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TOWARDS CREATIVE ASTONISHMENT:
A Metaxological Approach to Design

A dissertation submitted in fulfilment
of the requirements for the degree
Magister Artium (Information Design)

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by

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FEBRUARY 2021

DECLARATION

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I hereby declare that *Towards Creative Astonishment: A Metaxological Approach to Design* is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Gideon Nel
1 February 2021

“We breathe the glory of the sublime creation,
in its disproportion to our power to master it.”

– William Desmond (1995a:206)

ACKNOWLEDGEMENTS AND DEDICATION

I would like to thank the following people for their love, support, and guidance during the writing of this dissertation:

- My supervisor, Prof. Duncan Reyburn. Your wisdom, creativity, and wit are continuous sources of inspiration, awe, and wonder. Not only during the writing of this dissertation, but from the very first lecture you gave during my studies as an undergraduate student, eight years ago. Thank you for always believing in my ability to do good and meaningful work. Thank you for introducing me to the work of William Desmond and supporting me, with patience and endurance, when I felt directionless in the face of the daunting richness of his metaphysics. One of the most memorable aspects of this adventure was having the privilege of working with you. May I forever have the creativity to conjure up new excuses for us to go for coffee.

- My parents, Giepie and Helen Nel. Thank you for creating a safe, beautiful, and loving home for me to stay in during the writing of this dissertation. Thank you for nurturing my artistic and creative dreams, even before I knew the value of their preservation. I am eternally grateful. Your unconditional love and support throughout my life has given me wings to fly.

I would like to humbly dedicate this study to the giants of philosophy, art, and design who have gone before me. In aiming to follow the pathways they have taken, explorers like myself have been allowed to stumble, quite unexpectedly, into faint glimpses of enduring and all-embracing beauty.

SUMMARY AND KEY TERMS

This study offers a philosophical hermeneutic of design. It aims to achieve this by exploring William Desmond's metaphysics, specifically his *fourfold sense of being*, and how it relates to design. Desmond's fourfold sense of being is a valuable lens through which to understand being and the dynamic relations that constitute being. It consists of the following: the univocal sense of being; the equivocal sense of being; the dialectical sense of being; and the metaxological sense of being. This study suggests that Desmond's fourfold sense of being not only speaks to the rich complexity of being, but can also be a valuable lens through which to understand the ontological richness of design and to explore different approaches to problem-solving methodologies in design.

The four senses of being follow each other successively, but are also dynamically interrelated. Thus, this study explores each sense of being systematically, considers the philosophical characteristics of each sense, and explains how each sense provides a unique perspective on the nature of design with regard to selected design theory and theorists. With reference to the metaxological sense of being, as the most complex and dynamic sense of Desmond's fourfold sense of being, and the design philosophy of Neri Oxman specifically, this study aims to begin to articulate a *metaxological approach to design.*

Key terms: William Desmond; *fourfold sense of being*; dialectic; metaxological; design; metaxological approach to design.

SUMMARY OF KEY TERMS

Desmond's metaphysics and the philosophical terminology he uses to articulate his metaphysics forms an integral part of this dissertation. This study aims to keep the integrity of Desmond's original terminology intact by referring to terms as he does throughout his writings. This implies the following:

- The term "fourfold sense of being", even though it is the title of a philosophical concept, is written in lower case letters. Throughout the dissertation, the terms "fourfold", "the fourfold", "Desmond's fourfold", "the four senses", or "the senses of being" refer to the full philosophical system that is "Desmond's fourfold sense of being".

- Throughout the dissertation, the terms "univocal" or "the univocal" refer to "the univocal sense of being"; and, the terms "equivocal" or "the equivocal" refer to the "equivocal sense of being", unless stated otherwise.

- The terms "dialectic", "dialectics", or "dialectical", have been used by various philosophers to refer to different things. In this dissertation, unless stated otherwise, they refer to two different, but interrelated concepts. In certain cases in the main text, where one concept is emphasised over the other (as being more relevant in relation to the context of what is being discussed), it is explained in the text. The two concepts are:

    1. Dialectic as understood, developed, and articulated by the philosopher, Georg Wilhelm Friedrich Hegel.
    2. Dialectic as understood and articulated by Desmond, which can be regarded as an interpretation (and further development) of Hegel's dialectic. When the dissertation refers to Desmond's fourfold sense of being or his philosophical way of thinking, the terms "dialectic", "the dialectic", "dialectical", or "the dialectical" refer to "the dialectical sense of being".

- In the same way, the terms "metaxological", "the metaxological", or "Desmond's metaxological", refer to "the metaxological sense of being". Throughout the dissertation, the term "metaxological" functions as a noun or adjective, depending on the context.

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CHAPTER ONE: INTRODUCTION

1.1 Background and aims of study

Design is a pliable, versatile, and ever-changing activity[1] with a great many "spheres of influence" that can be applied to various contexts and environments, and is, therefore, difficult to define (Harland 2011:22). Throughout the development of design discourse, theorists have grappled with design, its definition, and the logic of its processes in both implicit and explicit ways. These theorists include Jorge Frascara (1988; 2004), Herbert A. Simon (1988; 2001), Nigel Cross (1997; 1999), Richard Buchanan (1992; 2001a; 2001b), DK Holland (2001), Kees Dorst (2006), and Robert Harland (2011), to name a few.[2] Some design theorists, like Neri Oxman (2016:2), have grappled with the relation of design to other creative disciplines, such as science, engineering, and art, while other design theorists, like Harland (2011:29), have grappled with the determination of the key components of design and the complex relations within the discipline.

This study investigates the nature of design by discussing different hermeneutics of design. The discussion that follows deals with how various theorists have gone about defining design. Theorists like Oxman (2016:4) and Harland (2011:21, 32) make use of diagrammatic models to explain their interpretation of the nature of design, whilst other theorists like Stephen J. Beckett (2017:5) are concerned with the underlying "logic" of the design process, and unpack their theories through philosophical discourse. The contribution of each theorist's perspective, relevant to the study, is discussed further on in this section, as well as in the following chapter.

Although the contexts where design is practiced and applied are diverse, a fundamental part of the nature of design that is unchanging, according to Beckett (2017:5), is the relation of "design problem" to "design solution". Beckett (2017:5) contends that the nature of the "design problem" is an important topic of discussion in design discourse and its complex

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[1] Although there are many terms to refer to design, like 'practice', 'process', 'method', 'field', or 'subject', for example, theorists tend to resort to two main terms, namely 'activity' (in the majority of cases) or 'discipline'. Design, according to Simon (1988:67), is an *activity* that changes an existing situation into a preferred one. Beckett (2017:13, emphasis added), among many other theorists, supports Simon's view, who explains that design is a "conscious, human, [and] goal-directed *activity*".

[2] A more comprehensive list of theorists who have contributed to design discourse is mentioned in the Literature review (Section 1.2) below.

character “frequently plays a key role in marking design’s difference from art or science, on the basis that the design problem is of a different nature to problems confronted in those fields”. This assertion is not based on the content of the design problem, but on the basis of its logical structure, namely the relation between problem and solution, as well as how a solution is achieved (Beckett 2017:5). According to Beckett (2017:5), who echoes Richard Buchanan and Horst Rittel, design problems can be complex and determining their nature is an essential part of the design process.

To tackle more complex problems in design, theorists are moving away from the interpretation of design as a purely linear process that moves from problem to solution, towards a model of “co-development”, where the problem and solution co-evolve simultaneously (Cross 1997:317; Beckett 2017:6). According to Beckett (2017:6), this resolves some of the paradoxes caused by a more analytical approach and results in more sophisticated problem-solving methods. To interpret and explain this theory of co-development, Beckett (2017:8) employs the philosophical mode of reasoning, namely *dialectic*, as developed by Georg Wilhelm Friedrich Hegel. Dialectic, as developed by Hegel, treats the problem (thesis) and solution (antithesis), as “moments” of the same concept that undergo a dialectical process, and not as two separate concepts that have to clash and overcome each other to achieve a synthesis (Beckett 2017:9). In Chapters Two and Five, I examine what a dialectical approach to design looks like, how the nature of design can be considered dialectical, and what the designer’s role in the dialectical design process may be.

Although Hegel’s dialectic is a powerful philosophical tool, as discussed by Beckett (2017:8), it may not be the only appropriate way to approach complex problems in design. William Desmond, a contemporary philosopher and key theorist, especially concerning this study, contends that there is a step further or beyond dialectic (Desmond 1995a:xii). For Desmond (1995a:xii), this step beyond is the “metaxological sense of being”, also referred to as the “metaxological”. The metaxological sense of being forms part of Desmond’s *fourfold sense of being*, which lies at the heart of his philosophical system. The fourfold sense of being consists of four distinct, yet interconnected ‘senses’, namely: the univocal sense of being, the equivocal sense of being, the dialectical sense of being, and the metaxological sense of being.

Desmond’s fourfold sense of being is a flexible philosophical lens through which to explore the complex relations that constitute being, or what he refers to as “the between” or

"happening of the between" (Desmond 1995a:xiii). Desmond (1995a:xiii) does not assert that his fourfold sense of being exhausts all the ambiguities of being, but suggests that it offers a useful "systematic framework" upon which an insightful interpretation of the complex relations of being can be formulated.

According to Desmond (1995a:xii), the fourfold sense of being, and more specifically his philosophy of the metaxological sense, moves beyond the dialectical sense as it acknowledges and engages certain ambiguities that dialectic[3] fails to account for. Desmond's metaxological approach moves beyond dialectic's emphasis on *self-determination* and makes room for true 'otherness' or transcendence. The rational and self-determining mind, according to Desmond (1995:xii), desires to overcome the complexities and ambiguities of being through varying univocal or dialectical methods, and in that way strives to subsume being as "other". The result is a depreciation of the "astonishment" or wonder of being (Desmond 1995:xiii). Where a scientific, rational, and univocal mode of knowing is emphasised, from philosophy to modern physics, we seem to lose sight of the very source of being that makes any form of knowing possible (Desmond 1995b:735). Desmond's metaphysics, specifically his articulation of the metaxological sense of being, aims to restore a sense of 'openness' towards that which transcends univocal knowing.

With the guidance of Desmond's metaphysics, this study aims to investigate the nature of design through a specific philosophical lens. More particularly, it aims to explore what a *metaxological approach to design* might look like and whether it can revive, to use Desmond's (1995b:736) terminology, a sense of "awe" and "astonishment" related to the process of design. For Desmond (1995b:736), "astonishment" is rooted in humility and gratitude, for it acknowledges being as given, and the excess of that given being. In *Being, determination, and dialectic: on the sources of metaphysical thinking*, Desmond (1995b:736) explains:

> Astonishment names the original wonder. I prefer the term "astonishment" because contemporary usage of the word "wonder" easily slides into the sentimental. We are struck into astonishment. We do not think our way into astonishment; we are overcome by astonishment. There is a certain shock or bite of otherness in astonishment. There is also a certain receptivity, indeed patience. The givenness of being is offered for our beholding. We are patient to its giving in so far as we do not

[3] It is important to note that this study does not aim to provide an overview of discussions on Hegel's dialectic, since the scope of the subject is immense, but engages with dialectic only in terms of how design theorists have done so and in terms of how Desmond articulates it.

> produce it, or bring it towards ourselves only for it just to be cognitively possessed by us. There is always an excess in astonishment. Something is both given to mindfulness, and yet is in excess of what mindfulness can grasp clearly and distinctly in that given.

The metaxological sense of being, according to Desmond (1995a:xiii), accounts for this "excess of being" and provides a helpful philosophical point of view from which to navigate the complexity and richness of this "excess". My aim is to investigate the nature of design, examine the complex relations of its 'being', and determine the most comprehensive way to understand the logic of its process by exploring various theoretical and philosophical approaches. If Desmond (1995a:xiii) proposes that his metaxological is a philosophical theory that "complexly and very comprehensively" helps interpret the ontological richness of being, this study seeks to investigate what a metaxological approach to design might look like and how that would differ from a dialectical approach. To achieve this, it is important to systematically work through Desmond's fourfold sense of being and explain how each sense relates to the nature of design.

Since this study can only offer something of a provisional view of the subject matter at hand, the predominant aim of this research is to begin to articulate what I am calling *a metaxological approach to design* by exploring design through the metaphysics of Desmond. In service of this aim, a few core objectives can be identified, namely:

- To offer an overview of certain developments in design discourse concerning:
    - The nature of design;
    - Design as relational;
    - Design as dialectical.
- To provide an overview of Desmond's philosophical perspective insofar as it relates to this;
- To explore the nature of Desmond's fourfold sense of being;
    - In particular, this means analysing the univocal, equivocal, dialectical, and metaxological senses of being;
- To offer a hermeneutic of design in terms of this fourfold sense of being;
    - In particular, this requires exemplifying the applicability of Desmond's metaxological with regard to the logic of the design process.

The literature review below explains how this study aims to achieve the objectives mentioned above. It explains the core structure of the study and how the research will be conducted by referring to the primary sources consulted in this study.

1.2 Literature review

Throughout the development of design discourse theorists have grappled both implicitly and explicitly with design, its definition, and what it entails. Among them are Jorge Frascara (1988; 2004), Herbert A. Simon (1988; 2001), Nigel Cross (1997; 1999), Richard Buchanan (1992; 2001a; 2001b), Luz María Jiménez Narváez (2000), DK Holland (2001), Steven Heller (2002), Kees Dorst (2006), Michael Bierut (2007), Robert Harland (2011), Marcus Jahnke (2012), and Stephen J. Beckett (2017), to name a few.[4] The theoretical discussions undertaken by these theorists concern, among other things, the development of a comprehensive definition of design, the revision of design history, and the possible development of design as an 'independent' discipline.

In the article, 'The dimensions of graphic design and its spheres of influence', Harland (2011:21) investigates how design is defined for the purposes of education, research, and practice, and tries to explain design's intricate relations and spheres of influence. Harland (2011:22) explains that "graphic design has been depicted as a unified thinking and doing activity that involves idea generation, image creation, word interpretation, and media realisation, for industry, commerce, culture, and society". In this article specifically, Harland (2011:22) seems to be more concerned with the actual processes and outputs of design – the *what* – than with the abstracted logic behind the design process – the *how*. In other words, his concern is the interplay between subject matter and methodology.

While Harland (2011) concentrates on the inputs and outputs (or products) of design, like typography, illustration, and web design, for example, other theorists like Reyburn (2008), Narváez (2000), Dorst (2006) and Beckett (2017) grapple more with the nature of design and the abstracted logic of its process. In the article 'Nomads at a crossroads (X-roads): a framework for ethical design in South Africa', Reyburn (2008:11) explains that "design is best

[4] Other theorists, among those mentioned here, who have contributed to the discussion on design discourse include: Victor Margolin (1994; 2005; 2007), Gui Bonsiepe (1994), Jeffrey L. Meikle (1995), Vilém Flusser (1999), Ranulph Glanville (1999), Wolfgang Jonas (2001), Alex Coles (2005), Guy Julier (2006), Daniel Fallman (2008), Duncan Reyburn (2008), Steven McCarthy (2011), Teal Triggs (2011), Julia Moszkowicz (2011), Anthony Crabbe (2012), etc.

understood as that which is beyond any isolated definition, or at the very least as a practice/ theory that cannot be delineated in purely stable or linear terms. Design, far from being a fixed thing is concerned with framing things. Design is not a what, but a how". Design then, according to Reyburn (2008:11), is not something easily defined, but a complex activity that involves various processes. As a result of design's complexity and the varying contexts where it is applied in the world, Reyburn (2008:9) explains that "the tensions that exist between various perspectives on the world within any communication context, ought to encourage designers to constantly reflect on and review their assumptions concerning design praxis". It is important for designers to continuously review and revise the way they aim to solve problems, as well as the nature of the problems they are trying to solve.

Although design cannot be reduced to the activity of problem solving alone, as Reyburn (2008:11) explains it is something both "adaptive/generative" and "derivative/creative", solving problems is a central part of design. As Beckett (2017:5) explains, a fundamental topic of discussion in design discourse is not only determining the relation between design problem and solution, but determining the "nature of the design problem" itself. Beckett (2017:5) refers to the theory developed by Simon when he explains that "design problems are essentially well defined; their intractability derives from the difficulty the problem solver may have in properly identifying the problem". Buchanan (1992:15) explains that problems that are difficult to identify or determine can be referred to as *wicked problems*.

Buchanan (1992:15), in his article 'Wicked problems in design thinking', refers to the theory of "wicked problems" developed by Horst Rittel and explains that there is a "fundamental indeterminacy in all but the most trivial design problems" a designer can face. This indeterminacy, as Buchanan (1992:16) notes, implies that there are no set conditions, limits, or boundaries to design problems. Although the theories of Buchanan and Rittel concerning design may have aged somewhat, it is arguable that 'wicked problems' or 'ill-structured problems' are still present in contemporary design theory and practice.

In 'Design's own knowledge', Narváez (2000:36) explains that contemporary problems in design, art, and even science cannot be solved using only rational, linear, or systematic approaches. According to Narváez (2000:37), these 'systematic approaches' may not always produce advantageous results because "of the current awareness that the complexity of problems related to nature and humanity require several viewpoints, elicited from new tendencies and theories, such as the complexity theory, systems theory, self-organization

theory, etc.". Although I do not elaborate on these specific theories mentioned by Narváez in this dissertation, since its core focus is philosophical, it is worth noting her point that more complex, nuanced, and nonlinear methods of problem-solving may be required in certain design projects. A different hermeneutic of design is therefore also required.

In 'Design problems and design paradoxes', Dorst (2006:4) investigates the nature of design and the various methods used to achieve design solutions by revisiting more traditional texts on "design problems", specifically the "ill-structured problems" initially described by Simon. Dorst (2006:5) works through traditional understandings of the design process to explain how certain traditional ideas have shaped contemporary design methodology. By revisiting and reframing various problem-solving methods in design, Dorst (2006:5) gains new perspectives on the "development of an alternative framework for describing design". According to Dorst (2006:13), although design may include the activity of solving problems, it cannot be reduced to problem-solving alone. Dorst (2006:13) refers to Armand Hatchuel, who explains "that any model or description method that tries to reduce design to problem solving is bound to miss important aspects of the design activity". For both Dorst and Hatchuel, design means more than merely solving problems. But, as Buchanan (1992), Narváez (2000), Reyburn (2008), and Beckett (2017) explain, solving problems is a key part of design.

In 'Children of the moving present: the ecology of culture and the search for causes in design', Buchanan (2001:67) articulates his thoughts on the nature of design and the direction in which the field is moving. What is important for the development of design and its future, according to Buchanan (2001:67), is a working and dynamic understanding of the intricate complexity of design. In his closing remarks in the article, Buchanan (2001:84) states:

> Rethinking design should be an inquiry into the nature of design as we understand it today, and a reflection on what may follow from its continued exploration in many directions. This is a task that requires the support of philosophy as we pursue the continuous reconstruction of design in theory as well as in practice and education.

In 'The logic of the design problem: a dialectical approach', Becket (2017:8) echoes Buchanan when proposing that philosophy, specifically the philosophical theories developed by Georg Wilhelm Friedrich Hegel, can be helpful in understanding design and the relation between the design problem and design solution more comprehensively.

As discussed above, the nature of the design problem and the relation between problem and solution can be difficult to determine. Beckett (2017:8) explains that the design scenario (understood as the process whereby a designer needs to propose a solution to a problem), contains paradoxes that need to be resolved if a synthesis is to be achieved. For Beckett (2017:8), dialectic as developed by Hegel, may be helpful for achieving this. Beckett (2017:8) explains that the logic of dialectic not only helps to defuse the paradoxes inherent in the design problem, but also helps to "more fully perceive the nature and extent of the designer's subjective intervention into the design scenario". The key idea, for Beckett (2017:8), when approaching design dialectically, is that the design problem and solution are not two separate entities but moments of the same concept that develop simultaneously.

A generally accepted aspect of Hegel's dialectic is that it involves a triadic structure, or series of events, typically rendered as a triad of "thesis–antithesis–synthesis" (Beckett 2017:8; Fritzman 2014:3). This interpretation implies that a concept or *thesis* (in its inception and development) is met by its counterpart or *antithesis*. The contradictions and paradoxes of this meeting are then balanced out, through a process of 'reconfiguration' (which will be elaborated upon in the following chapter, Section 2.3), to resolve in a final *synthesis* (Beckett 2017:8). This way of understanding dialectic, although commonly accepted, is only partially true and does not coincide precisely with the more complex perspective on dialectic developed by Hegel (Beckett 2017:8; Fritzman 2014:3).

Most notably, these three stages are not separate entities, but moments of the *same* concept that evolve together. As Beckett (2017:9) explains, "the dialectical movement, then, is a movement of contradiction through negation", where a positive concept is determined by its negation (and the characteristics thereof). In dialectical terms, the determination of the design problem (concept) involves the determination of its solution (negation), and vice versa (Beckett 2017:9). When reading design dialectically, nothing is added or taken away in the final "solution", as the "synthesis is purely a formal movement that reconfigures pre-existing content" (Beckett 2017:9). What the designer requires to solve the problem is already present *in* the problem.

The solution thus emerges not by adding something extra to the situation, but by reframing the design problem in such a way that it brings forth a new perspective (Beckett 2017:11). Dialectic stresses process and *becoming*, as opposed to absolute determination or *completion*, which allows for a more "open" and nuanced understanding of design (Beckett

2017:10). Such an “open” approach to problem-solving methods is necessary if design is to tackle ‘wicked’ or ‘ill-structured’ problems – to use the language of Rittel, Simon and Buchanan. In dialectical fashion, Reyburn (2008:11) complements Beckett in explaining that “the being of design is always bound to the becoming of design. The means of design are tied to the unforeseen ends of design”. How the design process can be understood dialectically, including what the designer’s role as the ‘thinking subject’ is, is dealt with in broader terms in Chapters Two and Five specifically.

In reflecting on the design problem and solution as one concept that develops simultaneously, also known as ‘coevolution theory’, Dorst (2006:13) offers a warning by explaining that the term “design problem” can be misleading. Dorst (2006:13) explains the following:

> If the ‘design problem’ in general is not knowable at any specific point in the design process; and if it is evolving in the design process, at least until the creation of the design concept, and possibly beyond that point; and if the connotations of the very concepts that are used to describe a ‘design problem’ are shifting as a part of the design effort; then we need to radically reconsider our use of the term ‘design problem’.

While this may be the case, the term ‘design problem’ still forms a fundamental part of design methodology and helps pinpoint an important part of the design process. And although there are paradoxes inherent in the design scenario, as Beckett (2017:5) explains, the determination of the problem remains a key design activity. Beckett (2017:5) suggests that approaching design dialectically not only helps solve some of the temporal and formal paradoxes of the design scenario, but provides a more comprehensive way to understand the complexity of the design process.

Although dialectic may be a powerful philosophical tool that overcomes certain complexities and contradictions, Desmond (2012:161) suggests that there exists a step further or after dialectic, namely the “metaxological”. As noted above, Desmond (1995b:762) developed the metaxological sense to account for the ambiguities of being that cannot be completely resolved or mediated by dialectic. To explain how the metaxological differs from dialectic, and how a metaxological approach to design might differ from a dialectical approach, it is necessary to examine Desmond’s *fourfold sense of being*. The four senses that constitute the fourfold sense of being follow each other consecutively and are also dynamically interrelated. The final sense, the metaxological, is the most complex, intricate, and integrated

sense of the four. Thus, in essence, this study seeks to articulate a *metaxological approach to design.* It aims to do this by providing a brief introduction to Desmond's metaphysics and systematically analysing his fourfold sense of being as it relates to design.

This study suggests that metaphysical thinking, or *thinking about design metaphysically*, can provide new insights into the nature of design. Design, as a fundamental human activity, is one of the most significant ways through which human beings shape their environment, navigate their surroundings, determine ways of communication, express cultural and individual identity, and ultimately, make sense of the world (Simon 1988:82). We design our environments, surroundings, and ways of communication based on our underlying ideas related to the nature of being and our role in the world. These underlying ideas, perspectives, and assumptions are essentially metaphysical in nature, for metaphysics concerns the most elemental questions related to *being* and *what it means to be*.

In other words, the way we think about ourselves and the world (our metaphysical and existential perspectives), shapes the way we design. These two essential human activities are inseparable, for how we think shapes the way we design and how we design shapes the way we think. Therefore, this study endeavours to bring the worlds of metaphysics (specifically Desmond's interpretation of metaphysics) and design together in a meaningful way. The aim is to uncover the underlying metaphysical perspectives that drive certain approaches to design, while simultaneously exploring philosophical insights regarding the complex and dynamic nature of design.

This focus on Desmond's metaphysics specifically transpires for two reasons. Firstly, he is one of the few contemporary philosophers who has not given up on the intrinsic value of metaphysics. Various postmodern continental philosophers, such as Mark C. Taylor, Gianni Vattimo, and John D. Caputo argue that metaphysics is "no longer a live option for serious thinkers today" (Simpson 2009:1-2). But, Simpson (2009:2-3) argues that Desmond's metaphysics provides a "viable and preferable alternative" to these contemporary voices and can stand against the most severe critiques of metaphysics.

Secondly, this study suggests that Desmond's fourfold sense of being brings specific value to the philosophical discussion concerning the nature of design. There are significant overlaps between Desmond's articulation of the four senses (their unique characteristics and relation

to one another) and various expressions of design, which will be explained in further detail in what follows.

At the core of Desmond's (1995a:xiii) metaphysics is the desire to uncover the perennial perplexities of being by discussing the essential relations between mind and being, identity and difference, self and 'other'. Desmond (1995a:xiii) aims to understand, restore, and resolve some of these perplexities through the dynamic structuring and functioning of his fourfold. He claims that "the fourfold sense of being offers a flexible systematic framework that allows us complexly and very comprehensively to interpret the variety of possible relations, and the very ontological richness of what is at stake in each of the perplexities" (Desmond 1995a:xiii). Although philosophers throughout the philosophical tradition have been generally "hostile" towards the perplexities and paradoxes of being, Desmond (1995a:87) explains that his fourfold sense of being can offer a more finessed approach to these perplexities.

Desmond (1995a:xiii) explains that while these perplexities and paradoxes present real problems for any philosopher, they can be resolved and restored by exploring these relations with the help of a versatile, yet structured philosophical framework. Such a framework offers a generative way of approaching various questions relating to what he calls "the between" or "being between" (Desmond 1995a:xiii). While there is much more to Desmond's work than his fourfold sense of being, the fourfold provides a useful way to begin to reframe how design itself can be understood; in particular, it proposes the possibility of rethinking different approaches to problem-solving in design. Each sense of the fourfold, as discussed in this study, helps to articulate different approaches to problem-solving in design and provides unique philosophical perspectives on the nature of design.

Seeing that Desmond's work can be quite complex and contemplative, the book *Religion, metaphysics, and the postmodern: William Desmond and John D. Caputo* (2009) by Christopher Ben Simpson is referred to as a valuable guide into Desmond's metaphysics. According to Simpson (2009:1), his book can be understood to be "a systematic presentation of William Desmond's philosophical system and an argument for its viability and superiority relative to dominant alternate visions". These "alternate visions" refer to other contemporary voices who regard metaphysics as a discipline no longer relevant in the larger context of contemporary philosophy (Simpson 2009:1). According to Simpson (2009:2-3), Desmond is a contemporary philosopher who still believes in the intrinsic value of metaphysics and whose

theories can stand against the most critical objections upheld by these 'alternate voices'. Simpson (2009:5) explains that "Desmond's work can be complex, dense, meditative, and full of neologisms; and as such, it can sometimes be difficult to penetrate and understand fully". Therefore, he provides a concise summary and way-finding system to navigate Desmond's work.

Although Simpson's work is a valuable introduction to Desmond's metaphysics, a key primary text that grounds this study's investigation of Desmond's philosophical system is Desmond's monumental *Being and the Between* (1995a). This book, alongside *Ethics and the Between* (2001), and *God and the Between* (2008), forms part of Desmond's important philosophical trilogy. In this trilogy Desmond develops his own philosophical system in full and explains his approach and understanding of metaphysical thinking. For Desmond (1995a:3), the questions of metaphysics are "what is being?", "what does it mean to be?", and "why being at all?".

Although these questions have been grappled with since the dawn of human mindfulness, Desmond (1995a:xvii) explains that it remains the task of contemporary philosophers and metaphysicians to tackle these difficult questions. Desmond (1995a:3) explains that he dares to ask the question of metaphysics again "not to downgrade past efforts as misguided and superseded, but because the question bespeaks an elemental perplexity that perennially calls for renewal. Even where it has been answered, often the meaning of the preferred answer grows faint and needs refreshing". Desmond therefore asks an ancient question that continually demands a fresh and relevant answer.

Desmond starts his metaphysics with the "how" of metaphysics, and explains "how" to go about talking about being (Simpson 2009:28). For Desmond (in Simpson 2009:28), there are many different ways to approach being and speak about being. Thus, any philosophical system that aims to make being intelligible, needs to reflect this plurality of ways. Desmond's fourfold sense of being, then, "proposes a way to think about metaphysics, and our relation to what is other to thought, that is plurivocal and thus appropriate to the plural fullness or overdetermination of given being" (Simpson 2009:28). Desmond's fourfold is, first of all, a way to interpret being as given, something not created but received; and second, a way to understand being as a complex interplay between "indetermination and determination, transcendence and immanence, otherness and sameness, difference and identity" (Desmond 1995b:762).

One moves through the fourfold, driven by an “immanent exigency” whose desire for wholeness propels thought through the “breakdown of less whole, less true understandings of being until all of the senses are teleologically suspended in the open whole of the metaxological community of being, which is the true” (Simpson 2009:28). In other words, human thought has an intrinsic desire to think through less true understandings of being until it finds (if only temporarily) a larger, more comprehensive understanding closer to what is true.

Desmond’s fourfold starts with the univocal sense of being. The univocal sense stresses sameness and identity, over difference and otherness (Desmond 1995a:xii; 1995b:762). The univocal is concerned with immediate sameness of mind and being and can be understood as “the search for determinate solutions to determinate problems, impelled by specific curiosity” (Desmond 1995b:762). These ‘determinate solutions’ include scientific, methodical, and mathematical methods. In the univocal sense, there is a strong emphasis on determinacy, in such a way that all being is understood as completely and absolutely intelligible (Simpson 2009:29).

The second sense of Desmond’s fourfold is the equivocal sense of being. The equivocal sense, as opposed to the univocal, stresses difference over sameness and diversity over unity (Desmond 1995b:762). The equivocal can be understood as “the unmediated difference of being and mind, sometimes to the point of setting them into oppositional otherness” (Desmond 1995b:762). In the equivocal there exists a strong emphasis on indeterminacy, an unmediated difference between mind and being that refuses to be resolved in any form of unity (Simpson 2009:29). The univocal and equivocal senses are both true and untrue to being, as they play an essential role in thought’s movement through the fourfold, but eventually run into certain limits and restrictions (Simpson 2009:30). This calls for the mediating work of the dialectical sense of being.

The third sense of Desmond’s fourfold is the dialectical sense of being. Unlike the univocal and equivocal senses, the dialectical sense stresses the unity of sameness and difference, identity and otherness (Simpson 2009:30). According to Desmond (1995b:178), dialectic tries to “redeem the promise of univocity beyond equivocity” as it drives thinking on through the contradictions of the equivocal in search of a larger wholeness or more embracing totality. The dialectical aims to restore the paradoxes of the equivocal through mediation, without

completely eradicating any inherent paradoxes. For Desmond (1995b:168), the dynamic structure of the dialectical sense of being is "shown in the negating power that unfolds from the immediate unity itself, and that sunders the unity into oppositions that are self-oppositions. The return to mediated unity is also the issue of dialectic, now in its affirmative finale".

In other words, dialectic moves beyond the "naïve" emphasis of the univocal on complete sameness and beyond the emphasis of the equivocal on absolute difference, and aims to bring about a fuller understanding that embraces paradox and contradiction in a larger, more embracing totality (Desmond 1995b:762). Like the univocal and equivocal senses, dialectic, is both true and untrue to being. It fails to acknowledge, restore, and resolve true "otherness", ambiguity, and mystery in its drive towards a fuller comprehension through *self-mediation* (Simpson 2009:31). This leads to the fourth and last sense of Desmond's fourfold, namely the metaxological sense of being.

For two reasons, the metaxological is the "fullest" and most "comprehensive" sense of being, according to Desmond (1987:9). Firstly, it takes up the best of the partial truths of the preceding senses, specifically with regard to their plurivocal perspectives on being, while placing the relation of sameness and otherness into a more complex and inclusive framework that avoids the shortcomings of these more restricted perspectives (Simpson 2009:33). The metaxological moves beyond the immediate determinacy of the univocal, the indeterminacy of the equivocal, and the totalising self-determinacy of the dialectical, towards a more complex intermediation of multiple beings in the happening of "the between" (Simpson 2009:33). And secondly, the metaxological allows for genuine plurality, transcendence, and 'otherness' to exist. Instead of trying to reduce 'otherness' to an intelligible and controllable entity, the metaxological is 'open' to the irreducibility of the 'other' (Desmond 1987:9).

In its affirmation of the irreducible infinitudes of being, in its "letting be", the metaxological sense of being allows for the development of an "agapeic mind", which lies at the core of Desmond's "phenomenology of mind" (Simpson 2009:32). This "agapeic mind" concerns an 'open' posture towards the irreducibility of the 'other', emphasises an awareness of the dynamic relation *between* the 'self' and the 'other', and, ultimately, leads to "internal wholeness of being and external harmony with being" (Desmond 1987:8). Although the metaxological might move further than dialectic in its ability to acknowledge and restore a

sense of ‘otherness’, mystery, and ambiguity, and in that way may appear as the ‘superior’ sense, Desmond (1987:9) reiterates that the contributive insights from all four senses are required for the development of a comprehensive philosophical perspective.

In his book, *Desire, dialectic, and otherness*, Desmond (1987:10) explains that “these four relations, I believe, can help us develop an ordered approach to the self and otherness. In a sense, the four are bound together, for, if we isolate the first three from the last, they can easily become abstractions that generate certain contractions of our sense of being”. It is therefore important for this study to work through a univocal, equivocal, *and* dialectical approach to design, to begin to understand the possibilities of a metaxological approach to design.

Other writings of Desmond that inform the study, as they relate to his fourfold, are: *Art, origins, otherness: between philosophy and art* (2003); *Art and the absolute: a study of Hegel’s aesthetics* (1986); and, *The gift of beauty and the passion of being: on the threshold between the aesthetic and the religious* (2018). From these primary sources this study formulates its core structure and main chapters of investigation. To work towards a metaxological interpretation or approach to design, this study interprets each sense of the fourfold systematically in relation to design. Starting with a univocal approach to design, each approach expands and evolves into the next. The univocal leads to the equivocal, the equivocal to the dialectical, and finally, the dialectical to the metaxological. As noted above, these stages, from the univocal to dialectical, are interrelated and contributive voices in the final, more complex and dynamic sense – the metaxological.

In the book, *The monstrosity of christ: paradox or dialectic?*, John Milbank (2009:131) aims to determine the difference between the three perspectives of Hegelian dialectic, postmodern difference, and Catholic paradox. According to Milbank (2009:131), Desmond’s metaphysics may not, in the end, be a successful continuation of Hegel’s dialectic. This is because, in Milbank’s (2009:131) view, Desmond's metaxological means “to indicate what has traditionally been described as an ‘analogical’ outlook”. This means that the metaxological, despite its promise to be a more sophisticated sense than the dialectical, still represents a ‘paradoxical perspective’ (Milbank’s 2009:131). Although this is arguably true, as will be discussed in further detail at the end of the study (specifically in Chapter Six, Section 6.5, *The limitations of a metaxological approach to design*), it is still worth pursuing the richness

of the metaxological understanding as developed by Desmond, especially as it aims to articulate a relation to being beyond Hegel's dialectic.

In the end, this study does not aim to provide a comprehensive overview of debates around Hegel's dialectic but to provisionally articulate something of what Desmond's philosophy can bring to our understanding of design. In his article 'Being, determination, and dialectic: on the sources of metaphysical thinking', Desmond (1995b:732) asks the contemporary philosopher not to be discouraged by the "greatness" of Hegel and assume that dialectic has been completed. Instead he asks the philosopher to dust off the concrete foundations of Hegel's philosophy, to reread it with an inquisitive mind, and to remain 'open' to the philosophical possibilities beyond dialectic.

