A critique of design thinking: An interrogation into the value and values of *design thinking*

by

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DECLARATION

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I hereby declare, that 'A critique of design thinking: An interrogation into the value and values of *design thinking*' is my own work, and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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August 2015

"One cannot understand the problem without knowing about its context; one cannot meaningfully search for information without the orientation of a solution concept; one cannot first understand, then solve."

– Horst Rittel and Melvin Webber (1973:162; 1984:138)

SUMMARY AND KEY TERMS

This study aims to explore the value and values of *design thinking* as an approach. More specifically, this study interrogates and explores the value and values of characteristics in design thinking. Moreover, this study specifically focuses on and interrogates characteristics identified by Charles Owen and Tim Brown in more detail. An attempt is made to critically discuss preconceived ideas regarding the nature of design thinking as a methodology and process. As a result, the characteristics identified in this study serve as the main point of departure. These inform and guide the study towards an understanding of value and values within design thinking.

The understanding of design thinking relies on an understanding of design, but more specifically, the changing nature of design as a discipline and field of study. Therefore, this study begins with a brief history of design praxis, which serves as a foundation for contextualising design thinking. In addition, the history of design covered in this study serves as the foundation on which design thinking itself is based.

This study especially seeks to uncover the history and origins of design thinking from various points of view. The history of design thinking is fairly complex, thus the various points of origin assist in a better understanding thereof. These points of origin are critiqued and compared in an attempt to further illuminate the value and values of design thinking as an approach. As a result, the different origins of design thinking are linked to the characteristics identified by Owen (2005a:12-14; 2006a:3-5; 2006b:24-25) and Brown (2008a; 2009a:49-62, 71-77, 85-86), which further communicate the need for value and values in design thinking.

In addition, this study investigates various criticisms against design thinking, in an attempt to understand many of the uncertainties surrounding the term. Moreover, the various criticisms are discussed and critiqued in order to build a case for design thinking, as well as the value and values it may add to any future outcome.

Lastly, this study briefly explores the ethical values that underpin certain responsibilities within design thinking. Ethics and responsibilities play a key role in any design and design thinking outcome, and are discussed with this in mind.

Key terms: Design thinking, design values, design innovation, design discourse, wicked problems.

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DEDICATION

This dissertation is dedicated to my fallen heroes:

- Johanna Magdalena Botha (1918-1993)
- Hanna Agathe Hoops (1922-1998)
- Anita van Niekerk (1949-2005)
- Marie Koen (1946-2013)
- Serahni Wolmarans (1971-2013)
- Johan van Wyk (1972-2015)

As children we can never quite fully comprehend the magnitude of another person's death. But, as adults unfortunately, we have to live with the burden of knowing that never again can we share a moment with you in this physical world. May you rest in peace.

Lastly, I would like to dedicate this dissertation to my parents, who gave me the strength and courage to pursue this venture.

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CHAPTER 1
INTRODUCTION

1.1 Background and aims of the study

In the last decade, the design[1] industry has tried to better establish itself within a business environment by negotiating with chief executive officers and marketing directors to find a way of making design thinking work for their businesses. Many recent practitioners and design advocates argue that design thinking has the ability and strategic capacity to drive innovation and transform our society (Brown 2009a:3; Kimbell 2009a:2; 2011:285; Martin 2009a:6-7). However, one of the most widely recognised issues in the discourse on design thinking is the inability to explain and frame design thinking properly. For example, Bruce Nussbaum (2011) argues that the framework of design thinking itself is causing some major concerns. This, as Helen Walters (2011) suggests, originates from the reality that there has been no unanimous decision regarding the actual definition of design thinking. Moreover, the term itself is "confused and the literature on which it is based is contradictory" (Kimbell 2009a:1). Ria van Zyl (2008:2) argues that even though design thinking as a design concept is widely understood, it is still in need of a more cohesive definition.

Given the attention paid to design thinking in recent years, the necessity to really "understand its core essence" is as important as ever (Hassi & Laakso 2011a:1). Thus, in order to gain a better understanding of design thinking, one has to first understand the reasons behind the misunderstanding thereof. This makes the origins of this misunderstanding particularly important. Whilst design thinking research[2] keeps expanding on its well-established history, the term has recently attracted a lot of attention amongst managers, especially within management practice (Hassi & Laakso 2011a:3). It has become clear that design thinking is moving into new areas other than the traditional design practices, such as strategy and service design (Hassi & Laakso 2011a:3; Kimbell 2009a). Design is not a uniform concept, but rather complex, and consists of diverse aspects to varying degrees (Badke-Schaub, Roozenburg & Cardoso 2010:45).

The inconsistencies in application and articulation of design thinking have forced many writers, theorists and practitioners to disregard its importance and latch onto newer and

[1] For the purpose of this study, the word design also refers to *design thinking*, unless a specific differentiation is made between the two terms, and thus mentioned otherwise. Some sources may specifically refer to design, as opposed to design thinking, but the former is often used in the context and framework of explaining the latter.
[2] Design thinking research emerged from the fields of architecture and design (Hassi & Laakso 2011a:3).

perhaps less refined conceptual frameworks. However, this behaviour is causing even more confusion. For example, Lucy Kimbell (2009a) articulates some of the issues with the term *design thinking*, but tries to move away from it too quickly by introducing new terminology. Kimbell's (2009a) primary motivation for moving to new terminology is encouraged by the confusion around design thinking itself. Nussbaum (2011) does the same by declaring the "end" of design thinking and introducing the notion of creative intelligence. It seems that even before design thinking is interrogated or thoroughly understood, substitute terms are hastily introduced. Without properly clarifying the current terms of design thinking, it is inevitable that these newer notions risk treading the same path of contradiction and confusion.

Like Kimbell (2009a) and Nussbaum (2011), Fred Collopy (2009) blatantly criticises the term *design thinking*. He seems to believe that the term does not do any justice to the design process. Although Collopy (2009) agrees that what is known as design thinking is different to other ways of thinking, and that design in itself is very powerful, he argues that the problem with the term *design thinking* is mostly linguistic in nature. Consequently, like Kimbell (2009a) and Nussbaum (2011), Collopy (2009) hints towards changing the term instead of interrogating why it is misunderstood.

