approaches. There are apparent visual similarities between different examples within the same approach as well as horizontally across strategies. Additionally, it is worth noting that there is a progression in age with older examples in the left column and newer in the right, and as mentioned in the previous descriptions of the findings, there is also a progression from rural to urban settings, as well as the subsequent scale of the projects.

In terms of strategies, there is a progression from integrated low-tech and passive strategies on the left to applied active and high-tech strategies on the right. Subsequently, the level of integration between these approaches and technology has an impact on what the building looks like. Buildings on the left are more holistic and integrated in appearance, while many of the buildings on the right seem to make use of solar shading in its different forms to apply more of a façade treatment, or skin, on what would otherwise be a conventional building. I would suggest, from my personal opinion, that some of the buildings on the right use solar shading techniques more for aesthetic purposes rather than as a responsive climatic strategy, which visually adds to the progression of greenwashing. Nonetheless, it is interesting that the differences in these approaches and integration result in noticeable visual differences. Additional visual elements and language can be seen in the form and transparency. The majority of the buildings have large glass surfaces as a result of the passive solar techniques, thereby adding to their visual cohesion. Intriguingly, examples on the right still have large glass surfaces which are subsequently covered by solar shading in a variety of

Figure 9.9 Collection of buildings to analyse looking for similarities in visual language.



different ways, giving the impression that these buildings are more substantial than they are. Within column three there is also a reoccurring visual feature of varying transparency through latticed screens, whereas in column four active facades have larger unobstructed openings which are subsequently covered depending on the climatic conditions which change the visual appearance of the building.

This collection of buildings has been provided as one small example of how the visual language and identity have been analysed. As mentioned, it is evident that within these buildings there is no one identity, but rather a variety of approaches that have a lexicon of visual elements. These elements can be common across different building types, and in some instances creates more cohesion. However, these elements vary depending on the approaches employed. Subsequently, I would argue that there is a visual lexicon within sustainable architecture which emerges from different approaches, strategies, and contexts.

9.3.3 Visual discourse

The importance of visual discourse as a media for the transfer of information and knowledge has been argued for previously within this dissertation. This study subsequently addressed this topic through the visual analysis of its buildings and informal conversations. Interestingly, while completing the second analysis, I often asked colleagues (without knowledge of sustainable architecture) to pick out which examples they thought looked like sustainable buildings. Often enough, the ones that were chosen were the small scale 'alternative' looking buildings, those submerged within the landscapes, or those with prominent green roofs. When asked to elaborate why they chose these examples, responses were often that they looked more natural, were closer to natural processes, or were chosen due to their scale. When asked to explain what they think was sustainable about larger scale and more contemporary buildings, few had responses which did not relate to the application technology.



Figure 9.10 Examples of a colleague 'visual dominoes': connecting buildings based on their visual appearance.

While these conversations were informal, it emphasised, especially from non-specialists, what elements and visual features were considered to be sustainable. This further emphasises the importance of how information is transmitted between buildings as information 'senders' and the subsequent 'receivers.' Additionally, it acknowledges the level of knowledge needed to be able to interpret the tacit visual language of sustainable architecture beyond the explicit technical add-ons. This notion is supported through the identification of different sustainable features and elements of particular buildings and was particularly interesting for this theme as they are often some of the most recognisable, or associated elements, with sustainable architecture. Passive strategies, energy saving technology, façade or envelopes, greenery, or plants in different forms were some of the most commonly coded variables. The reoccurring presence of these elements within the examples emphasises the point that many of the visual elements are add-ons and are consequently affecting the level of greenwashing in the industry.

9.4 SUMMARY

This study was designed to address debates raised within the literature and has built upon the research presented previously, especially in the contextual narrative in Chapter Four. Within this chapter, the method has been outlined focusing on the process of selecting the example buildings, the collection of information, the visual processing, and the information's subsequent analysis. The two iterations of analysis were articulated with supporting examples of the process. Descriptions of the initial findings were presented followed by a discussion of the visual language and identity through some selected examples. Additionally, a short discussion concerning the role of visual language in the transfer of knowledge is presented and consequently highlights the potential barriers which are present when buildings are considered part of the discourse and not merely an artefact. This study has attempted to contribute to the articulation of the visual language which exists within sustainable architecture. From the findings, I argue that there are many lexicons of visual elements which are dependent on the approaches employed and the context in which it sits. While this study has only scratched the surface and has not analysed each building in depth, it has provided an interesting starting point for further exploration of this theme and barrier. Finally, while many of the findings from this study may be considered obvious, more often than not this information is tacit and not explicated, subsequently, this study provides some empirical information which can form the foundation for further studies or research.

9.5 REFERENCES

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PART **FOUR**

Reflecting

Chapter Ten

SYNTHESIS

This chapter is the synthesis of each constructed theme from the seven studies (chapter four to ten). Its purpose is to clarify the content through the discussion of the categories and sub-categories within each of the five central themes. Further, it elaborates to mark the boundaries of the research and provide an additional base for the concluding remarks and the proposed contributions to knowledge in Chapter Eleven.

10.1 INTRODUCTION

This synthesis chapter brings together a selection of significant findings which have been constructed through the seven studies to combine the variety of perspectives and outcomes, which together create a bricolage of conclusions for each of the five central themes. The five themes which frame this research were constructed as a result of the grounded-bricolage methodology. This approach gave me the freedom to traverse uncertain avenues of discovery which would have otherwise not been possible within a more rigid research approach. Themes were constructed and expanded throughout the process as new information was collected and analysed as well as the re-examination of previously collected material. These iterations meant that I was constantly aware of the context and connections between different secondary sources and voices from the primary studies. This research moves between the very specific and the very broad. Gathering information from diverse sources, ensuring context and complexity while also framing the dissertation within the narrow scope of the five central themes.