1.3 Theoretical framework and methodology

This study is strictly qualitative and exploratory in nature, and relies on a particular philosophical discourse. Thus, the methodology adopted is strictly interpretive, and largely involves the clarification of concepts in the construction of an argument. As suggested by the above aim and objectives, the approach I plan to take involves working through relevant ideas in a systematic fashion. This allows for the application of Desmond's metaphysical perspective in a new context. As implied above, Desmond's fourfold sense of being operates somewhat as a method, since it encourages a systematic way of interpreting relations without diminishing ontological richness (Desmond 1995a:xiii).

The literature review above provides a sense of the theoretical ground covered, as well as how the research is conducted. In Chapters Three to Six, case studies are used to support and explain the philosophical theories put forward. The purpose of each case study is not to exhaust every possibility regarding how each sense of Desmond's fourfold might apply, but to provide a suitable example of its relevance to (a hermeneutic of) design. Case studies have been determined on the basis of the question of relevance, somewhat dictated by the way that Desmond defines each sense of the fourfold. Put otherwise, the study does not seek to prove or disprove any assumptions on a strictly empirical (univocal) basis, but rather aims to explore design through a specific philosophical lens developed by Desmond, even if, in the end, the final synthesis is my own.

1.4 Overview of chapters

As noted above, Desmond's fourfold consists of the univocal, equivocal, dialectical, and metaxological senses. These follow each other successively, while also being dynamically interrelated. Thus, the study moves in consecutive chapters from the univocal sense of being (Chapter Three), through the equivocal sense of being (Chapter Four), and dialectical sense of being (Chapter Five), towards the metaxological sense of being (Chapter Six).

Before this, however, Chapter Two provides the theoretical background of the study and positions the study within design discourse. The chapter does this by discussing traditional and contemporary definitions of design, specifically the ways these definitions relate to the nature of design, the relationality of design, and the presence of the dialectical within design. The discussion on the dialectical nature of design in particular, as informed predominantly by Beckett (2017), establishes the foundation for a philosophical exploration of design. Furthermore, the chapter examines the ways in which the study seeks to bring the worlds of design and metaphysics together in a meaningful way. In addition, an introduction to Desmond's metaphysics is provided along with a brief summary of his fourfold sense of being.

Chapter Three discusses the univocal sense of being and how it relates to design. The univocal sense stresses 'sameness' over 'difference' and 'clarity' over 'ambiguity'. According to Desmond (1995a:48), there is an "excess" to being that strikes mindfulness as a 'too muchness'. The univocal mind seeks to reduce this 'excess' of being through systems, equations, and categories that concern rational determination. The univocal sense interprets being's inherent ambiguity as a problem to be fixed through systematic problem-solving processes, such as scientific or mathematical modes of thinking (Desmond 1995a:49). These ways of thinking concern consistent methodologies that deliver reliable and comparable results. This chapter discusses *information visualisations* as a field within design that exemplifies a univocal approach to design. Although univocal ways of knowing are important in fields of design that concern clear and consistent communication, the univocal sense does not exhaust the fullness of the nature of design.

Chapter Four discusses the equivocal sense of being and how it relates to design. The equivocal sense stresses 'difference' over 'sameness' and emphasises that which is beyond absolute univocal knowing (Desmond 1995a:88). Whereas the univocal sense concerns the

absolute determination of beings, the equivocal sense speaks to the allusive interplay between indetermination and determination of being. This chapter refers to the designers David Carson, and Eric Timothy Carlson, whose work exemplifies an equivocal approach to design. This approach to design concerns ambiguity, intuition, and obscurity. It emphasises an 'experimental' methodology which involves the artistic, personal, and emotional expression of a text in visual form. Although the equivocal sense is also true to being, it does not speak adequately to the dynamic intermediation between beings as articulated by the dialectical or metaxological senses.

Chapter Five discusses the dialectical sense of being and how it relates to design. According to Rittel (as quoted by Buchanan 1992:15), problems in design can be complex. This means they lack definitive boundaries, fixed requirements, or clear goals (Buchanan 1992:15). Beckett (2017:8) suggests that the most effective way to solve complex problems in design is dialectically, which means interpreting the relation between problem and solution differently. Instead of viewing the problem and solution as two different concepts of a linear, step-by-step process, the problem and solution are interpreted as two *phases* of the same concept that develop together. This chapter refers to the internet,[5] as an example of design that exemplifies the *dialectical nature of design*, and to *Wikipedia*, as an example that exemplifies a *dialectical approach to complex problems in design*. Although the dialectical sense is more complex and integrated than the univocal or equivocal senses, it does not articulate the full richness of being. Dialectic stresses *self-mediation* and *self-determination*, which does not capture the agapeic nature of the metaxological sense of being.

Chapter Six, the final chapter of the study before the conclusion, discusses the metaxological sense of being and how it relates to design. The metaxological sense, according to Desmond (1995a:198), moves beyond dialectic's emphasis on *self-mediation* towards the 'other' as other. The metaxological sense speaks to the 'excess of being'; the irreducible 'otherness' of the 'other'; and, to the dynamic intermediating community of the 'self' and the 'other' which transcends univocal or dialectical determination (Desmond 1995a:198). A metaxological approach to design, therefore, would imply design that is mindful of the 'other', that aims to

[5] The question of the internet's capitalisation, between *internet* and *Internet*, has been a long-term and ongoing debate. According to Herring (2015), the argument is strongly supported for either case. On 1 June 2016, *The Associated Press*, along with *The New York Times* and other publications, officially updated their style guides to require the shift from *Internet* to *internet* (Corbett 2016). Therefore, this study refers to the internet with a lowercase "i" – thereby referring to the global network that evolved out of ARPANET, and not to any generic internet connection between smaller networks.

involve the ‘other’ as a contributing entity in the design process, and concerns the creative potential of collaboration between the ‘self’ and the ‘other’.

This chapter refers to the work of Neri Oxman and how her design philosophy exemplifies a metaxological approach to design. As discussed with reference to Oxman’s work, a metaxological approach to design delights in the ‘mystery’ of the ‘other’ that cannot be completely controlled; concerns highly integrated and environmentally-informed *formation processes*; involves an awareness of the dynamic relations *between* the ‘self’ and the ‘other’; and, emphasises the creative potential of a community of ‘co-designers’ over the abilities of the individual designer. Finally, this chapter explains some of the limitations of a metaxological approach and discusses the possible relevance of such an approach to the future development of design.

Chapter Seven brings the study to a close. It provides a summary of the chapters, explains the contribution of the study, and discusses the limitations of the study. This chapter also mentions suggestions for further research, before offering some concluding remarks.

CHAPTER TWO: DESIGN AND METAPHYSICAL THINKING

2.1 The nature of design

This chapter outlines the theoretical framework for the study. It does this by discussing the nature of design and by providing a brief overview of how some theorists have gone about defining design in the development of design discourse. An important theme discussed in this chapter, but also in the entirety of the study, is not only the *what* of design (functions, products, and systems) but the *how* of design (the nature of its process).

Defining design requires an understanding of the nature of design, its *being*, which at its core is both a theoretical and a philosophical question. Throughout the development of design discourse, theorists have struggled with this question, for it is not static but perennially requires a relevant and viable answer (Buchanan 2001:8; Jonas 2001:65; Harland 2011:22; Jahnke 2012:30). Moreover, the term 'design' is used in different ways to refer to different things by various theorists, which makes the determination of a lasting and comprehensive definition of design difficult. Richard Buchanan (1992:5) explains:

> Despite efforts to discover the foundations of design thinking in the fine arts, the natural sciences, or most recently, the social sciences, design eludes reduction and remains a surprisingly flexible activity. No single definition of design, or branches of professionalized practice such as industrial or graphic design, adequately covers the diversity of ideas and methods gathered together under the label. Indeed, the variety of research reported in conference papers, journal articles, and books suggests that design continues to expand in its meanings and connections, revealing unexpected dimensions in practice as well as understanding.

In other words, the flexibility, diversity, and variety of activities associated with design is what makes it difficult for theorists to develop a comprehensive definition (Buchanan 1992:5; Harland 2011:21, 24; Jahnke 2012:30). Although some theorists, such as Cross (1999:7), suggest that design has developed into a discipline in its own right with its own "distinct intellectual culture", other theorists, such as Jonas (2001:65), argue that the struggle concerning the definition of design alludes to a possible weakness in design discourse. This weakness may hinder design to 'stand on its own' among other disciplines such as: economics, engineering, art, or architecture, for example (Jonas 2001:65; Triggs 2011:3).

In 'Design research and the new learning', Buchanan (2001:8) explains that "the literature is filled with contrasting and sometimes contradictory definitions of design, and efforts to define

design have often led to acrimony". According to Buchanan (2001:8), this seemingly endless task of defining design, an activity that continually transcends the restraints of static language, points to the strength, vigour, and versatility of design and not to its weakness. Although the task remains challenging, it is worth the struggle, as Buchanan (2001:8) explains that "definitions are critical for advancing inquiry, and we must face that responsibility regularly in design, even if we discard a definition from time to time and introduce new ones".

To understand some current design discourse, it is valuable to consider different definitions of design by both traditional and more contemporary theorists. Harland (2011:22), who has contributed to the discussion on the definition of design by developing diagrams to illustrate the 'spheres of influence' of design, explained design in 2007 as a "unified thinking and doing activity that involves idea generation, image creation, word interpretation, and media realisation, for industry, commerce, culture, and society". Purchase and Vande Moere (2011:362) define design as various "goal-oriented, constrained, decision-making, exploration and learning activities, which all operate within a given context, and which depend on the designer's perception of that context". What these theories have in common is that design involves various processes, that have specific goals, which can be applied to different environments.

In 'Design's own knowledge', Narváez (2000:36) investigates design, its definition, and the language being used to determine its role within human culture. For Narváez (2000:38), design is a creative activity that concerns the built environment and explains that it is "necessary to locate design and the studies it may originate within the space-time framework of 'material culture'". The term "material culture" refers to the ways in which human beings interpret, shape, and manipulate their physical environments (Narváez 2000:38). Thus, according to Narváez (2000:38), design has more to do with the material processes of culture, like the making of tools, artefacts, and the shaping of environments, and less to do with nonmaterial processes, like shaping or influencing the beliefs, traditions, and values of a culture.

However, as Narváez (2000:38) also points out, these different processes are interdependent and "the presence of material culture relies on nonmaterial culture, and vice versa". For Buchanan (2001:9), like Narváez, production and "making" are key to the nature of design, for he defines design as "the human power of conceiving, planning, and making products that

serve human beings in the accomplishment of their individual and collective purposes". For Buchanan (2001:9), design concerns innovation, invention, and production that can be applied to various contexts.

Although the act of defining design is key to its establishment and development as a creative discipline, as Buchanan (2001:8) and Harland (2011:22) point out, design's definition might benefit other disciplines as well (Simon 2001:27). Herbert A. Simon (2001:217) argues that society in general should aim for a more "liberal education" system, where students are exposed to different subject fields, the problems that arise in those fields, and how people go about solving them. For society to move forward, Simon (2001:217) suggests that "we could all benefit, in our own thinking, in communicating our thoughts, and in understanding the thoughts of others, from having a reasonable knowledge of what processes we all use in thinking and communicating". For Simon (2001:217), a key component of growth in any discipline is the ability to learn from other disciplines, seeing that creative progress requires "extensive exposure to, and experimentation with, examples of thinking in a variety of domains". Understanding design and the logic behind its way of solving problems may unlock problem-solving methods that can be applied to other creative, academic, and professional domains (Simon 2001:217).

Throughout his career, Harland (2011:22) has offered many revised versions of his definition of design as his understanding has evolved over time. In 'The dimensions of graphic design and its spheres of influence', Harland (2011:23) re-examines the diagram and theories related to the definition of design he put forward in 2007 (Figure 1) to see how it relates with his understanding of design in 2011. For Harland (2011:29), the diagram created in 2007 worked well as a basic research model, but failed to properly account for the complexity of relations that constitute design. According to Harland (2011:29), the 2007 diagram has two flaws: firstly, the practical and contextual "domains" remain static and fixed in size, which, as a result, fails to describe the flexible nature of design; and secondly, the diagram fails to adequately portray the dynamic relations between the various 'functions' and 'contexts' of design.

With the aim to define design and its intrinsic relations more comprehensively, Harland (2011:28) designed a diagram in 2011 (Figure 2) that improves on the one he designed in 2007. Harland (2011:29) based his 2011 diagram on Walter Christaller's geographic mapping technique of "central place theory" – a mapping technique that helps to describe the

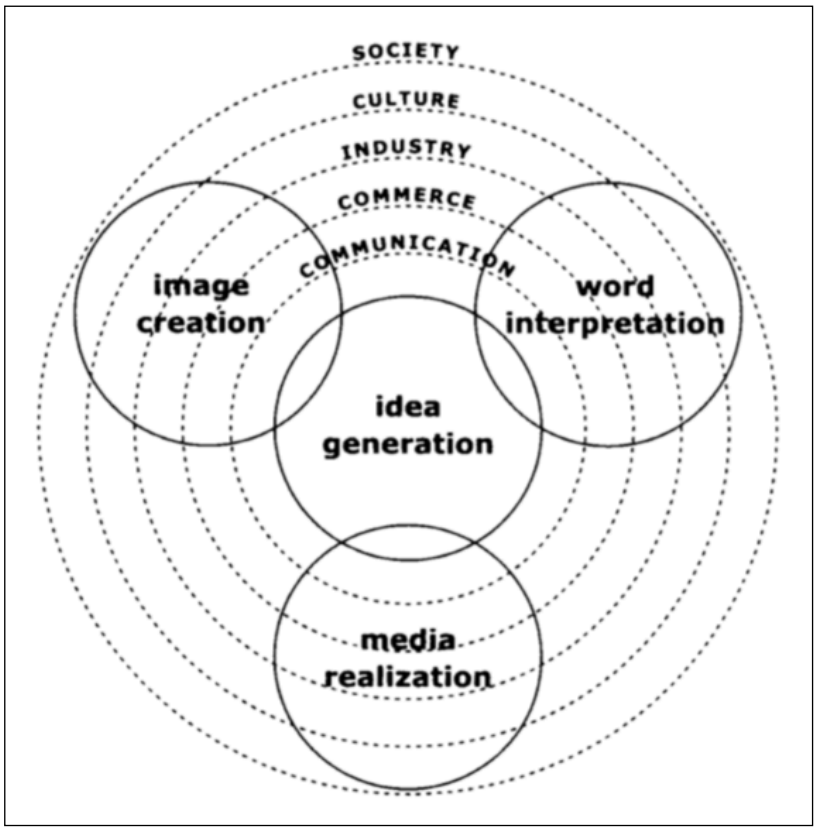

Figure 1: Robert Harland, *Model for graphic design and its spheres of influence (2007)*, 2011. (Harland 2011:21).

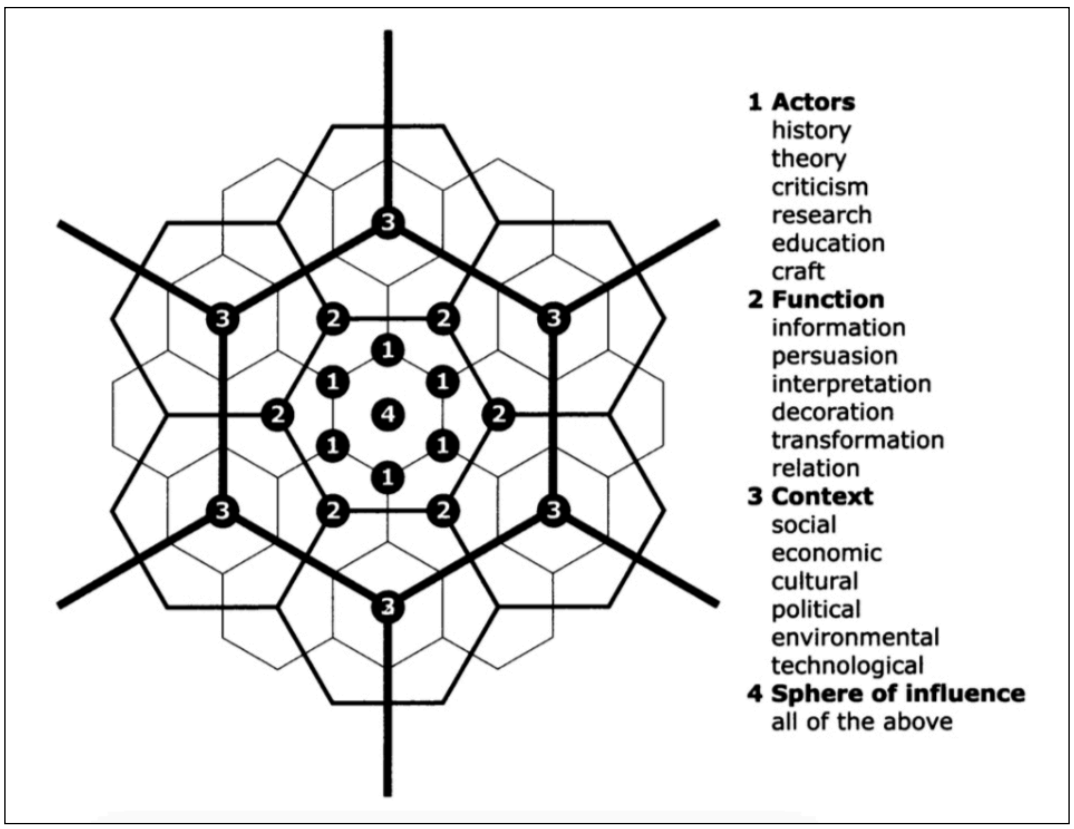

Figure 2: Robert Harland, *The complex spheres of influence that contribute to the micro dimensions of graphic design: actors, functions, and context*, 2011. (Harland 2011:32).

geographic patterns of settlements. The theory developed by Christaller describes key "central places", how they overlap, and how they form larger, more complex spheres of influence (Harland 2011:29). By making use of the same underlying logic of Christaller's mapping technique, Harland (2011:30) is able to draw a diagram that reflects the pliable and ever-expanding "spheres of influence" of design (which consist of different actors, functions, and contexts) more accurately.

The 2011 diagram provides the opportunity to explore various influences, factors, and elements of design at macro- and micro-levels (Harland 2011:30). The relation and interaction of the various actors, functions, and contexts all contribute to the production of what Harland (2011:31) calls the 'artefact' – a designed object that can either be functional or decorative. Although the context of the application of design is constantly changing and evolving, Harland (2011:23) suggests that "graphic design as an integrated process concerned primarily with relationships is not changing". In other words, design is not a static set of activities, but an integrated network of relations between varying 'actors', 'functions', and 'contexts' (Harland 2011:23).

In some way, defining design can be regarded merely as a linguistic exercise (Harland 2011:24). However, Harland (2011:24) explains that the way language is used to define a subject field is important, especially "if that language limits an understanding about how far a subject can be appreciated and developed". Some theorists throughout the development of design have used language in a way as to create overly "fixed" or static definitions of design (Harland 2011:24). According to Harland (2011:24), the language used to define design has not been consistent enough throughout design discourse and the development thereof "must be a contemporary concern, and it needs the urgent attention of those concerned with graphic design".

If design, as a "cross-disciplinary" subject (Crabbe 2012:6) is to move forward, new language is required to define its nature and relation to other creative disciplines. As Harland (2011:34) explains, "transdisciplinary ways of thinking may well offer the impetus to overcome language barriers and unify a subject that sees history, theory, criticism, research, education, and craft occupying a shared territory". Owing to the complexity of design, more sophisticated and tactful definitions are required to portray its continual development and transformation.

Other designers and theorists, like Harland, have also grappled with theoretical diagrams to define design – to determine its various processes, influences, and outcomes. Among them is the bio-architect,[6] scientist, designer, and professor at MIT's Media Lab, Neri Oxman. Oxman (2016:2) suggests that a new age of "entanglement" is on the rise in the twentieth century, where "knowledge can no longer be ascribed to, or produced within, disciplinary boundaries, but is entirely entangled". Oxman (2016:2) interprets design as one of the four major disciplines of human creativity together with science, engineering, and art. In 2016, Oxman developed a map (Figure 3), the *Krebs cycle of creativity* (KCC), to explain her interpretation of the process of creativity and the intermediation between what she understands as the four major creative disciplines.[7] This map builds on theories developed by Rich Gold and John Maeda, who assigned a specific mission for each discipline – for science: *exploration*; for engineering: *innovation*; for design: *communication*; for art: *expression* (Oxman 2016:2).

According to Oxman (2016:2), the creative process starts on the frontier between art and science and moves clockwise through each creative domain, generating new 'creative energy' as it goes. The process flows as follows: science *explores* and turns information into knowledge, engineering *builds* and turns knowledge into utility, design *shapes and forms* utility to influence human behaviour, and art *expresses* the perceived changes in human behaviour to generate new information (Oxman 2016:2). Each discipline relates to the other and forms part of the larger process of human creativity. As perceived on a molecular level and applied by Oxman to a different context, the *Krebs cycle of creativity* explains how creative energy, as she calls it "CreATP", is generated and transferred from one domain to the next (Oxman 2016:2). When the creative process flows through the cycle and hits "midnight" on the clock, a real "Cinderella moment" is achieved (Oxman 2016:5). For exactly at that previously unknown frontier, new perceptions, insights, and perspectives awakened by art's expression, inspire new scientific exploration (Oxman 2016:5). In that way the KCC is completed and the beginning of a new cycle is initiated.

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[6] The term "bio-architect" or "bio-architecture" refers to an emerging field where science, architecture, engineering, and design come together. It is a design approach that incorporates solutions, techniques, and principles derived from nature to solve universal human problems (Ripley & Bhushan 2016:10-11).

[7] Various human activities might be considered to be "creative", but the term "creative disciplines", as used here, refers specifically to science, engineering, art, and design. These disciplines, as interpreted by Oxman (2016:2), are specifically concerned with *exploration*, *innovation*, *expression*, and *communication.*

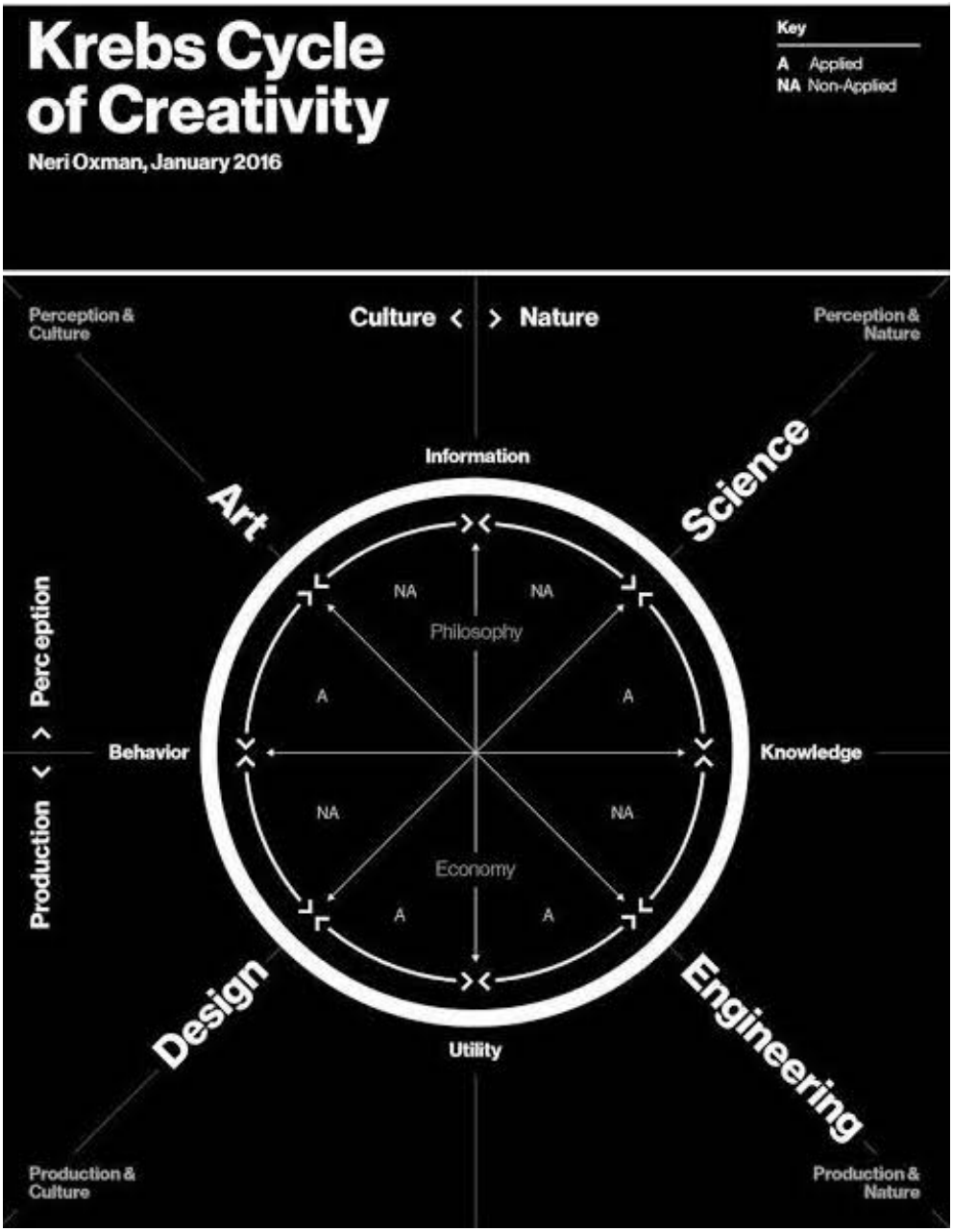

Figure 3: Neri Oxman, *Krebs cycle of creativity*, 2016. (Oxman 2016:4).

Oxman (2016:3), therefore, is interested in the definition of design as an integrated part of a larger process of human creativity. Design, according to Oxman (2016:3), in its critical embodiment, operates "through speculation, devising unforeseen strategies that challenge preconceived assumptions about how we use, and live within, the built environment", while in its affirmative embodiment design operates by "offering practical, and often utilitarian, solutions that can be rapidly deployed". Thus, design has cultural implications for the way people perceive their interactions with the built environment and practical implications for the shape and functionality of products, systems, and processes (Oxman 2016:3). For Oxman (2016:3), creativity in the twentieth century is the ability to move between domains, or even

to occupy different domains at once. To explain her interpretation of the role of design in what she calls “creative entanglement”, Oxman (2016:3) suggests “it is likely to assume that if what you are designing carries meaning and relevance, you are not operating within a single, distinct domain”.

Both Harland and Oxman use the geographic metaphor of country and continent to explain their ideas relating to the nature of design (Harland 2011:26; Oxman 2016:3). For Harland (2011:26), the way graphic design emerged and developed can be understood through the metaphor of a continent’s own development. He explains that “graphic design emerged from core territories, parts of which are populated by separatists, some countries are claimed by more than one group, and other regions are yet to be explored” (Harland 2011:26). If some domains of design overlap with others, if certain borders are “crossed”, and certain areas remain unexplored (as Harland’s 2011 diagram suggests), the key question for Harland (2011:26) is “what might a graphic design nation look like?”. Staying true to the geographic metaphor, Oxman (2016:3) asks a similar question: is each creative human being bound to the margins of their respective domains, or does the new age of “creative entanglement” call for an expansive and “borderless” landscape?

In explaining his 2011 diagram, Harland (2011:30) complements Oxman, who suggests that his theory captures something of the porosity of design. Harland (2011:30) suggests that “boundary lines are not fixed, but permeable, with significant overlaps between approaches that might prompt new spheres of influences to emerge, old ones to dissolve, and new ones to be rediscovered”. Harland (2011:30) explains that the functions and contexts of design are constantly changing, with multiple domains of design overlapping simultaneously. Might this view of design echo Oxman’s vision of an “age of entanglement”, where not only the boundaries within the areas of application of design are ‘blurred’ but the boundaries between design and other disciplines are ‘blurred’ as well?

In terms of this geographical metaphor, both Harland and Oxman are leaning towards the idea of a global “intellectual Pangea” (Oxman 2016:2), where creatives can move effortlessly between ‘countries’, harness the best of each area, and even occupy different domains at once. For Harland (2011:34), an important step towards making this a reality is the necessity of theorists to overcome certain “language barriers” through new ways of thinking about design and, in that way, help to ground the discussion on the complex and interdisciplinary nature of design.

As discussed above, design is a creative and complex activity that involves interrelated processes that can be applied in various contexts. Theorists have grappled with the definition of design throughout the development of design discourse and will probably continue to do so, as design keeps transforming in relation to the development of new technologies and environments. As Reyburn (2008:11) explains, “design is best understood as that which is beyond any isolated definition, or at the very least as a practice/theory that cannot be delineated in purely stable or linear terms”. If design, as suggested by various theorists such as Buchanan, Narváez, Reyburn, Harland, and Oxman, is a complex and ever-changing activity that cannot be defined in purely scientific or linear terms, how do we go about speaking about design? Is there a more universal way to understand and engage with design? Is there a philosophical framework, terminology, or language that can speak to the underlying principles of design, even as an interdisciplinary activity? That is part of what this study aims to investigate.

2.2 Design as relational

With all the various definitions of design being used in industry and academia, it may seem that there are no legitimate means to determine how design ought to be understood (Reyburn 2008:8). Reyburn (2008:8) suggests that all the definitions of design have one thing in common, and that is that design is relational at its core. Reyburn (2008:8, emphasis added) explains that design is “concerned with how designed products and communications work *in relation* to both personal and public perceptions of any given communication context” and that it acts as a mediator between “material reality” and “subjective interpretation”.

This supports the theory put forward by Harland (2011:23), who explains that the context of the application of design might change, but design at its core remains an integrated process concerned with various relationships. These relationships include, among others, those between the designer and the designed object; between the designed object and the viewer/reader; between the designer and the viewer/reader; and, between the designed object and the environment.

One of the key relations in design is the relation between design theory and design practice (Reyburn 2008:9). Reyburn (2008:9) explains that design “concerns not only making things but thinking about making things”. For Buchanan (2001:6), on the other hand, a purely

theoretical and philosophical approach to design might not be fruitful and proposes a more "human" or "practical" approach. This way of approaching design, for Buchanan (2001:6), has significant implications on the research of design and the way design is being taught, understood, and explained.

According to Buchanan (2001:6), if design and design education remain stuck in traditional spheres of academic theory, the design knowledge we gain "is fragmented into so great an array of specializations that we cannot find connections and integrations that serve human beings either in their desire to know and understand the world or in their ability to act knowledgeably and responsibly in practical life". Buchanan (2001:6) stresses a more "humanistic" and practical approach to design and design education, especially in reaction to overly theoretical approaches in the development of design as a discipline. He argues that design theory and practice needs to be an integrated process, as theory shapes practice and practice shapes theory.

Another key relation in design is that of designers and culture (Reyburn 2008:7). Reyburn (2008:7) explains that the relationship between designers, their work, and culture, can be complex, as "designers both shape and serve culture, produce and consume culture, and inform and are informed by culture". Designers are to be interpreters of culture (*readers* of culture), while simultaneously influencing the way culture is being interpreted (*writers* of culture) (Reyburn 2008:6). For Julier (2006:64), "design culture" has become an important term in academia and has been established as a scholarly discipline among "visual culture" and "material culture".

According to Julier (2006:70), "design culture" does not only refer to the various things designers do in society, but points to something larger – it expresses a collective and societal attitude, value, and desire "to improve things" through design. As designers shape and are shaped by culture, certain conflicts of perspective may emerge (Reyburn 2008:9). As a mediating agency between "communicators and audiences", design is by "necessity always caught in a tension between parties that may have differing, even conflicting, world views" (Reyburn 2008:9). The role of the designer is to overcome and solve these contradictions to "serve human beings" by shaping culture constructively and supporting the development of society (Buchanan 2001:9).

If designers are to influence culture constructively and support the progress of society, designers have the responsibility to continuously reflect on their praxis and be continually aware of how these relations, discussed above, influence their work (Reyburn 2008:9). Among the various relations that determine the nature of design, when it comes to design practice, one relation in particular seems fundamental – the relation between "design problem" and "design solution" (Beckett 2017:5). Traditionally understood, the design project follows a linear and systematic process from problem to solution, but as Beckett (2017:6) suggests, the relation between problem and solution may be more complex. Recent theories in design discourse suggest that the design problem and solution might be two *phases* of the same concept that evolve together (Beckett 2017:6). This means re-evaluating and rethinking a core relation of design to understand its nature more comprehensively.

2.3 Design as dialectical

An important part of the relation between the design problem and design solution, according to Beckett (2017:5), is the way in which the 'problem' is understood. In 'The logic of the design problem: a dialectical approach', Beckett (2017:5) argues that the complexity of the design problem "plays a key role in marking design's difference from art or science, on the basis that the design problem is of a different nature to problems confronted in those fields". For Oxman (2016:2), as mentioned above, design forms part of a larger process of human creativity among science, engineering, and art, where Beckett (2017:5) interprets design to be a unique and separate discipline, because of the complex nature of the design problem. Beckett (2017:5) does not base this assumption on the content of the design problem, but on the "basis of its logical structure—that is, the relation between problem and solution". For Beckett (2017:5), the relation between problem and solution, and the way in which a solution is achieved in design, sets design apart from other creative disciplines.

One of the stumbling blocks a designer might face in a design scenario – a process by which a design solution is proposed to a design problem – is determining the problem itself (Beckett 2017:5; Narváez 2000:41). Beckett (2017:5) refers to a theory put forward by Simon, and explains that the intractability of a design problem "derives from the difficulty the problem solver may have in properly identifying the problem". Horst Rittel (in Beckett 2017:5) defines a "wicked problem" as a specific design problem with a complex character that refuses to be solved in a straight-forward or pragmatic way. To approach or solve these complex design problems, design theorists have begun to interpret the design problem and solution as *one*

concept that develops together, instead of viewing problem and solution as two discrete parts of a linear process (Beckett 2017:6; Dorst 2006:10). These theorists are leaning towards a theory for complex problem-solving that involves the 'reconfiguration' or 'reframing' of components present in the problem itself (Beckett 2017:6; Dorst 2006:10).

What this approach or act of 'reframing' might mean, is that a design solution can be achieved by the reformulation or reinterpretation of the elements that constitute a design problem (Beckett 2017:6). The design solution might lie in the very act of better defining, understanding, and framing the design problem itself, as Beckett (2017:6) explains "the pursuit of the design problem coincides with the discovery of its solution". This model of co-development might prove fruitful in theory and move closer to the actual experience of designers in their act of solving problems, but there still exists a paradox at the heart of the design scenario (Beckett 2017:7). For Beckett (2017:7), the cause of the paradox is both temporal and formal.

Firstly, it is temporal because "common sense tells us that a problem must precede its solution, just as a cause must precede its effect". However, as Beckett (2017:7) points out, experience tells us that a design problem is not properly established until its solution has been defined. The characteristics of the solution, paradoxically, determines the characteristics of the problem. And secondly, the cause of the paradox is formal, because "common sense tells us that a solution must be deduced from its problem", however, it seems like the solution in some way determines the problem from which it is derived (Beckett 2017:7). How then is the 'logic' of the design process to be interpreted in a way that resolves these paradoxes without resorting to a linear, over-simplified, or reductive mode of thinking?

For Beckett (2017:8), this means turning to the work of Georg Wilhelm Friedrich Hegel, specifically his theory of dialectic. Beckett (2017:8) suggests that the best way to approach the complexity of the design problem, without eradicating its inherent paradoxes, is dialectically. This means interpreting the design problem and solution as two *moments* of the same concept that undergo a dialectical process (Beckett 2017:8; Dorst 2006:10). For Beckett (2017:8), reading the design scenario dialectically means not only resolving the temporal and formal paradoxes, but also understanding the nature of the designer's role in the design process more comprehensively.

To formulate a dialectical approach to design, it is important, firstly, to understand what Hegel means by dialectic, and secondly, how his dialectical mode of reasoning can be applied to design. The term 'dialectic' has been used by philosophers since the Platonic era to refer to (in general) the process of debating opposing positions, but it was not until Hegel's *Phenomenology of Spirit* (first published in 1807), that dialectic was used to refer to "some fundamental quality of the movement of thought and knowledge and the interaction of their form and content" (Beckett 2017:8).