These hasty moves towards new terms and buzzwords can potentially harm the core nature of design thinking and perhaps even discredit its past success. Moving to new terms will not necessarily fix the problem of understanding its meaning and value, and could potentially cause more harm than good. What many in business and in the design industry still fail to understand is that creatives[3] are not the only ones that can display characteristics of design thinking. Tim Brown (2008a:3) playfully points out that "[c]ontrary to popular opinion, you [do not] need weird shoes or a black turtleneck to be a design thinker". Furthermore, design thinkers are not only "created … by design schools" (Brown 2008a:3). Design thinking is holistic and interactive, and teamwork or collaboration plays a very important role (Owen 2006a:24). Charles Owen (2006a:25) argues that "[d]esign thinking today is highly influenced by this, and designers routinely work closely with other designers and experts from other fields". Therefore, designers can actively participate in "facilitating and expediting" collaboration as part of the design thinking process (Walters 2011).

Apart from the many misconceptions that surround the term, most advocates of design thinking strongly believe in its unique characteristics and components, and ultimately, the unique benefits it displays and value it can add. For example, Owen (2006b:3) argues that

[3] "Creatives", a term used in the design industry, refers to creative individuals such as designers.

"[d]esign thinking offers a way of approaching issues, problems and opportunities almost uniquely suited to innovation". Many of the characteristics of design thinking originate from the unique components that influence design, as well as how designers do things. Nigel Cross (1982:221) claims that "design has its own distinct 'things to know, ways of knowing them, and ways of finding out about them'". Cross (1982:221) offers that design presents unique "designerly ways of knowing". This results in areas of design that correspond with areas in design thinking. For example, both designers and design thinkers often face what is called, "indeterminate" (Buchanan 1992:16) or "wicked problems"[4] (Rittel & Webber 1973:160; 1984:136) and both designers and design thinkers focus on solutions when solving problems. Van Zyl (2008:9) contends that "designers and design thinking are integrated, with designers' roles extended beyond physical design activities to intellectual and emotional design thinking". Therefore, a clear relation between designerly ways of knowing and design thinking starts to emerge. This emergence can perhaps start to illustrate the initial inception of design thinking through the understanding of design itself. However, design praxis should not be assumed as part of the problem in articulating design thinking. Instead it should serve as a foundation and starting point for possible solutions.

Thus, by exploring the various characteristics of design thinking this study not merely attempts to identify and superficially discuss them, but also reveal the inherent or assumed value and values that direct them. Moreover, such an exploration is intended to uncover what merits and pitfalls each characteristic may have for any design strategy, solution or future result. As an example, teamwork (or collaboration) in design thinking may be highly prized without considering why teamwork is necessary in the first place. Collaboration should be considered only insofar as what it contributes through its core value and values. For example, one of the key aspects of collaboration is the use of interdisciplinary teams (Brown 2008a). However, this is still not enough to determine real value and values. Therefore, characteristics like this are interrogated in more detail in order to discover the inherent value and values that underpin them. Where possible, results or the effects of these characteristics are discussed, but only to highlight the underlying value and values within design thinking.

It is important to note the use of the words *value* and *values*, respectively. *Value* is used, first and foremost, to refer to the assumed *goodness* of design thinking as an approach. In other

[4] The term *wicked problems* was first used in the context of design by Horst Rittel (Bousbaci 2008:47; Buchanan 1992:15-16). Originally borrowed from philosopher Karl Popper, the wicked problems approach focuses specifically on the nature of design problems and the confusion and "wickedness" that often surrounds social system problems and the way in which they need to be solved (Bousbaci 2008:47; Buchanan 1992:16). However, it was Horst Rittel and Melvin Webber (1973; 1984; Bousbaci 2008:47; Buchanan 1992:16) that introduced the ten "properties" or attributes of *wicked problems*.

words, *value* is used to refer to the idea that design thinking may ensure *improved*[5] future outcomes. The word *values* is used to refer to the additional worth that design thinking may add to any outcome, by means of unique characteristics. Thus, each characteristic is argued to possess its own value (or worth). As a result, when these are combined under a single term, *design thinking*, they indeed result in *values*. In other words, the individual *values* form part of the overall *value* of design thinking as an approach.

This partial background frames clearly, amongst many diverse issues, one bigger, encompassing issue with design thinking: both the framework and understanding of design thinking point to inconsistencies and a seeming lack of clear direction. Therefore, by using design praxis as a baseline, an attempt is made to better understand and articulate design thinking.

Bearing the above in mind, this study aims to critically analyse and interrogate design thinking by exploring the underlying assumptions with which it currently conforms. Therefore, this study attempts to repaint design thinking, not only in terms of its currently understood characteristics, but also in terms of the underlying value and values that shape and direct such characteristics. Therefore, the characteristics identified in this study are not discussed to retrofit any specific opinion or promotion, but are considered only to the extent that they add real value to the direction taken by design thinking, whether theoretical or practical in nature.

Furthermore, some important aspects regarding design thinking are specifically covered in the course of this study, and are as follow; firstly, design praxis is utilised as a foundation for contextualising design thinking. Secondly, a thorough exploration of the history of design thinking assists in determining various points of origin. These are then critiqued and compared. Thirdly, unique characteristics or parameters that govern design thinking are identified and established using the work of Charles Owen and Tim Brown as the main points of departure. Furthermore, an investigation into various criticisms against design thinking is launched, in an attempt to articulate many of the uncertainties surrounding the term. Lastly, this study explores the ethical values that underpin certain responsibilities of design thinking. Included in this interrogation and exploration is an attempt to identify the major issues with the term in order to avoid further harm, but also to focus on the positive aspects of design thinking to enhance its future use and possible success.

[5] Improved ultimately implies *better* and relates directly to the notion of good design and the premise on which design thinking is based.

1.2 Literature review

A major work of design theory in the twentieth century is Herbert Simon's *The sciences of the artificial*. First published in 1969, *The sciences of the artificial* influenced many of the perceptions about design in contemporary society. In the third revised edition, Simon (1996:111) argues that most professions are "centrally concerned with the process of design", including architecture, business and law schools. However, many of these schools strived for "academic respectability" through "intellectually tough" and analytical subjects (Simon 1996:112). On the other hand, design was regarded as "soft, intuitive, informal, and cook-booky", and did not enjoy the same level of respect amongst educational institutions (Simon 1996:112). Nevertheless, Simon (1996:111, 114) argues in favour of design, since design as an action is "aimed at changing existing situations into preferred ones" and is "concerned with how things ought to be". This can be argued to create a sense of possibility, which in itself is an important prerequisite for design and design thinking. Furthermore, Simon (1996:115-116) argues that the logic or reasoning practiced by designers is carefully considered in opposition to being "sloppy" or vague.