The diversity of methods and studies utilised in this research may seem like seven individual smaller studies, however, during the process of researching, the boundaries between the studies have bled together, and within my own process, they have been considered one rich study made up of seven parts.

The identification of the themes – definitions, greenwashing, communication, approaches and aesthetics – and their subthemes form a significant part of this dissertation's contribution to knowledge. However, it is worth reiterating, that these themes are in no way the only barriers between discourse and practice and may not even be the most crucial, despite this, they were chosen as they were grounded in the information, their positioning within the relationship, ability to be examined and they were of interest and importance to me. In the remainder of this chapter, significant findings from the studies will be 'bricolaged' together to form a substantial overview of the constructed results from the series of studies, starting with definition, terminology, and language.

10.2 DEFINITIONS, TERMINOLOGY AND LANGUAGE

The theme definitions, terminology, and language was the first barrier to be identified within this research. Initially, it only consisted of definitions, or the lack thereof, of sustainable architecture. It originated early on from the literature, particularly, from the tendency that many authors generally began their introduction discussing the elusive nature of sustainable architecture or one of the many associated terms. Also, within the literature, it was apparent that the related terms were often used as synonyms for sustainable architecture. Therefore, this notion was added to the scope for this theme. Slowly through each study, numerous categories and subcategories were constructed and contributed to, not only identifying this theme as a barrier, but also expanding it to include the broader categories terminology and language.

Throughout the research process, the bricolage of different studies built on each other to add richness to the findings for each theme. The contextual narrative, questionnaire, and interviews explicitly explored this theme. The other four studies, inadvertently contributed by supporting existing findings or adding alternative perspectives and conclusions. The central results which were constructed are presented (by each study) to cohesively articulate from this research how definitions, terminology, and language affect the relationship between discourse and practice.

To begin, the contextual narrative explored the development of different key terms (eco, green, sustainable, resilience) which developed from the 1960s, with the intention of articulating the nuances between them. This study addressed the subcategory of synonyms and the interchangeability of terms within the vocabulary. Findings from this study were based on literature and indicated that not only had there been a development of terms; there was also a development of meaning within each of the terms. Moreover, the progression of both the vocabulary and the meanings are heavily influenced by the social and political context in which they are constructed. Additionally, it was established that there are many definitions, and each of these can be person and context specific. This study emphasised the importance of the nuances between the four terms which were examined through common examples of each definition.

The questionnaire was the second study which explicitly explored the theme of definitions; it built on the contextual narrative's previous identification that there are multiple meanings of the term sustainable architecture. It focused on collecting a series of definitions from experts in the field to examine this notion. The results of this study indicated that every respondent had their own definition of sustainable architecture which formed a collection of over one-hundred different understandings. Furthermore, it is evident that there is some influence from the Brundtland definition and the triple bottom line. This includes future perspectives, the environment, economy and social issues which influenced some of the responses.

In the interview study, I attempted to add further meaning to this theme through the construction of perspectives and opinions concerning the effect of vague definitions and the interchangeability of the associated terms. Three key findings from this were, firstly, the impact vagueness has on the progression of the field, both from a negative and positive perspective; with some understanding it as a design opportunity whereas others consider greenwashing an outcome of the vagueness of meaning. Secondly, the range of different definitions and the implication of this and thirdly, the importance of the language used to communicate sustainable architecture.

At this stage in the research, the theme had broadened to include the language associated with sustainable architecture, and this was inadvertently explored through the content analysis of the websites. Within this study, terminology was intended to be investigated to understand better the role of greenwashing and techno-centrism; however, this additionally led to further exploration of the theme from a different secondary source. Some of the associated findings were the use of specific strategies and solutions to discuss projects rather than general concepts, except in the case

of the term 'sustainable' which was frequently used as an adjective to describe projects, often with little further explanation. The significant use of sustainable was subsequently constructed as a central subcategory and explored further in the periodical and blog analysis.

Similar to the website study, the periodical study was not designed to address this theme explicitly but inadvertently does, through the quantitative and qualitative examination of periodicals and blogs. Results from this study indicated that sustainable architecture is not discussed extensively in the selection of popular architecture literature. Of the keywords, sustainable was the most used. However, it was more frequently used to describe an associated object or process rather than architecture itself.

The visual language study did not address this theme but connected the notion of visual identity with the definition. This study emphasised some interviews between the two categories. Terminology is essential to the oral and written discourse, whereas, for the physical build, there is a vocabulary of 'visual terms' which forms a visual lexicon.

The collection of information to study this theme was crucial in understanding the topic from many perspectives and in many contexts, with both primary and secondary sources. The diversity of both sources and studies added to the richness and rigour of the finding which was constructed. These findings identified different definitions, explored the relationship between sustainable architecture and associated terms, gained perspectives of different understandings of the definition and related language and what impact it has. It reinforced the importance of precise language within the field of sustainable architecture, and subsequently, this dissertation argues not for a singular definition or terminology, rather more deliberation in what is meant when using specific language.

10.3 GREENWASHING AND A TECHNO-CENTRISM

The theme of greenwashing and techno-centrism emerged from popular literature as well as my own experience of the field, and what is being designed and constructed. The review of literature in chapter two supported the first initial frame of this theme to help identify what gaps were missing in the knowledge concerning both greenwashing and techno-centrism. It was evident that this theme was underrepresented in both research and literature with little empirical information available. Subsequently, different studies were used to construct some information which would be used in different supporting discussions concerning the effect on the industry and the connection to discourse and practice.