As mentioned above, dialectic does not necessarily concern the linear progression from 'thesis' to 'antithesis' to 'synthesis', but interprets 'thesis' and 'antithesis' to be part of the same concept (Beckett 2017:8; Fritzman 2014:3). Another important aspect of dialectic is the notion of "negation" (Beckett 2017:9). Dialectic can be interpreted as a mode of reasoning that resolves contradiction through "negation" (Beckett 2017:9). This implies that the determination of the characteristics of the thesis simultaneously determines the characteristics of its negation – its antithesis, against which it is defined. The determination of the thesis (*what the concept is*), instantly results in the determination of its antithesis (*what the concept is not*). In dialectical terms, the solution or synthesis is not realised by eradicating the antithesis or by mitigating the contradictions between thesis and antithesis, but by 'reconfiguring' the relation *between* thesis and antithesis (Beckett 2017:9). In the final synthesis, or "*speculative movement*", nothing is added or taken away, but the components of the thesis-antithesis scenario is rearranged to deliver a resolved solution (Beckett 2017:9).

If the design scenario is understood dialectically, and if the synthesis of a design problem is achieved not by adding or subtracting anything, what then is the role of the designer? According to Beckett (2017:10), the role of the designer is pivotal, as the dialectical movement is not self-driven, but requires the active intervention of a thinking subject. For a concept to exist (as concepts do not think themselves), its content must be abstracted and determined by a thinking subject (Beckett 2017:10). In the same way, a design solution can only be achieved if a designer intervenes in the design scenario to abstract and determine the characteristics of the problem. Through the designer's intervention, nothing is added or subtracted, but the "stuck" content of the design scenario is reconfigured to achieve a synthesis (Beckett 2017:10).

As Beckett (2017:12) explains, the dialectical process is a "subjective process, in that it only occurs as the result of the designer thinking through the problem". Narváez's (2000:41) view

supports Beckett's, as she explains that the designer's role in the design process "requires two fundamental aspects: understanding the design problem and the act of developing an idea, and defining 'what needs to be done' with respect to social aspects". In other words, the way in which a designer approaches, interprets, and defines the nature of the problem, determines the direction of the whole design project.

According to Beckett (2017:10), a designer should start the design process by first reducing the complexity of the scenario and then determine the nature of the problem. It is important to note that the 'problem' does not exist objectively, but needs to be abstracted as a concept from the scenario by the designer (Beckett 2017:11). The designer is invited to "venture into the knotted logic of the situation", to "construct a different understanding", and in that way, establish the relation between *how things are* (problem/thesis) and *how things ought to be* (solution/antithesis). Once the difference between the problem-space and solution-space have been determined, the designer needs to find a way to resolve the contradictions in the final solution.

If the design problem (thesis) and solution (antithesis) are two moments of the same concept that develop simultaneously in a dialectical process, in the final synthesis, the question of how their inherent paradoxes are resolved and contradictions overcome, remains. The synthesis is not a separate concept, but a third *moment* in the 'problem-solution' scenario (Beckett 2017:12). In the synthesis, the contradiction between thesis and antithesis is *Aufgehoben* (to use Hegel's original German terminology), which is translated in English as *sublated* – meaning "included", "resolved", "restored", or "overcome" (Beckett 2017:12). The designer arrives at a solution by investigating, interpreting, and reframing the components of the design problem from different perspectives, so as to reconfigure the relation between problem and solution (Beckett 2017:12). Although the synthesis of thesis and antithesis may appear as the arrival of a "new" concept, it is merely a reconfiguration of content already present in the original concept (Beckett 2017:12). The synthesis in the dialectical process, however, does not arrive automatically, as it requires a subject (the designer) to think through the complexities of the problem to realise a resolved solution (Beckett 2017:12).

It may be important to note that the final solution of a dialectical design process does not necessarily imply the creation of a solution in physical or material form, as it remains a concept only (Beckett 2017:13). Only when the solution moves outside the "teleological form" of the design scenario does it become a concept on its own that can be translated into

material form (Beckett 2017:13). What is being described here is the ‘logic’ of the design process as a subjective and cognitive activity. In a purely material sense, the design process cannot rely on a solution to exist before a problem, or expect that both will evolve simultaneously, as that would be nonsensical. But design is not purely physical, rather, it is a “conscious, human, [and] goal-directed activity” (Beckett 2017:13). It is a process that has its own logic, which can be abstracted and understood (Beckett 2017:13). By reading the design process dialectically, its underlying dialectical structure is revealed and its process is understood more clearly.

In the final phase of the dialectical process, as the relation between problem and solution have been redefined to form a resolved synthesis, it may appear as if the solution was always there, present in the original content of the design scenario. In this way, the contribution of the designer in the process may seem dispensable. But, according to Beckett (2017:16), this is not the case, for without the designer the ‘problem’ cannot be abstracted and determined from the scenario, and thus, the design project (and its possible beneficial outcome) may never be initiated. The way in which the designer thinks through the complexity of the situation and defines the attributes of the problem, determines the direction of the entire design project (Beckett 2017:16).

Beckett (2017:16) concludes that a “design problem (and thus a design solution) is a scenario in which a designer brings a speculative judgment to bear on the particular”, where the “speculative judgement” refers to a dialectical reading (as discussed above) and the “particular” refers to actual products, processes, and environments. Therefore, the role of the designer, according to Beckett (2017:16), is to apply and practise a dialectical-speculative reading of the particular.

Although design cannot be reduced to problem solving alone, problem solving forms an integral part of design (Dorst 2006:13). It may also be important to note, as we approach different ways to solve problems in design, that a ‘perfect solution’ does not exist (Simon 2001:207). Simon (2001:207) explains that “in the real world, problem solving seldom involves finding an optimum solution: only rarely is this discoverable in spaces of real-life complexity, even with the largest computers. The expert searches until a solution is found that is good enough, that satisfies, that reaches what he or she thinks is a reasonable level of aspiration” (Simon 2001:207).

Reyburn (2008:9) supports Simon, who explains that a design solution "implies the search for compromise. In other words, once again there is no absolutely fixed, definable end". For both Simon and Reyburn, better solutions for problems may be achieved through design, but a design problem is never absolutely fixed and remains open-ended (Simon 2001:207; Reyburn 2008:9). For Beckett (2017:13), the conclusion is the same, as he explains "the synthesis does not mark some closure or completion of the contradiction; further determinations of the problem will be reflected in the solution, and vice versa".

In dialectical fashion, Reyburn (2008:8) suggests that "one may view the journey and the destination as separate, but the nature of design indicates that they are one". The process of design, understood dialectically, does not follow a simple linear path, as Reyburn (2008:11, emphasis in original) suggests "the *being* of design is always bound to the *becoming* of design. The means of design are tied to the unforeseen ends of design". A design solution is not a 'completion' of a design problem, but a step further or *moment* in the unfolding or becoming of that particular design scenario. For Reyburn and Beckett, in a dialectical reading of design, it is important to note that there is a continuous nature to the process. The continuous determination of the design problem will result in the continuous determination of the solution as well (Beckett 2017:16).

As Beckett (2017:16) concludes, a dialectical reading helps to further analyse (and not merely describe) what designers do when they design and helps to "recognize the distinction between the form of the design scenario and its content and the subjective nature of the designer's intervention therein". A dialectical approach to design does not necessarily imply the realisation of the solution in material form, but helps to abstract the logic of the design process and, in that way, helps to interpret, understand, and define the nature of design more comprehensively.

With the above in mind, the question remains: is a dialectical approach the most effective or sophisticated way to approach complex problems in design? If theorists like Beckett (2017) employ the work of a philosopher such as Hegel to interpret the nature of design, and argue that it is indeed fruitful and effective, are there other methods or systems of thought within philosophy that might be useful to design and the way design is understood? And what might a step further or beyond dialectic look like, in relation to design? This is, predominantly, the question this study explores.

2.4 An introduction to William Desmond's metaphysics: astonishment, wonder, and perplexity

A study of philosophy or metaphysics, according to Hegel (1977:46), starts with an understanding of "cognition", which, according to him, is regarded "either as the instrument to get hold of the Absolute, or as the medium through which one discovers it". For Hegel (1977:46), there are different types of cognition and some may be more appropriate than others in philosophical discourse. Therefore, without a clear understanding of the "nature and limits" of any particular cognition, or *way* of thinking, when engaging with metaphysics, one might "grasp clouds of error instead of the heaven of truth" (Hegel 1977:46).

This, in essence, is what Desmond's metaphysics is about – it concerns the *way* we think about being, the *way* we know what we know, and *how* we relate, cognitively, to the complex relations that constitute being (Desmond 1995c:ix). According to Desmond (2003:3), metaphysics is the philosophical aspiration to make the complex intricacies of being intelligible, and is therefore not a simple task by any means. For Desmond (2003:3), metaphysics is rooted in gratitude and humility. Gratitude, because this 'being' that we are a part of, that we are able to behold and ponder, is not manufactured but received.

For Desmond (2003:3), good metaphysics is aware of the fact that it always starts "too late". It is caught "in the middle", trying to reflect on something that has already happened, is happening, and is going to happen. Good metaphysics acknowledges that it is dependent on an origin other than itself. This realisation leads to astonishment, wonder, and perplexity, which, according to Desmond (2003:3), are the driving agencies behind metaphysical curiosity. Desmond (1995c:ix) argues that our society, our collective conscious life, is driven by perplexity even though our knowledge of life and its various elements grows exponentially.

Desmond (1995c:ix) explains that "there is hardly a thing that escapes our curiosity, we have devised efficient means for probing this thing, that thing. We can look forward to knowing more and more. And yet we are still disquieted. In all this expanse of knowing, we are missing something, and we know it, even when we deny it". Desmond (1995c:ix) is therefore not necessarily interested in generating more philosophical knowledge that might add to the perplexity, but aims to develop a philosophy that explores *how* we engage with being and relate to the dynamic relations that constitute being.

Desmond's metaphysics, at its core, is a philosophy of "the middle" and concerns "the between" (Desmond 2018:8). For Desmond (2018:8), the experience of human life happens

in the intricacy of “the between”. As he explains, his metaxological philosophy “serves to illuminate this between-condition”, by developing language to name, interpret, and understand (as far as philosophically possible) being as *the happening of the between* (Desmond 2018:8). The term *metaxological* is a neologism created by Desmond. The word *metaxu* is the Greek word for “between”, while *logos* can mean word, wording, reasoning, order, or logic. Thus, the metaxological is the philosophical naming of “the between”, the linguistic endeavour to illuminate the mysteries of the happening of the between (Desmond 2018:8). The metaxological, in other words, aims to make intelligible the interconnected and complex relations of identity and otherness, humanity and divinity, and intimacy and strangeness, among other key relations that relate to being (Simpson 2009:32).

David Whyte, a poet working within "the conversational nature of reality”, echoes Desmond in his book *Crossing the unknown sea: work as a pilgrimage of identity* (2001), when he explains that “most of our days we do not perceive beginnings and endings; births and deaths feel blessedly far away, we find ourselves almost always in the middle of things. Sometimes for years we seem to be nothing but middle. Middle and muddle” (Whyte 2001:114). Whyte (2001:115), although aware of the immensity of life being lived “in the middle”, does not entertain the idea with any romantic sentiment. In his view, “the middle” is only temporary and may be used as a buffer to keep the reality of life’s “births and deaths” at bay (Whyte 2001:114).

Whyte explains that “middles are fleeting, mostly illusory, a form of defence. Life arrives and departs in the middle. All our great artistic and religious traditions take great pains to tell us so. Middle barely exists” (Whyte 2001:115). Although the lived experience of life in ‘the middle’ may be interpreted as a form of escape by Whyte, Desmond suggests that life’s essence and fundamental treasures can be discovered by understanding the intricate dimensions of ‘the middle’, or ‘the between’, more comprehensively.

A final thought to this section may pertain to the *why*, as opposed to the *what*, of metaphysics. As mentioned above, metaphysics aims to reflect on and engage with the ‘excess’ of given being. To do justice to this ‘excess’ or plentitude, metaphysics must acknowledge that certain parts of being will always escape its intelligible constructs (Simpson 2009:24). Being itself cannot be tied down to simple determinate intelligibility. Therefore, according to Desmond (in Simpson 2009:24), a finessed and sophisticated approach towards metaphysics requires a certain humility. Although the philosopher aims to articulate the complexity of being as intelligibly as possible, being, in its depth, intricacy, and richness, continually transcends all forms of complete univocal knowing.

Thus, there is no end, completion, or final realisation of metaphysics. According to Desmond (1995a:3), the question of metaphysics is "ageless and ever-fresh", one that "bespeaks an elemental perplexity that perennially calls for renewal". It remains a discipline or way of thinking engaged with the 'happening of the between' or the 'becoming of being'. This, in a sense, echoes the nature of design, as Reyburn (2008:8, emphasis in original) explains "the *being* of design is always bound to the *becoming* of design". Both philosophical definitions that strive to determine the nature of being *and* theoretical definitions that strive to determine the nature of design, involve various open-ended and ongoing processes. This study, therefore, explores design in relation to metaphysics in order to understand its open-ended, evolving, and perplexing nature, in various contexts, more comprehensively.

2.5 An introduction to Desmond's fourfold sense of being

The aim of metaphysics, according to Desmond (in Simpson 2009:28), is to make the surplus of given being, also referred to in his work as the ontological ethos, community of being, or the between, intelligible. This means developing a philosophical language that can name being, and the "excess of being's plentitude", most accurately and comprehensively (Desmond 1995:177). For Desmond (1995a:177), being is plural, or plurivocal, and transcends all forms of univocal knowing. He therefore proposes a flexible and sophisticated philosophical framework to deal with the metaphysical complexities of being (Desmond 1995a:xii). This framework or lens is called the *fourfold sense of being*. It has traces in Hegelian dialectic, but with important differences, specifically with regard to the nature and significance of "difference" or "otherness" (Simpson 2009:28).

The fourfold allows the philosopher to comprehensively explore and unravel the variety of possible relations in the 'community of being'. One moves through the fourfold sense of being, driven by a 'desire' for wholeness and transcendence. This desire breaks through less whole, less true understandings of being until it finds rest, resolve, and restoration in the unfolding landscape of the *metaxological community of being* (Simpson 2009:28). The promise of the metaxological, according to Desmond (1987:8), is "internal wholeness of being and external harmony with being".

With the above in mind, this study investigates the following: can Desmond's metaxological sense of being inform an understanding of design in its fullness, by acknowledging and engaging with certain perplexities that dialectic does not account for? What might a metaxological approach to design entail, and how will it differ, if it differs at all, from a

dialectical approach? To answer these and other relevant questions, it is important to work through Desmond's fourfold sense of being systematically and explain how each sense relates to the nature of design. This study does this, in the chapters that follow, by discussing each sense in more detail and exploring how they inform different approaches to design in varying contexts.

CHAPTER THREE: DESIGN AS UNIVOCAL

3.1 An introduction to the univocal sense of being

The univocal sense of being is the first sense of Desmond's fourfold sense of being (Desmond 1995a:xii). According to Desmond (1995a:47), the concept of unity is essential in our attempts to make determinate sense of being. Although unity and uniformity are crucial to our understanding of being, there is no such thing as "absolutely pure univocity", for that would mean the evasion of mediation or differentiation (Desmond 1995a:47). Without mediation or differentiation, there would be no "happening of the between, no determination of diversity among beings, no speaking about being, and no articulated knowing of anything" (Desmond 1995a:47).

It is precisely this "diversity among beings", or being as other to what we know or are comfortable with, that drives univocal thought. We seek to overcome ambiguity, to make sense of what we do not understand, by developing "*our own rational univocity* to take away or mitigate the seeming threat of enigmatic being" (Desmond 1995a:48, emphasis in original). The univocal mind seeks to conquer the obscurity and uncertainty of being through rational models, systems, and categories (Desmond 1995a:48).

The univocal sense, according to Desmond (1995a:48), is an essential part of being and of how we make sense of the "between". There are beings, processes, and "happenings" (as Desmond refers to phenomena observed in our lived-experience of reality), in constant motion in the between, that do not necessarily lack determinate identity, but take "determinate form and articulated presence" (Desmond 1995a:48). It would be impossible to know or understand anything in the everyday world, if there were no commonly determined identities. Thus, the univocal sense is "inseparable from the solid mindfulness of sound *common sense*" (Desmond 1995a:48, emphasis in original).

Although there is more to univocal things than what appears at face value, the univocal sense assures the integrity of everyday speech, interactions, and activities. The univocal way of knowing may allude to the practice of common sense, but certain thinkers would argue that it is much more than that, as it may well be the ultimate or "most privileged" way to make sense of being (Desmond 1995a:49). For such thinkers, the merit of the univocal sense

depends on “self-coherence” and “precise determinacy” as it aims to overcome the discrepancies and ambiguities of being (Desmond 1995a:49).

As Desmond (1995a:49) points out, the ways of knowing that exemplify the univocal sense are metaphysics, science, and mathematics, where *mathematical knowing* may be considered to be the “embodiment par excellence of the univocal sense”. These ways of knowing depend on the notion of an ideal unit, of an integer with integrity across different domains, that can be used to do simple and complex mathematical calculations (Desmond 1995a:49). The aim of these calculations is to determine and understand phenomena, processes, and happenings completely, or absolutely univocally, as to eradicate all equivocity as far as possible (Desmond 1995a:49).

The univocal mind yearns for the safe harbour of rational, well-defined, mathematical equations to calm the ever-present misty waters of being’s ambiguities. The mysterious nature of being, the “equivocal forces”, concern the unexplainable and unnerving, whereas the univocal sense of knowing involves “ordered, clear, methodical *mathēsis*, which yields well-defined results that are publicly communicable to all rational minds” (Desmond 1995a: 49). Although the univocal sense of knowing may be crucial, especially as the foundation of the subject fields mentioned above, the human process of meaning-making lies in the *oscillation* between univocity and equivocity (Desmond 1995a:47).

The univocal way of knowing forms a fundamental part of modern science and mathematics, and in the same way, the “univocal mind” is essential to philosophy and the development of metaphysics (Desmond 1995a:50). Philosophy promises the “single-minded reconstitution of the lost whole, absolute unity of being”, as it aims to make the complex equivocations of being intelligible (Desmond 1995a:50). The philosophical pursuits of Parmenides and Plato can be referred to as examples of the univocal at work in the earliest days of metaphysics. Parmenides, who was convinced that a state of “eternal, univocal being” can be realised, pursued the absolute unity of mind and being (Desmond 1995a:50).

To realise this, for Parmenides, meant transcending being as *becoming*, or being as process. But the notion of *becoming*, which alludes to things in motion, is essential to being. Without being as *becoming*, without things in motion and identities that are *coming to be*, there is no being. Thus, Parmenides’ pursuit of absolute univocal unity (*stability of being*), to a certain extent, depends upon the equivocal (*becoming of being*), which is self-contradictory.

Although the philosopher may pursue the unity of mind and being, Desmond (1995a:50) explains that “absolute unity cannot be univocal unity”.

Plato, following in the footsteps of Parmenides, aimed to discuss the oscillation between univocity and equivocity, by also referring to the notion of *becoming* in relation to *being* (Desmond 1995a:50). Plato, when speaking of being, recognised that one cannot completely avoid difference, ‘otherness’, or plurality, and that a more finessed approach to univocal unity is required (Desmond 1995a:50). For Plato, *being* is univocal (consisting of eternal units of intelligibility), while *becoming* is equivocal (consisting of temporary fragments in motion) (Desmond 1995a:51). Plato warns against over-simplification and explains that any straightforward dualism between being and becoming, between “the pure forms of being” and “the mixed processes of becoming”, will not be sufficient.

The question of being and the pursuit of univocal unity, for Plato, requires a deeper understanding of the interplay between univocity and equivocity (Desmond 1995a:51). Although the search for univocal unity is driven by the conviction that being can be determined intelligibly, Desmond (1995a:51) reminds the philosopher against the “simplicity of the idea of univocity itself”. The univocal sense of being, although it may promise absolute univocity, cannot achieve it, for it will always have to include an element of the equivocal in one way or another. For Desmond (1995a:51), the happening of the between relies, to some degree, on the reciprocity between univocity and equivocity.

According to Desmond (1995a:59), there are three fundamental *expressions* of the univocal sense of being that demonstrate the “univocal mind” at work and that can be explained in terms of the interplay between univocity and equivocity, namely: the *methodological*, *metaphysical*, and *mathematical* expressions. The two expressions that allude to a *scientific approach to design* (to be discussed in the following section), are the methodological and mathematical expressions. Both of these expressions concern predictability, effectivity, and consistency; and depend on the reduction of subjective influences (Desmond 1995a:59). The methodological expression, also referred to as the “Cartesian method” of univocalising, as developed by René Descartes, relies on the functionality of *method* to reduce the influence of an individual’s involvement (Desmond 1995a:59). Method allows univocal intelligibility to become possible by overpowering the “wayward equivocity of idiosyncratic selfhood” and establishing specific boundaries, procedures, and regulations (Desmond 1995a:59).

The Cartesian method, as a systematic process, starts by extruding all equivocations as far as possible and reducing the given complexity to simple, univocal, thinkable forms (Desmond 1995a:59). Once all contradictions and ambiguities have been systematically eliminated, the original complexity will be reconstructed using the idealised units of univocal intelligibility. The result of the Cartesian method, is a reassembled complex unity that is "articulated within itself as a completely determinate intelligibility" (Desmond 1995a:59). In other words, the methodological expression involves minimising an individual's subjective influence, reducing complexity to simple, thinkable forms, and reconstructing the complex unity with these reduced, univocal elements.

The main objective of the methodological expression is complete determination and intelligibility, driven by the desire to bring being in its 'otherness' within complete control (Desmond 1995a:60). For Holley and Tierney (2008:41), scientific inquiry depends on precise *methodology* as it aims to make sense of natural phenomena. Although there are many different approaches to scientific inquiry, the rigorousness of a scientist's methodology remains key to the validity and credibility of any research project (Holley & Tierney 2008:41).

The mathematical expression, on the other hand, can be considered to be the exemplar of the Cartesian pursuit of univocity (Desmond 1995a:61). In its ambition to control the equivocities of being, to conquer the untameable ambiguities of nature through rational formulas, mathematical expression has moulded modern science and physics in a fundamental way (Desmond 1995a:61). This ambition can be permitted to a certain extent, for mathematics was in turn shaped by the perception of being as a cosmos, as a beautifully complex network of elements and processes, all with their own "inherent *logos*" (Desmond 1995a:61, emphasis in original).

Pure mathematicians and philosophers, like Descartes, were convinced that *matter* and *mind* were built from the same 'logos', and that these two modes of being could ultimately be united by uncovering the nature of this 'logos' through the correct equations and formulas (Desmond 1995a:61). Their desire was to totalise the univocal sense of being, create a universal *mathēsis* of nature, and become 'masters' of intelligible being (Desmond 1995a: 61). Although these thinkers regarded their pursuit as 'mastery' from the outset, Desmond (1995a:61) argues that it is rather a form of 'submission'. For the mathematical way of knowing, as interpreted by Desmond (1995a:61), is not "the one and only path of destiny for human mindfulness", but in some cases a rather peculiar abstraction of the richness of being.

3.2 Design as univocal: A scientific approach

In the same way the univocal way of knowing, or the 'univocal mind', plays an essential role in fields like metaphysics, mathematics, and science, as discussed above, the univocal approach can also be applied to design. One of the key functions of design in society is clear, comprehensible, and univocal communication in various environments. Various industries, such as engineering, telecommunications, and health services rely on the highest quality of design to communicate valuable information in a way that is reliable and coherent. Design plays an important role in public environments, but also in academic and scientific domains (Gero & Kannengiesser 2019:2). Design not only supports the development of scientific exploration, according to Gero and Kannengiesser (2019:2), but as a discipline itself, is rooted in scientific study.

One of the key theorists in the development of design discourse, concerning the nature of design and its connection with scientific methodology, is Herbert A. Simon. In 'The science of design: creating the artificial', Simon (1998:82) states that the "proper study of mankind is the science of design, not only as the professional component of a technical education but as a core discipline for every liberally educated person". Among the many theorists who explore the intrinsic scientific dimension of design, like Simon, is the bio-architect, scientist, and designer, Neri Oxman. Oxman (2010:30), who operates at the frontier where design and science integrate, regards the future "wedding" of science, technology, and design as "inevitable". For Simon, Oxman, and Gero and Kannengiesser, harnessing the illuminating mechanisms of science can lead to a more intimate knowledge of design.

In 'Incomplete by design and designing for incompleteness', Garud, Jain, and Tuertscher (2008:351) investigate the principles of a *scientific approach* to design versus the virtues of a *pragmatic approach*. They point out that the notion of 'completeness' has been valued throughout the majority of design discourse and forms an essential part of a scientific approach to design (Garud *et al* 2008:351). The notion of 'completeness' in design, exemplified by rational and systematic problem-solving methods, entails the "pre-specification of a problem, the identification of pre-existing alternatives, and the choice of the most optimal solution" (Garud *et al* 2008:351). A scientific approach to design concerns 'efficiency' and 'routinisation', relying on the stability of environments, the invariability of desired outcomes, and the consistency of user preferences (Garud *et al* 2008:351).

The principle of 'completeness' was fundamental to design at a time in human history when fabrication and production were key to the development of society (Garud *et al* 2008:353). Key to the effectivity of production lines, and their design, was the determination of system 'boundaries'. These boundaries concerned the definition of the problem, the precise role of the product designed, and the characteristics of the environment where the product would be used (Garud *et al* 2008:353).

An essential part of this approach to design, was the assumption that the environment implied for the designed product, was stable and unvarying. For many decades, as design and its function within society developed, this assumption held, as environments were relatively steady and consumer preferences were unchanging (Garud *et al* 2008:353). As a result, it was understood that most noble contribution of design to society was *stability* – its ability to deliver consistent products that matched pre-determined outcomes in relatively stable environments (Garud *et al* 2008:353). Thus, a scientific approach to design involves rational and logical processes, concerned with productivity, dependability, and consistency.

3.3 Case study: The science of information visualisation

Within the domain of design, specifically within visual communication design, various sub-disciplines exist that utilise a scientific approach and that can be considered to be univocal in nature. As discussed above, these disciplines rely on 'clarity of communication', 'coherence', and 'comprehensibility'. Among these disciplines that exemplify a univocal approach to design, is *information visualisation*. Purchase and Vande Moere (2011:356) explain that information visualisation, also known as "information graphics" or "infographics", includes various visual methods that help to clarify, interpret, and analyse large, complex data sets. Fox and Hendler (2011:705) supports Purchase and Vande Moere (2011:356) in explaining that information visualisations "are absolutely critical to our ability to process complex data and to build better intuitions as to what is happening around us". For Edward R. Tufte (1987:389), information visualisation refers to the "progress of methods for enhancing the density, richness, efficiency, complexity and dimensionality of communication".

Bailey and Pregill (2014:168) explain that information visualisation techniques have been used for centuries to "reveal patterns, to communicate complex ideas, and to tell stories". Chen and Floridi (2013:3422) support Bailey and Pregill (2014:168) in explaining that information visualisation is a form of "computer-aided seeing", with the main purpose to make

complex information accessible and comprehensible. For Chen and Floridi (2013:3422), information visualisation involves two fundamental processes: 'viewing' and 'seeing'. 'Viewing' concerns the process of identifying valuable information and representing that information in a visual way to viewers. 'Seeing' concerns the process of helping viewers to interpret the meaning of what they are seeing (Chen & Floridi 2013:3422). The responsibility of information visualisations, according to Chen and Floridi (2013:3422), involves both processes of 'viewing' and 'seeing'.

Purchase and Vande Moere (2011:356) explain that information visualisation has its roots in "scientific reasoning, computer graphics and algorithmic optimization", and was originally used by experts in data science as a "scientific tool" to convey accurate presentations of information. As a result, information visualising techniques were developed that emphasise 'precision' to solve specific, well-defined problems. As a tool for scientific research, mainly utilised to communicate research results, principles like 'aesthetics' and 'user experience' in the design of information graphics were generally neglected (Purchase & Vande Moere 2011:356). Although, in recent years, with more information being created and made accessible by the general public, information visualisations moved out of the traditional domains of 'expert scientific research' into the domains of 'popular culture' (Purchase & Vande Moere 2011:356).

Bailey and Pregill (2014:168) support Purchase & Vande Moere (2011:356) in explaining that information visualisation technologies have shifted gradually from the 'scientific sector' to the domain of the general public. One of the domains it has been applied to is 'cultural heritage data' and art history, where information visualisation has been regarded as a valuable research methodology and used as part of informative displays in public museums (Bailey & Pregill 2014:168). With the shift of information visualisation from the 'scientific community' towards the printed and digital environments of popular culture, design principles like 'aesthetics' and 'user experience' became more important (Purchase & Vande Moere 2011:356; Gaviria 2008:479).

Contemporary artists and designers use information visualisation methods as tools for creative expression, to communicate personal insights, and to allow the reader to engage with information in more subjective ways (Purchase & Vande Moere 2011:356). As the popularity of information visualisations grows in science (Fox & Hendler 2011:705), and simultaneously in the digital and printed media of popular culture, the role of designers and

their design choices becomes a fundamental part of information visualisation methodology (Purchase & Vande Moere 2011:361; Gaviria 2008:479). For contemporary designers of information visualisations, also known as *information designers*, 'functional effectiveness' and 'visual impact' are both equally important to the success of an infographic (Purchase & Vande Moere 2011:361).

Thus, the introduction of design principles and aesthetic awareness to information visualisation meant that previously represented data sets could be "better" communicated – being more accessible, understandable, and even, enjoyable (Purchase & Vande Moere 2011:362). Purchase and Vande Moere (2011:362) explain that this can be a challenging task, as "such a design process [of information visualisation] often needs to take into account multiple complex and interrelated constraints, ranging from open-ended specifications of qualitative expectations from users to strict, predefined requirements such as screen resolution, calculation power or data consistency". Various interrelated connections, components, and design principles need to be considered when designing information graphics, and therefore, it requires expertise in both 'data analysis' and 'visual communication' (Purchase & Vande Moere 2011:362).

As with other design disciplines (such as fashion, product design, and architecture), certain design principles guide the design methodology of information visualisations (Purchase & Vande Moere 2011:362). According to Purchase and Vande Moere (2011:362), the design of infographics should aim to achieve a certain harmony between utility, soundness, and attractiveness. This triad of design principles was first developed by the Roman architect Vitruvius, published in his book *De Architectura* (25BC), as a basic guideline for good design. Relating to the design of infographics, 'utility' refers to efficiency and effectivity, and how information can be communicated as clearly as possible (Purchase & Vande Moere 2011:362). 'Soundness' refers to the reliability of the design and to what extent the design can adapt to changes in data-input (Purchase & Vande Moere 2011:362). 'Attractiveness', often the overlooked principle of information visualisation, refers to the aesthetic quality (visual impact) of the design (Purchase & Vande Moere 2011:362). In order for infographics to be effective and successful in both 'scientific' and 'popular' domains, according to Purchase and Vande Moere (2011:362), there needs to be a balance between these three principles.

According to Purchase & Vande Moere (2011:361), information visualisations are divided into three main categories, namely ‘scientific research’, ‘commercial practice’, or ‘artistic expression’ (Purchase & Vande Moere 2011:361). These three different categories or approaches, with their varying methodologies and applications, according to Purchase and Vande Moere (2011:361), need to overlap and learn from each other if the discipline is to progress altogether. To explain their theory, Purchase and Vande Moere (2011:361), inspired by the model of ‘interaction design research’ developed by Daniel Fallman (2008:14), have designed a diagram (Figure 4) to illustrate their interpretation of the role of design in information visualisation and how the three different approaches relate to each other.

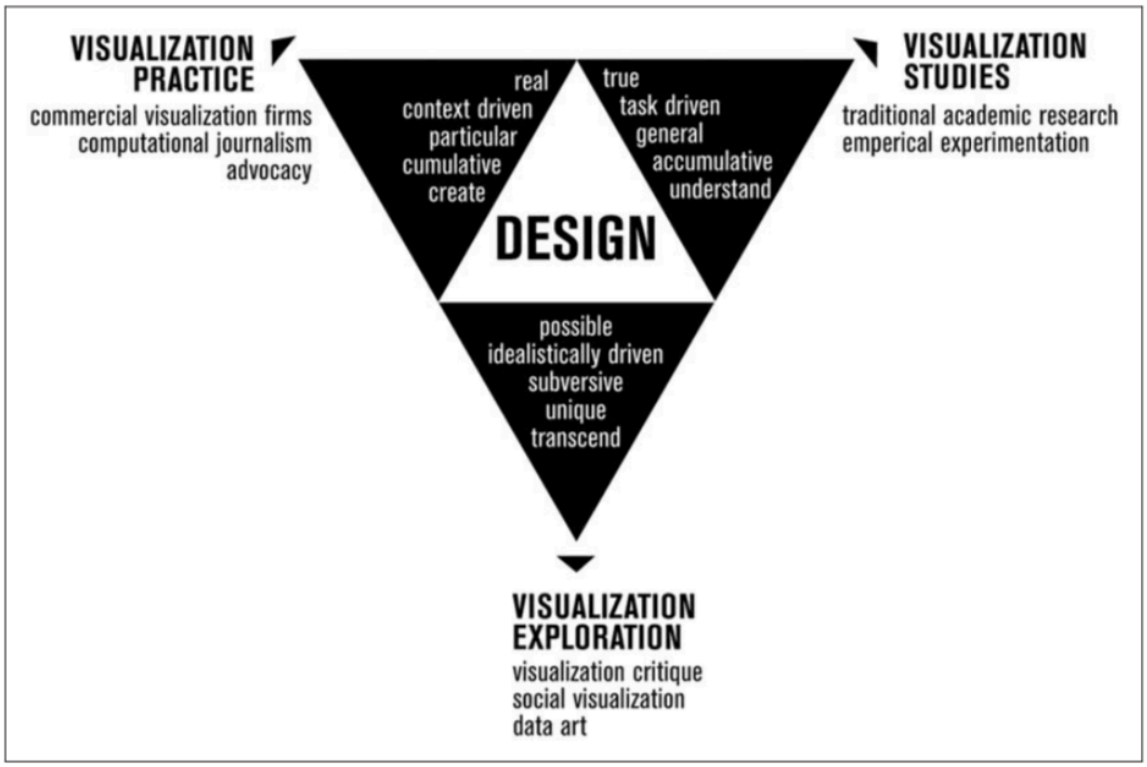

Figure 4: Andrew Vande Moere and Helen Purchase, *A model of three roles of design information visualization research*, 2011. (Purchase & Vande Moere 2011:367).

The domain of ‘visualization studies’ is task-driven and aims to support academic research (Purchase & Vande Moere 2011:367). The focus of this domain is to communicate well-researched empirically-proven insights, by investigating, interpreting, and analysing specific bodies of knowledge (Purchase & Vande Moere 2011:367). Infographics created within this domain are intended for an academic, usually scientific community, and emphasise ‘utility’ and ‘soundness’, rather than ‘attractiveness’ (Purchase & Vande Moere 2011:367). In traditional scientific practice, information visualisations usually form part of the last steps of a

project, with the main purpose to communicate the results of the research (Fox & Hendler 2011:705). For Fox and Hendler (2011:705), information visualisation should not be regarded as an after-thought exclusively, but can be a powerful tool for scientific exploration and can form an essential part of scientific research.

An example of an information visualisation that exemplifies the domain of 'visualization studies', can be found in the research of Howon Kim *et al* (2017:1), published in the article 'Atomic-scale visualization of surface-assisted orbital order'. This research project aimed to investigate the properties of the heavy fermion compound – $CeCoIn_5$ – and more specifically, how "orbital-related physics" could be applied to contribute to the existing knowledge of the compound (Kim *et al* 2017:1). The results of the research were captured in various information visualisations (Figure 5) that were shared with a specific scientific community. The research itself is complicated and advanced, and to a certain extent, only accessible to those who have prior-knowledge in those specific research fields. As a result, the information visualisations, as seen in Figure 5, do not seem to emphasise any design principles related to 'aesthetics', like 'accessibility' or 'attractiveness', but focus on clarity, accuracy, and soundness of information for a specific, academic audience.