Moreover, Simon (1996:138) argues 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". This seems to suggest that design is necessary in order to open up or even liberate new ways of approaching design and design thinking in contemporary society. Nigel Cross (1982:222) further argues for the importance of design in education by stating his case for "design in general education", and using the dialectic of the humanities and the sciences as an entry point for his argument. These two authors help to identify the importance of design in the education and life of any individual who is able to practice design thinking to some extent.

In addition, Simon (1996) emphasises complexity, as well as complex systems within contemporary society. As a result, one has to consider the complexity of design problems in contemporary society. Horst Rittel and Melvin Webber's (1973) *Dilemmas in a general theory of planning* becomes particularly important in this regard. Rittel and Webber (1973; 1984) introduce what they call "wicked problems" to describe the nature and complexity of problems faced in the design process. Richard Buchanan (1992:16) argues that design problems are characterised as "wicked", since design has no specific "subject matter" of its own other than a designer's own perception thereof. Moreover, social problems are distinctly different from problems faced in the sciences, and are therefore regarded as "wicked" (Rittel

& Webber 1973:160; 1984:136). Wicked problems are different, since they are "ill-defined" and rely heavily on "resolution" or purpose as opposed to a single solution (Rittel & Webber 1973:160; 1984:136). The notion of *wicked problems* is closely related to design thinking and perhaps one of the earliest identifiers of the types of problems faced in the design thinking process. Thus, one can argue that the idea of *wicked problems* influenced the changing nature of design into what we now know as *design thinking*. This is to say that the approach to solving wicked problems established a need to clarify the role design has to play in our world (Kimbell 2011:292).

Furthermore, the need emerged to clarify the purpose of any outcome, as well as redefine problems in order to determine the "outputs … rather than the inputs" of activities (Rittel & Webber 1973:157). The "idea of efficiency" needed to be replaced with "equity" so that problem statements can be considered in "valuative frameworks" (Rittel & Webber 1973:156-159). Thus, one can argue that the value of the outcome is as important as the initial input, since value is what needs to be measured. Rittel and Webber (1973:159) further argue that defining a problem is essential in relation to a "desired condition". Thus, one can further suggest that the value of the outcome determines the desirability thereof, and vice versa.

Additional literature is referred to in order to show that a great deal of the understanding of design thinking stems directly and indirectly from the understanding of design and its history. Owing to the expansion of design and its meanings, some surprising areas of practice and understanding started to emerge. For example, Richard Buchanan's (1992) article, *Wicked problems in design thinking* signifies the importance of the emergence of design thinking in contemporary society, but not without emphasising the need to understand design's long-established history. In addition, Buchanan (1992) specifically links *wicked problems* to design thinking, which in itself is a significant contribution to design thinking as a discourse.

Furthermore, Buchanan (1992:5) refers to design's initial state as a "trade activity", which later became fragmented, as well as professionalised. However, in more recent years design is seen as "a new liberal art of technological culture" where change is quite obvious (Buchanan 1992:5). Therefore, the liberal arts as it is known today, cannot be considered without understanding design's important history (Buchanan 1992:5).

The fragmentation of different subject matters, previously known as the *liberal arts*, has lead to a need for integrative disciplines (Buchanan 1992:6). Without these disciplines of understanding and communication, there is little hope of expanding our knowledge to serve

the purpose of improving human life (Buchanan 1992:6). With this in mind, the inception of design thinking in the twentieth century is crucial. Therefore, interdisciplinary approaches to problem solving and the diversity of ideas are important in design thinking. Owen (2006b:4) puts this in context when he states that "design thinking is highly generalist in preparation and execution". By saying this he does not disregard the importance of specialists in any way, but rather emphasises the need for specialists to extend themselves across different practices where and when possible.

Combining the nature of integrative thinking (or the integration of disciplines), which Buchanan (1992) mentions, as well as the "science of design" from Simon's (1996; Bousbaci 2008:46) work, this study focuses specifically on the work of Charles Owen[6] (1998; 2004; 2005a; 2005b; 2006a; 2006b). Owen (2005a; 2006a; 2006b) draws a parallel between scientific thinking and design thinking to structure a framework that identifies the characteristics of design thinking. Owen's (2006b:17) contention is that "[d]esign thinking is in many ways the obverse of scientific thinking". By this Owen (2006b:17) does not imply that scientific and design thinking are mere opposites, but rather that a balance or a complementary relationship exists. "The source of the complementation lies in deeply rooted differences in ways of thinking" (Owen 2006b:19). As a result, Buchanan (1992:6) comes to the conclusion that:

> [t]he significance of seeking a scientific basis for design does not lie in the likelihood of reducing design to another of the sciences, [but] rather, it lies in a concern to connect and integrate useful knowledge from the arts and sciences alike, but in ways that are suited to the problems and purposes of the present. Designers are exploring concrete integrations of knowledge that will combine theory with practice for new productive purposes, and this is the reason we turn to design thinking.

Therefore, combining science thinking with design thinking is much more valuable than isolating either of these as a source of guidance (Owen 2006b:22). Both scientific and design thinking are highly influenced by creative thinking, since both rely greatly on creativity (Owen 2005a; 2006a:3; 2006b:22, 23). However, other characteristics of design thinking are also important. Therefore, this study especially explores the parameters of Owen's (2005a:12; 2006a:3-5; 2006b:23-25) more "elusive" characteristics in more detail, as well as critically

[6] Charles L. Owen (2006b:16; Institute of Design [sa]) is Distinguished Professor Emeritus at the Institute of Design in Chicago. Owen (2006b:16; Institute of Design [sa]) has administered research and teaching in post-graduate design programs at the Illinois Institute of Technology (IIT), as well as directed a product design program for over twenty years. Furthermore, Owen (2006b:16; Institute of Design [sa]) founded and directed the *Design Processes Laboratory* for fourteen years, and has been publishing the *Design Processes Newsletter* for ten years. Owen (2006b:16; Institute of Design [sa]) has also written several computer programs for application in businesses and institutions, and has published over 150 articles, papers, books and chapters.

analyse their importance within design thinking. More importantly, this study explores and interrogates the value and values that underpin these characteristics within the framework of design thinking.