Within the contextual narrative, the development of the use and integration of technology within the field was explored to understand where the add-on approach emerged from and subsequently how greenwashing occurred. The outcome of this study was the articulation of some select examples. These developed from environmental concerns with a techno-centric or techno-heroism approach to solving problems. Furthermore, exploration identified some apparent connections between the

approach from a different period and some examples support notions of greenwashing in the industry.

The topic of greenwashing is one in which people are reluctant to confess; therefore, the questionnaire study, intended to gain more understanding of the theme, the technique included broader questions which cover more diverse topics. One of the primary intentions was to understand without bias, which strategies were used. However, what I understood from this study was many of the respondents had vast knowledge of the field, and the questions I asked were not going to elucidate the knowledge I needed.

Combined with the interview study it became apparent that experts were not the right sample group to gain knowledge about greenwashing. Despite this, some direct questions were designed into the research guide for the semi-structured interviews at a later date. The aim of this was to understand from the perspective of experts what impact greenwashing had on the industry. Some of the perspectives which were constructed were the fact that greenwashing dilutes other practices which are successfully producing high-quality examples of sustainable architecture. That it is slowing the adoption as practitioners are sceptical, they see it as an extension of engineering and technology, rather than an architecture issue. Furthermore, it was discussed by one respondent that their practice had gone through a phase in the past of advertising as much of the sustainable elements as possible, but this was no longer the case.

As the questionnaire did not elucidate enough empirical information, the subsequent and directly related study of architectural websites was designed. This addresses explicitly how sustainable architecture is present in the descriptions of a series of selected buildings and what aspects are discussed. Some of the key findings from this were the identification and classification of different approaches to integrating sustainably into practice, and these ranged from fully integrated to greenwashing. Furthermore, it was apparent that some offices claimed to be practicing sustainable architecture often in 'all' of their projects but the reality in many cases was far from this. Very few offices of those which were collected produced sustainable buildings in all of the collected instances. Additionally, when buildings were described with sustainable variables, often this was very few which may indicate that they are not holistically sustainable.

Furthermore, within the periodical and blog study, advertising indicated there is a very high-level of greenwashing within the materials and product industry associated with architecture, and this is likely to have an impact, even if only subconsciously. Furthermore, greenwashing and techno-centric approaches were also present especially within the online blogs. Additionally, the previously mentioned use of blanket terms in the definitions section also indicated a level of greenwashing through the marketing of different projects as sustainable. Moreover, the topic of greenwashing was also present within a select few articles often about certification and rating systems.

The visual language study was not designed to address greenwashing or techno-

centrism explicitly; however, it is very closely linked with the theme of visual language and identity, and consequently, some findings from this study also transferred. It was apparent that the visual language was heavily linked with the add-on approach and literal greening. Some of the most common sustainable elements or strategies were technology, photovoltaics, thermal collector, green roof or vertical gardens and solar shading devices. All of these elements are often present in greenwashing; this is not to say that all of the collected examples for this project were greenwashing, rather that it indicates that technology is very visually present in a range of examples.

Gathering information for this theme was more difficult than some of the others. One of the reasons for this was because of its negative connotations, and consequent lack of openness to discuss it honestly. Furthermore, it is often subjective. Because of the elusive and contested nature of sustainability, it is equally as difficult to explicitly identify without in-depth studies of a building over a more extended period. This theme connects and influences discourse and practice by visually representing a fragment of the field through built examples which subsequently then provide fragmented visual information, entering into a vicious circle of shallow information producing shallow buildings which in turns exacerbates shallow discourse which further produces shallow information.

10.4 INFORMATION, KNOWLEDGE AND COMMUNICATION.

This theme was constructed in the reviewing of literature. It became apparent that there are enough information and technology, but something was hindering the transfer of information and knowledge. This was a pivotal point in the research and informed the shift from examining the discourse and theory within the literature, to focusing more evenly on furthering the understanding between discourse's relationship with practice, rather than on discourse itself. This theme has also been challenging to study as it relies on individuals' personal experiences with learning and gathering information. Thus, studies concerning this theme have attempted to investigate it through the collection of as many different perspectives from a variety of information sources.

Like many of the topics within sustainable architecture, it was evident from the literature review that there was contention concerning the quality and quantity of information, as well as the multidisciplinary nature of a considerable portion of existing knowledge. This subcategory was particularly explored through the contextual narrative, understanding where literature and information emerged from. The dramatic increase of publications over this period and the visual transfer of information were a substantial factor. What was not known at this time, was which sources were used to gain knowledge, subsequently this was designed into the questionnaire.

The questionnaire explicitly asked what sources were used to gain knowledge of sustainable architecture, how often and for what purpose (to refresh or gain new knowledge). These responses combined with other questions concerning what concepts, movement, and theories the participants had knowledge of, it indicated

that respondents used a variety of sources to gain information about a diverse range of content. One interesting finding was the frequency (daily or weekly) that websites and periodicals were used over other formats. This prompted the further study of the periodical analysis, as it was unclear what content was gained through these formats of discourse. It was evident from these respondents that many formats of discourse were used to gain knowledge.

To further explore how knowledge was gained, direct questions were asked in the interviews to ascertain from their expert experiences what barriers were present regarding this theme. This study, elaborated on why they chose specific sources and where they disseminated their knowledge. Some results from this study indicated that respondents felt there was enough information but it was fragmented or overwhelming and there was an appreciation for visual and oral formats, especially within practice. Another interesting outcome was the disconnect between academia and practice concerning knowledge sharing. Some respondents indicated that academic lectures were too complicated and theoretical and often not useful as they had no directly applicable information.