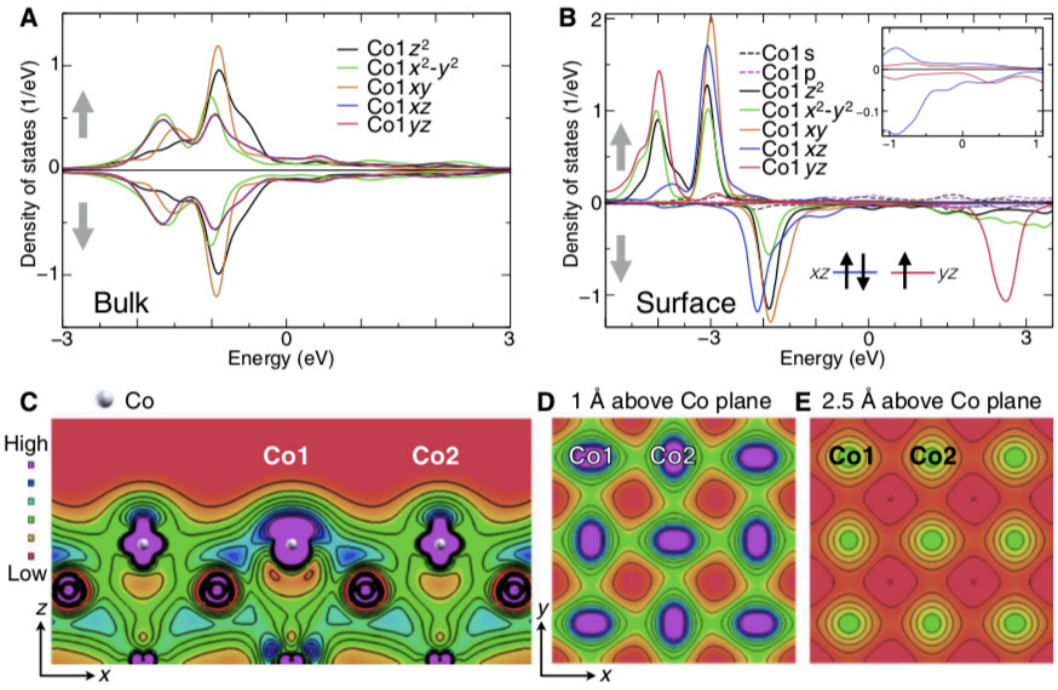

Figure 5: Howon Kim *et al*, *First-principles electronic structures*, 2017. (Kim *et al* 2017).

The domain of ‘visualization practice’ is context-driven and intended for commercial platforms (Purchase & Vande Moere 2011:367). Information visualisations in this domain are usually executed by data visualisation companies, creative studios, or freelance ‘information designers’, who aim to make complex data sets accessible and attractive to specific clients or to the general public (Purchase & Vande Moere 2011:367). In this domain, the design principles of innovation, novelty, and originality are highly valued, as designers pursue the most creative ways to communicate complex sets of data to various audiences (Purchase & Vande Moere 2011:367). A design project that exemplifies the domain of ‘visualization practice’, is *Project Ukko* (Figure 6) by Moritz Stefaner for EUPORIAS (in collaboration with FutureEverything and the Barcelona Supercomputing Center). Project Ukko aims to capture and communicate seasonal wind prediction data in a visually accessible, attractive, and effective way (Stefaner 2016).

Figure 6: Moritz Stefaner, *Project Ukko: main map*, 2016. (Truth & Beauty 2016).

The project allows energy distribution companies and wind farm managers to spot patterns and changes in future wind conditions, and in that way, make better decisions that have a positive impact on the energy industry (Stefaner 2016). The aim of the information visualisation was to communicate complex, but necessary information, in a clear and

coherent fashion (Stefaner 2016). The result was a global, interactive map, that illustrated predicted wind conditions for more than one hundred thousand regions, through a unique visual language that consisted of varying lines. The lines communicated essential information through their design – the historical accuracy of the prediction (for that location) was communicated through opacity, the predicted wind speed through line thickness and the predicted trend of wind speed in line tilt and colour (Stefaner 2016). If a user of the map were to click on a line, a panel would appear (Figure 7) with additional information concerning the predicted wind conditions for that specific region.

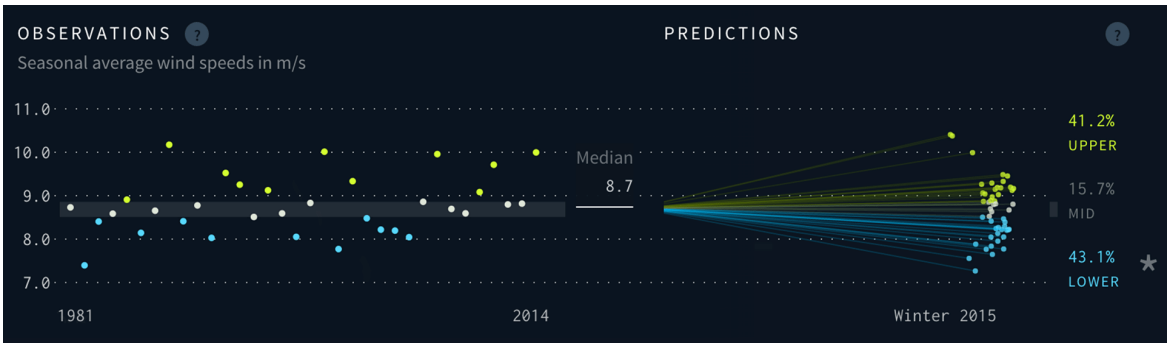

Figure 7: Moritz Stefaner, *Project Ukko: additional panel*, 2016. (Truth & Beauty 2016).

Information graphics that form part of the 'visualization exploration' domain, are predominately inventive, imaginative, and idealistic (Purchase & Vande Moere 2011:367). Usually driven by the designer's own curiosity or personal research, these information graphics aim to communicate personal insight, provoke an emotional response, and illustrate specific interpretations of information in innovative ways (Purchase & Vande Moere 2011:367). Although these information graphics aim to be as accurate as possible, the emphasis remains on the design principles of 'attractiveness', rather than 'utility' and 'soundness', like the information designs related to scientific research or commercial practice.

A project that exemplifies the 'exploration' and 'artistic' domain of information visualisation, is *Literary Organism* (Figure 8) by Stefanie Posavec. In the project, Posavec (2008) uses various methods to visualise the structure and themes of the book *On the Road*, by Jack Kerouac – a book that is of personal significance to her. The aim of the project was to illustrate "sentence length, themes, parts-of-speech, sentence rhythm, punctuation, and the underlying structure of the text" in visually interesting ways (Posavec 2008).

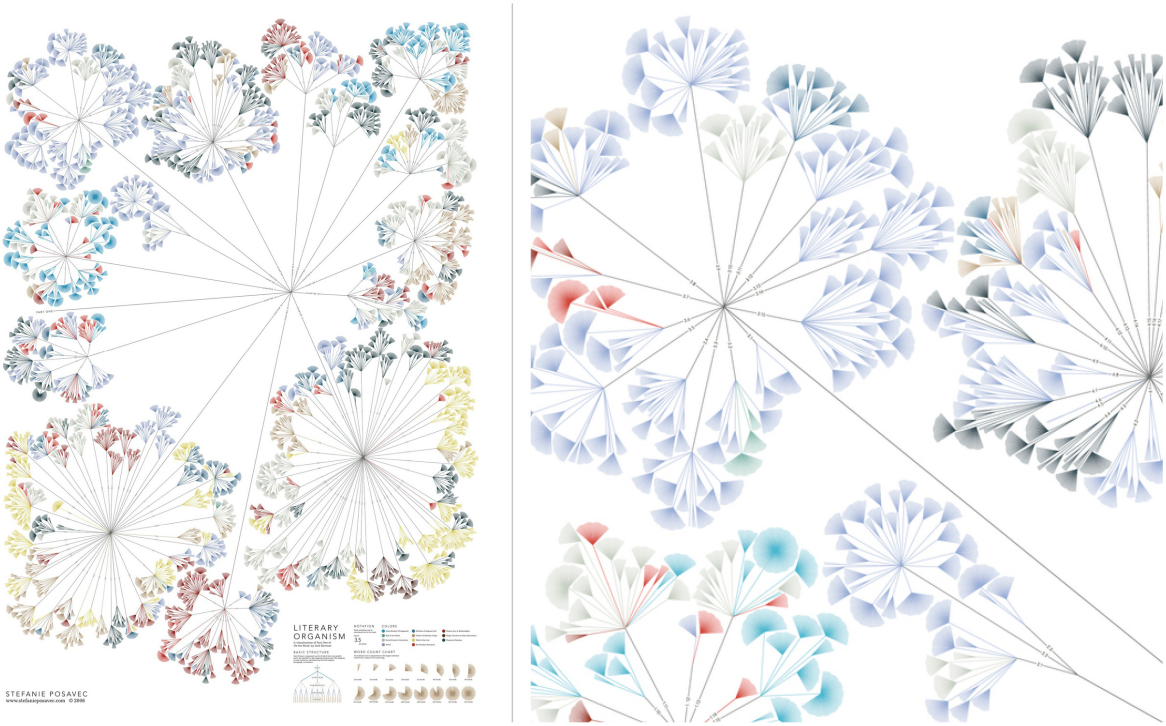

Figure 8: Stefanie Posavec, *Literary Organism*, 2008. (Posavec 2008)

Posavec (2008) aimed to design a methodology of data gathering and visual interpretation that could be applied to other literary works as well. Posavec (2008) concentrated on sentence length and structure, as quantifiable information, to visualise the text. The information graphic, as seen in Figure 8, shows how Part 1 of the book is split into chapters, how chapters are split into paragraphs, how paragraphs are split into sentences, and how sentences are split into words (Posavec 2008). The lines of the infographic are also colour-coded, based on the topic or theme of each sentence. By using a self-generated, but strict and systematic design methodology, Posavec (2008) was able illustrate the text as a "living, breathing thing full of energy and vitality". According to Posavec (2008), this information graphic communicates the hidden complexities of the text and helps the viewer to understand the text from a different, unconventional perspective.

As seen with the examples mentioned above, the art of information visualisation emphasises accuracy, coherence, and clarity of communication. Although the desired goal, methodology, and intended audience may differ for the various applications of information visualisation, the underlying purpose remains the same, namely to analyse, condense, and communicate complex data sets (Purchase & Vande Moere 2011:356). Information visualisation exemplifies a scientific approach to design, because it aims to solve specifically determined problems using precise methodology in a rational and systematic way. Whether an

information visualisation is intended for commercial environments, like *Project Ukko* by Moritz Stefaner (Figure 6 & 7), or for artistic expression like *Literary Organism* by Stefanie Posavec (Figure 8), the main objective of information visualisations is to make information accessible, attractive, and comprehensible to various audiences.

3.4 Information visualisation and metaphysical thinking

The aim of this chapter is to explain how design can be understood to be univocal, how a scientific approach to design might function, and how *information visualisation*, as a field within communication design, exemplifies such an approach. Information visualisation can be considered to exemplify the *univocal sense of being*, as described by Desmond, for numerous reasons of which two are most essential. Firstly, the purpose of information visualisations is to conquer the ambiguities of nature, subdue uncertainty, and overcome the equivocities of being. By collecting complex data, analysing various components, and finding patterns within large collections of information, information visualisations aim to make obscurities comprehensible and determinate. As Desmond (1995a:49) explains, the univocal way of knowing emphasises "ordered, clear, methodical *mathēsis*" that produce quantifiable results and that can be publicly communicated.

Secondly, the process of information visualisation relies on strict, accurate, and well-defined methodologies to produce specific results. According to Desmond (1995a:59), the notion of *methodology* is one of the fundamental aspects associated with the univocal way of knowing. Methodology, whether related to scientific research or the design of an infographic, concerns 'effectivity', 'reliability', and 'consistency' (Desmond 1995a:59). According to Desmond (1995a:59), an essential part of the methodological expression (especially in philosophy as developed by Descartes), relies on specific processes, procedures, and systems to reduce personal or subjective intervention. This is exemplified in *Project Ukko* by Moritz Stefaner (Figure 6 & 7), where large and complex sets of data were analysed, organised, and communicated according to a specific methodology to accurately reflect verifiable information.

In the same way, Stefanie Posavec's infographic, *Literary Organism* (Figure 8), relied on a well-defined methodology to visualise data in a specific way. Even though her project is of a personal and artistic nature, Posavec (2008) explains that she wanted the graphics to be "based on something quantifiable". Posavec (2008) decided to concentrate on the structure

of the text, rather than the 'literary themes' (which would have implied a high level of subjective interpretation), and in that way measure and visualise verifiable information. From the outset, Posavec (2008) desired to visualise the structure of the novel as a "living, breathing thing", and that, paradoxically, required a strict and well-structured systematic methodology. By staying true to the scientific requirements of her methodology, Posavec (2008) was able to achieve her aesthetic aspirations as the infographic resembled a "cellular, plant-like structure".

3.5 The limitations of a univocal approach to design

Garud, Jain, and Tuertscher (2008:352) explain that a scientific approach to design may be effective in certain cases (see the previously-discussed examples of information visualisations), but the new frontier of continually-changing factors and environments faced by designers may require a different approach. In this new frontier, as explained by Garud *et al* (2008:352), "problems are ill-defined, preferences are fluid and solutions emerge in action". A rigid and logical approach to "ill-defined" problems that emphasises 'consistency' and 'completeness', may result in consequences that decrease effectivity and limit future possibilities (Garud *et al* 2008:352).

Stefanie Ollenburg (2018:280) echoes Garud *et al* (2008:352), as she explains that a univocal approach to design, with its emphasis on 'completeness', has not only shaped design practice, and ways of solving problems in design, but design education as well. For many years, the accent of educational design programs was to teach designers how to create "consumer-, user-friendly, and target-group-relevant solutions", with minimal attention to the global implications of design on various environments (Ollenburg 2018:280). Two of the limitations of such a narrow approach to design education are an overemphasis on stylistic qualities and the neglect of environmental impact. Design, understood in this way, continues to be recognised, solely as a 'tool' for commercial sectors, and not as a powerful creative agency through which impactful and constructive solutions can be achieved (Ollenburg 2018:280).

As traditionally understood, design is a tool for intelligible communication that relies on clarity, stability, and consistency. Although scientific methodology in design is an essential part of the discipline, as discussed above, there is more to design than the univocal. As Harland (2011:24) explains, design is a pliable, versatile, and multi-disciplinary discipline with various

interrelated “spheres of influence”. Although a scientific approach to design may prove effective in certain cases, there are several different approaches to design, each with their own specific methodologies, procedures, and outcomes. The univocal approach to design does not exhaust the nature of design. Thus, in the following chapters, this study discusses different approaches to design and how they relate to Desmond’s fourfold sense of being.

3.6 Towards an equivocal approach to design

The univocal sense of being is essential from a design perspective, specifically for domains of design where clear and coherent communication of information is required, as seen with the examples of information visualisations discussed above. The univocal approach in design is effective and beneficial where problems and desired solutions are well-defined, but not highly adaptable when these conditions are not present. The univocal sense of being is also essential from a philosophical perspective, as it forms a key part of being and the meaning-making process of being (Desmond 1995a:48). In its pursuit to make being totally intelligible, and unite ‘mind’ and ‘matter’ absolutely, it becomes self-contradictory and runs into various complications (Desmond 1995a:82). Thus, as Desmond (1995a:62) explains, the univocal mind will have to “consent to its own death as totalizing, and its being humbly reborn as one voice in a more embracing community of being and mind”. The univocal sense does not have the last say on the nature of being, it is merely one voice among many in the plurivocal community of being (Desmond 1995a:80).

Much of modern philosophy and the pursuit of univocal unity with being, as Desmond (1995a:58) explains, has been driven by a “decreased tolerance of the equivocal” and a desire to tame the perplexity of being. For millennia, philosophers have pursued the determination of being in terms of univocal intelligibility, but it seems that there is “*no end* to perplexity and questioning”, as the ambiguities of being refuse to be suppressed (Desmond 1995a:58, emphasis in original). In addition, the origin of the univocal project in philosophy lies in the confrontation with being in its ‘otherness’, thus, its very genesis lies in the equivocity of being. It seems that any search for univocal unity needs to acknowledge and incorporate equivocal difference. As Desmond (1995a:58, emphasis in original) explains “the quest for univocity that would conquer equivocity betrays (in more than one sense) its own origin in a *rich* equivocity, without which the quest itself would never have moved from the spot”. It is towards this rich and untamed equivocity to which we now turn to move beyond the univocal sense of being.

CHAPTER FOUR: DESIGN AS EQUIVOCAL

4.1 An introduction to the equivocal sense of being

The univocal sense of being, as discussed above, is an essential part of the human mind's attempt to make sense of being (Desmond 1995a:47). The univocal way of knowing is fundamental to subject fields like metaphysics, mathematics, and science. These all share a common purpose, namely to make the ambiguity of being intelligible (Desmond 1995a:49). The univocal sense's pursuit to 'tame' the obscurities of nature is driven by a desire to control the intimidating fullness of being, to understand the excess of being (Desmond 1995a:48). This *excess of being* or what Desmond (1995a:85) calls, the "ontological plentitude of the happening of the between", is what motivates the univocal way of knowing to make determinate sense of being. Paradoxically, as Desmond (1995a:58) explains, in trying to make all things absolutely intelligible, the univocal sense betrays its own origin, namely the 'untamed' equivocity that initiated the univocal project in the first place. It seems that the univocal mind, even with all its calculating power, is not able to evade the 'rich ambiguity' of the equivocal sense of being, for its very existence depends on it (Desmond 1995a:86).

If we are to reflect the fullness of being intelligibly and truthfully, we will need to be more respectful towards the equivocities of being and approach what we do not understand with more 'finesse' (Desmond 1995a:82). According to Desmond (1995a:86), the role of the philosopher is not to overcome the perplexity of the "overdetermined milieu of truth" (that is being in excess to what the univocal mind can understand) with mere univocalising methods, but to find harmony between the univocal and equivocal dimensions of being.

The equivocal sense of being, because it emphasises difference, ambiguity, and 'otherness', has made philosophers in their pursuit of intelligibility generally "hostile" towards the equivocal throughout the philosophical tradition (Desmond 1995a:87). Instead of treating the equivocal as the enemy of euphonic truth, Desmond (1995a:87) suggests that "equivocity is not to be killed but charmed from being a mythic monster into a fabling of the plurivocity of being". If we are to understand and integrate the equivocal sense as an important voice in the plurivocal *community of being*, according to Desmond (1995a:87), we "must come to terms with the beauty of the beast".

The equivocal sense can be interpreted as 'negative', but also 'affirmative' (Desmond 1995a: 87). As mentioned above, the negative dimension of the equivocal has been generally accentuated, yet according to Desmond (1995a:88), philosophers have not pondered deeply enough on the positive value of the equivocal at work in being. Equivocity exists, not because we have failed to define being absolutely or failed to produce the correct univocal categories to reflect being's actual essence, but because equivocity is embedded in the nature of being itself (Desmond 1995a:88).

In certain cases, these univocal categories are fundamental to making sense of being (as discussed in Chapter Three), but being also encompasses the 'process of becoming', 'being as flux', 'being as temporal', and therefore being cannot be stabilised or reduced to unambiguous univocity (Desmond 1995a:88). The equivocal sense is rooted in the ambiguous nature of being, in the ongoing 'process of becoming', and therefore can be interpreted as "at times a true presentation, a true mirroring of this enigmatic happening" (Desmond 1995a:88). The equivocal is not a result of our failure to reflect the truth of being comprehensively, but it forms an important part of the true nature of being.

The univocal mind aims to stabilise, control, and determine the *becoming of being*, but being is given to us as an immediate "aesthetic show" before any form of univocal rationalisation can take place (Desmond 1995a:88). We experience being in its fullness 'aesthetically', through our senses, before we can cognitively make sense of our experience. Desmond (1995a:89) refers to this immediacy of being as the "aesthetic show of becoming", where the mind is faced with the excess of being and needs to think in other ways than merely static, univocal categories. In the *aesthetic show of being*, we find an interplay between equivocal difference and univocal identity, for things do not remain absolutely indefinite, but do stabilise (if only temporarily) in various forms of determinacy (Desmond 1995a:90). There is a *doubleness* at play in the equivocal, for things that *become*, like a tree that grows, is itself and yet not completely itself. The tree remains true to its identity throughout its life, and yet not entirely, for as it grows it changes in size, colour, and character. As Desmond (1995a:90) explains with reference to this interplay, "nothing absolute is, yet things are, and hence the things that become, both are and yet are not absolutely".

In the equivocal sense of being, everything is in constant flux and nothing is absolutely the same (Desmond 1995a:90). The equivocal emphasises the "ambiguity of the happening of the between" as it alludes to the interplay between creation and deconstruction; articulation

and unintelligibility; life and death (Desmond 1995a:90). The ambiguity of being as a process of becoming forms the melody that allows the dance between indetermination and determination to take place (Desmond 1995a:91). According to Desmond (1995a:91), the promise of creative power lies in the transition from indetermination (formlessness) to determination (form or *forming*), as every determinate being is not static or frozen, but a living entity, "entirely energetic" and "entirely dynamic". This unpredictability of *being as becoming*, articulated by Desmond (1995a:91) as the "aesthetic show of being", might be overwhelming to the univocal mind, but this process of transition and interchange is what sparks the dynamic and creative power of being.

In other words, the equivocal sense is an important part of being, as it refers to *being as becoming* and alludes to the interplay between indetermination and determination (Desmond 1995a:91). The equivocal sense of being has its origin in the "matrix of ambiguity" and refers to the immediate aesthetic experience of being, that happens prior to any form of univocal rationalisation of being (Desmond 1995a:91). The body is *aware*, before the mind *comprehends the awareness*. The univocal mind may argue that the equivocal sense of being is deliberately confusing matters or unnecessarily mixing things up, to conceal a lack of sound determinations of being. Desmond (1995a:92) disagrees with such a view, as he explains the following:

> … things are mixed up, things are mixed. They are mingled together, confused, and this, in the etymologically correct sense (*con-fusio*): the promiscuity of the equivocal is the confusion of becoming. Things fuse together; they flow into each other. Becoming is ontological confusion in that sense, fluid, porous, mixing and commingling. Being is confusing. Logically one might not like this, if one insists that being and intelligibility must be determinate. But who gives logic the license to dictate to being to be other than it is? Logic may not like the confusion of being but that may be logic's fault, not being's.

Desmond's (1995a:92) point is not to absolutise "confusion", but to draw attention to the mysterious nature or *poiēsis* of being. The happening of the between, interpreted as the *poiēsis* of being, aims to restore mind to the "primal aesthetic intimacy" with being, where the empirical or rational mind on the other hand tends to split the self and being into dualistic opposites (Desmond 1995a:93). Being, in equivocal terms, cannot be grasped absolutely univocally, but is a poetic reciprocity between indetermination and determination, a "community of interchange and interaction" (Desmond 1995a:93).

One area of human endeavour that exemplifies being as becoming, or the *poiēsis* of being, is the "aesthetic mindfulness of the artist" (Desmond 1995a:94). This idea also applies to the designer. The artist creates an artwork that is confined and determinate, but simultaneously infinite and beyond all univocal knowing. For Desmond (1995a:95), the beauty of a great work of art lies in its ability to capture a sense of the "infinite reserve". Desmond (1995a:95) explains, with reference to such an artwork, that "there is no reductive objectification of the reserve, the excess. The beyond is there, and yet not there; or it is there as beyond, beyond as there". Great works of art embody the interplay between clarity and ambiguity; determination and indetermination; finitude and infinitude (Desmond 1995a:94).

In art we are exposed to unfiltered "sensuous appearing" and marvel at the sheer *thereness* of line, texture, and colour manifested on canvas. We are again connected through this sensuous appearing to "agapeic astonishment" before being, to the primal "intimacy with being", and celebrate the givenness of being (Desmond 1995a:94). The abundance of being's origin is revealed in the finite work of art, as Desmond explains (1995a:94), "creation shimmers in these concretions".

The aesthetic experience of being, the *poiēsis* of becoming, not only connects us to the essence of human creativity but also reminds us of the dynamism of nature *naturing* (Desmond 1995a:94). The notion of nature *naturing*, as opposed to nature *natured*, refers to nature's ability to grow, evolve, and transform beyond the intellectual capacity of the univocal mind. Nature's ability to produce innumerable variations, varieties, and species is referred to by Desmond (1995a:103) as the "prodigal pluralizing power of nature". The equivocal is at play in nature, not only in the way it diversifies beyond absolute univocal knowing, but in the way certain species behave and express their identities (Desmond 1995a:103). There are many examples of the "aesthetics of becoming" at work in nature, but no other organism exemplifies equivocal being quite like the orchid. According to Desmond (1995a:103), this beautiful flower is the equivocal being *par excellence* – equivocity in pure botanic splendour.

Orchids are the "*erotic equivocators* of the flower kingdom", as they need to attract or seduce insects for their own reproductive purposes (Desmond 1995a:104, emphasis in original). These exotic flowers are not independent when it comes to their reproduction, but rely on insects for pollination. The orchids achieve this by imitating the appearance of other flowers through fragrance and colour or by resembling the erotic double of the insect, and thus luring

the insect towards itself (Desmond 1995a:104). The identity of the orchid is therefore *double* – it is itself and yet not itself; it can only be itself by not being itself.

The revelation of the orchid's true identity implicates the concealing of its true identity, as it shows itself by hiding itself (Desmond 1995a:104). This *doubleness* of identity, this interplay between sameness and difference, between indetermination and determination, exemplifies the equivocal at work in nature (Desmond 1995a:104). This equivocal "aesthetic show" alludes to the primal *intimacy of being*, the intimate *poiēsis* of becoming, that cannot be easily objectified or rationalised by a univocal mind (Desmond 1995a:105). As Desmond (1995a:105) suggests, when it comes to the equivocal at play in nature, truth is *wooed* into being.

4.2 Design as equivocal: A poetic approach

The equivocal sense of being, as discussed above, refers to ambiguity, mystery, and *doubleness*, and speaks of that which moves beyond intelligible univocal knowing (Desmond 1995a:87). The equivocal sense, unlike the univocal, does not concern the tedious rationalisation of being, but the immediate "aesthetic experience" of being (Desmond 1995a: 89). Both univocal and equivocal modes of thinking are beneficial to the discussion on the nature of being, as Desmond (1995a:97, emphasis added) explains, "we need mathematics *and* music to understand the intelligibility and to hear the beauty of the cosmos". In the same way the univocal sense of being plays a key role in design (see Chapter Three), the equivocal sense of being is also essential to the nature of design. The equivocal approach, as will become clear, alludes to the artistic, expressive, and poetic nature of design.

4.3 Case study: The lovers of visual flux

As traditionally understood, design is a process concerned with rationality, coherence, and clear communication (Garud *et al* 2008:353). On the other hand, various artists and designers, both traditional and contemporary, have transcended the boundaries of 'univocal' communication and ventured into the ambiguous shadows of equivocity in their work. These artists and designers, who Desmond (1995a:117) would call the "lovers of flux", are not concerned with the univocal transmission of information, but with the equivocal dance between indetermination and determination. Design, in essence, is a visual practice and has its origin in more traditional practices like fine art. Before considering the ways in which

designers personify the equivocal in their work, it might prove fruitful to first investigate the work of an artist who is considered by many to be a master of equivocal nuance.

Few artists exemplify the equivocal at work in *aesthetic mindfulness* like René Magritte. Magritte, born in 1898 in Belgium, was a surrealist painter who challenged observers' predetermined conceptions of reality (Freer 2013:330). Magritte asks the viewer to engage with the *doubleness* at play in his artworks, for surface appearances are not exactly what they seem and often point to something beyond the artwork itself (Freer 2013:330). In true equivocal fashion, Magritte's artworks are visual *riddles* or *poems*, deliberately composed as intriguing dialogues between the "visible and the invisible" (Freer 2013:330). For Magritte, as interpreted by Freer (2013:330), truth is "never absolutely revealed but is suggested in an open-ended dialectic".

In Magritte's work, the "surface reality" of the artwork (or what Desmond would call the "aesthetic show" of the artwork) draws attention to itself, to its own aesthetics, but simultaneously points to the "mystery of the sublime" beyond its surface (Freer 2013:331). Magritte creates artworks that embody the equivocal interplay between indetermination and determination. This corresponds with Flusser's (1999:18) etymological study of the word 'art' or 'artist'. According to Flusser (1999:18), the root of 'art' comes from 'ars' in Latin, which relates to cunning trickery, deception, or conjuring.

An example that illustrates the equivocal sense of being in Magritte's work, is his painting *The treachery of images* (Figure 9), painted in 1929. In this artwork, Magritte paints a pipe, with an accompanying description at the bottom of the pipe – *"Ceci n'est pas une pipe"*, which is French for *"This is not a pipe".* Magritte shows the viewer a picture of a pipe and then tells the viewer it is not a pipe. This is Magritte's point – it is not an actual pipe, but a visual representation of a pipe. In equivocal terms, it is what it is, and yet *not what it is*. The description of the pipe is both true and untrue. Magritte, as a master of wit and acuity, gave the painting an apt title, for the interaction between the image and the description for any semiotician is indeed 'treacherous'. Magritte's point, similar to Desmond (1995a:47), is that truth is not absolutely univocal or equivocal, but an *oscillation* between both. Magritte's irony aims to mock the desire to know truth 'absolutely', or ridicule the idea that one can 'own' the truth of something (Durham 1993:20). Magritte's pipe, almost like Desmond's orchid, slips through any attempt to stabilise its identity absolutely.

Figure 9: René Magritte, *The treachery of images*, 1929.
Oil on canvas, 60.33 cm × 81.12 cm.
Los Angeles County Museum of Art, Los Angeles.
(Durham 1993:17).

In a similar way that artists like Magritte have alluded to the equivocal in their work, graphic designers and illustrators have done the same. Throughout the development of visual communication and visual expression in popular culture, various designers have moved away from the 'strict rules' of a traditional, univocal approach to design and embraced a more artistic, poetic, and expressive approach. One of the designers who exemplifies such an approach, especially in poster design, print media, typography, and editorial design, is David Carson.

Carson, born in 1955 in Texas, is a graphic designer and typographer who pioneered new approaches to typography and layout design by abandoning "design's established truths of order and legibility" (Lupton 2014). Carson experimented with alternative ways to apply typography in print media throughout his career, but specifically while being the art director of magazines such as *Ray Gun*, *Beach Culture*, and *Blue.* These magazines, driven by Carson's free-spirited and ambitious aesthetics had a significant impact on the style of American and international surf and pop culture. Owing to the grid-free, sporadic, and expressive nature of Carson's work, his visual style can be regarded as an "evolution that straddles the line between art and design" (Saddoris 2019).

Carson's work exemplifies the equivocal sense of being in three ways – firstly, in the way he approaches design (*the role of the designer in the design process*), secondly, in the visual nature of the design work itself (*the aesthetics of the design*), and thirdly, in the way a viewer

or reader might experience the design (*the relation between a viewer and the design*). In the way he approaches design, Carson is known for his “legendary disregard for readerly conventions” and for bending the standard rules of typography, typesetting, and editorial layout (Lupton 2014). Where a traditional perspective on typography in print media may stress univocal legibility and coherence, Carson’s work concerns the ‘immediate aesthetic and emotional experience’ of a text. Carson’s work, in true equivocal fashion, involves an interplay between indetermination and determination. An example that epitomises this approach, is the poster he designed for AIGA’s (American Institute of Graphic Arts) 2014 spring conference (Figure 10).

Figure 10: David Carson, *Poster for the AIGA spring conference*, 2014.
(Butler 2014).

The poster, advertising Carson’s own presentation at the event, includes minimal information, at least little legible information, concerning the details of his talk. Rather, the poster is a collage of ink swashes, illustrations, and cropped typography that capture the spirit of

Carson's presentation and his unconventional aesthetic approach. The poster does not concern the univocal and rational communication of information, but concerns the immediate "aesthetic experience" of the text. Carson's message is in the expressive nature of the aesthetics and the ambiguity of the media used. In equivocal fashion, there is a *doubleness* at play in the poster – on the one hand, the aim of the poster is to provide the location, date, and time of the presentation, but on the other hand, it refuses to provide this information in a straight-forward way. Carson pushes the boundaries between determination and indetermination, legibility and illegibility. The founder of the AIGA event, Armin Vit, changed the final poster without advising Carson, to make it more 'comprehensible' (Butler 2014).

Another way that Carson's work embodies the equivocal sense of being, together with the way he approaches design, is in the *aesthetics* of his work. Carson's aesthetics, to use Desmond's (1995a:88) terminology, relate to being as *becoming*, being as *flux*, or being as *temporal*. According to Desmond (1995a:88), in the equivocal, things are constantly changing, morphing, and transforming. In the equivocation that takes place in the "matrix of ambiguity", no object or element is absolutely fixed or totally determinate (Desmond 1995a: 91). This links with Desmond's (1995a:103) notion of the *poiēsis* of being – the fertile nature of the equivocal that exists in excess of the univocal mind's capacity to know determinately. Carson's work can be interpreted as proliferating visual language, which seems to have no beginning or end. The generative and *ambiguous richness* associated with Carson's work is what Desmond (1995a:103) would refer to as "nature *naturing*" or the "prodigal pluralizing power of nature".

An example of this is evident in the poster Carson designed for the 50th anniversary of the National Theatre in London in 2013 (Figure 11). In the poster, the word "theatre" is barely recognisable, as collage-type illustrations and images overlap to communicate the spirit of the theatre and Carson's personal interpretation of the theatre's personality. This immediate "aesthetic show", as Desmond (1995a:91) would explain, might frustrate the univocal mind in two ways. Firstly, although they are printed on a flat, 2D surface, the elements in the design do not seem to reflect determinate form. These visual 'bits and pieces' remain in flux that refuse to be univocally stabilised. Secondly, the design yields no exact information concerning the theatre or an event related with the 50th anniversary. It merely captures the personal, emotional, and expressive character of the theatre.

Figure 11: David Carson, *Poster for the National Theatre, London*, 2013. (Carson 2013).

As discussed above, Carson's work exemplifies an equivocal approach to design, firstly, in the way he approaches the design process; secondly, in the aesthetics of the designs themselves; and thirdly, in the viewer or reader's experience of the designed work. In his work, Carson pushes the boundaries between indetermination and determination, exploring the nuances and limitations of equivocity in visual communication. In one design specifically, an editorial layout for *Ray Gun* magazine published in 1994 (Figure 12), it can be argued that Carson aimed to transcend univocal boundaries to achieve absolute equivocity.

The layout concerns an article about the musician Bryan Ferry, and according to Carson (as quoted by Butler 2014) at the time, the article was "really boring", poorly written, and lacked genuine enthusiasm. Instead of setting the article in a general typeface, Carson set the entire article in Zapf Dingbats (a typeface consisting of various digital ornaments, signs, and symbols), which made the article illegible to a certain degree. In this example, there was no

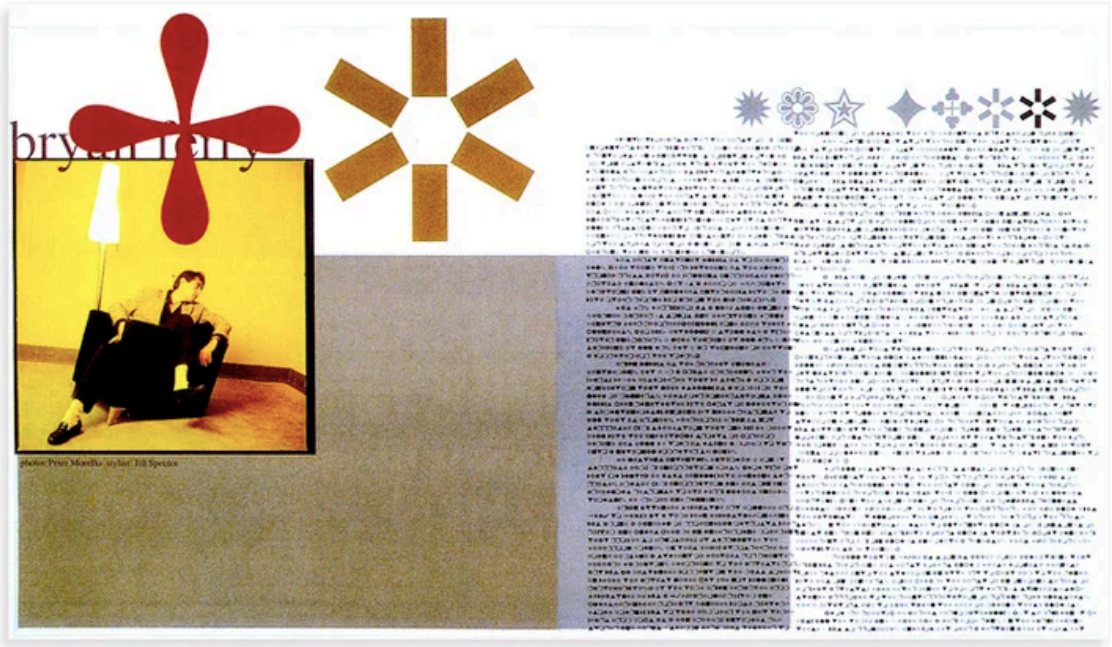

Figure 12: David Carson, *Layout design for Ray Gun magazine*, 1994. (Butler 2014).

transition of univocal information between the text and the reader, but only the ‘aesthetic expression’ of Carson’s personal opinion of the quality of the text.