In addition to Owen, Tim Brown's (2008a; 2008b; 2008c; 2009a; 2009b; 2012a; 2012b) thinking is also important for this study. Brown (2008a; 2009a; Tischler 2009a; 2009b) is the chief executive officer and president of design consultancy, IDEO.[7] As a design thinker and design practitioner, Brown (2009a:8) is a firm believer in knowledge created through doing. As a result, Brown (2009a:8) identifies his own "principles and practices that make for great design thinking". Brown speaks widely on the subject of design thinking, through the use of various mediums, for example books (2009a), articles (2008a: 2008c; 2012b) and talks on TED.com[8] (2008b; 2009b). Brown also contributes through his own blog (2012a), *Design thinking. Thoughts by Tim Brown*. What is especially fascinating about Brown's work is the ease of understanding with which he presents it, as well as his use of real-life case studies, which seem to provide proof that his views on design thinking have practical value. In other words, Brown seems to provide tangibility to the concept of design thinking, by making it widely accessible through his use of popular jargon. More importantly, the characteristics identified by Brown (2008a; 2009a:49-62, 71-77, 85-86) appear to derive from a different source than those identified by Owen (2005a:12-14; 2006a:3-5; 2006b:24-25). Thus, the comparison between these two authors helps for mapping the territory covered by the term *design thinking*. More importantly, it starts to highlight the inherent value and values within these characteristics, which add to or subtract from the direction taken by design thinking. Furthermore, it strengthens the argument that supports the belief that different origins of design thinking exist, as well as the importance of these so-called origins.

Since design thinking has gained a lot of popularity and status in the past decade, many of the remaining sources in this study attempt to reflect the currency of the matter at hand. Many of the misconceptions about the term *design thinking* seem to originate from more recent literature. However, much of such literature assists with defining design thinking within contemporary society, and is thus of utmost importance. Therefore, a range of literature from

[7] IDEO is one of the biggest "product design consulting firms in the United States" (Sutton & Hargadon 1996:689). Founded by David Kelley in 1978, IDEO employs more than 150 designers across the world (Sutton & Hargadon 1996:689). IDEO ([sa]b; 2012:81) takes a human-centered, design-based approach to solving global problems. It operates from its headquarters in Palo Alto in California, but also from smaller offices in Boston, Chicago, London, Tokyo and so forth (IDEO [sa]c; Sutton & Hargadon 1996:689).

[8] TED ([sa]a) is a non-profit organisation committed to "spreading ideas, usually in the form of short, powerful talks (18 minutes or less)". TED ([sa]a) initially started in 1984 as a conference where ideas on technology, entertainment and design were shared. However, today it covers a vast number of other topics in over one hundred languages (TED [sa]a).

current writers, theorists and practitioners are also explored. These include, amongst others; Bruce Nussbaum (2005; 2007; 2011), Helen Walters (2011a; 2011b), Lucy Kimbell (2009a; 2009b; 2011; 2012) and Roger Martin (2004; 2008; 2009a; 2009b; 2009c; 2012; [sa]). Furthermore, the current literature attempts to contextualise how writers, theorists and practitioners with great reach and influence, currently articulate design thinking. More importantly, it explores the influence that such literature may have on today's design thinkers, organisations and even our society.

Perhaps, one of the most important considerations is that design thinking clearly falls into the branch of design discourse that deals specifically with design praxis. Design thinking is arguably also an aspect of discourse on design management and is explored and interrogated with this in mind. Therefore, this study always remains conscious of the link between design and design thinking.

1.3 Theoretical framework and research methodology

The research methodology for this study relies substantially on historical, seminal research that informs the direction of the study through a thorough literature study. Many of the theorists and practitioners featured in this study are respected individuals within the design research community. As a result, their contributions to design praxis and design thinking as a discourse need to be emphasised. The current misunderstanding of design thinking cannot be understood without considering design's long-established history,[9] especially in relation to design research and practice. Therefore, the contribution of seminal authors is of utmost importance to this study, since it reflects the history of design research and practice, as well as the initial interest into design thinking as a discourse and field of study.

However, owing to the nature and currency of the study, as well as design thinking's recent popular status, other influential and more recent literature is explored and interrogated. This exploration and interrogation attempts to formulate a complete representation of design thinking, resulting in a critical literature study. These two points of departure inform the direction of the study, keeping in mind design's history, as well as its popular status. These two points of departure are supported by appropriate literature from both timeframes.

[9] It is important to mention that even though design has a long-established history, design research itself is still fairly new, with a history of only about five decades. For example, the *Conference on Design Methods* held in London in 1962, signifies the launch of design methodology as a subject or field of enquiry (Cross 2006:3). Thus, the *Conference on Design Methods* serves as a starting point in the history of design as a noteworthy field of research.

1.4 Overview of chapters

This study commenced in Chapter One, which introduced the background and aims of the study, as well as summarised the context and relevance of the study. Chapter One continued with a literature review, which further contextualised the study by highlighting the most important literature. Thereafter, the theoretical framework and research methodology were noted.

This study continues in Chapter Two with a brief history of design praxis, which serves as a foundation for contextualising design thinking. Furthermore, it serves as the basis on which design thinking itself is structured. Chapter Two explores the history of design dating back to the Bauhaus school, since the core principles of the Bauhaus inform some key considerations for the rest of the study. Chapter Three then explores an in-depth history of design thinking from various points of origin. The history of design thinking is fairly complex, and so the various points of origin assist in a better understanding within context. These points of origin are critiqued and compared in an attempt to illuminate the value and values of design thinking as an approach.

Chapter Four delves into unique characteristics and parameters that govern design thinking in an attempt to further illuminate the value and values inherent in design thinking. The characteristics discussed in Chapter Four focus on the work of Charles Owen and Tim Brown, but refer to other sources to build on their ideas. Furthermore, these two perspectives are linked to the different origins of design thinking in order to further highlight the strengths and weaknesses of either perspective or origin. Chapter Five investigates various criticisms against design thinking in an attempt to understand many of the uncertainties surrounding the term. Moreover, the various criticisms are used to build a case for design thinking and the value and values it can add to any future outcome.