As mentioned, the identification of periodicals and blogs as a frequent information source, initiated the content analysis study of the four select periodicals and two online blogs. This study examined the frequency sustainability was mentioned, in relations to what topics or content were present as well as the formats which were used to present this information. Some of the key findings from this study indicated that there was a considerable amount of shallow or fragmented information. Topics of sustainability were often discussed but very rarely explored in depth. Information was also often vague and ambiguous with many statements used imprecisely.

Furthermore, there was often contention between the information provided, with some in support and other still sceptical of the entire field. Information varied in its format, with some journals focusing on essay-style articles and others using mainly build examples and case studies. A significant amount of imagery was included in all publications but very few diagrams or process illustrations. Sustainable buildings in these instances, like most examples of architecture, were mostly presented as 'glamour' shots with short explanations. Additionally, one article within the publications raised the notion that experts think there isn't enough quality information whereas non-specialists believe there is an excessive amount which indicated a discrepancy between quality versus quantity.

The architectural website analysis was not designed to address this theme, but as websites are intended as communication tools, it inadvertently did. While this study was designed to understand greenwashing further, the keywords and how the office presented its projects, it subsequently indicated what parts of sustainable architecture the authors considered important. It was evident that the country and industry context impacted the strategies described and the consequent language which is used within the descriptions. This points to a broader discussion concerning the descriptions and if they reflect what the market desires regarding sustainability or if how they describe their projects creates a specific public expectation.

The visual language analysis built on the previous contextual narrative study particularly how knowledge is transferred from buildings and this is evident through the selection of different built examples. Central conclusions from this study indicate that there is a visual vocabulary which is heavily influenced by the sustainable strategies; moreover, the combination of this lexicon can form a visual language which differs depending on the approaches employed and the context in which it is situated. Furthermore, it was posited that the visual language and identity are essential formats to communicate information and this was apparent through an obvious progression and development of different visual elements and approaches over several decades.

This theme contained the most information directly related to how discourse is integrated and employed by practice.

It emphasised the implications of multiple ontologies and how this affects how and what information is gained. Reinforcing the notion that it is essential to be aware of an audience's knowledge base and perceptions to be able to transfer knowledge successfully.

10.5 APPROACHES, ATTITUDES, AND PERSPECTIVES

This theme was not individually established from the initial phase of the research, rather fragments of it were present in many of the discussion within the previous three themes. However, this theme ended up as the largest and most diverse. Through the research, it expanded to include perspectives and attitudes as a direct response to conversations within the interview study. Established key literature already exists concerning the plurality of approaches, and this was one reason this theme was not included from the start as it seemed there was already a considerable investigation into the topic. However, it became apparent that the connection between approaches and the other themes was necessary as the approaches represented many perspectives from the side of practices which was crucial for a balanced understanding of the relationship between discourse and practice. This theme also expanded to include perspectives and attitude as well as many subcategories; and additionally, was one of the themes which appeared throughout all of the studies despite not being the primary focus of the study.

As the approaches was not a central theme at the time the contextual narrative was first established, it was not a primary filter for the historical studies; however, it was very apparent when going back through the information that different approaches, perspectives, and attitudes were present. Similarly, the questionnaire was also designed prior to the establishment of this theme; however, in a similar way to the contextual narrative when re-examining the findings from the questionnaire, it was clear that different categories associated with the approaches were present in questions such as how embedded sustainable architecture was in their profession. If the office or institute operated with set agendas and goals or what specific movements and strategies the respondents knew of. Some interesting conclusions from this study were that the majority of the respondents operated under

a sustainably driven strategy or philosophy for their entire workplace. Secondly, the majority of the respondents agreed environmental issues were very important, followed by social, technological; whereas, economic, aesthetics, and culture were all rated the very important slightly less by the same number of respondents and political issues were the only subcategory considered not important frequently. Another interesting finding was the theories, strategies, and concepts which respondents had knowledge of, answers to this were very diverse with the most common being those which relate to passive strategies or energy, such as solar architecture, passive architecture, zero energy, Passivhaus and bio-climatic architecture. These responses indicated that the respondents have a broad understanding and focus on different aspects of sustainable architecture with a slight focus on energy-related approaches.

Within the design of the interview chapter, no direct questions were asked concerning approaches; rather I aimed to gain information which emerged freely. Furthermore, as mentioned, outcomes from this study helped to broaden this theme to include perspectives and approaches. Through the conversations with experts, it was apparent that it was not only the diversity of approaches which was interesting and significant to study; but also, the influence different perspectives and attitudes had on these different approaches as well as how they influenced which approaches architects employed and how. A few interesting perspectives which were raised concerning this theme were that there was a lack of motivation to create more sustainable buildings. Also, that perspectives concerning sustainable architecture were changing, yet, it was often still considered a separate field. Moreover, there was contention regarding if sustainable architecture was mainstream or not and that there was a diverse range of often conflicting approaches employed which included there being multiple and single approaches; integrated and shallow approaches, as well as many other specific approaches.

The architecture website analysis study was interesting in that unexpected results concerning how different architecture firms integrated and practiced sustainable architecture was established. This expanded the theme also to include the different approaches an office has toward practicing as well as the design strategies employed. Also, from the coding of this study, it was evident that there was a preference towards energy efficiency (after natural light and materials) and rating or certification systems. Which similar to the questionnaire pointed to a tendency to focus (not exclusively) on energy related factors.