Although Carson may have attempted to achieve absolute equivocity in this unconventional design, some things are still univocally communicated. As Desmond (1995a:89) explains, neither the univocal or equivocal sense can be absolute, for the nature of being consists of an interplay between both. Although the content of the article might be incomprehensible to the general public, Carson's personal attitude toward the content of the text is the intended reading. At the expense of the transmission of rational information, Carson was able to communicate his personal and emotional perspective emphatically.

Therefore, it may be argued that Carson rejects the idea that his work should be tamed or suppressed by “univocal rationalisation”, but should be an honest reflection of the ambiguous and enigmatic nature of being (Desmond 1995a:88). According to Carson (as quoted by Gosling 2019), the commercial world of visual communication, driven by computer-technology, can lack visual vitality as it overemphasises clear, precise, and coherent communication. According to Carson (as quoted by Lanks 2017), in the visually oversaturated commercial environment, a well-written article or paragraph might not be enough to get a message across. Designers need to “appeal to people on an emotional

level" and understand how design can be used to make a positive and memorable impact in society (Lanks 2017).

Carson's unconventional aesthetics and free-spirited approach inspired a generation of designers and artists to move beyond the strict confines of univocal regulations and embrace a more expressive and artistic approach (Gosling 2019). One contemporary band in particular, who has been *blurring* the lines between music and visual art, and who can be regarded, like Carson, to exemplify an equivocal approach to visual communication, is Bon Iver. Bon Iver is an American indie folk band, founded in 2006 by singer-songwriter Justin Vernon in Eau Claire, Wisconsin. The band has had a significant impact on indie folk culture, grown in popularity in contemporary alternative music, and since 2012 have been nominated for seven Grammy Awards of which the band won two. An important part of the band's growing popularity among musicians and artists alike, is the extensive and impactful visual language that accompanies the band's music. The album covers and additional visual material for the last two Bon Iver albums, "22, A Million" (2016) and "i,i" (2019) were designed by Eric Timothy Carlson.

Carlson is an artist and designer known for developing rich, enigmatic, and cryptic visual material for a variety of bands, especially those from the Minneapolis and Wisconsin music scene (Byrne 2016). According to Byrne (2016), Carlson is a visual linguist whose work concerns the "fluidity between text and image, the discarded pictographic origins of alphabets" and "the semiotic slide between icon to index to symbol". Carlson, like Carson, can be considered an agent of the equivocal at work in visual communication, for his work involves the reciprocity between indetermination and determination; the interplay between clarity and ambiguity. An example of an equivocal approach to design in his work is the album cover (Figure 13) and additional visual material (Figure 14) Carlson designed for Bon Iver's album "22, A Million". According to Byrne (2016), this project is not an elementary exercise in brand identity design, but involves the complex and intricate "documentation of a collaborative network of players, places, times, and tools".

The "22, A Million" design project by Carlson exemplifies an equivocal approach to design in three ways. Firstly, resembling Carson, is the way Carlson interprets his role as a designer and how he approaches the design process; secondly, is the way the aesthetics of the work embody the interplay between indetermination and determination; and thirdly, is the way the work reflects what Desmond (1995a:94) would call the "*poiēsis* of being" – the way the

Figure 13: Eric Timothy Carlson, *Bon Iver, "22, A Million"*, album cover. (Richardson 2016).

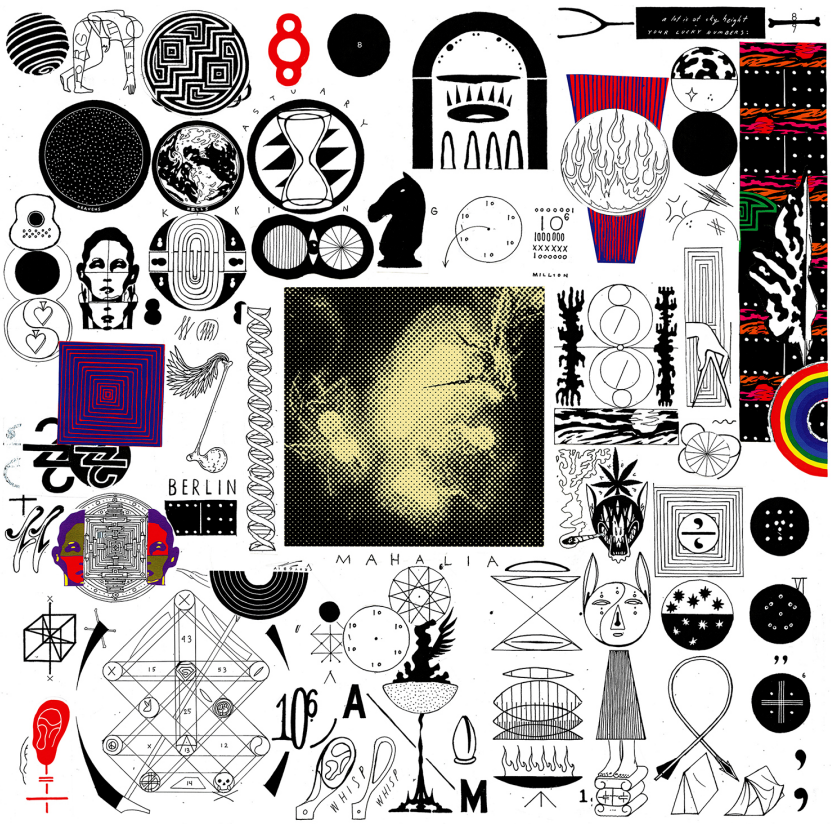

Figure 14: Eric Timothy Carlson, *Bon Iver, "22, A Million"*, additional visual material. (Byrne 2016).

proliferative nature of the work transcends the limitations of comprehensible univocal knowing. Carlson explains that the aim from the start of the project was to create a "robust world of work" through experimentation and expansive documentation that was not overly fixed on a specific visual outcome (Byrne 2016).

The dense body of work is a collection of drawings, illustrations, ideas, notes, and poems that aim to capture the ambiguous dialogue between the various audio and visual elements at play during the recording process of the album. Carlson explains that "real references and experiences are collaged in both the music and the artwork", as to allow the natural development of icons and symbols (Byrne 2016). By combining, overlapping, and mixing different visual references, Carlson was not univocally 'in control' of the final manifestation or meaning of the designs. This experimental approach allowed each song to develop its own "matrix of new notes and symbols" that would contribute to the larger evolving visual language (Byrne 2016).

Carlson's work not only embodies the equivocal in the way he approaches the design process, but also in the way the aesthetics exemplify an equivocal interplay between indetermination and determination (Desmond 1995a:90). Within the complex iconography,[8] as seen on the cover of "22, A Million" (Figure 13), some elements do stabilise as determinate univocal forms – for one can make out, amongst other things, the shape of a bird's feather, a snake, an upside down chair, and butterfly wings. These elements, icons, and symbols might be recognised univocally, but their relation, meaning, and logical implication remain equivocally perplexing.

As Byrne (2016) explains, Carlson does not aim to communicate univocally, but his use of symbols and icons "evokes multiple readings at once, asking to be adopted and infused with new life". For Carlson (in Richardson 2016), the network of symbols is not only an interplay between indetermination and determination, but an oscillation between past and future realities – it is "reaching back and it's reaching forward, simultaneously". Although the identity of these symbols and icons can be univocally interpreted to a certain degree, these "icons, masks, unknowables, unsayables [and] unpronouncables", as Carlson refers to them, remain beyond the complete comprehension of the univocal mind (Byrne 2016).

[8] The duck-rabbit icon, seen in the top left corner of the cover (Figure 13), is particularly "equivocal" as the icon offers two different interpretations (either duck or rabbit) simultaneously.

Thus, Carlson's work exemplifies an equivocal approach to design in the way he tackles the design process; in the way the work embodies an interplay between indetermination and determination; and finally, in the way it represents Desmond's (1995a:92) notion of the *poiēsis* of becoming. The designs Carlson developed for "22, A Million" can be interpreted as an extensive and proliferating visual language that seems to have no beginning or end. This embodies Desmond's (1995a:103) notion of the equivocal "pluralizing power of nature" or "being as *becoming"*, which refers to the expansion and diversification of being beyond the intellectual capabilities of univocal knowing.

The complex and multi-layered body of work allows for a variety of interpretations, as there is no fixed or definitive way of reading the network of symbols (Petridis 2016). This might frustrate the univocal mind, for the design does not concern the communication of an exact, precise, or coherent message, but the *aesthetic expression* of poetic ambiguity. As Desmond (1995a:103) explains, this *poiēsis* of becoming, or the "nature of being as *becoming*", alludes to equivocity's ability to move beyond what the univocal mind can fully comprehend.

4.4 Ambiguity in design and metaphysical thinking

Along with the ideas described above, some further clarification is needed on how design can be understood as equivocal, or at least how it can reflect the equivocal. Carson and Carlson both exemplify an equivocal approach to design in various ways, of which three are essential, namely: the way the designer approaches the design process (*the role of the designer in the design process*); the aesthetics of the design itself (*as embodying an interplay between indetermination and determination*); and finally, the way in which the design embodies Desmond's notion of the "*poiēsis* of becoming" (*the ability of the work to transcend the boundaries of univocal knowing*). There are undoubtedly more ways in which the work of Carson and Carlson exemplify an equivocal approach, but these three ways, summarised below, are most relevant to the study at this stage.

Firstly, Carson's approach to design does not concern the univocal communication of comprehensible information, but the *aesthetic expression* of the emotional nature of a text. Carson employs various methods of collage (cropping, cutting, and pasting) and unorthodox typographic treatments which allow the aesthetics of a design to develop in surprising and unexpected ways. In a similar way, Carlson uses a dense network of seemingly unrelated drawings, illustrations, and ideas to create a complex body of work (Byrne 2016). By

overlapping, mixing, and combining various symbols and icons in an experimental way, Carlson allows the extensive visual language to evolve organically. Carlson, like Carson, does not 'control' or 'manipulate' the process of creation absolutely univocally to achieve a predetermined outcome, but allows the aesthetics of the design to develop instinctively.

Secondly, both Carson and Carlson's work concerns an interplay between determination and indetermination; clarity and ambiguity; exposure and concealment. Carson creates posters that aim to communicate specific information regarding specific events (Figures 10 and 11), but the posters refuse to yield the information in a straightforward way. Rather, the posters express the spirit and character of the respective events through bold, abstract, and unconventional aesthetics. Carson's designs do contain legible and univocal forms, but they form part of a larger "matrix of ambiguity" (Desmond 1995a:91).

In the same way, Carlson's work can be interpreted as an interplay between indetermination and determination. His complex visual language includes symbols, icons, and illustrations that move in and out of determinate identity. Although some of the elements in the designs can be univocally recognised, the relation between the symbols and the collective meaning of the icons remain equivocally perplexing. In both Carson and Carlson's work, the visual ambiguity of their aesthetics allow for multiple interpretations, perspectives, and translations of the same text to flourish (Desmond 1995a:91).

Finally, Carson and Carlson's work exemplify an equivocal approach to design in the way their work embodies Desmond's (1995a:103) notion of the *"poiēsis* of becoming" or the "pluralizing power of nature". Carson's work, with specific reference to Figure 11, can be described as a proliferating visual language that keeps evolving, morphing, and transforming. Carson's aesthetics reflect the *poiēsis* of being, or being as *becoming*, as his work involves the combination of a variety of cropped typography, illustrations, and indeterminate visual elements to create an *aesthetic experience* of a text. In the same way, Carlson's work concerns the organic and intuitive development of an expansive visual language, that seems to have no beginning or end. The visual prolificacy inherent in Carlson's work makes it difficult to comprehend the 'exact' meaning or intention of his designs in a univocal way. As Desmond (1995a:112, emphasis in original) explains, "there is a *fecundity* to the equivocal, as well as a possible malignity".

4.5 The limitations of an equivocal approach to design

As discussed above, an equivocal approach to design does not concern the univocal communication of comprehensible information, but predominantly involves the *aesthetic expression* of a text. An equivocal approach to design proves effective when the essence or character of a message needs to be communicated in a way that transcends univocal language. Although an equivocal approach to design is effective in certain cases (as discussed above with reference to Figures 10 to 14), an equivocal approach may not be constructive in all the domains where design is practised and applied. Certain professional and social domains in society, like the scientific industry, health services, and public transport, for example, require clear and comprehensible communication of information. These specific domains do not require the aesthetic and emotional expression of a message, or the communication of subjective perspectives, but rely on systematic design procedures to deliver dependable and consistent solutions.

The equivocal sense tends to free up feelings and ideas in surprising ways, but might confound the univocal mind for its lack of coherence and rationality. After all, the equivocal sense stresses difference, 'otherness', and ambiguity, which hinders mediation between the reader and the message. For Desmond (1995a:128), *mediation* is key to being and the essence of "the happening of the between". Being and mind cannot be reduced to the absolutisation of "univocal *mathēsis*" or equivocal difference (Desmond 1995a:129). Even though the equivocal sense is in part true to the nature of being, as it alludes to being's plurivocal nature, it does not exhaust the fullness of being's complexity. According to Desmond (1995a:128), "equivocity must be mediated" and a more "complex mindfulness of being" must be pursued if we are to reflect the fullness of being truthfully.

4.6 Towards a dialectical approach to design

As discussed in Chapters Three and Four, both univocal and equivocal approaches are essential to the nature of design and fundamental to various projects that require different applications of design. Although the univocal and equivocal senses are essential components of design, they do not exhaust the rich complexity of design. Although the univocal and equivocal senses are important, they are neither absolute nor the only voices at play in the complex *community of being* or the "happening of the between" (Desmond 1995a: 70).

To refer to the metaphorical terminology of Desmond – if the univocal sense implies knowing the difference between a tree and a flower determinately, and the equivocal refers to the interplay between determination and indetermination as seen in a flower like the orchid, the dialectic concerns not only the dynamics of this interplay, but a mindfulness towards the *ground of being* that makes both univocity and equivocity possible. To develop a comprehensive understanding of the nature of design, therefore, one has to include but also move *beyond* the univocal and equivocal perspectives of design. Thus, this study now turns towards a dialectical approach to design.

CHAPTER FIVE: DESIGN AS DIALECTICAL

5.1 An introduction to the dialectical sense of being

As discussed in Chapters Three and Four, both the univocal and equivocal senses of being are important voices in what Desmond (1995a:132) calls the "community of being". The equivocal sense is both true and untrue to being – true in the way it reflects being as *coming to be* (the movement between indetermination and determination) and untrue, in the way it absolutises difference and diminishes the possibility of mediation (Desmond 1995a:129). The equivocal poses a threat to philosophers because of its capability to deconstruct the stability of any univocal principle, conviction, or category (Desmond 1995a:131). Thus, philosophers have been generally "hostile" towards the equivocal throughout the history of philosophy, with either the aim to demolish it or avoid it completely (Desmond 1995a:87). According to Desmond (1995a:131), if we are to aim to understand being comprehensively, the avoidance of the equivocal or the retreat to simple univocity will not do, for we will have to include and *think through* the ambiguities of being towards a more encompassing wholeness.

Dialectic, according to Desmond (1995a:143), "tries to recover a more complex sense of sameness beyond the threat of dissolution posed by the absolutized equivocal". It aims to articulate determinate identity, to restore the promise of univocal unity, without diminishing "ontological complexity" (Desmond 1995a:143). The way towards this more complexly articulated unity is *through* the contradiction of the equivocal itself. By thinking through the indetermination of the equivocal, dialectic aims towards a more "differentiated and inclusive determination" (Desmond 1995a:144). For Desmond (1995a:144), dialectic means a complex determinacy that is "more richly articulated than univocity, and a wholeness more integrated than the equivocal".

The dialectical sense of being aims to *think through* contradiction and ambiguity, and strives to approach or tackle the equivocities of being with more intellectual finesse (Desmond 1995a:132). Where the univocal concerns the coming to be of determinate identity, and the equivocal concerns the interplay between indetermination and determination, the dialectical concerns both of these senses, as well as a mindfulness of the *happening of the between* (or the coming to be of *the between*) that allows both the univocal and equivocal senses to be (Desmond 1995a:132). The dialectical sense of being aims to be mindful not only of the

interplay between the univocal and the equivocal, but also of the coming to be of the "between itself" (Desmond 1995a:132). Dialectic does not concern the absolutisation of univocal *sameness*, nor the absolutisation of equivocal *difference*, but a mode of thinking that resolves the contradictions between univocity and equivocity through *mediation* (Desmond 1995a:132).

According to Desmond (1995a:136), the essence of dialectic concerns *mediation*, especially the mediation between indetermination and determination. The promise of dialectic is to "move from an initial condition of perplexity and disagreement, through both of these as further developed or mediated, towards some condition of rational agreement, where the initial perplexity is alleviated in a more or less determinate answer to the initial question" (Desmond 1995a:136). In other words, dialectic is a way of reasoning that resolves the pressing perplexity of a question (a disagreement, contradiction, or opposition, for example), without diminishing the inherent paradoxes. It is a "mediating process that takes place in the give and take of question and answer" (Desmond 1995a:138).

Dialectic, according to Desmond (1995a:133, 253), is an integral part of the tradition of philosophy and "a major and wide-ranging concept, meaning a number of things to different thinkers". Various philosophers have contributed to the discussion on dialectic throughout the history of metaphysics – starting with Zeno,[9] to Socrates, Plato, Aristotle, Kant, Nietzsche, and finally, Hegel. For Plato, as referred to by Desmond (1995a:133, 137), dialectic is the "supreme philosophical art" and concerns the highest form of philosophical thinking. Plato views dialectic as a method of thinking through perplexity to resolve contradiction and to uncover the primal essence of a thought, idea, or proposition (Desmond 1995a:137). For Plato, dialectic is a powerful mode of reasoning, not only concerned with the interplay between a standpoint and its objection (typical in philosophical debate), but with the "movement of thinking at the highest level of ultimate intelligibility in which hypotheses are traced back to their ultimate origin (archē)" (Desmond 1995a:137).

This *archē* of being towards which the dialectic is directed – the origin of being it aims to uncover through a specific process of thinking, points to the origin of being as "excessive", as the 'excess' or 'plentitude' of being (Desmond 1995a:138). Although dialectic emphasises intelligibility and resolved unity, according to Plato, a mature form of dialectic does not aim to

[9] Both Aristotle and Hegel regard Zeno as the inventor of dialectic (Desmond 1995a:133).

reduce this “excess” to absolute univocal categories, but remains *open-ended* (Desmond 1995a:138). According to Plato (in Desmond 1995a:138), a sophisticated form of dialectic is respectful of the excess of being, or the “excess of transcendence” in being, and acts as a ‘bridge’ between transcendence and human mindfulness. Dialectic aims to think through and *beyond* contradiction, to make intelligible sense of complex concepts or phenomena through mediation.

When we turn from Plato to Aristotle and the sophists,[10] there is a depreciation of the “excess of being” and a tendency to formalise and over-rationalise the dialectic “movement of mindfulness” (Desmond 1995a:138). The sophists were masters of rhetoric, who turned dialectic into an “instrumentalized strategy of thought that could be directed to contradictory ends” (Desmond 1995a:135). The sophists used methods of dialectic to make weak arguments appear strong and strong arguments appear weak. In this way, Nietzsche (in Desmond 1995a:135) interprets dialectic as another form of the *will to power* – a mode of reasoning concerned with “conquering the other, rather than pursuing the truth”. This “instrumentalization of mind and truth” is what Plato fought against to protect the integrity and essence of dialectic (Desmond 1995a:135).

The essence of dialectic does not concern the “systematic determinacy” of Aristotle or the sophists, but a way beyond contradiction through *mediation* (Desmond 1995a:138). This mediation, in dialectical terms, concerns the relation *between beings* in the happening of the between, as well as the *nature* of the between itself (Desmond 1995a:138). How, then, does the dialectical relate to beings in the between? If the univocal sense is mindful of the determinate identity of beings, and the equivocal mindful of the becoming of beings (the interplay between indeterminate *difference* and determinate *identity*), how is the dialectical mindful of beings in the between?

Dialectic aims to reflect the complex determination of beings in articulated form, while also being mindful of the *process of coming to be* of determinate beings (Desmond 1995a:144). Determinate beings are there, in the happening of the between, because they have come to be. Beings are driven forward by an intrinsic “ontological power to be” – to develop, to grow, to evolve, and eventually, to pass on (Desmond 1995a:144). Determinate beings, as having

[10] In fifth and fourth centuries BC, the sophists were a group of philosophers in ancient Greece. The term “sophist” relates to *Sophia*, the ancient Greek name for “wisdom”. The terms “sophist” and “philosophy” both refer to the *philos of Sophia*, or the “love of wisdom”.

beginnings and ends, move in and out of being. Dialectic aims to do justice to this reality of beings in the between, by making intelligible the interplay between beginning and end; indetermination and determination; continuity and discontinuity (Desmond 1995a:144).

Dialectic aims to articulate this interplay, between univocal *being* and equivocal *coming to be*, as two voices part of a larger, encompassing "process of coming to be" (Desmond 1995a: 145). This process is a creative development, a passage, a transition – from indetermination to determination, and back again. Being is in constant creative flux, as beings move in and out of determinate form. For Desmond (1995a:145), the word *trans* is notable in "transition", as it refers to a "going across", a "crossing over", or, "transcendence". For Desmond (1995a: 145), there is a transcendence at work in the coming to be of being, an *immanent transcendence*.

This immanent transcendence is intimately at work in all beings, in such a way that no being is absolutely static (Desmond 1995a:146). As Desmond (1995a:146) explains, "everything is dynamized, and the unfolding of the dynamism is neither an inflexible order nor is it completely disordered". The dynamism of being shows the "prodigal power of creation" that works endlessly and continuously to stabilise beings determinately in the happening of the between. These are beings with "myriad relations to other beings, beings with intricate modes of self-relativity, beings that exemplify the power of immanent transcendence in their species or singular way" (Desmond 1995a:146). Each being, each species in its own finitude, no matter how big or small, resembles the complex, dynamic, and infinite transcendence of being at work in creation (Desmond 1995a:146). Thus, dialectic aims to be mindful of the intricate processes of becoming inherent in being that transcend univocal or purely *mathematical* ways of knowing.

A univocal and mathematical mode of knowing stresses the notion of *external relativity* where parts are connected "from the outside", rather than *internal relativity* where beings are driven to connect by an intrinsic agency (Desmond 1995a:146). As Desmond (1995a:146) explains, in mechanical relations "terms do not inherently have relations to other terms, nor is there any dynamism inherent in the terms that would drive them into relativity to other terms". To view being purely as "mechanism" is to reduce the intrinsic, intimate, and natural relativity between beings to mere 'mechanical processes' (Desmond 1995a:146). Thus, dialectic tends to think of being as an *organic* entity, rather than a *mechanical* system composed of unrelated parts.

To view being, in dialectical terms, as an organism rather than a machine, implies that being is a "whole unto itself" (Desmond 1995a:147). This is not to say that an organic being has no relations to other beings, but all relations within and without are there to support and sustain the integrity of the being itself. As Desmond (1995a:147) explains, being (as a living entity) is concerned with developing itself for itself, and its "interplay with the environment of other-being is with the view to furthering the unfolding of its own ontological possibilities". The ontological richness of being transcends both univocal *mechanism* and equivocal *difference*, and demands more nuanced ways of knowing. Thus, dialectic aims to articulate this richness through a language or terminology that reflects being's organic, creative, and transcendent nature (Desmond 1995a:147).

It follows that, if being is understood dialectically as an organism, it implies that being is driven to develop itself for the sake of itself (Desmond 1995a:147). Through a dynamic process of "self-pluralization" an organism grows and develops into its own complex identity. An organism develops itself, and its own unique characteristics, out of its own "immanent resources" and through the interaction with its external environment (Desmond 1995a:147). This *self-pluralization* is not "a mere self-doubling as a self-splitting, or negation of univocal identity", rather, it is the process of constituting itself at a more complex level of mediated determinate being (Desmond 1995a:147). An organism aims to develop itself, to *self-pluralize*, in order to sustain its own dynamic integrity. This, for Desmond (1995a:147), points to an essential process of dialectic, that of *self-mediation* and *self-determination*.

The organic entity, understood dialectically, is a complex network of various interconnected relations sustained through self-mediation. The organic entity "mediates with itself, mediates with itself out of its own resources" and "mediates with itself in interplay with the environment of being-other to which it is related" (Desmond 1995a:147). The process of self-mediation is key to an organism's development, growth, and formation as a unique identity. This is not to say that organic being exhausts the dialectical sense, but it points to essential principles of dialectic – that of *self-development*, *self-relativity*, and *self-mediation*.

The notion of self-mediation is particularly central to Hegel's interpretation of dialectic. How this notion of self-mediation tends to dominate Hegel's philosophy of dialectic is referred to at the end of this section. Various philosophers, as mentioned above, have contributed significantly to the discussion on dialectic, but none more so in recent history than Hegel

(Desmond 1995a:135). For Hegel, dialectic concerns both a way of thinking *and* the nature of being itself (Desmond 1995a:175). Being, for Hegel, is ultimately a dynamic dialectical entity – an interplay between self and other, and sameness and difference, that can be articulated through a process of intelligible determination (Desmond 1995a:134). Thus, dialectic concerns the "articulation in intelligible saying of that interplay, with respect to both mind and being" (Desmond 1995a:134).

According to Hegel, dialectic, as a way of thinking and the nature of being, concerns two major concepts, that of *conflict* and *articulation* (Desmond 1985:253). Firstly, Hegel's dialectic aims to deal with conflict, antithesis, and opposition in a way that resolves contradiction (Desmond 1985:253). As Fritzman (2014:1, 2-5) explains, Hegel is a philosopher who "thinks things through to their conclusions and links them together"; whose central philosophical project is "reconciliation" by overcoming dualism and skepticism. For Hegel, neither conflict nor opposition hinders our ability to understand being, but in effect drives it forward. Central to Hegel's dialectic, as Brincat (2009:456, emphasis in original) explains, is the "grasping of opposites in their unity, the positive *in* the negative".

Secondly, Hegel's dialectic concerns *articulation*, especially the articulation of the origin of being, or the beginnings of being (Desmond 1995a:168; 1985:253). For Hegel (in Desmond 1995a:168) being at the beginning is without articulation, it lacks intelligibility. All a philosopher can resort to, or is tempted to resort to, concerning the beginning of being, is "that it is" (Desmond 1995a:168). Although being at the beginning is marked by incomprehensibility, according to Hegel (in Desmond 1995a:168), there is an intrinsic drive in being to develop itself into an articulated "network of relations and universals". Dialectic concerns this "drive" towards articulation and the development of intelligibility concerning the interplay between indetermination and determination (Desmond 1995a:168). Dialectic articulates the dynamic movement from "inarticulated immediacy" (the beginning of a 'concept', for example) to its diversification into dualistic opposition (the objection of a 'concept'), and its return to a mediated, articulated unity having passed through opposition. Dialectic, in other words, involves the dynamic interplay between univocal *affirmation* and equivocal *negation* (Desmond 1995a:168).

Dialectic is thus, a dynamic thinking process that concerns *conflict*, the reconciliation of that conflict, and the *articulation* of the complex movement between indetermination and determination. For Hegel, dialectic does not refer to the movement from thesis through

antithesis to synthesis as three discrete concepts, but refers to these stages as “moments” that form part of a single concept (Beckett 2017:8; Fritzman 2014:3). Dialectic is not a process where two opposing concepts meet with the aim to clash and overcome each other, but a process by which “both thesis and antithesis emerge simultaneously” to achieve a synthesis (Beckett 2017:9). This means the determination of the thesis involves the simultaneous development of the antithesis (Beckett 2017:9).

Hegel’s dialectic, according to Desmond (1995a:149), has a definitive goal or end in mind. The end of dialectic will not be “a vague and amorphous dream of longing; it will be the outcome of the process of determination which, in fact, it is claimed now, is a process of *self-determination*” (Desmond 1995a:149, emphasis in original). Desmond (1995a:169) agrees with Hegel, that dialectic allows the articulation of a certain “mediated reintegration” or resolved determination, but disagrees with Hegel in the way his dialectic aims to resolve all ambiguity within its own *self-mediation*. There is an intrinsic drive in Hegel’s dialectic to think through every possible contradiction until all is mediated. As Desmond (1995a:168) explains, “there is a *telos* in this repetition in that the dialectical process is driven forwards at each point by the failure of consciousness, or self-consciousness, or reason, or spirit to achieve complete mediated identity with itself”. In this respect, the ‘otherness’, difference, or paradox of being is reduced and totally consumed in the dialectical process (Desmond 1995a:169).

Mind and being become one, as being, in Hegel’s interpretation of dialectic, is subsumed by the “pure self-determination of thought thinking itself” (Desmond 1995a:169; 175). The ultimate aim for Hegel’s dialectic is a “self-knowing that is absolutely self-mediating” (Desmond 1995a:169). Being, as the “excess of ontological otherness”, is reduced to a mere thought category (Desmond 1995a:169). Where Desmond (1995a:169) sees the origin of being as overdetermined[11] richness, Hegel sees it as the lack of all determination, mere “nothingness”, and so trusts in dialectic to mediate all difference until all is consumed, subsumed, and determined.

[11] For Desmond (1995a:168), the primal origin of being, what he refers to as “aesthetic being”, the “excess of being”, or the “expansive plentitude of sensuous being”, is *overdetermined*. It is not merely indeterminate (as lacking determination or intelligibility), but overdetermined – it strikes mindfulness as a rich abundance that cannot be reduced to simple univocal categories. This astonishment before the *aesthetic immediacy* of being, for Desmond, is what drives metaphysical curiosity.

5.2 Design as dialectical: A co-development approach

It becomes obvious that dialectic is an important term in philosophy and integral to the development of metaphysics. This chapter has so far discussed the dynamics of dialectic and how it aims to articulate the complexity of being. Dialectic includes, but also moves beyond the univocal sense's concern with *absolute sameness* and the equivocal sense's concern with *absolute difference*. It is a powerful mode of reasoning that strives to think through contradiction and resolve perplexity in a larger, more encompassing wholeness. The dialectical way of reasoning is not only a constructive way to solve problems in philosophy, but also an effective way to approach the complexity of design (Beckett 2017:8). The logical structure of a design problem, that is, the relation between design problem and design solution, can be complex (Beckett 2017:8). For Beckett (2017:8), the most fruitful and effective way to approach the logic of the design problem is dialectically.

As Beckett (2017:5) explains, the design process may be complex, because the relation between design problem and solution is not always clear. It is often difficult to define the problem itself. Beckett (2017:5) refers to Simon, who explains that "design problems are essentially well defined; their intractability derives from the difficulty the problem solver may have in properly identifying the problem". Design problems that are difficult to define, that are "ill-structured" and may lead to varied solutions, are referred to by Rittel as *wicked problems* (in Buchanan 1992:15). A linear model of design concerns "determinate problems which have definite conditions", whereas a *wicked problems* approach suggests that some design problems are inherently indeterminate, complex in nature, and require more nuanced approaches (Buchanan 1992:15).

In an effort to develop more nuanced approaches to complex problems, theorists are moving away from the interpretation of design problem and solution as two phases in a linear process, but consider the design problem and solution as two *moments*[12] of the same concept that develop together (Beckett 2017:6; Cross 1997:317). For Cross (1997:317), such a design approach implies that "partial models of the problem and solution are constructed side by side". It does not entail the static determination of a problem and the realisation of its

[12] To reduce the process of design to just "two" moments (namely 'problem' and 'solution') might be an oversimplification, since design processes involve multiple facets that cannot necessarily be reduced to "two" moments alone. What Beckett (2017:6) is suggesting though, is that the design process (which includes 'problem' and 'solution') is *one* concept that undergoes different phases in its development.

corresponding solution, but the simultaneous co-development of both problem and solution (Beckett 2017:6).

The designer's role in the design process is to *reinterpret* and *reframe* the design problem. Reframing the attributes of the problem, understanding it from different angles, might uncover inaccurate assumptions concerning the nature of the problem (Beckett 2017:6). Understanding the design problem as comprehensively as possible may lead to new insights regarding the design scenario[13] and its possible direction. According to this logic, the solution lies *in* the problem, or put differently, the problem *is* the solution. As Beckett (2017:6) suggests, "the pursuit of the design problem coincides with the discovery of its solution".

Although this approach may reflect the way design projects play out in reality more accurately, the logical relation between problem and solution remain problematic and paradoxical. Common sense would argue that a solution cannot precede a problem and that a solution must be deduced from a problem. How, then, are we to interpret the logic of a design scenario, as a process of co-development, in a way that resolves the inherent paradoxes it creates? Beckett (2017:8) suggests that the most effective way to do this, is to approach it dialectically.

In a dialectical design process, determining the attributes of the problem (*what it is*) means simultaneously determining the attributes of its determinate negation, of its solution (*what it is not* or *what it ought to be*) (Beckett 2017:8). When the content of the concept (the problem) is determined, its negation is also determined as that which it is defined against. In dialectical terms, a concept cannot be determined without also being negated, as its negation is a necessary part of its becoming a concept. Thus, the determination of a concept, understood dialectically, results in a thesis and antithesis whose relation needs to be reframed and resolved in the final moment of the dialectical process. Hegel describes this final phase of dialectic using the verb *Aufheben* in German (*sublate* in English), which can mean "to overcome", "to cancel", "to resolve", and also, "to preserve" (Beckett 2017:9).

In the last phase of the dialectical process, the relation between thesis and antithesis is reconfigured which results in a resolved synthesis. The division between thesis and antithesis is 'overcome', as both are united in a new relation. Their contradiction is also

[13] The term "design scenario" is used by Beckett (2017:10) to refer to a situation, like a design project, where a design solution needs to be created or proposed by a designer to a design problem.

"preserved", as the opposition of the antithesis is not demolished but integrated into the final synthesis (Beckett 2017:9). The synthesis of a dialectical process does not imply a *new concept*, but the reconfiguration of pre-existing content, as nothing is added or taken away. If the design process, understood dialectically, implies that nothing is added to or taken away, what then, is the role of the designer?

According to Beckett (2017:10), the dialectical process is not self-driven as concepts "do not think themselves", but requires an impetus from a thinking subject. The design problem is not absolute or completely determinate; it lacks "objective existence" and therefore needs to be abstracted from the situation by the designer (Beckett 2017:10). The way the designer approaches, interprets, and frames the problem, determines the direction of the whole design project (Beckett 2017:10). The designer introduces the "teleological form" to the situation, that is, determining the difference between *how things are*, as opposed to *how they ought to be* (Beckett 2017:11). According to Margolin (2007:4), designers "occupy a dialectical space between the world that is and the world that could be".

In dialectical terms, the final synthesis of the design process involves the "negation of the negation" and the reconfiguration of the relation between problem and solution. In other words, the solution the designer is looking for lies in the problem itself, or, what the designer requires is *already present* (Beckett 2017:12). The solution lies in redefining and reframing the nature of the problem, which results in a shift of perspective. Interpreting the design process dialectically, does not necessarily imply a physical or material solution, it only illuminates the underlying logic of the design process. It may lead to solutions in material form, but a dialectical interpretation concerns, primarily, the logical structure of the design process as a subjective and cognitive activity (Beckett 2017:13).