Chapter Six explores the ethical values that underpin certain responsibilities of design thinking. Ethics and responsibilities play a key role in any design and design thinking outcome, and are discussed with this in mind. Lastly, Chapter Seven brings the study to a close. Firstly, it provides an overview of the various chapters by highlighting key aspects that are discussed in each chapter. Subsequently, the contribution and limitations of the study are noted, as well as suggestions for further research. Chapter Seven completes the study with concluding remarks.

CHAPTER 2
DESIGN PRAXIS AS THE FOUNDATION TO INFORM THE CONTEXTUALISING OF DESIGN THINKING

This chapter attempts to give a brief, chronological overview of the history of design.[1] This chapter not only focuses on design as an activity – what it is that designers *do* – but also focuses on aspects such as design research and design education through the use of influential design historians, theorists, design organisations and design institutions. Furthermore, this chapter attempts to identify key aspects of design that can assist in determining corresponding aspects within design thinking. Each of these aspects is argued to possess (or not possess) a certain value or certain values that add to or subtract from the improvement of contemporary society.

2.1 Brief history of design, design praxis and design research

There has been much debate around the meaning of design and it has often been unclear as to what the term actually implies. Clive Dilnot (1984b:3) seems to grapple with the same thought when he states his uncertainty around whether design refers to an activity,[2] the results of that activity[3] or to the value that design seems to add (or subtract) through the activity. John Walker (1989:23; 2009:42) further ascertains that design is ambiguous, since it can be identified as both a process and the result of that process. As a result, Dilnot (1984b:3) concludes that design is not either of these, but rather all of them; it is "an uneasy mélange of all three meanings".

When Dilnot (1984b:3) mentions the value of design, he refers to the somewhat nondescript idea of "good design". *Good design* is a phrase that appears throughout this study, and apart from Dilnot's (1984b:3) description, few attempts have been made to indicate or explain what it actually implies. However, good design creates the assumption that design has value and values to add. In other words, from a basic linguistic perspective, the assumption that can be made is that *good design* is something *positive* and that it has *positive value* to add, thus reiterating Dilnot's (1984b:3) point. "Good", a noun, describes "actions and behaviours that are morally right" (Hornby 2010:646). Moreover, "value to add" suggests that the intention of an action is to create something good or positive, and is another phrase that is never fully explained. Perhaps the issue here is not that either "good" or "value" can be seen as

[1] For the purpose of this study, the word *design* is used in the context of graphic design, communication design or information design, unless stated otherwise.
[2] Dilnot (1984b:3) refers to the activity as an *act* of designing, or the *process* of designing. The Design Council (2008:9) also refers to design as a process – "design as a verb, not just a noun".
[3] In this instance, Dilnot (1984b:3) refers to actual designed objects or images.

something negative, but rather that little indication is given to what the actual *good* or valuable outcome should be. Moreover, there is very little indication of *how* this can and should be done.

The unavailability of definitions in design in general is problematic, as attempts to refrain from providing such definitions, explanations and methodologies appear to be deliberate, at least to some extent. According to Dilnot (1984b:9), the first generation design historians consciously tried to keep the subject of inquiry "open and pluralistic" by not providing the necessary explanations. However, this deliberate refrain, problematic as it may be, is perhaps masked by an inability to explain certain concepts, or perhaps even the fear of getting it wrong, rather than a so-called problem of pluralism. Furthermore, design itself is flexible and ever-changing, and as a result, very hard to define. Therefore, this chapter attempts to explain the changing nature of design, by means of an appropriate historical overview.

The history of design discussed in this chapter not only gives an overview of design, but also attempts to provide an understanding of how design thinking developed out of something that was only a craft initially. In other words, the history of design discussed in this chapter attempts to highlight design's ability to change and adapt into what we now know as *design thinking*. Buchanan (1992:8) argues that "[w]ithout appropriate reflection to help clarify the basis of communication … there is little hope of understanding the foundations and value of design thinking in an increasingly complex" world. More importantly, change in the area of design is quite obvious, since design has grown from a "trade activity"[4] into a segmented profession, into what is now known as a "new *liberal art of technological culture*" (Buchanan 1992:5).

However, history is important for another reason. According to John Heskett (2001) and Richard Buchanan (2001a), the knowledge of the past will provide an understanding of the present. "We should look to the future, while learning from the past" (Chick & Micklethwaite 2011:79). Heskett (2001) in particular discusses cultural and physical contexts and how various institutions have expedited the spread of information and ultimately altered the material culture and people's lives. Therefore, one can argue that the changing nature of design, as well as that of knowledge, can alter the way in which society ultimately changes. As a result, designers will expand on the "way history is written" in order to provide a structure for authenticating their work (Julier 2000:40). Guy Julier (2000:40) calls it a form of "self-representation" or "historicity".

[4] "Trade activity" is synonymous with *craft* in this context (Buchanan 1992:5).

Various efforts have been made to outline the history of design, as well as to provide a single, acceptable definition to encompass design in and amongst its various fields and practices. Despite these efforts, Buchanan (1992:5) argues that "[n]o single definition of design, adequately covers the diversity of ideas". Walker (1989:23; 2009:42) contends that definitions of design that claim to express design's essential meaning are often inadequate. However, Walker does not provide a clear understanding of what he means by *inadequate*, and one is left to wonder to what extent this inadequacy is implied. The assumption that can be made is that these definitions do not explain enough, or perhaps attempt to explain too much. Moreover, the inadequacy appears to be mostly linguistic in nature. According to Walker (1989:23; 2009:42), "language, like everything else, is subject to historical change". As a result, defining design becomes even more difficult, since both design and language continue to change. This is an important point to consider, since language is crucial for understanding and defining design thinking as well. For example, Fred Collopy (2009c) blatantly criticises the term design thinking, since he feels that the term does not do the act of designing any justice. Therefore, language, as well as design's ability to change, transform and expand over time becomes utterly important. As language continues to adapt, new discoveries and expansions[5] in the area of design will inevitably alter the words used to express it, thus allowing design to become even more flexible, albeit more difficult to define.