Additionally, within the periodical analysis, it was interesting the amount of scepticism towards sustainable architecture which was still prevalent. There was a diversity of perspectives and attitude, and these were wide-ranging. The study of the visual language emphasised the diversity of approaches as evident in the diversity of buildings and their visual language. Again, this study was not explicitly focused on this theme, but some findings did emerge which addressed the connection between the concept or approach, strategies employed and subsequent visual language.

The built examples probes focused on approaches and perspectives within five example building processes. Many different primary and secondary sources were

used to gain understanding concerning which perspectives and approaches were used and why. Interestingly, a considerable amount of influence on these came from the client's commitment or desire for a sustainable building. In all five of the buildings, the 'client' had a sustainability agenda or goals, and these are heavily reflected in the approaches used and end results. For instance, one building had the agenda of zero waste, zero energy, and zero water, and these are the main elements which were focused on in the design. Other issues were not forgotten about, but these three are prevalent and somewhat evident in the building. Another building wanted autonomy from the grid and a close connection with the natural environment and this also very present in the final building design.

This theme has indicated that there is an immense array of different approaches, perspective, and attitudes which can often be in contention with each other and on different ends of various scales. The approaches and perspectives act as a middle ground between information and knowledge within discourse and the product when is produced from the design process. In many ways, it is the filter that is used to translate theoretical information into practice and thus, forms a crucial and direct connection.

10.6 VISUAL LANGUAGE AND IDENTITY

The visual language and identity theme were one of the last to be constructed for this dissertation. Subsequently, it was the one which was narrower in focus and has the least amount of coding and categories to support it. It was considered an important theme as it connects many of the other themes and supports the important notion that discourse also includes visual elements and buildings. The initial exploration of this theme indicated that there was still a heavy bias towards the stigma that sustainable architecture is ugly, poorly designed or recognisable as 'alternative-hippy' architecture. These opinions were continuously reiterated or alluded to in much of the literature. However, personally. This did not seem like a fair representation of the field and the many successful examples which exist. Consequently, this theme was included to understand if all of these opinions were valid and if there was a 'style' or a set visual language for sustainable architecture as many stated. Further, it aimed to understand what role visual language has in communicating the discourse of sustainable architecture.

Similar to previous themes, these emerged after Part One was completed and; therefore, they were only considered after the first analysis had occurred. However, within the contextual narrative there were many references to the visual language through the explored examples and discussions of the transfer of visual knowledge. Especially through the mapping and timeline study, it was evident that there were some common visual elements which were present across the history, and this discovery lead to a more extensive study of the visual language which was presented in Chapter Nine.

Looking back through the questionnaire, some interesting discoveries were constructed when focusing on this theme. To start, the previously mentioned

question in which the respondents rated subcategories with their level of importance indicated that in total nine percent of the respondent found aesthetics not important and furthermore, twenty-two percent of academia found it not important. This was surprising and led to some questions being designed in the interview to understand the role and impact of aesthetics and visual language for the progression of the field. Another interesting finding was the majority (second most common only after books) of respondents looked at built examples and precedents as information sources. Additionally, respondents from practice also indicated that the only forum for disseminating their knowledge was through built examples and competitions, whereas this was the second most common format for academia. Responses to these two questions, supported the previous query concerning what information built examples provide as knowledge generators and communicators.

Direct questions concerning this theme were designed into the interview guide at later stages in the interview process. These questions concerned, as mentioned, the role or impact the visual language has on the progression of the profession. Within the responses there were still some references to ugly buildings; however, more interesting there was contention between those who consider it essential and those who raised the ethics versus aesthetics debate expanding that too often it is aesthetics at the consequence of ethics.

From the website analysis, it was evident, not from the analysis as such, but rather from the observation as I save screenshots of over 1500 buildings, which there was a diversity in the visual language. Frequently with many contemporary buildings, I was not able to guess which were going to be described as 'sustainable' or not. There were obvious exceptions to this, as some buildings were covered in iconic sustainable technology, but as a whole, it became hard to distinguish between the two approaches. This may indicate that there is a level of greenwashing, in that some buildings are described as sustainable when they are not; or sustainable strategies are starting to be integrated within standard building practices.

Observations of the periodical and blogs indicated similar conclusions as with the websites, there was a diversity of approaches to the visual aspects, and often these were indistinguishable from conventional architecture. However, within the written, there was still reference to the stigma that sustainable buildings were poorly designed, ugly or just the addition of technology referring to greenwashing. These responses were often accompanied by the previously discussed perspectives and scepticism of the entire field. Additionally, awards were often conferred concerning sustainable architecture, with many debates if there should be an exclusive category for sustainability or not. Furthermore, there were some discussions which indicated that the judges themselves did not know how to assess a sustainable building and others arguing that the ethical considerations compensate for a building being less architecturally refined. This suggests that there are still some disparities in how sustainable architecture is considered with the field and that there is still this stigma present.

As previously mentioned, the visual language analysis was designed to correctly

respond to some of the notions raised throughout the previous research. It built on information collected for the contextual narrative and explore around one-hundred-and-sixty buildings. Some key findings were first, that the alternative-hippy stigma was not indicative of the reality. Granted in the sixties and seventies there were more examples of these types of buildings, but within at least the last three decades this has not been the case. It is posited that this stigma may still be attached to sustainable architecture because the complex and elusive nature of the field means non-experts cling to the only explicit references they have knowledge of. Additionally, as mentioned in the discussion of definitions and language that there are multiple visual languages of sustainable architecture and these consist of diverse visual terminology.