In summary, a linear approach to design implies that problem and solution are distinct phases of a sequential process, whereas a dialectical approach implies that problem and solution are *moments* of the same concept that develop together. The designer thinks through the complexity of a design scenario to determine the nature of the problem. Any attribute of the problem (*as things are*), is negated in the solution (*as things ought to be*), and vice versa. In the final synthesis of the design process the division between problem (thesis) and solution (antithesis) is bridged, and the contradiction between problem and solution resolved. Thus, the solution lies in the reconfiguration of the design scenario, in a shift of perspective. With the afore mentioned in mind, the next section discusses examples that

exemplify both the *dialectical nature of design*, as well as a *dialectical approach to complex problems in design*.

5.3 Case study: Information infrastructures

This study now turns to examples in design that exemplify a dialectical approach. This section discusses examples that both reflect the *dialectical nature of design* (design as structure or system), and a *dialectical way to approach complex design problems* (as a way to design). This study suggests that the internet, as a complex, evolving, and open system (Hanseth & Lyytinen 2010:4) exemplifies the dialectical nature of design. This section starts by discussing how the internet does this and then discusses *Wikipedia*, the largest online encyclopaedia in the world and the sixth largest website on the internet, as a specific example of a dialectical approach to complex problems in design.

Hanseth and Lyytinen (2010:1) explain that the complexity and versatility of Information Technology (IT) solutions have increased dramatically in the last two to three decades. Complexity, in this regard, can be defined as "the dramatic increase in the number and heterogeneity of included components, relations, and their dynamic and unexpected interactions in IT solutions" (Hanseth & Lyytinen 2010:1). The increased complexity has demanded new and more suitable solutions from software engineers, information architects, and information designers[14] (Hanseth & Lyytinen 2010:1). Hanseth and Lyytinen (2010:2) explain that the internet is an example of a complex IT solution, that falls under the technical branch called *Information Infrastructures.*

Vint Cerf, who is recognised together with Bob Kahn as the co-founder and co-creator of the internet, explains that "the internet is really a design philosophy and an architecture expressed in a set of protocols" (The Internet: IP Addresses & DNS 2015). A protocol, or *internet protocol* (IP), is a set of rules, regulations, and standards that allow efficient communication between multiple devices across the globe. This specialised design philosophy allows "the internet to adapt and absorb new communication technologies" at a

[14] The term "information designer", in this chapter, refers to someone who is responsible for the structure, order, and communication of information, usually in digital environments associated with the internet. The term "information designer" is used as a synonym for the term "designer of *Information Infrastructures*", as referred to by Hanseth and Lyytinen (2010:2).

rapid pace (The Internet: IP Addresses & DNS 2015). The internet's ability to adapt new technologies easily and speedily contributes to its ever-increasing complexity.

Information Infrastructures (referred to in the singular as 'II' or in the plural as 'IIs') are notable for having social and technical dimensions. Social, in the way IIs need to regulate and manage relations between users and their preferences, and technical, in the way IIs need to adapt and embrace new technologies. As a result of the increasing complexity of IIs, information designers are faced with two specific problems. Firstly, the demands and requirements of the first users of an II need to be met, while also keeping the 'end result' or 'completeness of the design' in mind. This means adjusting specifications in real time, without losing sight of the ultimate aim of the II's design (Hanseth & Lyytinen 2010:2).

Secondly, during the period of rapid growth of an II (as perceived with the growth of the internet), designers need to "heed for unforeseen and diverse demands and produce designs that cope technically and socially with these increasingly varying needs" (Hanseth & Lyytinen 2010:1). The demands of users from an II can change abruptly and therefore the design of an II needs to be flexible, while maintaining the core integrity of its functionality (Hanseth & Lyytinen 2010:2).

Hanseth and Lyytinen (2010:1, emphasis in original) define an II, like the internet, as "a *shared*, *open* (and unbounded), *heterogeneous* and *evolving* socio-technical system". IIs are shared across multiple communities, through various platforms in different ways. They exhibit "unbounded openness" as new components, features, and functions are added in "unexpected ways and contexts" (Hanseth & Lyytinen 2010:4). The design of an II is distributed to multiple users as there is no singular 'designer' that controls the II. There are also no clear boundaries between those who may design IIs, and those who may not – it is an *open* system. According to Hanseth and Lyytinen (2010:4, emphasis in original), "II designs need to be approached *as if* no closure, in principle, is assumed in their form or content, capability, form or scope of access". As IIs are open to being reconfigured by limitless users, who enhance the infrastructure with new technologies, they become "increasingly heterogeneous" and evolve unceasingly (Hanseth & Lyytinen 2010:4). Thus, the internet, what Gillespie (2006:429) refers to as a "massively intricate technological system", is notable for being *shared*, *open*, *heterogeneous,* and *evolving*.

As a heterogeneous and evolving system, the internet exemplifies the dialectical dimension of design in two fundamental ways: firstly, in the nature of its structure and functionality, as discussed with reference to visual representations below; and secondly, as *a way to solve complex design problems*. Vinciguerra, Frenken, and Valente (2010:1969) investigate the evolution of the internet's infrastructure to uncover the most effective way to simulate computer network development.

Vinciguerra *et al* (2010:1971) propose that the principle of 'preferential attachment' has a profound impact on the internet's infrastructure and may prove the most effective way to simulate its development. By 'preferential attachment', Vinciguerra *et al* (2010:1971) mean that "new cities entering an infrastructure network will prefer to create links with nodes[15] that are already well connected, to profit from transfer opportunities". Cities that have been part of an internet infrastructure longer than others tend to become attractive 'hubs' for newcomers to the infrastructure, for they are already well positioned and make new connections possible more easily. Thus, the internet's infrastructure, as seen in the simulations done by Vinciguerra *et al* (Figure 15), develop organically around nodes that were introduced to the infrastructure at an early stage.

In the simulation, thicker lines between nodes indicate stronger and well-developed connections, where thin lines indicate new and developing connections. As seen in Frame B and C, strong connections form around nodes that were already present in Frame A. This indicates that the time of entry of a city ('node' or 'connection hub') into the infrastructure influences the future development of the infrastructure's geography. According to Vinciguerra *et al* (2010:1971), there is an inherent drive within the network to seek the best possible connections as to benefit from the most efficient "transfer opportunities".

Thus, the internet, as seen in the visual simulations of Vinciguerra *et al* (2010) (Figure 15), allude to the dialectical nature of design in two fundamental ways. Firstly, in the way the visual simulations illustrate the internet as a determinate being (something that *is*) and as a process of becoming (something that is *coming to be*). According to Desmond (1995a:144), the dialectical sense reflects the nature of beings as having beginnings and ends; births and

[15] A 'node', in computer network terminology, is a data point or connection point in a larger network. According to Fischer (2019), a 'node' is "any physical device within a network of other tools that's able to send, receive, or forward information". A personal computer is the most common example of a 'node' within a larger network of computers.

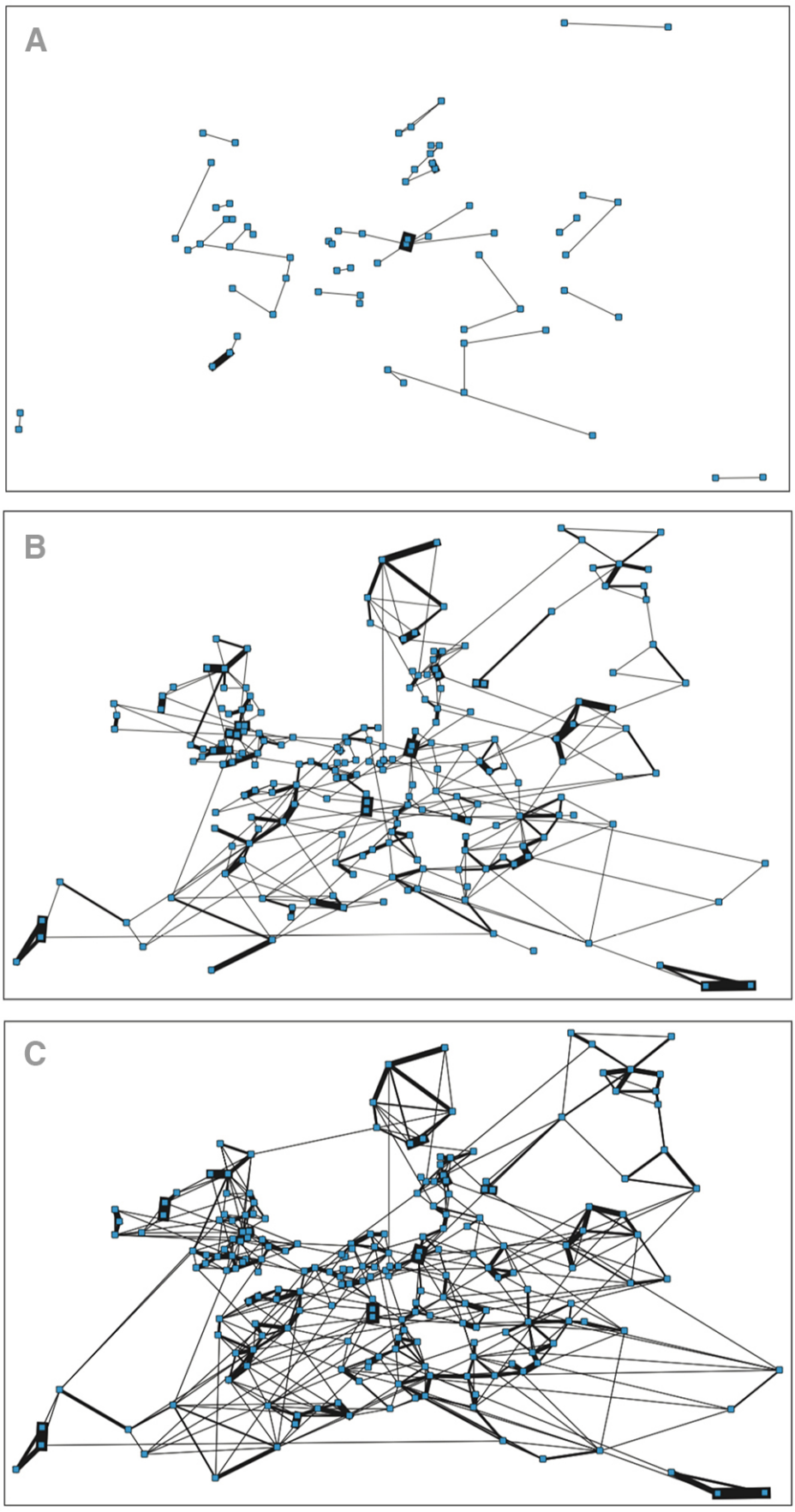

Figure 15: Vinciguerra *et al*, *Simulation of the internet's infrastructure over time,* 2010. (Vinciguerra *et al* 2010:1980).

deaths. Beings are driven forward by an intrinsic “power to be” – to develop, to evolve, and eventually, to pass on. Dialectic aims to render intelligible the interplay of being, between beginning and end, indetermination and determination, continuity and discontinuity (Desmond 1995a:144). This can be perceived in the development of the internet’s infrastructure as seen in Figure 15 from frame A to C.

In dialectical terms, the internet moves from *indeterminate beginnings*, where the connections between nodes are still new and developing (as seen in Frame A), to *determinate identities*, where connections are well-developed, stable, and more easily recognisable (as seen in Frame C). Connections in the internet’s infrastructure are not necessarily long lasting. Older technologies and connections are replaced by more advanced technologies and connections as the internet drives itself forward to become a more efficient and effective network of connections. In dialectical terms, referring to Desmond (1995a:147), the internet overcomes, almost naturally, *equivocal discrepancies* in search of a more efficient, complex, and integrated unity.

The internet is a *pluralizing*, *evolving* network, driven by an *immanent transcendence* to stabilise beings (like ‘connections’) determinately in the between. The dynamic *pluralisation* of the internet, in dialectical terms, is not an “inflexible order nor is it completely disordered” (Desmond 1995a:146). In other words, even though the internet diversifies and expands at a rapid pace, the internet’s functionality is held together by guiding principles that keep its core integrity intact. The internet’s development is not only guided by inherent principles, but by the complex interconnectivity between connections. Connections are defined by their relations with other connections. Desmond (1995a:150) would refer to this as the complex “community of relativity”, where “a thing is itself not only through itself but through its relativity to others, which themselves are what they are through their relativity to others”. The internet’s dynamic relativity can be described, to use Desmond’s (1995a:150) terminology, as the “universal interconnectedness of all things”. In summary, the internet depends on its dynamic *self-relativity* to grow, expand, and develop its own structure.

Another example that can be regarded to exemplify the dialectical nature of the internet, specifically the *organic nature* of the internet, is *The Opte Project: Mapping the Internet* (Figure 16) by Barrett Lyon (2003). The work formed part of an exhibition, *Design and the Elastic Mind*, at The Museum of Modern Art, New York City (MoMA) in 2008. According to Bittiner (2008), the exhibition aimed to provide “fresh perspective on the symbiotic and

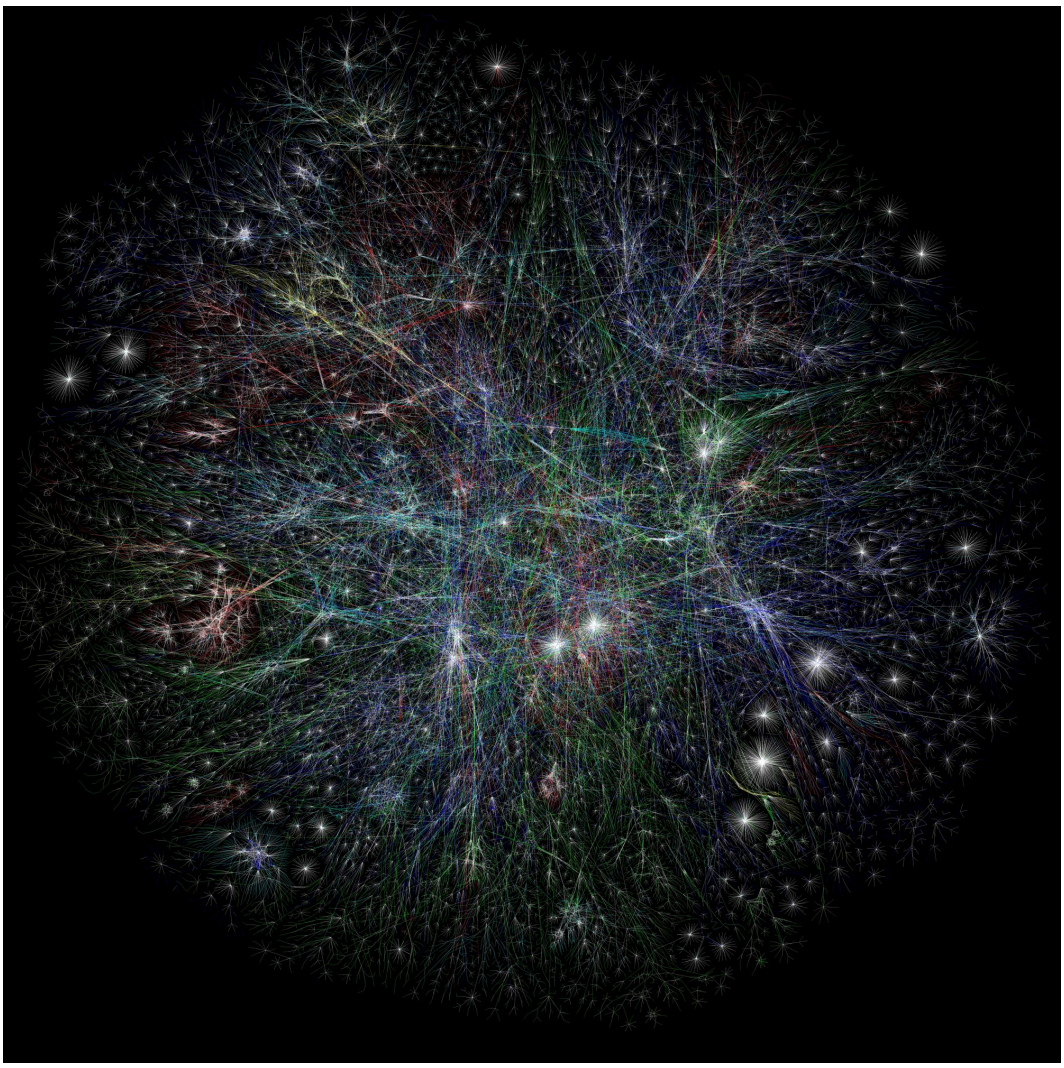

Figure 16: Barrett Lyon, *The Opte Project: Mapping the Internet*, 2003. (MoMA 2008).

evolving relationship between design and technology". In this work, Lyon aimed to visualise the intricate and complex infrastructure of the internet.

Lyon's *The Opte Project* (2003) serves multiple functions: that of "modelling the Internet, analyzing wasted Internet protocol (IP) space and distribution", and "detecting the result of natural disasters, weather, and war" (MoMA 2008). Each line represents the communication between two internet protocol (IP) addresses, where the length of the lines illustrate the delay between the two nodes and the colour of the lines indicate the physical location of the IP space. Red lines correspond to Asia and the Pacific Islands, for example, while dark blue lines indicate North America (MoMA Learning 2003). Lyon's visualisations can also, seemingly, detect the effects of world events, like natural disasters for example, as they are indicated by large-scale expansions of specific network connections (MoMA Learning 2003).

As seen in the visualisations by Vinciguerra *et al* (2010) and *The Opte Project* (2003) by Lyon, the internet consists of innumerable connections. Beings (like nodes and connections) within the internet's infrastructure are defined and determined by their relations to other beings. This *community of relativity* is not static, but adapts and evolves organically as older connections are replaced by new ones. For Desmond (1995a:147, emphasis in original), beings in the between, understood dialectically, "are not merely parts but *members* of the whole". As seen in *The Opte Project* by Lyon (Figure 16), the internet resembles the dynamic structure of a living cell or the complex neural pathways of the human brain. Thus, this visualisation supports the interpretation of the internet's infrastructure as an *organism*, rather than an *inanimate machine*.

For Desmond (1995a:147), the organic nature of being implies that being is a "whole unto itself". Although the internet is driven to expand, adapt, and pluralize at increasing complexity, the internal integrity of the connections are kept intact. The network works endlessly to sustain and support itself. In dialectical terms, Desmond (1995a:148) explains that "the pluralization of the determinate organic entity is not necessarily a rupture that undermines all integrity and identity". The diversification and expansion of the internet does not undermine its core identity, but points to the continuity of itself *in* the variation. As Desmond (1995a:148) explains, "the pluralization of the self of the organic being is still the self, and the self is reiterated in its variations over a span of becoming or genesis".

Thus, the internet, understood as a designed system and a dialectical organic entity, is sustained by the complex dynamism of *self-relativity*. According to Desmond (1995a:150), being understood dialectically, implies the "co-relativity of community" which "extends out and out into the web of universal togetherness". The internet, as a dialectical structure, aims to sustain its own 'universal togetherness' as all relations within and without are maintained to preserve its own integrity. It aims to develop itself for itself, as its interplay with the environment, or "environment of other-being", is determined by its drive to realise its "own ontological possibilities" (Desmond 1995a:147). The internet, as a dialectical system, transcends both univocal *mechanism* and equivocal *difference,* as it forms, reforms, and continually transforms into a more complex and integrated entity.

This section has, so far, discussed the nature of the internet and how it exemplifies the dialectical nature of design (as a designed system or structure). We now turn to a discussion of a dialectical way of solving complex problems in design specifically for *Wikipedia*.

According to Simon (in Garud *et al* 2008:351), a scientific or univocal approach to design requires “clear boundaries, stable preferences and fixed goals”. Problems designers face related to the internet do not necessarily concern ‘stable preferences’ or ‘fixed goals’. As the internet evolves, boundaries, preferences, and goals change and shift unceasingly. The website *Wikipedia* is an exemplar of such a complex and evolving entity that poses varying ‘problems’,[16] that may require a more nuanced approach (Garud *et al* 2008:351).

According to Garud et al (2008:360-361), the mission of *Wikipedia* is to make available an extensive and free encyclopaedia with the ability to provide information related to world events in real time, to every person connected to the internet around the globe. What makes *Wikipedia* unique as a digital infrastructure is that it is designed to grow infinitely by allowing limitless users to generate and modify pages on boundless topics, which blurs “the boundaries between user and producer” (Garud *et al* 2008:360). According to Livingstone (2015:497), *Wikipedia* is a “socio-technical system of heterogeneous actors and forces in constant motion, maintaining a tension that keeps the project stable and yet flexible”. Thus, *Wikipedia* concerns *rapid expansion* on the one hand, and *reliability and coherence* on the other.

The underlying design principles that guide the functionality of *Wikipedia*, as an “evolving knowledge project”, are incompleteness, alteration, and perpetual change (Garud *et al* 2008:361). The desired goal of *Wikipedia*, to provide extensive information on as many topics as possible, renders the infrastructure in a state of permanent ‘incompleteness’. As new information related to specific topics are uploaded to the website, new terms, facts, and concepts are added to the network that need to be defined and elaborated upon. Every ‘answer’ related to a topic generates new ‘questions’ or ‘problems’ instantaneously. Thus, both in the complex nature of the ‘problems’ the website poses and in the way the designers of the website find solutions, *Wikipedia* exemplifies a dialectical approach to design in two fundamental ways.

Firstly, the ‘problems’ the website aims to answer are not constrained within set boundaries, but change and evolve over time. These are the 'wicked problems' referred to by Rittel (in

[16] The term “problem”, as it is used in this section with specific reference to *Wikipedia*, does not imply a flaw in the structure or functionality of the website. It refers to new topics, facts or concepts uploaded by users to the network that require new definitions. In *Wikipedia’s* infrastructure, every new entry by a user is a ‘problem’ that requires a relevant ‘definition’, ‘answer’ or ‘solution’. These ‘problems’ posed by the nature of *Wikipedia*, demand a specific design solution.

Buchanan 1992:15) that cannot be solved through a straightforward linear approach. In dialectical terms, 'problems' within *Wikipedia* are generated as solutions are developed, and vice versa. The characteristics of the solution (the definition of new terms, facts, and concepts) generate the characteristics of new problems. This notion of co-development is what makes the relation between problem and solution, within *Wikipedia*, particularly dialectical.

Thus, the essential problem *Wikipedia* faces is how to produce a network of information expansive enough to keep up with the development of human knowledge, in real time, with a limited financial budget. This leads to the second way in which *Wikipedia* exemplifies a dialectical approach, which concerns not only the nature of the problem it poses (as discussed above), but also the way designers have gone about finding solutions. If the relation between problem and solution within *Wikipedia* were to be interpreted in a more linear way, the website would be rendered as a service provided by a specific group of producers to specific clients. This would imply a separation between an elite, often paid group of experts (who compile large amounts of curated information) and paying customers. Such an approach is exemplified by the *Encyclopædia Britannica*, for example (Garud *et al* 2008:360).

In contrast, *Wikipedia* advocates an 'open' platform that invites anyone in the world to contribute to the network of knowledge, either by starting a page concerning a new topic or editing an existing one. This allows the users of the website to help each other to create, edit, and share solutions related to specific problems (Livingstone 2015:506). According to Pentzold (2010:713), *Wikipedia* can be described as an "ethos-action community". This means that membership, participation, and quality of contributions are guided by two essential principles: firstly, in the acceptance of *Wikipedia's ethos* by users, which includes values like 'openness',[17] 'fairness', 'participation', and 'quality'; and secondly, in *actions* (like edits and contributions) that reflect those values.

In dialectical terms, the solution has been achieved by 'reframing' the problem. The problem, initially, was the vast amount of users that require specific information on numerous topics.

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[17] Although *Wikipedia's* ethos may include values like 'openness', the final published articles and pages are still curated by an elite group of editors who strive to publish entries of the highest quality possible. This means that *Wikipedia* may strive to realise the values of complete 'openness' and 'participation' in theory, but that these will give way to values like 'quality' and 'coherence' in practice. This is particularly relevant with entries that regard controversial topics.

Instead of trying to generate that amount themselves, which would be impossible, the designers of *Wikipedia's* infrastructure created a platform where these users could interact with each other, contribute to a 'collective human intelligence', and strengthen the quality of entries in real time (Livingstone 2015:497). In dialectical terms, the designers thought through the complexity of the scenario, 'reframed' the problem, and realised a working solution by reconfiguring the components that were already present.

The solution was achieved not by adding or subtracting something from the design scenario. The vast amount of users with their unique reserves of knowledge and various demands, which was the problem initially, became the solution. Thus, *Wikipedia* exemplifies a dialectical approach to design, both in the nature of the problem and in the way the designers have gone about realising a working solution. A dialectical approach highlights the fact that problem and solution are not necessarily separate concepts in a linear process, but different *phases* of the same concept that develop simultaneously.

This section set out to describe the design and functionality of the internet, as well as *Wikipedia*, as accurately as possible with reference to the sources consulted, but the author of this study admits that this description does not exhaust the complexity of the internet. As Gillespie (2006:428) argues, the relationship between language and technology can be very complex. According to Gillespie (2006:428), "lawyers, politicians, users, educators, parents, and advertisers" debate on social and political levels what the internet is and what it should be used for, but are not necessarily experts in computer network engineering or its terminology. I have aimed to reflect the sophisticated nature of the internet, with reference to the sources consulted, without assuming complete knowledge of the internet's complexity. This, in a certain sense, speaks to the dialectical nature of the internet as well, for its intricate and expansive complexity transcends absolute univocal knowing.

5.4 Design as dialectical and metaphysical thinking

In this section, to clarify and summarise the above, I highlight a few essential ways in which the internet exemplifies the dialectical nature of design and ways in which *Wikipedia* exemplifies a dialectical approach to design. As discussed with reference to the visualisations by Vinciguerra *et al* (Figure 15) and Lyon's *The Opte Project* (Figure 16), the internet exemplifies the dialectical nature of a designed structure (or system) in at least three ways. Firstly, in the way it embodies the dynamic interplay of being, between indetermination

and determination; beginnings and ends; continuity and discontinuity. Nodes and connections begin as *indeterminate beings* in the early stages of the internet's infrastructure, but develop into *determinate identities* through the internet's development.

Secondly, the visualisations by Vinciguerra *et al* (2010) speak to the *self-relativity* intrinsic to the internet. Beings, like nodes and connections, are determined through their relations with other beings. The connections of the internet, both new and more established, are maintained to sustain the integrity of the internet's identity and functionality. The internet is a complex *community of self-relativity*, interested in developing its "own ontological possibilities" (Desmond 1995a:147). According to Hanseth & Lyytinen (2010:4, emphasis in original), "recursion forms the organizing principle implying that *Information Infrastructures* return 'onto' themselves by being composed of similar elements". The internet is a dynamic entity that establishes itself through diversification and pluralisation.

And thirdly, the internet can be considered to be an *organic organism*, rather than an *inanimate machine*. Its configuration resembles the dynamic structure of a living cell or the complex neural pathways of the human brain. According to Desmond (1995a:147), being as an organic organism is a "whole onto itself". Where a mechanical device is marked by "external relativity" (Desmond 1995a:146), an organic being is driven by an intrinsic relativity towards other beings. Read dialectically, the internet sustains, supports, and maintains itself through its own complex network of relations.

As discussed with reference to *Wikipedia*, its structure and functionality can be seen to exemplify a dialectical approach to complex design problems in two essential ways. Firstly, in the nature of the 'problem' itself. Problems posed by *Wikipedia* are essentially 'wicked', as they do not have clear boundaries or fixed solutions. New entries uploaded to the network generate new 'problems' that require further elaboration and refinement. In dialectical terms, the problems develop with the solutions, and vice versa. Secondly, *Wikipedia* exemplifies a dialectical approach in the way the designers of the network find solutions. Instead of trying to produce the vast amount of information required themselves, the designers of *Wikipedia* put a digital platform in place where users can help each other to generate, revise, and share knowledge on various topics. The limitless amount of users, which was the problem initially, became the solution. Thus, the solution was achieved not by adding or subtracting any content from the design scenario, but by 'reframing' the relation between problem and solution.

The internet, as a *shared*, *open*, *heterogeneous,* and *evolving* socio-technical system (Hanseth and Lyytinen 2010:1) transcends the univocal sense, as it continuously moves beyond the boundaries of any form of determinate knowing. It is a complex system of interrelated connections that keep evolving, transforming, and expanding. The internet's ever-increasing expansion does not necessarily imply that it lacks determinate identity or integrity, for it resolves all equivocal contradictions and discrepancies through a process of *self-mediation* – moving towards a more complete form of *self-determination*. Both the internet and *Wikipedia* aims to resolve all equivocal discrepancies and inconsistencies within their own systems to become more efficient, effective, and productive.

5.5 The limitations of a dialectical approach to design

As discussed in this chapter, a dialectical approach to design includes the univocal and equivocal senses, but transcends both. It moves beyond the rational boundaries of univocal knowing and resolves the contradictions and inconsistencies of the equivocal through *self-mediation*. A dialectical approach concerns not only the univocal determination of beings, or the equivocal interplay between indetermination and determination in the between, but also the nature of the between as a *community of relativity*. This chapter has referred to the internet, *an open, evolving, and heterogeneous system*, as a designed entity that exemplifies the dialectical nature of design. The internet is a dynamic network of connections that strive to sustain and support itself for itself. It can thus be considered to be a complex *community of self-relativity* as all its relations, within and without, are maintained to enhance its own efficiency. This notion of *self-relativity* and *self-mediation*, according to Desmond (1995a: 169), is what signifies Hegel's interpretation of dialectic.

Desmond (1995a:169) maintains that the *self-mediation* and *self-determination* of Hegel's dialectic leaves no room for true 'otherness' to exist, as it aims to mediate all contradictions within itself. Dialectic, understood in this way, implies *thought thinking itself*. It is a complex and integrated unity, but according to Desmond (1995a:169), still a 'closed' unity. It can only grasp, understand, or interpret what it can mediate through its own powers. Desmond (1995a:169) argues that there is 'more', as the *excess of being* cannot be reduced to the outcome of a dialectical process. There is an 'otherness' to being that dialectic cannot fully account for. It transcends the mediated, all-encompassing wholeness dialectic means to offer. To acknowledge, interpret, and aim to understand the 'otherness' of being as truly

'other', and not as another equivocal component to be mediated or subsumed by dialectic, we need to move beyond the dialectical sense of being.

5.6 Towards a metaxological approach to design

This study has, up to this point, discussed the univocal, equivocal, and dialectical senses of being as developed by Desmond, and how they relate to design. The dialectical sense, according to Desmond, *includes and transcends* the univocal and equivocal senses. According to Desmond (1995a:132), dialectic speaks to an integrated unity beyond the equivocal sense's emphasis on 'difference' and beyond the univocal sense's emphasis on 'sameness'. Although dialectic is an effective 'way' or mode of reasoning to solve complex problems in philosophy, as well as in design, Desmond (1995a:177) suggests that there is a sense of being that transcends dialectic. For Desmond (1995a:177), the *metaxological sense of being* is an articulation of being, or way to relate to being, that moves beyond dialectic. Thus, the following chapter discusses the metaxological sense of being and how it relates to design.

CHAPTER SIX: DESIGN AS METAXOLOGICAL

6.1 An introduction to the metaxological sense of being

The preceding chapters have dealt with the univocal, equivocal, and dialectical senses of being. This study has examined their unique philosophical characteristics and how they inform different approaches to design in varying contexts. Still, there remains more to be explored. As Desmond (1995a:177) suggests, "we have come some distance, and still we have some distance yet to go". For him, this distance yet to go implies the metaxological sense of being (Desmond 1995:177). According to Desmond (1995a:181), the essence of the metaxological sense of being is a mindfulness that *being is given* – we do not produce or conceive being, but receive it as an agapeic[18] gift. This notion is the origin, foundation, and impetus of Desmond's philosophical discourse.

For Desmond (1995a:177), being's givenness "reappears over and over, redoubled in excess of any dialectical reduction to a monism of self-mediation". There is an 'excess' to being – in its origin, its middle, and its end, that cannot be completely subsumed by univocal knowing or dialectical self-mediation (Desmond 1995a:181). According to Desmond (1995a:177), as previously discussed, the univocal, equivocal, and dialectic senses of being aim to articulate the nature of being's 'excess' each in their own way with their unique strengths and restrictions. The metaxological sense aims to do the same, but remains mindful of the "excess of being's plentitude" that cannot be completely mediated (Desmond 1995:177). For Desmond (1995a:177), the metaxological sense of being concerns the following:

> If univocity stresses sameness, equivocity difference, dialectic the appropriation of difference within a mediated sameness, the metaxological reiterates, first, a sense of otherness not to be included in dialectical self-mediation, second, a sense of togetherness not reached by the equivocal, third, a sense of rich ontological integrity not answered for by the univocal, and fourth, a rich sense of ontological ambiguity not answered for either by the univocal, the equivocal, [or] the dialectical.

The metaxological sense of being seeks to articulate the relation between being's irreducible "otherness" and being's intrinsic "togetherness" in a way that transcends dialectical self-mediation (Desmond 1995:177). The term "metaxological" is a neologism of Desmond that

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[18] The term "agapeic" comes from *agape*, a Greco-Christian term used to refer to God's boundless, all-embracing, self-sacrificial, and unconditional love. According to Grant (1996:4), *agape* refers to the "overflowing of divine plenitude", which is not be confused with *eros* (sensual or sexual love) or *philia* (friendship or mutual affection).

refers to a *logos*, meaning word or account, of the *metaxu*, meaning 'the between' or 'the middle' (Desmond 1995a:178; Simpson 2009:32). For Desmond (in Simpson 2009:32), the term "meta" in both *metaphysics* and *metaxological*, refers to that which is 'between' (immanent) and that which is 'beyond' (transcendent). The metaxological is a philosophical articulation of the nature of the between, the dynamic relations that constitute the *happening of the between*, and that which transcends the between.

According to Simpson (2009:32), the metaxological is a philosophical discourse *of* the middle and *in* the middle, as it articulates the space between univocity and equivocity. It can be argued that it tries to "redeem the promise of equivocity beyond univocity and dialectic", for it remains mindful of that which cannot be reduced by any form of mediation (Desmond 1995a: 178). The metaxological includes the partial truths of the univocal, equivocal, and dialectical senses regarding the nature of being, but in a more complex and nuanced way.

As a more complex articulation of being, the metaxological sense aims to acknowledge the "too muchness" of being, as well as the mystery of being that passes "beyond all determinate knowing" (Desmond 1995a:181). For Desmond (1995a:208), the mystery of being is not undetermined or merely unintelligible, but 'overdetermined' and 'overfull'. Being's fullness, its *over-fullness*, is "too much for us, often too much with us, for us to be able to think it" (Desmond 1995a:208). Despite our efforts to make sense of being univocally or dialectically, the rich "excess" of being still escapes the complete grasp of our rationalising capabilities (Desmond 1995a:181).

The metaxological aims to articulate the "excess" of being, its relation to the happening of the between (as *immanent transcendence*[19]), and its relation to human mindfulness (Desmond 1995a:181). Whereas dialectic, as discussed in Chapter Five, sets out to overcome the excess of being through self-mediation (mediation directed towards the completeness of self), the metaxological seeks to keep the integrity of this excess intact by not reducing the complexity of its 'otherness' (Desmond 1995a:177) The metaxological seeks to articulate the 'excess' and mystery of being's 'otherness' within a larger, more integrated, and more complex "community" of mediation (Desmond 1995a:177).

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[19] For Desmond (1995a:181), the term *immanent transcendence* relates to the intrinsic "creative power of being". This power of creative being is at work in both the depth of every being (the inner intimacy of each being), and in the outward drive of every being towards a *telos* of self-becoming and self-development (which is beyond the self).

For Desmond (1995a:179), the overdetermination of being, the “plentitude” of being, is an “original dynamism of being that cannot be finalized or fixed”. The three senses of being discussed in the preliminary chapters relate differently to this plentitude of being. Firstly, the univocal sense aims to simplify the overdetermination of being by rendering it as definite. The univocal aims to overcome being’s indefiniteness through its “fixed determinations of being” and systematic thought categories (Desmond 1995a:179). The univocal cannot tolerate the ambiguity of being’s plentitude and aims to reduce it to comprehensible components.

Secondly, within the equivocal sense there exists a mindfulness of the “indeterminate beyond univocal determinacy” (Desmond 1995a:179). The equivocal aims to articulate the *process of becoming*, or the ’creative power of being’, which causes the emergence of “variability and diversity” (Desmond 1995a:179). Although the equivocal is sensitive towards the indefiniteness beyond the univocal and mindful of the complex diversification of being, it tends to overemphasise ‘difference’ and ‘dissimilarity’. The equivocal does not see the possibility of mediation within being’s diversity and renders the *interplay between determinacy and indeterminacy* as merely “indefinite” (Desmond 1995a:179).