Buchanan (1992:5) further contends that design cannot be reduced in any way and will continue to change and extend in its interpretations and associations, exhibiting new domains in design praxis, as well as understanding. Thus, he highlights the importance of design as a flexible process. Victor Margolin (1992:114) supports this idea when he talks about design as a "process of continual invention", which broadens our understanding of design and what it is that designers do.[6] Walker (1989:23; 2009:42) further claims that like all words and concepts, design obtains a particular definition and value not only because of what it refers to, but also owing to its *contrast* with other, similar terms.[7] Once again, no explanation is provided for the specific *value* of design, but one can assume that part of this value lies in design's contrast with other terms. In other words, since it is in contrast with other terms, and is therefore *unlike* other terms, it may be deemed as having something unique to offer.

Furthermore, Dilnot (1984b:3) argues that design has possessed various, often contradictory meanings and associations over time. John Chris Jones (2009:77-78) further supports this

[5] Translation is another example of this expansion, and can alter the meaning(s) and definition(s) of design, but at the same time start to include even broader aspects of what design is becoming.
[6] As mentioned earlier, 'what designers do' will not be the only level of inquiry into what *design* refers to, but Margolin's argument creates a solid starting point for the domain that covers design.
[7] Here Walker (1989:23; 2009:42) refers to terms such as art, craft, engineering and the mass media.

notion and presents other contrasting definitions of design. However, the most troublesome area is an overall assertion that these differences and contradictions do not exist (Dilnot 1984b:3). Walker (2009:46) states clearly that definitions of design are "open" and have changed throughout history as new points of enquiry started to emerge. This further reinforces the idea that history and language are interlinked. Language has allowed design to possess various meanings, which have enabled design to continually change. Thus, making design unique in yet another way. Margolin (1992:114) further suggests that in order to establish a foundation for the study of design, one must visualise and think of design as openly and widely as possible, reiterating Walker's (2009:46) point. This further substantiates Dilnot's (1984b:9) contention of an "open and pluralistic" approach to design inquiries. Furthermore, it perhaps coincides with Jones's (2009:78) conclusion that the one single overarching principle of all these definitions is "*change* of one kind or another". In effect, design is a process of establishing *change* (Jones 2009:78), which in itself is open to debate.

Buchanan, Walker, Margolin and Dilnot's opinions create somewhat of an obstacle. When trying to understand design and design history, a somewhat narrower description or at least some form of an explanation could be helpful. As Dilnot (1984a:6) points out, this is not only necessary from a professional perspective, but "both the understanding of design and its public communication are urgent social needs". George Nelson (1957:6) further stresses the importance of design as "social communication". Design as "social communication" highlights the importance of meaning, since a designer positions work in relation to its social meaning (Nelson 1957:4-5). There is no specific mention of what design is supposed to achieve within these social contexts, but from a broader perspective some more obvious possibilities start to emerge. For example, design has become part of our everyday lives and how we view and consume design has become an integral part of our existence – whether good or bad. Thus, communication about design is necessary, even if only to create better understanding and awareness. As a result, the object is not as important as the "emotional intensity with which the essentials have been explored and expressed" (Nelson 1957:6).

In some of his later work, Buchanan (2001c:9) starts to elaborate on his understanding of design when he appropriately states that "[d]esign is the human power to conceive, plan, and realise products that serve human beings in the accomplishment of any individual or collective purpose". What Buchanan seems to imply is that design should start to address and solve bigger issues – on an individual, but perhaps also on a collective and societal level. The

societal level mentioned here implies that more than one person[8] can benefit from a single design solution and that design should be used to improve people's lives. When design is viewed from this perspective, focusing especially on Buchanan's (2001c:9) idea of a "collective purpose," one cannot help but steer towards Walter Gropius and his initial intent with the Bauhaus.[9]

For the purpose of this study, the part of the history of design that is covered dates back only as far as the Bauhaus. Active between the years 1919 and 1933, the Bauhaus was formed as a merger between *The Weimar School of Arts and Crafts*[10] and *the Weimar Art Academy,* and was renamed and restructured by Walter Gropius[11] after the First World War (Arnason 2004:329; Cross 1983:43; Fleming 1995:623; Meggs 1983:329). Originally founded as a workshop-based school of craft and design, Gropius turned the Bauhaus into a technical school of design with an emphasis on industrial arts and the study of modern materials and methods (Fleming 1995:623). The Bauhaus, with its meticulous theoretical and practical training, and with teachers such as Paul Klee and Wassily Kandinsky, had an enormous influence on design in modern times (Arnason 2004:330; Droste 1993:144-145; Fleming 1995:623; Myers & Copplestone 1977:273). Walker (1989:66) states an undisputed influence of the Bauhaus on not only twentieth-century design, but architecture and art education as well. Walker (1989:66) further claims that the Bauhaus is probably the design school with the "greatest volume of books, articles and memoirs devoted to it". Philip Meggs (1983:341) calls it the "most important design school in this century", while Steven Heller and Louise Fili (2006:50) argue that it is "one of the most influential design institutions in the world". Furthermore, Victor Papanek (1984:30) contends that no other design school in history had more influence in "shaping taste and design than the Bauhaus". The Bauhaus deemed design not only as an "applied art", but also as an essential part of the production process, which was applied on an international scale (Papanek 1984:30-31). From these contentions it becomes clear that the Bauhaus had an enormous influence on design, even today.

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[8] This could also mean a group of people, or various groups of people. "Collective" means, "shared by all members of a group of people" (Hornby 2010:278). Thus, "collective" suggests that these people or groups of people have something in common and as a result, benefit from the same outcome or solution.
[9] The Bauhaus is also known as *Das Staatliches Bauhaus* (Kleiner, Mamiya & Tansey 2001:1050; Meggs 1983:329) or *The Building Institute* (Fleming 1995:623).
[10] Some sources seem to suggest that the Bauhaus was previously known as the *Weimer School of Arts and Crafts* (Kleiner *et al* 2001:1050), however Philip Meggs (1983:329) and Anita Cross (1983:43) clearly state that there was a merger between the *Weimer School of Arts and Crafts* and the *Weimar Art Academy*. Gropius was allowed to change the new school's name to *Das Staatliches Bauhaus* (Kleiner *et al* 2001:1050; Meggs 1983:329). The Bauhaus formally opened on 12 April 1919 (Droste 1993:17; Meggs 1983:329).
[11] According to Meggs (1983:329), Gropius was one of three recommendations made by Henri van de Velde as a possible replacement, when Van de Velde resigned his position as director of the *Weimer School of Arts and Crafts* in 1914, to return to Belgium. It was only after the war that Gropius was confirmed as the new director, by then, already an influential architect (Meggs 1983:329).