The visual language and identity explored and refuted notions that sustainable architecture is a style, or looks like alternative-hippy architecture. Instead, this dissertation has argued that the visual language is as diverse as the approaches used. Additionally, it has demonstrated that the visual aspects of a building play a crucial role in communicating knowledge to the public. Furthermore, this theme plays an essential role in connecting discourse and practice as it embodies the design decisions from practice and then subsequently acts as a way to transfer this information through discourse.

This chapter has presented some of the key findings constructed from the different studies for each of the central themes; and, additionally has articulated how these themes connect discourse and practice. The following conclusion in Chapter Twelve will further discuss how the collection of findings constructed for each theme contribute to the broader field of research.

Chapter Eleven

CONCLUSION

This chapter intends to present the concluding remarks of this dissertation. It consists of a resume of the instigating concerns for the research, indicating the initiating aims and framework as well as the survey of literature and the design of the research approach which were outlined in Part One of the dissertation. With these articulated, the research aim is reflected on and the main contributions of the dissertation are discussed, reflecting on how they contribute to the wider field of sustainable architecture. Finally, a last discussion presents potential future studies which could build on or be influenced by the research presented in this dissertation.

11.1 OVERVIEW OF THE STUDY UNDERTAKEN

This grounded-bricolage research sits within a contested and complex field, subsequently, it has been framed within one understanding of this research context which acknowledges the different layers of concepts, disciplines, fields, and approaches which contribute to how this dissertation was initiated. Consequently, the approach of this research was designed to explore the relationship between discourse and practice through the following aims and research focuses:

- Identify what key factors or themes influence the relationship between sustainable architecture discourse and practice
- Discover where these themes occur and how they are connected.
- Understand how these themes may influence or impact the relationship between discourse and practice.

This 'terrain was mapped' through an ongoing review of the literature. The motivating aim of this study was to further delimit the scope through the identification of the central themes which 'bridge' discourse and practice. This study focused on combining a series of fragmented literature positioning this research within the broader field; while also collecting and constructing wide-ranging debates relating to the relationship between discourse and practice with particular focus on the five identified themes. Furthermore, this review, was designed to be an iterative process throughout the research, focusing and adding more information as new leads emerged, categories formed and tentative findings constructed.

In developing the review of the literature to frame this study I have surveyed contested understandings of the central concepts concerning, sustainability, sustainable development, and sustainable architecture. Particularly highlighting the contested, plural and multidisciplinary nature of these notions. Additionally, the literature review positions this dissertation within accepted understandings of discourse and practice.

Three initial themes were constructed from the early review of the literature and revealed:

- Recognition of the ambiguity, multiple and contested nature of the definition of sustainable architecture.
- The presence of greenwashing and techno-centrism as an unintentional consequence of the lack of education and also as an intentional market ploy.
- Accounts of access to sustainable architecture information, the quantity and quality of it combined with an incompatible format of knowledge.

These three themes were further expanded with additional reviews of the literature after the completion of additional studies which refined the themes. As a result of the explorative process, two additional themes were constructed at later

stages in the review of the literature and included:

- Acknowledgment of the plurality of approaches which range in scales, perspectives, and attitudes.
- Contested understandings of how the role of visual identity and language play in sustainable architecture.

The review of the literature also raised questions relating to how many of these opposed and various notions related to each other and the relationship between discourse and practice.

The explorative nature of this methodology approach traversed the uncertain boundaries of this research context and furthered understandings of 'what' 'how,' and 'in which ways' these central themes influence the relationship between discourse and practice. The development of the grounded-bricolage methodology consisted of seven interrelated studies which were designed to gather iterative information utilising visual methods of analysis in different phases as findings were constructed and the scope delimited.

This approach combined:

- The construction of the historical contextual narrative which merged accounts from various literature sources relating to sustainable architecture with visual mapping methods, forming the basis for the research.
- The collection of multiple narratives, perspectives and experiences from different experts in the field from academia, research and practice through one-way communication within the questionnaire and co-produced information from the semi-structured interviews.
- The production of visual mapping and coding from three iterations of content analysis (quantitative, qualitative and visual), gather information from architectural websites, periodicals, and blogs as well as built examples.

Each of these studies has been presented separately within this dissertation in chapter four to ten. While each study was conducted and analysed separately, they were not considered independent from each other as these processes were undertaken within the same periods of time. Subsequently, the research process was iterative with considerable crossover. What I learnt from the analysis in one study could be applied to data collection in another or visa-versa. Visual analysis of the seven studies was conducted to emphasise the patterns, relationships, and connections between information adding richness to the constructed information.

Reflecting on the methodology process emphasises the complexity of the research focus for this dissertation. It showcases the series of studies and methods as a complex, but essential process to better understand the ill-defined field. The presentation of each study as a chapter within this dissertation displays them as separate studies; however, this represents the retrospective understanding of the

research. In practice, it was multi-layered, iterative and overlapping interrelated studies that form a small part of a series that results in one cohesive study. Additionally, there were many limitations to this research, and these have been articulated throughout the dissertation. In many instances, the limitations of a particular study were unforeseen from the outset, and in some cases were they accepted as part of the research as they were indicative of the information source or a person limitation which I could not change such as language.

While this dissertation presents the outcome of my research project, it also represented the outcome of my education and learning throughout this process. This research process it has been considered an educational opportunity and successfully toned, tested and developed my skill to become a researcher. This education has involved not only learning from successful opportunities, methods and studies, but even more so from the failed or unsuccessful attempts.

11.2 CONSTRUCTING FINDINGS

This research set out to understand the relationship between discourse and practice and has successfully achieved this through the identification of five themes, their connections, and relationship to the broader field. These themes and the subsequent related findings have been constructed, collected and built on along the way. Identifying the gaps which are formed within the relationship between discourse and practice so they can be overcome or bridged.