Thirdly, the dialectical sense is mindful of the interplay between determination and indetermination, but, unlike the equivocal, does not render it as ‘indefinite’, but rather as “intelligibly mediated” (Desmond 1995a:179). In dialectical terms, the determinate is defined by the indeterminate, and vice versa, as “each would not be what it is without the other, and hence each is necessary for the other” (Desmond 1995a:180). Dialectic sees the determinate and indeterminate as different phases of a *self-mediating* process. The dialectical sense suggests that the negation of the indefinite “will not produce another indefinite, but an affirmative determination” (Desmond 1995a:180). The dialectical sense, similar to the univocal, endeavours to overcome the overdetermination of being, the perplexing plentitude of being, by mediating all possible contradictions through a process of *self-negation* (Desmond 1995a:180). Moreover, the dialectical process of self-mediation aims to subsume being’s plentitude, its overdetermined ‘otherness’, until all indefiniteness is made determinate (Desmond 1995a:180).

However, for Desmond (1995a:180-181), there remains an ‘excess of being’ that cannot be totally subsumed by dialectic’s self-mediation. The metaxological sense, for Desmond (1995a:181), is mindful of this excess *before* and *after* dialectic’s attempt to determine being absolutely. The metaxological reminds us of the irreducible ‘more’, the surplus of being,

which is there in the beginning and there in the end (Desmond 1995a:181). It reminds us to be aware of the "transcendence of being", that which exceeds absolute determination, and to see "*beyond* the work of self-mediation to the overdetermined as other" (Desmond 1995a: 180, emphasis in original). For Desmond (1995a:181), this excess is evident in the beginning, in the end, and in the middle (or in *the between*) of being.

The between, or happening of the between, as discussed with reference to the equivocal, is marked by the interplay between determination and indetermination. This interplay relates to the *coming to be* of beings, to singular selves moving in and out of being (Desmond 1995a: 181). Even in their singularity, finite beings cannot be "absolutely fixed" and radiate with the excess of transcendence (Desmond 1995a:181). The metaxological is thus acutely aware of the irreducible "excess" of being, both in relation to finite beings (singular selves) and to the *plurality* of beings (beings in community) (Desmond 1995a:182).

At this point, let us reflect on the metaxological nature of singular beings as 'showings of excess', and then on the dynamic nature of beings in community. For Desmond (1995a:182), to say that beings are "showings of excess", means "they are concretions of transcending power" beyond the confines of their finitude. In metaxological terms, singular beings are given to be, they do not produce or create themselves to be. Finite beings are given to be by what Desmond (1995a:184) calls an "other transcendence", a source beyond complete determination, and thus the givenness of a being exceeds its determination as a specific type of being. In other words, a being's very existence, its '*that it is at all'*, is prior to its determination as a kind of being. There also exists a uniqueness, a certain irreplaceability to each individual being. Beings exist once and only once, never to be repeated again (Desmond 1995a:184).

Each individual being does not create its own life, but is given to be fully and uniquely itself by a source other than itself (Desmond 1995a:185). This is what Desmond (1995a:185) calls an 'overdetermined origin'. The value of each being lies in the fact that *it is at all*, that it exists, and not in the way it can be determined, analysed, or known by univocal or dialectical processes. According to Desmond (1995a:185), the irreplaceability of each being, as a "radical once", is not a being that is simply "closed for-itself". It is for-itself, but it is first and foremost *given* to itself to be itself (Desmond 1995a:185). Each being, in its singularity, experiences the intimacy of being with "what is not itself but that gives it to itself as for-itself" (Desmond 1995a:185).

For Desmond (1995a:185), each being is given the gift to be and owes its unique existence to an agapeic source. It therefore cannot be closed off to others with the aim to sustain itself and only itself. The metaxological is mindful of beings' 'otherness' as other, and not as mere indefiniteness that needs to be dialectically self-mediated. Each singular being, as a showing of 'excess' and 'otherness', shimmers with transcendence (Desmond 1995a:185). As Desmond (1995a:187, emphasis in original) explains, "the excess of the *that it is*, immanent in every singularity, given by the absolute origin, out of nothing, is an agapeic gift". The metaxological reminds us of the transcendental 'more' in the singular being.

Singular beings transcend complete determination in their givenness and irreplaceable individuality, but they are also given to be in a dynamic *community of beings* (Desmond 1995a:182). There is an intrinsic and intimate relativity between beings, as no being is completely and absolutely independent (Desmond 1995a:182,194). Every being forms part of a community, in one way or another. Thus, according to Desmond (1995a:182), beings cannot be exhausted in univocal or dialectical terms, as they transcend complete determination both in their singularity (as mentioned above) and in the complexity of their "communal interplay". The community of being is not a "dialectical self-mediating" entity, but a "metaxological *intermediation* between beings" (Desmond 1995a:182, emphasis added). The metaxological is mindful of the intermediation between beings and the *plurality of mediations* present in the happening of the between (Desmond 1995a:182). For Desmond (1995a:182,196), the multiple mediations at work between beings cannot be reduced or fixed through a singular, all-encompassing, dialectical self-mediation.

According to Desmond (1995a:195), coming to be as a singular being implies coming to be in community as well. Beings are singular integrities that hold together, but they are also complexly related to beings other than themselves. No being is absolutely solitary or independent, but is "defined in a network of intermediating relations with what is other to itself" (Desmond 1995a:196). This intermediation points both to the relation each being has with its own "depth of infinitude", the inner transcendence or indefiniteness unique to every being, and to the relation each being has with other beings (Desmond 1995a:196). The community of being is "infinitely complicated", for it implies the coming together of multiple centres of self-mediation and self-transcendence (Desmond 1995a:195).

For Desmond (1995a:196), the community of being does not imply the reduction of 'difference' or 'otherness' in a homogeneous sameness, but the preservation of

heterogeneous relativity. In metaxological terms, beings in community do not exist solely to protect, sustain, or nourish themselves, but aim to serve and respect other beings as truly 'other' (Desmond 1995a:197). The metaxological guides the thinking of the other by an "agapeic mindfulness that goes towards the other as other, and not on a mediating detour that recoils back on itself, once having appropriated the other" (Desmond 1995a:197).

Agapeic mindfulness, according to Desmond (1995a:198), gives itself to the 'other' as other, and in that way, signifies a metaxological approach towards other beings. Agapeic mindfulness is rooted in abundance, it gives itself generously to the 'other' as other, and does not "think about what it gets from what it gives, if indeed it gets anything at all" (Desmond 1995a:198). A metaxological mindfulness does not concern the consummation or conquering of being as other, it lets the other be what it is – beyond univocal identification or dialectical self-mediation. As Desmond explains (1995a:198), "there is compassion in this knowing, an undergoing with the other, not a standing above in the mode of mastery or domination". In the metaxological community of being, beings are not merely subordinate, contributory parts of a larger whole, nor are the integrities of singular beings dissolved in a homogeneous similarity (Desmond 1995a:198). There is a dynamic intermediation at work between beings, a complex interplay between "otherness and togetherness" that transcends univocal or dialectical determination (Desmond 1995a:198).

The metaxological community of being, for Desmond (1995a:199), is beyond any form of totalisation and is thus free, *radically free*, from complete determination. The community of being is marked by an "excess of transcendence" and an "excess of freedom" (Desmond 1995a:199). There is an agapeic freedom given to beings to be themselves, but also to a community of beings that exist beyond totalising univocal or dialectical determination. As Desmond (1995a:199) explains, "the spaces between beings upheld by community are not subordinate determinations of an all-inclusive totality, but indeterminacies that welcome the advent and adventure of the freedom of its participants".

There is no absolute determination of what a community of freedom is, or should be, for its dynamic relativity within and without transcends all determination. This abundant freedom and transcendence of the metaxological community of being, for Desmond (1995a:199), constitutes the agapeic happening of the between. From reflection on singular beings and the agapeic community of being in the between, this study now turns to the metaxological nature of *the between* itself.

According to Desmond (1995a:201), the between, or the happening of the between, can be viewed in four different ways, namely: the awe of the middle and first astonishment; the familiar middle; the perplexing middle; and finally, the renewed agapeic mindfulness of the middle. Firstly, 'first astonishment' before being speaks to the givenness of being, to what Desmond (1995a:201) also refers to as the 'aesthetic show of being' or the 'aesthetic immediacy of being'. First astonishment is mindful of the *that it is at all* of being and aware of the elemental goodness, the innate value, of each being. First astonishment before being makes us open to an "elemental intimacy" with being which emphasises that "to be is sweet; being is good, it is good to be" (Desmond 1995a:201). But, as Desmond (1995a:202) explains, our astonishment before being ruptures over time as we settle into familiarity.

This leads to the second way, namely, the familiar middle. The primal intimacy with being in first astonishment leads to familiarity with being, which in turn leads to equivocal indifference (Desmond 1995a:202). The agapeic appreciation of the *being there at all* of being, deteriorates into an indifferent carelessness. Familiarity before the presence of being refers to a loss of grateful mindfulness, a loss of appreciation for what is given to be. When the astonishing between becomes the familiar between, beings lose their intrinsic value and are only valued to the extent to which they can be analysed, utilised, or disposed of (Desmond 1995a:202). Beings are rendered as objects, upon "which we try to exercise as much determining power as we can muster" (Desmond 1995a:202).

The loss of astonishment gives birth to a restless curiosity in mindfulness to know and determine all things completely, until all 'otherness' and 'ambiguity' of being is dissolved. This restless curiosity renders all "*real* questions" of being as problems to be solved rationally and systematically (Desmond 1995a:202, emphasis in original). Any problem that refuses to be resolved through a univocal or dialectical solution, is interpreted as a 'pseudo' problem. In this way, beings are "reduced to their value in relation to our determining power" (Desmond 1995a:202). In the familiar middle, mindfulness relies on univocal and dialectical processes to dissipate all forms of 'otherness' or ambiguity.

According to Desmond (1995a:203), the loss of astonishment is not everlasting, for the otherness of being, the surprising nature of being, has the power to renew astonishment in mindfulness. If we were to conquer the ambiguity of nature with our univocal curiosity and scientific endeavours, we "would lose ourselves and creation in their ontological value, just in that victory" (Desmond 1995a:203). As long as mindfulness continues, there is the possibility

for something ‘new’ and unexpected to emerge, other than the seemingly complete determination that renders being as “valueless thereness” (Desmond 1995a:203).

The dynamism of the equivocal, that is the disruptive prolificacy of equivocity, has a crucial role to play in rocking mindfulness back into astonishment. According to Desmond (1995a: 203), equivocity “will nibble away at our cherished categories” and “place here and there a sliding surface on the seemingly broad and secure path of science”. As a result, the seemingly solid univocity of being evaporates over time and opens up the possibility of something ‘other’ to arise. The familiar middle will, in the end, again be defamiliarised (Desmond 1995a:203). The emergence of an ‘other’ beyond determinate knowing strikes mindfulness as *perplexing*, which leads to our next and third way to view the between.

The first astonishment before being turns into the familiar middle, which in turn becomes the *perplexing* middle (Desmond 1995a:204). In the perplexing middle, mindfulness is made aware that nothing is completely familiar or univocally determinable. The equivocity of being forces mindfulness to go beyond its stable and dependable thought categories (Desmond 1995a:204). The equivocal in the perplexing middle “makes us wonder if we really know anything important at all, even as we progressively come to know everything determinate” (Desmond 1995a:203). This perplexity may tempt mindfulness to resort to univocal rationalisation or dialectical self-mediation as it attempts to determine the ‘excess’ of renewed ambiguity. Dialectical self-mediation does not tolerate indefiniteness, but aims to overcome perplexity through more complete and complex determinations. For Desmond (1995a:204), this resort to dialectical self-mediation will not do, for there will always remain an ‘excess’ of otherness and ambiguity beyond determination. The completion of dialectic’s self-mediation will mean the loss of ‘excess’, and of astonishment as well (Desmond 1995a: 204).

Perplexity, for Desmond (1995a:204), operates at the edge of determinate knowing. Continuously driven by dialectical self-mediation to know all things determinately, mindfulness is pushed towards the inevitable – to surrender to the transcendent otherness of being that can never be fully mediated (Desmond 1995a:204). The deeper mindfulness goes to resolve the perplexity, the further it pushes its own capacity to self-mediate, the more it “knows it does not know itself as self-mediation” (Desmond 1995a:204). Mindfulness in perplexity is reminded that its very ability to think both itself and what is other, is given to it.

Mindfulness realises that its ability to think is given to it by a source that transcends self-mediation. For mindfulness cannot give itself for itself to think, it is given *to be* by an 'other', an agapeic 'other' (Desmond 1995a:205). As Desmond (1995a:205) explains, "metaxological perplexity is reminded of the happening of the between as a givenness that is not self-produced". Thus, with regards to mindfulness and the between, we move from first astonishment to familiarity; from familiarity to perplexity; and finally, from perplexity to the renewed astonishment before being as agapeic mystery.

The mystery of being, the fact that being *is at all*, that it is *given to be*, awakens mindfulness into renewed astonishment (Desmond 1995a:205). This leads to our fourth way to view the middle. The mystery of being, for Desmond (1995a:205), does not imply mere indefiniteness, but an 'excess' of determination that is "profoundly positive" (Desmond 1995a:205). There is an inherent goodness, an eternal worth, to the mystery that transcends all determination. Western modernity, in its restless curiosity to know and conquer the ambiguities of being, tends to lose its appreciation of this mystery. As Desmond (1995a:205) explains:

> Our ears, long caked with misunderstanding, hear sporadically only a faint echo of song. We have been deaf for too long. This deafness can last centuries, as with Western modernity that has systematically closed its hearing to the "It is good"[20]. It finds no place for it in its scientific and technological project. It hears nothing. It congratulates itself on its scientific deafness. The signs that come to it from beyond itself strike it as a mere dumb show.

What is needed to think the mystery of being, or required to cultivate a deep awareness of it, according to Desmond (1995a:206), is an "agapeic mind". An agapeic mind, or agapeic mindfulness, is not alarmed in the face of mystery or 'otherness', but moves towards the 'other' as other. It does not, unlike dialectical self-mediation, seek to overcome the 'otherness' of what is other (Desmond 1995a:206). Agapeic mindfulness transcends itself, thinking beyond itself, to think of the other in its 'otherness'. It goes towards the other, not for what it might gain, but for what it can give out of its own essential richness and abundance.

Agapeic mindfulness of the other is intimately aware that beings, in their givenness, transcend univocal or dialectical knowing. The metaxological does not, unlike dialectical self-mediation, aim to reduce, overcome, or conquer the 'otherness' of being.

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[20] For Desmond (1995a:205), the term "It is good", also referred to as "the primal 'It is good'", refers to the innate value and goodness of being. The term comes from Genesis, Chapter 1, in the Bible, where God announces His delight in creation by proclaiming over it – "It is good".

For Desmond (1995a:206), metaxological mindfulness of the between means an "unwillingness to force being to conform to its thought determinations" and concerns an "ontological vigilance beyond violence or interference". Agapeic or metaxological mindfulness dwells in reverence before the beauty and mystery of being.

Ultimately, the metaxological sense does not view the infinitude of being as mere equivocal indefiniteness, but comes to appreciate it as agapeic plentitude. It knows the plentitude or 'excess' of being as abundantly affirmative, but that it can never be completely mediated. As Desmond (1995a:206) explains, "we breathe the glory of the sublime creation, in its disproportion to our power to master it". The metaxological sense speaks to the transcending nature of singular beings, to the dynamic relations between beings in community, and to the agapeic nature of the between.

6.2 Design as metaxological: An agapeic approach

According to Beckett (2017:8), the most fruitful or effective way to approach complex design problems is dialectically. As mentioned already, according to Desmond (1995a:177), the metaxological sense transcends the dialectical. Can one therefore speak of design metaxologically? What would a metaxological approach to design look like and how might it differ from a dialectical approach? This is what this study explores in the rest of this chapter. According to Desmond (1995a:177), as discussed above, the metaxological sense articulates an "otherness" beyond dialectical self-mediation, a "togetherness" not acknowledged by the equivocal, a "rich ontological integrity" not recognised by the univocal, and finally, a "rich sense of ontological ambiguity" not accounted for by either the univocal, equivocal, or dialectical senses of being.

Thus, a metaxological approach to design would move beyond dialectical self-mediation by respecting true 'otherness' for the sake of the other. It would imply design that is mindful of the other, that respects the integrity of the other, and that does not aim to reduce the other to its own limited thought determinations. It would mean design that is beneficial for the well-being of both the self and the 'other', and for the community of self and the 'other', without resorting to "violence or interference" (Desmond 1995:206). A metaxological approach to design would intentionally seek to keep the 'excess' or 'richness' of what is 'other' intact.

It will include the ambiguity emphasised by the equivocal, but also move beyond it, towards a complex and integrated unity not accounted for by either univocal knowing or dialectical self-mediation. It would imply design that is open to the mystery of 'the between', design open to what it cannot fully comprehend, analyse, or control. This implies design that is *agapeic*, design that delights in the untameable abundance of nature and marvels at the irreducible mystery of being. A metaxological approach to design might allow a break through the 'familiar middle', through what is predictable and monotonous, towards renewed creative astonishment.

According to Desmond (1995a:205), the renewal of an *agapeic mind* or *agapeic mindfulness* results in "renewed astonishment". This has specific implications for design as well. For Desmond (1995a:181), metaphysics is not necessarily about having the correct metaphysical point of view or about *thinking* correctly about being, but rather being mindful of being and being's plentitude in a particular way. Metaxological design implies designers that are 'open' to the plentitude of being beyond univocal knowing, that move towards the 'other' as truly other, and that are deeply and insightfully aware of the multiple intermediations that permeate the between. A metaxological mindfulness in design emphasises generosity and abundance, for it does not concern itself with what it can take, gain, or consume from the 'other', but with what it gan give (Desmond 1995a:198). Such a mindfulness is aware of the complex interplay between "otherness and togetherness" in the happening of the between, and strives to nurture the various relations that constitute a complex and creative community (Desmond 1995a:198).

6.3 Case study: Neri Oxman and material ecology

In the section that follows, with the afore mentioned in mind, I explore the work of Neri Oxman to uncover how her design philosophy might exemplify a metaxological approach to design. Oxman is an Israeli-born scientist, designer, bio-architect, and professor at the Massachusetts Institute of Technology's (MIT) Media Lab where she leads the Mediated Matter group. Oxman studied medicine at Hebrew University's Hadassah Medical School in Jerusalem, but moved to the Technion, Israel Institute of Technology, after two years to study architecture. After she graduated from the Technion, she completed her masters degree in architecture at the Architectural Association School of Architecture in London and then her PhD in computational design at MIT in Boston, Massachusetts (Fisch 2017:808). Oxman's

work explores the dynamic and complex relations between science, engineering, art, and design.

The Mediated Matter group at MIT aims to bring the material world, the digital world, and the biological world together in various meaningful ways (Bio-Inspired Design | Neri Oxman 2016). It investigates the intersection of four main domains, namely: computational design, digital fabrication, materials science, and synthetic biology (Mediated Matter Group [sa]). The focus of the group is to develop biologically-inspired fabrication tools, technologies, and structures to enhance the "relation between natural and man-made environments" (Mediated Matter Group [sa]). Its work is guided by a design philosophy called "Material Ecology"[21]. This is a specific design approach, formulated by Oxman, that strives to overcome the dualism between the built or *manufactured* environment and the natural or *grown* environment. This approach strives to realise new possibilities, specifically pertaining to the mediation between "objects and environment; between humans and objects; and between humans and environment" (Mediated Matter Group [sa]).

Traditional and modern design methodologies have been shaped and influenced by the "rigors of manufacturing and mass production" since the Industrial Revolution (Oxman, Ortiz, Gramazio & Kohler 2015:1). According to Oxman, the imaginations of designers and architects have been fixed to think about their products as assemblies of different parts with distinct functions (Design at the Intersection of Technology and Biology | Neri Oxman | TED Talks 2015). This approach to design stresses economic productivity but neglects sensitivity towards material properties. Industrial and production supply chains sustain the assumption that parts are made of single-purpose materials which have "predetermined specific functions" (Oxman *et al* 2015:1).

Material ecology aims to move beyond the one-dimensional approach personified by mass-production to develop a deeper and more meaningful relationship between an object and its environment (Oxman *et al* 2015:1). This notion stems from the realisation that an object (its structural and material properties) interacts with its environment on multiple levels and is influenced by various elements (Oxman *et al* 2015:1). If this is not kept in mind, it may result

[21] The term "ecology" refers to a branch of biology that studies the dynamic relations of living organisms to one another and to their environment. The term "Material ecology", thus, interprets materials to be 'living entities' – which are intrinsically complex, able to serve multiple functions, and capable to adapt to various conditions.

in an “ecological mismatch” where an object does not quite fit in its environment, nor can its material properties respond adequately to what is required of it (Oxman *et al* 2015:1).

To move beyond the design paradigms established by homogenous mass-production, Oxman and the Mediated Matter group look to nature for guidance and inspiration. Among numerous insights obtained from nature, three key nature-inspired design principles inform Oxman’s work. Firstly, in nature, there are high levels of integration between *how* things are made, of *what* materials they are made, and what their respective *purposes* are (Oxman & Hanna 2017:144). Oxman (Oxman & Hanna 2017:144) explains that nature’s processes are valuable sources of continual inspiration in her work, where “there is no separation between modelling, analyses and fabrication, and there is constant feedback between them”.

In nature, purpose inspires material, and material inspires form. In the way nature ‘designs’, form is informed by purpose. Often contradictory to nature’s ways, traditional and contemporary designers are taught to be “authors of form”, to keep form central and to start every design process with form in mind (Oxman 2010:20). According to Oxman (2010:20), there is a revolution currently emerging in contemporary design discourse, that aims to move from *form* (the construction and assembly of forms) to *formation* (new form-generation or form-finding processes), and in that way, move closer to the way nature designs. In this approach, referred to by Oxman (2010:30) as the “new materiality”, form is not determined by pre-defined stylistic expectations, but generated by “natural condition”.

This high level of integration in the design process allow designs to be made of more complex and sophisticated materials and forms. Designs, like products, apparel, furniture, and buildings that are made of more complex materials and forms, have the potential to adapt and modify their properties depending on what is required in different conditions. This high level of integration between the form, purpose, and material of a design relates to the second nature-inspired design principle in Oxman’s work. Her work moves toward design solutions, techniques, and procedures that concern *growth*, rather than *assembly* (Neville & Dadich 2019). This implies designs that are not made from different parts that need to be put together, but designs that are *grown* into being.

This approach aims to move beyond designs that are made of subordinate parts with different functions, but rather towards single-material designs that can alter their functionality and properties depending on the type of performance required at specific moments in time.

In nature the dualism between function and material do not exist as prominently as it does in man-made objects, products, or buildings (Oxman *et al* 2015:1). For example, a spider can generate and distribute fibre-based material (its web) with varying properties depending on specific functions or requirements (Oxman, Laucks, Kayser, Duro-Royo & Uribe 2017:249). The spider's web, which acts simultaneously as a home, a protective device, and a mechanism to catch prey, consists of a single material and serves multiple functions on multiple levels.

Thirdly, Oxman and the Mediated Matter group not only look to nature for inspiration, but involve nature as a dynamic co-creator and co-designer in their projects. Many of Oxman's designs rely on nature (live organisms) to cohabitate and co-fabricate her work. In episode two, season two of *Abstract* (A Netflix series, 2019), titled 'Neri Oxman: Bio-architecture', Oxman explains that her work involves the creation of new materials "for, with, and by nature" (Neville & Dadich 2019). In her work, nature is brought out from behind the laboratory glass screens and onto the main stage as a living and 'decision-making' entity key to the design process. Oxman (as quoted by Bailey 2019) explains that live organisms, like bees, silkworms, and bacteria, for example, are her "partners in crime, both in process and in product". Thus, Oxman's design approach is informed by three key nature-inspired principles: firstly, her approach involves the *integration* of purpose, material, and form; secondly, her approach concerns *growth*, rather than *assembly*; and thirdly, her approach sees nature as an essential co-creator and co-designer in the design process.

To understand how these design principles are realised in Oxman's work and how her approach can be interpreted as metaxological, this study explores three projects conducted by Oxman and the Mediated Matter group. In the project *Silk Pavilion* (Figure 17), Oxman and the Mediated Matter group aim to bring the worlds of material, digital, and biological fabrication together in one design on an architectural scale (Oxman *et al* 2017:249). The project is inspired by the silkworm's ability to create a 3D cocoon out of a single silk filament. The silkworm can spin an entire 3D structure from a single material, which varies in density, compression, and form depending on "environmental conditions" like light, humidity, and temperature (Oxman *et al* 2017:249).

The primary structure of the design consists of twenty-six polygonal panels, made of silk fibres, which are laid down or 'spun' by a Computerised Numerical Control (CNC) machine. To reinforce the primary (digitally spun) silk structure, six thousand five hundred *Bombyx mori*

Figure 17: Neri Oxman and the Mediated Matter group, *Silk Pavilion*, 2013. (Oxman *et al* 2017:248).

silkworms were let loose onto the structure (Figure 18) to spin flat, non-woven silk planes (Oxman *et al* 2017:249). The result was a superdome structure, on architectural scale, co-created by digital fabrication technology and living organisms. The project explores the possibilities of "additive manufacturing"[22] by re-imagining the relationship between artificial and natural production techniques (Howarth 2013).

One of the fundamental insights gained from the project was that this bio-digital approach allowed for the natural and organic distribution of fibres depending on the intricate interaction between the silkworms, their surroundings, and the underlying structure. The silkworms are naturally drawn to darker places, and as a result, silk fibres were more sparsely dispersed on the sunnier or lighter parts of the dome (Howarth 2013).

The design, in its modelling, composition, fabrication, materiality, and functionality, is thus 'open' to its environment and able to adapt to different conditions. The structure was 'grown' into the space, with the silkworms distributing the silk fibres in relation to their interaction with

[22] The term "additive manufacturing" (AM), refers to modelling and production technologies that create parts, objects, and products in a "layer-by-layer fashion" (Abdulhameed *et al* 2019:2). This involves various 3D modelling, 3D printing (3DP), and rapid prototyping (RP) technologies. AM also involves Glass 3D Printing (GDP), a revolutionary technology developed by Oxman and the Mediated Matter group (Lau 2015).

Figure 18: Neri Oxman and the Mediated Matter group, *Silkworms spinning a silk network for Silk Pavilion*, 2013. (Oxman *et al* 2017:255).

the environment. According to Oxman *et al* (2017:254), the biologically generated silk network achieved a level of sensitivity and sophistication unattainable by current digital fabrication methods. Oxman and the Mediated Matter group consider *Silk Pavilion* (2013) to be a generative template for sustainable design that concerns the integration of digital and biological fabrication techniques (Oxman *et al* 2017:254). The design methodology followed in *Silk Pavilion* (2013) can be utilised to solve similar problems, across different scales, in various built and biological environments (Oxman *et al* 2017:254).

Another project that exemplifies Oxman's design approach is a sound-sensitive chaise longue, titled *Gemini* (2014) (Figure 19). Designed originally for the exhibition "Vocal Vibrations" at Le Laboratoire, Paris, in 2014, in collaboration with Professor W. Craig Carter (Department of Materials Science and Engineering, MIT) and Professor Tod Machover (Muriel R. Cooper Professor of Music and Media, MIT), *Gemini* (2014) explores the interaction between material and sonic environments (Brooke 2014). *Gemini* (2014) is a furniture piece, made from natural and synthetic materials, that absorbs sound to create a quiet, relaxing, and tranquil environment for a person sitting or lying down in it (Oxman 2014a).

Figure 19: Neri Oxman, *Gemini*, 2014. (Hussey 2014).

The chaise longue consists of a smooth wooden shell, which acts as a protective dome and a sound reflector, and the inner nodular-like cushioning or “skin” (as seen in Figure 20), printed with forty four different material composites by *Stratasys* 3D printing technology (Hussey 2014). Inspired by the mythical relationship between the twins, Castor and Pollux, who represent the Gemini astrological sign, the chaise longue aims to explore the relations between seemingly opposing entities (Oxman 2014a). These entities include natural and synthetic materials; rigid and elastic textures; hard and soft media; and, subtractive and additive fabrication technologies (Oxman 2014a).

As seen in similar projects by Oxman, like *Silk Pavilion* (2013), *Gemini* (2014) exhibits an integration between material properties, form, and function. The shape, density, opacity, colour, and texture of the 3D-printed ‘skin’ of the chaise longue is informed by the performance requirements of the material in specific areas. For example, 3D printed nodules that are smaller and more rigid, provide support and structure, while 3D printed nodules that are larger, softer, and more elastic, absorb sound and provide comfort. In this way, the inner ‘skin’ of the chaise longue gives the impression of being *grown* – like a carpet of moss on the bark of a tree that varies its structural and material properties depending on its interaction with the underlying structure and its environment.

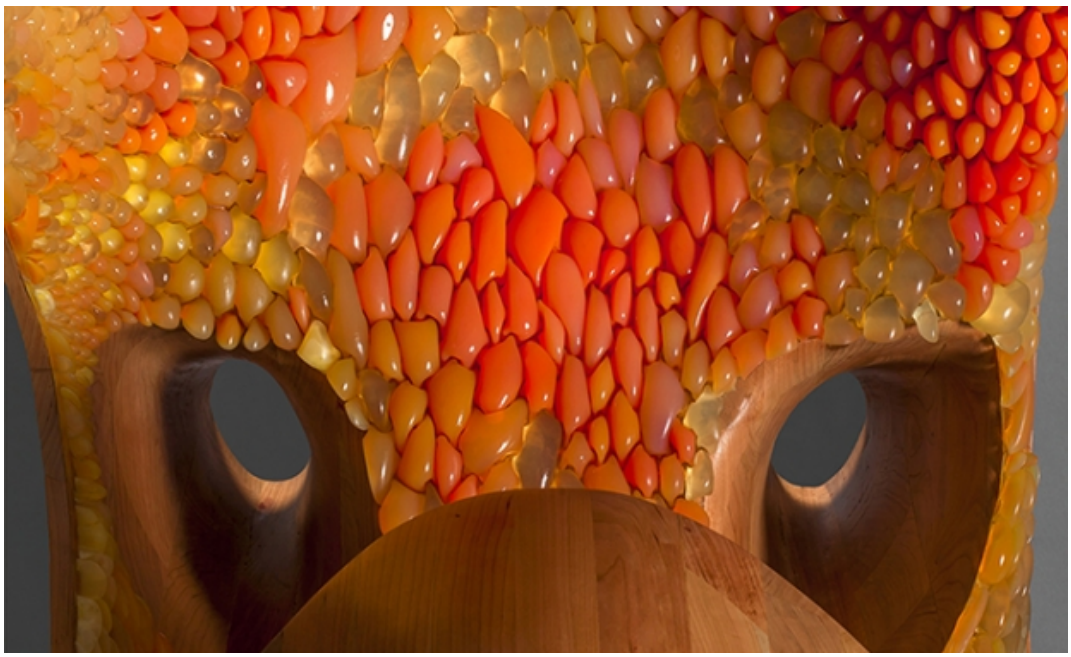

Figure 20: Neri Oxman, *Gemini: 3D printed sound absorbing "skin"*, 2014. (Oxman 2014a).

This material adaptability is achieved by a technology called *material computation* or *material-based design computation*, of which Oxman is a leading pioneer. This technology allows designers to simulate the interaction between a material and its environment over a certain period of time. Material computation is not only a developing technology, but a design philosophy that concerns new "form-generation processes" (Oxman 2010:29). According to Oxman (2010:30), material computation allows designers to develop form in different, sophisticated, and environmentally-informed ways.

For Oxman (2010:29), one significant consequence of design that is predominantly shaped by performance requirement, and not by form itself, is the inclusion of "difference". This implies that the often unpredictable and varying conditions of the environment play a significant role in the ideation, fabrication, and life of a design. The incorporation of "difference", for Oxman (2010:29), means "gradients of structural and material effects emerge" which modulate "their thickness, transparency, porosity, and thermal absorption according to their assigned function or desired condition of stability". Designs, in *material computational* terms, are not indifferent to the conditions of their environment, but are intricately informed by them. This seems to contrast design approaches that entail mass-production, for these approaches concern, amongst other things, the assembly of single-purpose parts and objects that are indifferent to their intended environments.

A design that can be considered to exemplify this approach is the chaise longue, *La Chaise* (1948) (Figure 21), designed by Charles and Ray Eames, which was inspired by the sculpture *Floating Figure* (1927) by Gaston Lachaise. *La Chaise* (1948), made predominantly from fibreglass, chromed steel, rubber, and oak, is considered to be a "long-established icon of organic design" (Eames Office: La Chaise [sa]). The adjective "organic" refers to the style and aesthetics of the design, but not, as in Oxman's chaise longue, to the *organic* and sophisticated integration of material, form, and performance.

Figure 21: Charles and Ray Eames, *La Chaise*, 1948. (Vitra [sa]).

The furniture piece *La Chaise* (1948) is iconic for its stylistic properties, but personifies an era of design and fabrication that entails the assembly of prefabricated, single-purpose parts. This is not to say that Charles and Ray Eames were not innovative leaders in furniture design, for they are considered to be the "premier American designers of their generation" (Forster 1998:201). The design techniques and production technologies they developed, although significant during the development of modern furniture design, are now considered to be steps towards a more integrated design approach – what Oxman (2010:30) calls the "new materiality".

In this approach, aided by *material computation* technology, designs are not only shaped by aesthetic and decorative requirements, but are both "structurally sound" and "environmentally informed" (Lau 2015). Oxman and the Mediated Matter group strive to generate objects, products, furniture pieces, and buildings through integrated fabrication processes from complex materials that are informed by environmental conditions.

In the *Wanderers* series (2014), the third and final project discussed in this section, Oxman and the Mediated Matter group explore the possibilities of voyaging to planets beyond Earth. In this series, synthetic and biological materials are combined to create biologically-augmented, 3D-printed wearables that can adapt to extreme environments (Mediated Matter Group 2014). Each wearable in the series is designed for a specific destination, for that destination's environment, and to achieve specific performance requirements – *Mushtari* is designed for Jupiter; *Zuhal* for Saturn; *Otaared* for Mercury; and, *Qumar* for the Moon (Oxman 2014b).

The wearable *Mushtari* (Figure 22) is made from 3D-printed transparent capillaries, that resemble the human digestive tract, which are infused with "synthetically engineered microorganisms" to make hostile environments habitable (Oxman 2014b). These engineered microorganisms or biological fluids that flow inside the 3D-printed tubes consist of *cyanobacteria*[23] and *E. coli (Escherichia coli)*. Cyanobacteria can be found in the Earth's oceans and fresh-water ponds, while E. coli is a bacteria found in the human digestive system. Cyanobacteria converts sunlight into sugar (sucrose), while E. Coli converts the sugar into biofuels that are edible (Design at the intersection of technology and biology | Neri Oxman | TED Talks 2015).

Figure 22: Neri Oxman, *Mushtari*, 2014. (Juc 2014).

[23] Cyanobacteria, also known as "blue-green algae", is one of the earliest forms of life on planet Earth, being more or less 3500 million years old (Walter 2018).