Gropius believed that through architecture and design, society could be changed for the better (Myers & Copplestone 1977:273). Gropius's belief appears to link directly with Buchanan's notion of a "collective purpose", as well as Buchanan's assertion that design should be at the service of a better society. Marty Bax (1991:31) calls it a "social striving for a better society". Again, there is no real indication or explanation of what "better"[12] actually entails. However, in the case of the Bauhaus it is perhaps important to consider the specific social context at a very specific time in history. In the period just after the First World War, "better" was perhaps synonymous with feelings of peace and freedom in a previously impoverished and starving German society.

Furthermore, Gropius's curriculum was based on basic principles that would allow artists, architects and designers to accept and anticipate twentieth-century needs (Kleiner, Mamiya & Tansey 2001:1050). There is no mention of what these twentieth-century needs entailed, but it is quite clear that the designer's role in society becomes fundamental, and that the designer had to be prepared for whatever societal changes would occur, and thus act (or design) accordingly.

The first of Gropius's principles, at a very basic level, included the use of primary design principles, for example; composition, colour theory, and so forth (Kleiner *et al* 2001:1050). Gropius also emphasised the importance of craftsmanship, as he believed artists and their crafts cannot and should not be separated (Kleiner *et al* 2001:1050). However foundational these principles may seem, design was already starting to expand in its meanings, application and understanding.

Owing to the expansion of design and its meanings, some surprising areas of practice and understanding started to emerge. Buchanan (1992:5) therefore highlights the following:

> This follows the trend of design thinking in the twentieth century, for we have seen design grow form a *trade activity* to a *segmented profession* to a *field for technical research* to what now should be recognised as a *new liberal art of technological culture*. It may seem unusual to talk about design as a liberal art. But the liberal arts are undergoing a revolutionary transformation in twentieth-century culture, and design is one of the areas in which transformation is strikingly evident. [I]t is important to recognise that what are commonly regarded as the liberal arts today are not outside of history.

The fragmentation[13] of different subject matters, previously known as the "liberal arts", has lead to a need for integrative disciplines to enhance the arts and sciences as part of our intellectual and practical life in the twentieth century (Buchanan 1992:6). This is a reminder

[12] "Better" is the "comparative of good" (Hornby 2010:127) and in this context bears similar qualities.
[13] Walker (1989:24; 2009:43) attributes this fragmentation (and specialisation) to the development of human knowledge on both a quantitative and qualitative level.

of Gropius's second principle; the promotion of unity in art, architecture and design (Kleiner *et al* 2001:1050).[14] As part of an instructional programme published by Gropius in April 1919, Gropius (in Bax 1991:30) claimed that "[t]he ultimate, if distant, objective of the Bauhaus is to achieve unity in art". Thus, a perception of the "fundamental oneness of all phenomena" started to re-emerge (Pevsner 1936:252). In a manifesto published in 1923, Gropius claimed that the "dualism" of the nineteenth century that "separates the individual from the community", is starting to vanish (Pevsner 1936:252). Furthermore, Gropius believed that a separation between monumental and decorative art did not exist (Bax 1991:30). Thus, Gropius encouraged the integration between disciplines that were traditionally known to function independently, such as art and architecture, art and craft, and so forth (Bax 1991:30). The integration was aimed at unifying various disciplines into one "common task" (Droste 1993:19). Thus, the integration between these disciplines seemed to allow areas, which were practiced in complete isolation, to become part of the bigger picture. The integration of knowledge is the only way of progressing as a society in an attempt to improve "human life" (Buchanan 1992:6). Furthermore, Buchanan (1992:5-6) claims that the division and subdivision of the various fields of the discipline – even though these contributed to the progression of knowledge – became "progressively narrow in scope", and disconnected from one another. One would expect the integration of the various disciplines to start limiting the levels of inquiry and ultimately diminish the area of design. However, quite the opposite seemed to happen, since the integration seemed to open up and expand the levels of inquiry. The integration seemed to encourage experimentation between various fields, which in turn expanded the knowledge base and allowed for more complex inquiries to emerge.

In an essay written in 1937, Gropius reflects on the Bauhaus as being an institution grounded on the idea of "'architectonic' art" (Buchanan 1992:6). "Architectonic" is derived from the term architecture, and describes the "integrative capacity" of the liberal arts, as well as Gropius's ideal of creating a unified whole (Buchanan 1992:6). Without these integrative disciplines of understanding and communication, there is little hope of expanding our knowledge to serve the purpose of improving human life (Buchanan 1992:6). Here, the expansion of knowledge and the improvement (or betterment) of society are clearly interlinked. What seems to be implied is that we cannot improve what we do not

[14] More variations of Gropius's *unity* exist; Bax (1991:30) talks about a "unity in art", while Meggs (1983:330) refers to a "new unity of art and technology". Bax (1991:35) also mentions a unity of "art and technique", while Heller and Fili (2006:49) refer to it as a "unified work of art". Cross (1983:43) talks about a "fundamental unity underlying all branches of design". These variations, however, do not change the core objective of the Bauhaus, since it is clear that all of the authors refer to the same fundamental ideology.

know. This reiterates the necessity of integrating various fields and disciplines, as well as experimenting within them in order to expand our knowledge.

As a third principle, Gropius encouraged pupils to design progressive environments through proper knowledge of machine-age technologies and methods, aimed at creating a synthesis between design and production (Kleiner *et al* 2001:1050). A unity between art and technique[15] was also evident, especially through concerts, plays and lectures that were recognised as a form of synthesis for the future (Bax 1991:35). This unity was evident across all fields and practices, thus integrating design with life.