Findings from the research are non-statistical but offer a snap-shot of a cross-section of the field. This research takes a holistic perspective, focusing on a small section of research which covers a broad perspective. While generalisations are not possible for many of the studies, they may have wider application as often the findings are not site-specific and consequently allows for further research to quickly build on top of this dissertation. The originality of this dissertation builds on existing fragmented information to construct a cohesive piece of research while embracing the complexity and context by keeping the focus broad across the field. Additionally, this research combines visual mapping and unconventional visual analysis with conventional methods of data collection to form a unique piece of research.

The previous synthesis brought together an example of the main findings to form a cohesive set of information. This conclusion chapter does not attempt to elaborate or discuss these findings rather articulate the possible impact they may have on the field and position; situating the information within the broader context and can aid in bridging research and practice.

11.2.1 Definition, terminology and language.

What was apparent from the research is a dichotomy of definitions, understandings, terminology and language which are all valid. This is evident through the distinct transition in terminology; the development of meanings which are influenced from the context and broader concepts; as well as the establishment that there are multiple definitions of sustainable architecture which are person specific. The evolution of

terms from eco, green, sustainable and now to resilience emphasises the professions search for solutions for healthier and more responsible architecture. However, changing or evolving terms does not equate better actions. It is the meanings and definitions behind the terms which are crucial to understand and articulate rather than the term itself. It is evident there are diverse perspectives concerning the progression of terms and language with some arguing for set definitions to reduce ambiguity and the subsequent diluting actions such as greenwashing, whereas others celebrate this vagueness as a potential driver for solutions to a complex problem. This dichotomy has potential value in that it maintains the broadness which allows for innovative thinking and diverse responses while also acknowledging multiple individuals and precise definitions which are also present.

Previously, the development of significant terms and their meanings have been described emphasising the nuances between them. Understanding and articulating the differences between terms and meaning has been an important discovery as it affects the way discourse is presented and understood, which in turn affects how it is practiced. Additionally, the use of different terms frames the way practice is perceived by others, as each term has its own connotation. For example, there is perceived and real differences between someone who practices eco architecture, green architecture or sustainable architecture. Understanding the extent to which sustainability is used as a blanket term with little to no explanation or clarification, made obvious why there is so much vagueness which surrounds the meaning of sustainable architecture and this perceived notion that it means everything and nothing.

Moreover, recognising that there are many definitions of sustainable architecture which are all personal and contextual emphasises the potential for miscommunication. Multiple ontologies influence how definitions are formed and meanings created, which increases the importance of understanding the nuances between how we define sustainable architecture as it is essential to understand the context of your audience when communicating, to ensure information is presented in a language which can be understood by the 'receiver.' Unfortunately, this is often not the case, especially between academia and practice.

11.2.2. Greenwashing and techno-centrism.

Greenwashing and techno-centrism is an essential connection between discourse and practice. Within this dissertation, the development, implications, and extent of greenwashing and techno-centrism have been explored. Some notions which have been made evident in this research are the diluting effect of greenwashing combined with a slowing of adoption within the field. These perspectives are crucial as they have a direct impact on how the broader profession view sustainable architecture especially for those who are non-specialist. Greenwashing has also been identified as one cause for slowing the adoption mainly because it is not understood that these examples are bad practice and not representative of the successful sustainable architecture projects which are inspiring in many ways. This points to a need for increased education and awareness, so accordingly, greenwashing projects

are understood as just that, rather than being seen as examples of sustainable architecture.

Furthermore, it has been posited that greenwashing is the outcome of ambiguous and vague definitions of sustainable architecture. This furthers the debate concerning definitions and language that there needs to be precise language used. However, I would argue against those who state that there should be one definition and that measurability can reduce the level of greenwashing. There are some small indications within this research that certification has just become another form of greenwashing which in many ways is even worse as it validates the false claim. Again this is crucial to understand for the broader industry as it has a direct impact on how architects approach sustainable architecture. It also connects discourse and practice through this communication of knowledge. As mentioned, buildings are considered part of the discourse, and if the examples which are most visible and with the most iconic technology are merely greenwashing attempts or adorned with technology, then the discourse which these buildings are providing is one who is shallow and fragmented. And as mentioned shallow discourse results in shallow attempts which creates a vicious circle. This emphasises the need for more successful projects to be celebrated and made popular within the architecture field, highlighting their architecture merit as well as their ethical and environmental aspects.

11.2.3 Information, knowledge and communication

It is apparent from this research project that there is contention concerning the state of the information and knowledge. This contention is especially relevant between experts and non-specialists. Within literature, there is often 'greenwashing' within the information and knowledge. On the surface, it appears there is a plethora of information; however when exploring further it is apparent that much of this is shallow built examples which are not always successful projects. Additionally, this information, especially within books, is often overwhelming as information is usually spread out within the pages and not simply articulated, especially within publications from academics. Contrary to these, there are often books of case studies which do little more than explain the technology and materials implemented within the building. This understanding of the quality and quantity of sustainable architecture books is important as practice especially has little time for the in-depth reading of books which may or may not provide the information needed. There is an apparent disconnection between the formats in which practice needs information presented and what is being produced especially by academia. This was also apparent in periodicals such as *Architecture Research Quarterly*, which contained the most extensive and quality knowledge from the periodicals, but was often written in an overcomplicated manner with little visual support. This theme is crucial to the connection between discourse and practice as it is all of this information and knowledge which discourse is based on, and as already indicated within the greenwashing, there is a dire need for an increase in awareness and primary education. However, if this information is not accessible and publications increase at the same rate they are today, then chances

are the discourse of sustainable architecture will become even more fragmented, overwhelming and complicated.