Thus, *Mushtari* (2014) represents a wearable that is grown onto the skin of a human, that interacts with its environment, and that generates consumable energy for human beings in harsh environments (Oxman 2014b). This sophisticated fabrication process is rendered by high-definition *material computation* technology. As seen in Figure 23, the wearable material grows organically onto the body of a human figure over a period of time (from frame A to frame C). The 'input' for the computational rendering is the curvature of the body, the quality of the skin, the properties of the material, the conditions of the environment (including light, temperature, humidity, etc.), and the required amounts of energy to be produced. To summarise, the wearable is 'open' to varying influences, from within and without, and can

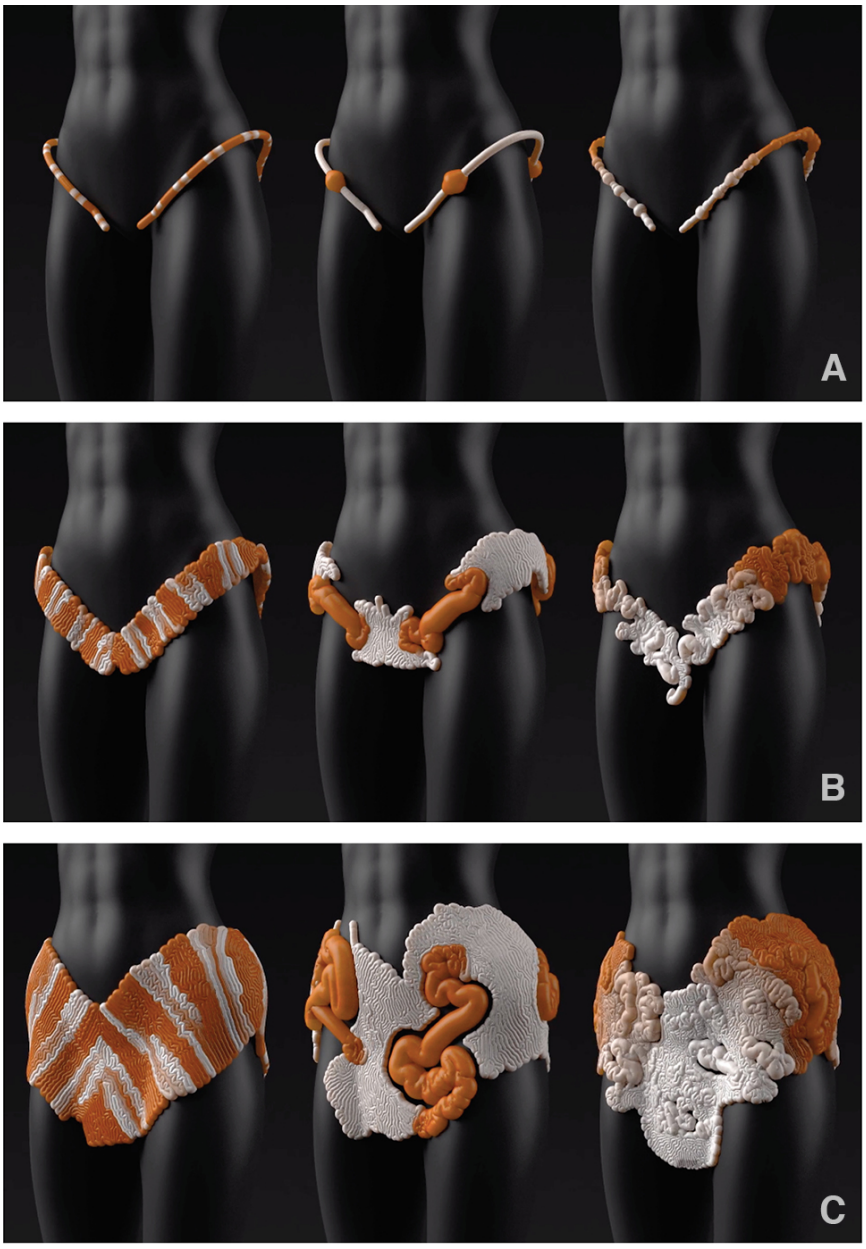

Figure 23: Neri Oxman, *Mushtari: computational renderings*, 2014. (Mushtari 2015). Screen shots by the author.

alter its material and structural properties in real time depending on what the performance requirements are.

In the computational rendering for *Zuhal* (Figure 24), for example, a wearable for Saturn, the shape and form of the design is informed by the high velocity of winds created by vortex storms on the planet (Oxman 2014c). A human being wearing *Zuhal-based* material, will be well adapted to the harsh conditions, and able to consume edible matter converted from hydrocarbons by the bacteria inside the material (Oxman 2014c). Although the *Wanderers* series (2014) can be regarded, in some cases, to be overly futuristic or ambitious, the possibilities *material computation* awakens has profound implications for design across various domains (Oxman 2010:29-30). For Oxman (Oxman & Hanna 2017:145, emphasis added) this means, amongst other things, that the designer "becomes an author of *process* as opposed to the author of the *product*".

Figure 24: Neri Oxman, *Zuhal*, 2014. (Oxman 2014c).

As discussed with reference to *Silk Pavilion* (2013), *Gemini* (2014), and the *Wanderers* series (2014), Oxman is helping to pioneer a shift in design thinking. With regard to her solo exhibition, titled *Material Ecology* (2020) at the Museum of Modern Art (NYC), Oxman (as quoted by Anderson 2020) explains that her vision for design is that it will help overcome the dualism between man-made products and the natural world in such a way that "all things material will relate, respond, and adapt to the natural ecology". Oxman and the Mediated

Matter group do not only refer to nature for design inspiration, but utilise the astonishing proficiency of nature itself to design, model, fabricate, and create.

In essence, this means moving from “nature-inspired design” to “design-inspired nature” (Mediated Matter Group [sa]). In material ecological terms, nature is the inspiration for the design, the co-creator of the design, and the ultimate client of the design. Oxman (as quoted by Anderson 2020) suggests that, with the evolution of bio-digital technologies, we can “re-envision, reimagine, augment, make better, [and] heal the environment, and nature as we know it”. With the emergence of new bio-digital, environmentally-conscious technologies, production companies who are indifferent to the impact of their products on the environment will inevitably run out of excuses. With these technologies in hand, that can either restore our planet or perpetuate destructive production systems, Oxman explains “it’s now on us to decide where we’re going from here” (Neville & Dadich 2019).

6.4 Design as metaxological and metaphysical thinking

This study has, up to this point, discussed Desmond’s philosophical theory as it relates to the metaxological sense of being and some of the key principles that inform Oxman’s approach to design. In this section the study highlights four ways in which Oxman’s work appears to exemplify a metaxological approach to design and in the following section the study offers a few critiques of such an approach and explain its possible limitations. Firstly, a metaxological approach to design (also referred to as *metaxological design*) moves beyond dialectic’s self-mediation by respecting the true ‘otherness’ of the other. It does not only keep the ‘otherness’ or ‘difference’ of what is other intact, but invites it, within the boundaries of the project, to be an essential part of the design process.

In the case of Oxman’s work, this means allowing nature, in the form of live organisms to cohabitate and co-fabricate the design process. As discussed with reference to *Silk Pavilion* (Figure 17), the dispersion, density, and exact composition of the silk fibres were not ‘completely’ or ‘absolutely’ determined by Oxman and her team, but were informed by the silkworms’ interaction with the underlying structure and the conditions of the environment. The silkworms made a unique contribution to the fabrication of the structure and formed a key part of the design process. The design, in metaxological terms, was realised *between* the design team and the live silkworms.

According to Desmond (1995a:181), there is an 'otherness' or 'rich excess' to being that cannot be completely mediated or reduced by univocal or dialectical knowing. Oxman and the Mediated Matter group are convinced that, like the quality of silk fibres produced by live silkworms for *Silk Pavilion*, nature, in its otherness and uniqueness, can produce materials and forms to a degree of intricacy and sophistication that exceed the capabilities of current digital fabrication technologies (Oxman *et al* 2017:254). This brings us to the second principle of a metaxological approach to design, which concerns the notion of *process* rather than *product*, or *formation* rather than *form*.

According to Oxman (Oxman & Hanna 2017:145), her approach to design implies that the designer becomes the one that puts the design process, with its various unfolding and evolving elements, in motion. This means that the designer is required, to a certain extent, to give up complete control of the final *form* of a design, to surrender some of the pre-determined aesthetic expectations, and to be 'open' to surprising and unexpected outcomes. Instead of being preoccupied with the final stylistic or aesthetic outcome of a design, this approach requires the designer to keep a high level of integration and integrity intact when it comes to the *process of formation.* This integration, according to Oxman (Oxman & Rosenburg 2007:28), is based on the premise that "material, structure, and form can become inseparable entities of the design process which relate to matter, performance and geometry" respectively. In other words, the form of a design is determined by material properties, which in turn are determined by performance requirements.

When a designer gives up some of the control of the design process and is 'open' to various influences that can inform the shape of the design, unexpected and fortuitous solutions may emerge. As seen with the projects like *Silk Pavilion* (Figure 17) and *Mushtari* (Figure 22), for example, Oxman and the Mediated Matter group put processes in place for the designs to *grow* and take shape naturally (informed by restrictions and requirements determined through *digital computation*), but were not completely in control of the final forms, structures, textures, and compositions of these designs.

As seen in *Silk Pavilion*, the dispersion of silk fibres were informed by the silkworms' interaction with the surrounding conditions, and thus, resulted in a design that was naturally more adapted to its environment. This high level of adaptability, concerning material and form in real time, is unattainable by current man-made production technologies (Oxman *et al* 2017:254). The silkworms helped to realise a solution that was sensitive to its surroundings

in a way that could not have been determined absolutely in advance. Similarly, as seen in *Gemini*, the 3D-printed nodules of the inner 'skin' were determined by structural, geometrical, and acoustic requirements (Oxman 2014a). Oxman and the design team were not completely in control of the shape, size, texture, opacity, or colour of the individual nodules, as these were determined by interior and exterior constraints, rendered by material computation technology. In the case of *Gemini*, the design was realised *between* the design team, the materials used, and the conditions of the environment.

The same principle can be applied to the project *Mushtari*, which forms part of Oxman's *Wanderers* series. Although Oxman and her team determined the constraints and requirements of the wearable, the final form, arrangement, texture, colour, density, and opacity of the material was determined by its organic interaction with the human figure's body type and the conditions of the environment (rendered by material computation technology). The varying conditions that the wearables are made for influence the *formation* of the wearables in real time, which is not completely controlled by Oxman and the design team.

As seen with *Silk Pavilion* and the *Wanderers* series, Oxman's approach to form-generation in design emphasises the notion of *growth*, which is more 'ungovernable' in a sense, in comparison to the more mechanical notion of *assembly*. Designs, in Oxman's work, are not simply composed of different unrelated single-purpose parts, but, to a certain degree, are *grown* into being. Thus, a metaxological approach speaks to an 'uncontrollable' or 'irreducible' dimension to the design process, that is not accounted for by either a univocal or dialectical approach. These approaches aim to 'know' and 'control' as much as possible in a design project. This leads to the third principle of a metaxological approach to design, which testifies to a creative potential beyond the capabilities of the individual designer.

A metaxological approach to design moves beyond the capabilities and restrictions of the individual designer, towards the notion of an integrated 'community of designers'. According to Desmond (1995a:196), no singular being is absolutely independent, but "defined in a network of intermediating relations with what is other to itself". This is exemplified in Oxman's work, where every design comes to be from and within a network of intermediating relations. There is no singular authority that determines the final material or structural properties of a design, but multiple interrelated entities (that function as a 'creative community'), give shape and form to a design.

In *Silk Pavilion* for example, the silkworms are considered to be 'co-designers' of the structure alongside Oxman and her team who guided the process. Together with the lead designers and the live silkworms, it can be argued that the environment, as an essential influencing factor, also became an important 'co-designer' in the project. The final structure of *Silk Pavilion* was determined, among other influences, by the conditions of the environment in the form of light, temperature, and humidity. Thus, in the case of *Silk Pavilion*, Oxman herself became a contributing voice within the complex and intricate community of beings that influenced the design and fabrication of the structure.

The same principle can be applied to *Mushtari* (Figure 22) or *Zuhal* (Figure 24) from the *Wanderers* series. Oxman determines the constraints and requirements of the wearables through computational technology, but the final material and structural properties are determined by various factors, such as: the curvature of the underlying figure, the properties of the skin, the conditions of the environment, and the amount of energy to be produced by the bacteria within. Oxman determines the initial materials and elements of the design, but the final form, structure, texture, density, opacity, and colour are influenced by the conditions of the environment and the nature of the bacteria within the capillaries.

The contribution of each creative entity in the design process, from the human designer and bio-digital technology to live organisms and the varying conditions of the environment, is integrated in such a sophisticated way in Oxman's work that it can be difficult to tell who designs what. According to Desmond (1995a:177), the metaxological attests to an integrated unity beyond the univocal or dialectical that keeps a sense of 'ontological ambiguity' intact. In metaxological terms, this approach allows the design to actualise within the ambiguous richness of *the between* – *between* the designer and technology; *between* technology and material; *between* material and form; *between* material and nature; and, *between* man-made and natural fabrication processes. Oxman's work illustrates the deep and intricate relationship *between* the human self and 'what is other' within a complex, creative, and integrated community.

According to Desmond (1995a:197), beings in a metaxological community do not exist solely to protect, sustain, and nourish themselves, but aspire to serve and respect other beings as truly 'other'. This leads to the fourth and final principle of a metaxological approach to design, which sees the designer as a contributing voice within a larger 'community of co-designers'. This integrated community is beneficial towards the self, the 'other', and the environment. A

metaxological approach is not simply self-serving, but is acutely aware of the needs of the 'other', the integrity of the 'other', and to what extent it can support the 'other' to be authentically itself. In Oxman's work, *nature* is the ultimate 'other'. In metaxological terms, Oxman is aware of the 'excess' or 'rich abundance' of nature that cannot be reduced completely by univocal knowing.

According to Desmond (1995b:736), we are struck into astonishment by the 'abundance' of being, for we do not generate or produce it ourselves, as it is simply *given to be*. Oxman delights in the unique qualities, the advanced sophistication, and the supreme adaptability of nature in her work. Nature is not only an inspiration to be referred to at the beginning of a project, but becomes a key 'co-designer' in her design process. For Oxman (as quoted by Anderson 2020), nature is not only a tool or technology to be utilised by design, but all design should be directed to help nourish, restore, and protect the well-being of nature itself. A metaxological approach is deeply aware that all our design practices, from ideation to fabrication, influence nature and the well-being of our planet in one way or another.

Metaxological design is not predominantly concerned with what it can take, gain, or consume, but with the ways in which it can give, restore, and sustain. This, ultimately, is what makes a metaxological approach agapeic (Desmond 1995a:206). It is agapeic in the way it includes both the 'self' and the 'other' in a mutually beneficial creative relationship – where the design actualises *between* the 'self' and the 'other'. If we are to perpetuate the notion that nature is a mere toolbox or source available for our disposal, we might further establish the duality between man and nature, and risk increasing the damage to an already fragile ecosystem. According to Oxman (Neville & Dadich 2019), it is now our responsibility to nourish and nurture nature through design.

Thus, in metaxological terms, the designer should be mindful of the impact of every material and procedure of the design process on the environment. According to Oxman (in Anderson 2020), her hope for the future is that "we will design with natural ecology in mind, such that all things material will relate, respond, and adapt to the natural ecology". Designers at the birth of the "Biological Age" (Bailey 2019), with new bio-digital technologies that bring new responsibilities, are custodians of environmentally-conscious design and the future well-being of our planet.

To summarise, a metaxological approach to design concerns four essential principles. Firstly, unlike a strictly univocal or dialectical approach, it does not, as far as possible, aim to reduce the 'otherness' of the other completely. It respects the integrity of 'what is different to itself', sees the merit of 'what is other' for its own unique character, and aims to participate with the 'other' in an interrelated, dynamic, and creative relationship. Secondly, it emphasises the *process of formation*, rather than the assembly of pre-constructed *form*. In Oxman's work, designs are *grown* into form, rather than *assembled* together from unrelated parts.

Thirdly, it speaks to the notion of a 'community of co-designers' which exceeds the capabilities of the singular designer. The design comes into being *between* many contributing entities that include, for example: the ideas of the human designer, bio-digital fabrication technology, live organisms, and the varying conditions of the environment. Finally, a metaxological approach emphasises an agapeic mindfulness of the intricate relations between the 'self', the 'other', and the environment. According to Oxman (in Anderson 2020), nature is the 'ultimate other', to whom we have the responsibility to restore, revive, and renew through design.

6.5 The limitations of a metaxological approach to design

Oxman and her team attempt to realise highly collaborative design projects between man and nature, between man and technology, and between nature and technology. This notion of 'collaboration' depends on advanced technologies and techniques that make the integration between the material, digital, and biological worlds possible. Projects like *Silk Pavilion* (Figure 17), *Gemini* (Figure 19), and *Mushtari* (Figure 22) were able to come to life through the use of sophisticated and expensive technology, which includes various laboratory equipment, 3D printers, fabrication tools, and computational software. This implies that the design philosophy of 'integration' followed and practiced by Oxman is aided by, and to a large extent depends upon, expensive tools and technologies such as those available at MIT's Media Lab. Design practitioners who strive to realise these high levels of integration in their own work may be restricted by not having sufficient financial resources or the necessary technologies to do so.

A further limitation concerns the principle that emphasises *formation* (what Oxman associates with 'growth') over *form* (what Oxman associates with 'assembly'). This may not necessarily deliver fortuitous results. The designer might have all the right constraints and

‘ingredients’ of the process in place, but the influence of live organisms (like silkworms or bacteria, for example) and the environment may alter the design to such a degree that the desired expectations of a design are not realised. In such a case, the lead designer must take responsibility for the process, carry more of the weight related to decision-making, and guide the participation of all the influencing entities to deliver more desired results.

Even though, in metaxological terms, the design is realised (as far as possible) by the contribution of multiple entities, the lead designer still has the responsibility to make important decisions as the main curator of the project. In Oxman’s case, alterations, modifications, and variations of design processes are tried and tested *before* the final solutions, with the correct material, structural, and aesthetic properties, are chosen.

This implies that Oxman, as the lead designer, is still, in the end, predominantly in control of the final design solution. Based on the research conducted in this study, and from what I can observe in Oxman’s work, there seems to be a distinction between the *intention* of her design process and the *way* that design process is carried out. In their design thinking, Oxman and the Mediated Matter group follow a metaxological approach in the way they strive to realise designs *between* man and nature; man and technology; and, nature and technology. They attempt to work with nature, the ultimate ‘other’, in various complex and meaningful ways to realise designs that benefit the ‘self’, the ‘other’, and the environment.

This means, to use Desmond’s (1995a:206) terminology, that they sustain an *agapeic mindfulness* of being and maintain an ‘open’ posture towards the dynamic relations that constitute being, especially in the way they think about design. But, in the way their design processes are carried out, they seem to reflect a more dialectical practice of curation and ‘control’, rather than a metaxological process. Even though Oxman and her team strive to involve nature as contributing ‘co-designers’, the overall direction and final outcomes of their projects are still guided by Oxman herself.

For example, in *Silk Pavilion* (2013), the silkworms were let loose to spin silk fibres on the digitally spun silk framework that was designed by Oxman and her team. Even though Oxman and her team envisioned a fully collaborative project between ‘human designers’ and live silkworms, the silkworms were placed on a predetermined structure with specific boundaries. Thus, the silkworms’ dispersion of silk was, in a sense, carefully curated and guided. Although nature, in the form of live silkworms, played a key role in the development

and fabrication of the structure, the team of human designers were still predominantly in control of the process.

This is not to say that Oxman and her team are not pushing the boundaries in terms of creative collaboration *between* man and nature, and in that way are also pioneering innovative methods of integration between man-made technologies and biological processes, but that most of the 'control' and decision-making still lie with the team of human designers. In summary, this study suggests that Oxman and her team embody a metaxological approach in their design thinking, but in the way their projects are carried out they reflect a dialectical practice. This study, therefore, suggests that Oxman's work is neither absolutely metaxological, nor absolutely dialectical, but exists *between* those two interrelated senses.

6.6 Design's future: a metaxological perspective

According to Oxman (as quoted by Bailey 2019), we are currently seeing the birth of the "Biological Age", an age that is marked by a shift in design thinking and what she refers to as the *new materiality* (Oxman 2010:30). This shift in design thinking seeks to overcome the polarities between the material, digital, and biological worlds. It aims to repair the split between man-made and natural environments through sophisticated and advanced bio-digital fabrication technology. This shift towards higher levels of integration in design may require advanced and expensive technology, but according to San Fratello (San Fratello, Rael & Oxman 2017:88), this might not always be the case.

San Fratello (San Fratello *et al* 2017:88) explains that there is a possibility in the near future that additive manufacturing technologies, such as 3D printers, can be shipped to remote locations to build or 'print' buildings using "local, very accessible and very humble materials that aren't expensive". Instead of transporting large quantities of expensive industrialised materials and tools to various locations, buildings can be made from local materials such as salt or clay, using additive manufacturing technologies. This means that buildings, structures, and objects can be made using inexpensive local materials and in that way, be uniquely adapted to their local environments.

Based on the philosophical theory developed by Desmond and the work of Oxman, this study propounds that a *metaxological approach to design* can guide the future of design. This approach emphasises sensitivity towards the complexity of being in the *between*, as well as

a deep awareness of the dynamic relationships between the 'self', the 'other', and the environment. This implies seeking new ways of integrating man-made technologies and biological processes to generate form in design. According to Oxman, this means shifting from design processes that rely on the 'assembly' of pre-constructed parts, to sophisticated and environmentally-informed *formation processes* that emphasise 'growth'. As exemplified by Oxman's work, integration between material, form, and function result in less waste and is an effective use of energy resources.

This approach delivers designs that are better adapted to their environments, that reduce the damaging impact on nature, and contributes, in various ways, to the well-being of a variety of natural ecosystems. It emphasises the creative potential of a 'community of co-designers' and the possibilities of creative collaboration between various entities. But, although this might be the case in theory, in practice, design tends to reflect a more dialectical activity of curation and 'control', rather than a metaxological process. This is not to say that Oxman and her team fail to realise a metaxological approach, but rather that design may, in the end, depend on dialectical processes of organisation, arrangement, and decision-making. This study therefore suggests that design, as exemplified by Oxman, exists in the creative tension *between* the dialectical and the metaxological.

CHAPTER SEVEN: CONCLUSION

7.1 Summary of chapters

Chapter One provides the theoretical background and aims of the study with reference to the broader context of contemporary discourse on design. It discusses the key sources of the study in the form of the Literature review (Section 1.2) that guides the direction of the study. It provides a brief summary of traditional and contemporary definitions of the nature of design and provisionally explains the connections between design and metaphysical thinking. Part of the intention is to offer the reasons for the focus on the metaphysics of William Desmond and how the study intends to develop a philosophical hermeneutic of design. It also elucidates some of the relevance of Desmond's metaphysics, in particular, his *fourfold sense of being* (which consists of the univocal, equivocal, dialectical, and metaxological senses of being), and how it relates to design. This chapter also highlights how the study aims to work towards the articulation of a *metaxological approach to design*. Finally, the chapter explains the research methodology and provides a brief overview of the chapters of the study.

Chapter Two provides the theoretical background of the study and positions the study within contemporary discourse on the nature of design. The method used includes an examination of the traditional and contemporary definitions of design, specifically in the way these definitions relate to the nature of design, to design as relational, and to design as dialectical. The chapter includes an introduction to the discussion on the dialectical nature of design, which is informed predominantly by the theorising of Beckett (2017). This discussion lays the foundation for the chapters that follow and explains how the study seeks to explore the nature of design through a specific philosophical lens – that is, William Desmond's metaphysics specifically. The chapter concludes with an introduction to Desmond's metaphysics and a brief summary of his *fourfold sense of being*. Each aspect of the fourfold sense of being is unpacked and discussed in further detail in the subsequent chapters.

Chapter Three discusses the univocal sense of being and how it relates to design. The univocal sense stresses sameness over difference, unity over conflict, and clarity over ambiguity. According to Desmond (1995a:48), there is a "rich excess" or abundance to being that strikes mindfulness as a "too muchness". The univocal mind seeks to reduce or overcome this 'excess' of being through determinate systems, equations, and categories.

The univocal sense renders being's intrinsic ambiguity as a problem to be fixed through systematic problem-solving processes like scientific or mathematical modes of thinking (Desmond 1995a:49).

These ways of thinking concern systematic and consistent methodologies that deliver reliable and coherent results. By referring to Moritz Stefaner's *Project Ukko* (2016) and Stefanie Posavec's *Literary Organism* (2008) specifically, the study discusses information visualisations as a field within design that exemplifies a univocal approach to design. This is not to argue that information visualisations must always and in all cases be univocal but rather that the univocal sense of being predominates in this particular category. In the end, it is stressed that, although univocal ways of knowing are important facilitators of clear and consistent communication in design, the univocal sense does not exhaust the fullness of the nature of design.

Chapter Four discusses the equivocal sense of being and how it relates to design. The equivocal sense stresses 'difference' over 'sameness' and is mindful of that which transcends univocal knowing (Desmond 1995a:88). Where the univocal sense concerns the absolute determination of beings, the equivocal sense aims to articulate the allusive interplay between the indetermination and determination of being. This study refers to the designers David Carson and Eric Timothy Carlson, whose work exemplifies an equivocal approach to design. As opposed to more univocal approaches to design that concern clear and coherent communication, an equivocal approach includes ambiguity, intuition, and obscurity.

The equivocal approach to design emphasises an 'experimental' methodology which involves the artistic, personal, and emotional expression of a text in visual form. This emotional and subjective expression applies to what Desmond (1995a:103) calls the *poiēsis of becoming* or the *pluralizing power of nature*, which transcends the grasp of univocal rationalisation. Although the equivocal sense is also true to being, it does not speak adequately to the dynamic intermediation between beings as articulated by the dialectical or metaxological senses.

Chapter Five discusses the dialectical sense of being and how it relates to design. According to Rittel (in Buchanan 1992:15), design problems can be complex in nature and difficult to define. These problems are referred to as 'wicked problems', which mean they are usually "ill-formulated" and lack definitive boundaries, fixed requirements, or clear goals (Buchanan

1992:15). Design problems of such a complex nature require an approach that is more sophisticated than a univocal or equivocal approach. According to Beckett (2017:8), the most effective way to approach complex problems in design is dialectically. This means interpreting the relation between problem and solution differently. Instead of viewing the problem and solution as two different concepts of a linear, step-by-step process, the problem and solution are interpreted as *phases* of the same concept that develop together. The solution is not completely separate or independent from the problem, but achieved by 'reframing' the existing content of the problem. In dialectical terms, the solution is achieved not by necessarily adding or subtracting any components, but by reconfiguring the *relation between* problem and solution.

This study refers to the internet, as a designed structure or system, as an example of the *dialectical nature of design*. With reference to the simulations by Vinciguerra *et al* (2010) and Lyon's *The Opte Project* (2003), this study posits that the internet exemplifies the dialectical nature of design in three primary ways. Firstly, it embodies the dialectical *process of becoming* related to being, as nodes and connections of the internet move in and out of being. Older connections are continuously replaced by new ones as the internet evolves over time. Secondly, the internet speaks to the dialectical *community of self-relativity*, where beings are defined through their relations with each other. And thirdly, the internet embodies dialectic's stress on *self-mediation*, as it aims to maintain all relations, within and without, in order to support and sustain itself.

The study refers to *Wikipedia* as an example of a *dialectical approach to complex problems in design.* Faced by a complex design problem, the designers of *Wikipedia* found a solution dialectically. They reconfigured the relation between problem and solution by changing the correlation between 'producers' and 'users' to realise a solution. In dialectical terms, they found a solution *within* the problem. Although the dialectical sense is more complex and integrated than the univocal or equivocal senses, it does not articulate the fullness of being absolutely. As a result of its emphasis on *self-mediation* and *self-determination*, dialectic does not capture the 'agapeic nature' of the metaxological sense of being.

The final chapter of the study examines the metaxological sense of being and how it relates to design. The metaxological includes the partial truths of all prior senses of being, but is a more complex and integrated articulation of being. It transcends dialectic's stress on *self-mediation* as it emphasises an awareness of being's 'excess' or 'plentitude' that cannot be

mediated through univocal or dialectical rationalisation. Unlike the dialectical sense, it does not emphasise the 'self' as the centre of all mediations in the *between*, but considers the 'self' as a contributing voice amongst the numerous intermediations that constitute the *between*.

For Desmond (1995a:198), the metaxological implies an *agapeic mind* or *agapeic mindfulness*. This means it does not necessarily concern itself with what it can gain or consume from the 'other', but rather it considers the ways in which it can preserve and enhance the relation between the 'self', the 'other', and the environment. It emphasises the creative potential of collaboration and integration that transcend strictly univocal, equivocal, or dialectical approaches to design (Desmond 1995a:199).

This study discusses the work of Neri Oxman and how her design philosophy exemplifies a metaxological approach to design. Oxman and the Mediated Matter group at MIT strive to bring the material, digital, and biological worlds together through design in a variety of meaningful ways. In metaxological terms, as exemplified by projects like *Silk Pavilion* (2013) and *Mushtari* (2014), Oxman and her team set out to realise designs *between* man and nature, *between* man and technology, and *between* nature and technology. In Oxman's design approach, nature, as the 'ultimate other', is not only a source of inspiration, but is incorporated into the design process as a valuable 'co-creator' and 'co-designer'.

Although Oxman strives to involve nature as an influential and collaborative entity, in the end, as the lead designer and curator of the projects, she still has the responsibility to make most of the design decisions concerning the final outcomes. Therefore, based on the research conducted, this study suggests that Oxman and her team follow a metaxological approach in their design thinking, but in practice, they reflect more of a dialectical process of 'control', curation, and determination.

7.2 Contribution of the study

This study aims to offer a new philosophical hermeneutic of design. Design, as a fundamental human activity, is one of the most essential ways through which human beings shape their environments, navigate their surroundings, determine ways to communicate, express cultural and individual identity, and, ultimately, make sense of the world (Simon 1988:82). As a consequence, design is informed by underlying ideas, perspectives, and assumptions related to the nature of being, which are metaphysical in nature. In other words,

how we think about being and our place in the world (our metaphysical and existential perspectives) determines the way we design and what we design. These two essential human activities are inseparable, for how we think informs how we design and how we design informs how we think. This study, therefore, aims to interpret the nature of design through a specific metaphysical lens. It does this by exploring the metaphysics of William Desmond, specifically his *fourfold sense of being*, and how it relates to design.

According to Desmond (1995a:xiii), his fourfold sense of being is an extensive and flexible lens through which to understand being and the dynamic relations that constitute being. This study suggests that Desmond's fourfold sense of being not only helps to articulate the rich complexity of being, but can be a valuable lens through which to understand the ontological richness and possibilities of design. This study explores the relation between design and Desmond's fourfold sense of being in two ways: firstly, in the way design can be approached differently with reference to the four senses of being (how we design); and secondly, in the way each sense provides a unique perspective on the nature of design (the nature of what we design). This study moves in successive chapters from the univocal sense of being, through the equivocal and dialectical senses of being, to the metaxological sense of being. Importantly, the four senses of Desmond's fourfold follow each other consecutively, but it must be emphasised that they are also dynamically interrelated.

This study aims to articulate the beginnings of a *metaxological approach to design*. The metaxological, after all, transcends and includes the other senses of design. By taking Desmond's metaphysical theories out from their usual philosophical or academic domains and applying them to visual design, this study attempts to formulate, if only provisionally, an insightful philosophical interpretation (*terminology* or *language*) of design. This philosophical language, which explores four unique interpretive approaches to design, might prove helpful in articulating design, in both theory and practice, as it relates to various creative practices.

These practices may relate to science, engineering, art, architecture, fashion design, furniture design, product design, and visual communication design, and much more besides. These practices, as discussed with reference to Oxman's work, can be interrelated and combined in unexpected ways to deliver astonishing results. Thus, design, as seen in Oxman's work, is becoming a more dynamic, complex, and sophisticated process as higher levels of integration (between material, form, and function) become possible through the development of more advanced technology. A philosophical language that articulates the

underlying principles of design in multiple modes of application, as developed in this study, can provide insightful perspectives into the practice of design and may be helpful to ground the discussion on the interdisciplinary nature of design.

7.3 Limitations of the study and suggestions for further research

This study sets out to develop a philosophical hermeneutic of design, with reference to Desmond's metaphysics, as it relates to *visual communication design* specifically. The domain of visual communication design is emphasised because this study falls within the subject Information Design, which is associated with traditional visual communication design practices.[24] As the study developed though, the examples that were referred to, especially those related to the dialectical and metaxological approaches to design, necessarily became more complex. This means that the examples moved away from more traditional practices of visual communication design towards design examples that embody an interweaving between science, engineering, architecture, art, and design.

The risk of this might be that one loses the 'disciplinary' aspect in search of an 'interdisciplinary' mode of practice. This might imply, for example, that graphic designers assume they are architects, or perhaps even scientists, because they understand a certain level of 'material integration'. This, however, might also be seen as a significant gain. According to Oxman (2016:8), operating within multiple creative domains at once might "entail a loss in disciplinary expertise and research proficiency", but it might also unlock new and uncharted creative possibilities. The question then is: where do the boundaries between creative disciplines start and end? What constitutes as 'design' and what does not?

Due to necessary constraints, this study does not make a significant effort to define such boundaries more clearly. Rather, it aims to focus on the underlying principles that guide design practice in various modes of application. These modes of application are predominately associated with traditional forms of visual communication design, but also include a wider range of design examples, as discussed with reference to Oxman's work. For Oxman (2016:2), though, this reality of 'integration' is inevitable in what she calls the "*Age of Entanglement*". This age refers to the interdisciplinary dimensions of creative activities,

[24] These 'traditional communication design practices' include, among others: graphic design; illustration; corporate identity design; design for marketing and advertising; packaging design; web design; editorial design; publication design; poster design; typography design; and, various forms of digital image-making etc.

where “knowledge can no longer be ascribed to, or produced within, disciplinary boundaries, but is entirely entangled” (Oxman 2016:2). With the development of more advanced technologies, it is inevitable that design will morph and transform into different combined modes of application. With this in mind, it is likely that traditional design schools, universities, or colleges who do not strive to participate in these new waves of integration between disciplines, risk being sidelined.

Thus, this study proposes a few areas of further research. In another study, one might investigate more clearly how Desmond’s thinking might inform the way the disciplinary boundaries of design are articulated. This means delineating more clearly what constitutes as ‘design’ and what does not. If multiple creative disciplines merge into one, what is the role of ‘design’ and the role of the ‘designer’ (and not the scientist or engineer) within the design process? One might also investigate, more specifically, the value of traditional visual communication practices in relation to the broader expansion of design.

If one is not interested in the relevance of design for other disciplines (which is the case in this study), one could apply Desmond’s metaphysics only to traditional visual communication practices. Due to the philosophical complexity of Desmond’s work, specifically in relation to the dialectical and metaxological senses, I found this to be impractical. In terms of the philosophical dimension of this study, the fourfold sense of being is an important part of Desmond’s metaphysics, but does not exhaust, by any means, the fullness of his philosophical anthology. In another study, one might explore the full breadth of Desmond’s work, to develop a more dynamic and sophisticated philosophical hermeneutic of design in relation to the one developed in this study.

7.4 Concluding remarks

By systematically working through Desmond’s fourfold sense of being, explaining the essence of each sense and how it relates to design, this study aims to articulate the beginnings of what I call a *metaxological approach to design*. In its search for design examples that exemplify the different senses, the study has uncovered a dynamic shift in design thinking as embodied by the work of Neri Oxman. The developments in advanced technologies and fabrication processes pioneered by Oxman and the Mediated Matter group at MIT, are turning traditional *form-generation processes* within design on their head.

Advanced technologies, like *material computation* software and sophisticated 3D printers, allow for unprecedented levels of integration between material, digital, and biological processes. This means that designs are highly adapted to their surroundings as they can alter their material and structural properties in real time depending on their interaction with the environment. This also opens the possibility for nature, in the form of live organisms and the environment, to become influential 'co-creators' and 'co-designers' in design projects.

Despite the development of advanced technologies that transform the way we design, the underlying philosophical principles that guide our design practices, as this study uncovers, remain rooted to timeless human truths. A metaxological approach to design, in essence, is deeply and insightfully *agapeic* in nature. This implies a design approach that respects the 'other' as other; that keeps the integrity of the 'other' intact; and, that helps to sustain a dynamic network of relations that benefit the 'self', the 'other', and the environment simultaneously. A metaxological approach does not necessarily emphasise the abilities of the individual designer, but speaks to the creative potential of collaboration within an integrated 'community of co-designers'. It does not emphasise the 'self' as the mediating centre of the *between*, but concerns an awareness of the intricate relations between the self and the 'other'.

According to Oxman, we have the responsibility to protect, nourish, and restore nature – a feat entirely possible through design. Nature, as seen in Oxman's work, is not only referred to as inspiration for the shape and direction of a design project, but becomes a valuable 'co-designer' in the process itself. No matter how advanced or sophisticated design tools, technologies, and processes become in the future, in metaxological terms, the essential driving force of all design should be, and should remain, *agapeic love*. This means design that concerns the prosperity, growth, and well-being of the 'self', the 'other', our communities, our environment, and our planet.

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