11.2.4 Approaches, perspectives, and attitudes

Approaches, perspectives, and attitudes, contain significant findings from the perspective of practice as these themes are what connects discourse with the built examples. As mentioned, approaches especially act as the translator between the discourse and end artefact. Discourse and practice are connected by this theme, which acts as a middleman between the two paradigms. Through the approaches, the information becomes applicable for design to use in the built environment. Understanding these approaches has been crucial in understanding how this information is transmitted. It is evident from the research that the chosen approaches, perspectives, and attitudes have a direct response with what type of building is produced. Similar to the definitions there is often a dichotomy of approaches, which is often discussed as scales, for example from light green to dark green or from low-tech to high-tech. The perception that there is one, or another has an impact on how sustainable architecture is understood by the broader profession. As each approach is usually associated with different connotations and these influence how they are perceived.

11.2.5. Visual analysis and identity

Studies into the visual language have refuted the stigma that sustainable architecture is a style or alternative-hippy architecture. It is evident that these opinions and perspectives are not indicative of the reality and the continued use of this stigma has a direct impact of the profession as there is hesitation, especially from clients that they do not want an alternative or experimental building and this influences the rate of adoption within the field. What is still ambiguous is why this stigma is still prevalent despite there being a multitude of other sustainable buildings which can be considered equally as iconic at the experimental eco-village buildings from the sixties and seventies. Additionally, this research has also suggested that there is a sustainable architecture language(s) which are made from a variety of visual elements which forms different visual vocabularies which depend on the approaches used. It is posited that increased awareness of these visual languages may help to link the visual outcome of a building with the approaches which influenced or were drivers for the project. In turn, this may help to increase awareness the information communicated through the visual language is more than just what it looks like. It is crucial, without an increase in knowledge of any information transmitted from built examples is going to be reduced to shallow features. This has the potential to have a direct impact on the profession if practice starts questioning extensively what information and knowledge they are communicating through their projects. Additionally, this link discourse and practice in a similar way as greenwashing, as it is a cycle between built examples the knowledge they communicate and how that then influences discourse.

12.4 FURTHER RESEARCH TO DEVELOP THE UNDERSTANDING OF DISCOURSE AND PRACTICE

The journey of traversing sustainable architecture does not intend to end within the format of this dissertation. The explorations and investigations made during this project form a collection of understandings which lead to propositions which conclude the formal ending of this research project. However, it leaves behind many unfinished studies, unanalysed information, unresolved discussions and potential areas of enquiry. This research and dissertation have created a base of knowledge which could be used in numerous ways to develop further understanding of how sustainable architecture practice uses, transfers and values discourse. Therefore influencing the potential ease with which sustainable practices could be adopted by both architectural practice and the supporting disciplines.

This further understanding could be achieved through different research methods such as ethnographic research, in particular using methods of participant observation. One possible approach which could be a fruitful avenue of discovery is following a live design process rather than after the fact. Building on the methods used in the study of built example process which was excluded from this dissertation an exploration to understand when and how barriers materialise and are overcome would be a rich method of discovery. My new academic role at Aarhus School of Architecture is fifty percent research, therefore it is feasible to be embedded part-time within an architectural office, giving me access to more information which is often not 'privileged' for people outside the team. This would be a real time opportunity to more fully understand how tacit knowledge is transferred/or not transferred between different actors. And as my new position is for three years, it may be possible to follow a project through several steps in the process to better understand at what stages barriers emerge.

With a similar intention, building on the idea of cases, in-depth case study methods may offer an alternative solution which is more independent. This would involve utilising full case methodologies with more resources and over a more extended period. Conversely, there are many interesting examples of successful sustainable buildings in Denmark which have little documentation from a holistic perspective. Conducting in-depth case studies of a section of buildings from multiple perspectives may elucidate information which further grounds the findings from this dissertation within the design practice.

Despite there being an overwhelming amount of information presented in this dissertation, a considerable amount was excluded and many paths not followed due to time constraints. Further research could be conducted by taking a point of departure where this dissertation ends. Traversing Sustainable Architecture has identified several barriers and begun to unearth why they have come about, and what influence they have on the profession, however, there is a considerable amount more which could contribute to furthering the articulation of these barriers and their relationships and influences. This project has tested several different methods to gain information from multiple perspectives, and this combination has led to the production of rich,

complex and grounded information. While, it has been a complicated way to complete a PhD project, in many ways it has reflected the state of the field of research I was endeavouring to understand. However, now that some key themes have been identified, more precise and directed research could be conducted into some of these themes more thoroughly. There is an obvious argument for testing larger sample sizes, and this could be combined with a more limited scope to have a more direct influence on a specific context or situation. Of particular interest to me is a thematic analysis of how architecture websites discuss their commitment to practicing sustainable architecture and also a more concentrated investigation into a broader range of periodicals.

Another possible progression from this dissertation could be translating the research findings for non-academic audiences. This thesis has argued for better formats of knowledge transfer for practices but has succeeded in producing a dissertation no one from practice would have the time or patience to read. However, information from this dissertation could be translated into language and formats which are more digestible for practice. It could be particularly interesting to deliver this information in the format of workshops, which would allow participants to be involved in the learning process as well as co-producing new information from the discussions and realisations. After traversing sustainable architecture between discourse and practice, identifying and constructing routes of enquiry, there is now a plethora of paths which have the potential to be explored further based on the findings from this dissertation.

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