Owing to the political situation in Weimar at the time, the Bauhaus was forced to close down, but found a new location in Dessau and reopened its doors in April 1925 (Droste 1993:46, 121; Pevsner 1936:251). An attempt was made to put modernism to the service of social change and the seeking out of a universal design language that would surpass the political divide of the time (Arnason 2004:329). Even though there was no mention of *how* design could help overcome the political situation at the time, one can perhaps argue that design was seen as a way to set free rather than oppress. Here, design was perhaps seen as a beacon of hope. Design as simplicity or "form follows function" was a way to make things beautiful, but more importantly, it was a way to "enable everyone to benefit from modernity" (Johansson & Woodilla 2008:12). Zygmunt Bauman (2009:168) further ascertains that the "modern mind" was created with the idea that the world can be altered, but also to dismiss whatever the world has become in an attempt to change and improve it.

Dessau, with its shortage of housing, was chosen primarily for its adaptability to Gropius's ideas (Bax 1991:42; Droste 1993:120). This in turn brought forth changes in the curriculum, which enabled the Bauhaus to take advantage of this new society (Bax 1991:42) and location – an area where social change was both necessary and possible. According to Bax (1991:42), these changes emphasised a shift from "individual-expressive to social-collective", as well as true collaboration between artist and industry. Thus, even as early as the Bauhaus, collaborative efforts were considered crucial. The collaboration between artist and industry allowed for the creation of better solutions for the problems of the time. The concept of "learning by doing" and the augmentation of an aesthetic based on reliable "craft skills" were also fundamentals to the Bauhaus philosophy (Arnason 2004:329). *Learning by doing* is a phrase used often in conjunction with design thinking (Kelley & Kelley 2013:25), which

[15] Hannes Meyer, as director of the Bauhaus in later years, continued this "activist objective" that resulted in a synthesis between art and technique (Bax 1991:47). Meyer's involvement with the Bauhaus is discussed further on in this chapter.

implies that certain skills cannot be taught, but are learned over time through continuous and intentional practice.[16] Cross (2004:427-428) further ascertains that expertise is the result of a "dedicated application" to a specific field of interest, which develops over time.

With Gropius's resignation in 1928, Hannes Meyer resumed directorship at the Bauhaus in February of the same year (Arnason 2004:331; Droste 1993:167). Meyer focused less on aesthetics and creativity, and began to focus more on functional and socially responsible design (Arnason 2004:331; Droste 1993:200). Bax (1991:46) supports this idea and claims that from the beginning of his directorship, Meyer, a functionalist architect, wanted to present himself as "socially engaged with a functionalist orientation". A clear link with Modernism can be identified here, where Meyer focuses more on modern ideas and methods, rather than traditional ones – allowing societal issues to become an important aspect in design consideration, as well as designing for function rather than mere aesthetics.

Furthermore, Meyer divided the history of the Bauhaus into three phases, the last being the most important, which was to address real-life and societal issues (Bax 1991:46; Droste 1993:200). According to Bax (1991:46; Droste 1993:200), the three phases Meyer identified are as follow; the first phase consists of the time in Weimar that exhibits chaos, the second phase (in Dessau) is evident of a more formalistic approach, while the third phase under Meyer's leadership (also in Dessau), highlights the importance of social issues. According to Meggs (1983:334), the Bauhaus's identity and philosophy only fully materialised during the Dessau period between 1925 and 1932. Thus, by breaking down the boundaries between various art disciplines, the Bauhaus attempted to bring art into a close relationship with "life by design", which was seen as a conduit for social change and cultural rejuvenation (Meggs 1983:340). Heller and Fili (2006:49) support this notion and state that by removing these boundaries, art could be more receptive to the public's social needs. During the Modernist era, designers started to play a pivotal role in society as they became more in tune with, and integrated into society. These students were to become essential members of society (Heller & Fili 2006:50).

Meyer aimed to achieve a synthesis between art and technique, as well as a synthesis between science and art through the various Bauhaus workshops (Bax 1991:47). By providing additional technical knowledge, the aim was to give a more scientific[17] basis to artistic design

[16] The notion of *learning by doing* is discussed in more detail later on in this study.
[17] The scientific basis was not only evident in Meyer's directorship at the Bauhaus (Meggs 1983:360). Meggs (1983:360) claims that the logical and scientific awareness of the twentieth century gained a graphic expression, and designers were able to develop visual communications that were both practical

with architectural solutions based on social and scientific criteria, such as target group and functional value (Bax 1991:48). Design therefore became more business-oriented; aimed at more specific, measurable outcomes. Thus, making money became increasingly important.

Moreover, Meyer clearly and openly supported Gropius's aim of creating *unity in art* (Bax 1991:50). In 1929 Meyer (in Bax 1991:50) claimed that "[t]he ultimate of all Bauhaus work is the unification of all vital forces to achieve the harmonious organisation of our society … a strategy for achieving a balance between cooperative and individual forces within the symbiosis of the nation". The Bauhaus students were to become integral members of society (Heller & Fili 2006:50). The insinuation here is that the students were to become the promoters of this *unity*, since these students both understood the importance thereof, as well as acquired the skills to make it a reality. In other words, these students not only understood this *unity*, but could practice it as well.

Politically driven students embraced Meyer's ideas through various claims in favour of Marxism, as they felt that only Marxists could be promising Bauhaus residents, and Marxism was the only modern world view that enabled freedom and progress (Bax 1991:50). According to Bax (1991:50), Meyer was not as radical as many had claimed, and in no way tried to create a *Communist* Bauhaus, partly because of his mindfulness towards the Bauhaus's position in a very conservative Dessau. Meyer clearly distanced himself from Communism, by calling himself a "philosophical Marxist" (Bax 1991:50). At the end of Meyer's directorship, the situation at the Bauhaus became progressively infuriated by external factors and radical political propaganda (Bax 1991:50). Meyer was dismissed in 1930 and was replaced by Berlin architect, Ludwig Mies van der Rohe (Bax 1991:50; Droste 1993:200). Bax (1991:51) claims that many believed the original ideal of the Bauhaus was lost under Van der Rohe's directorship, and that the "utopian goal" was neglected through a curriculum that was not keeping track of the current social context.

Political circumstances continued to amplify, and after serious conflict transpired between the aims of the Bauhaus and that of the Nazi regime, the Bauhaus was dismantled in 1933 (Arnason 2004:331; Droste 1993:236; Kleiner *et al* 2001:1054; Meggs 1983:340; Myers & Copplestone 1977:273). The constant revival of political conflict seems to indicate that design had not yet been successful in its aims to overcome the political divide of the time through its

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and meaningful. This new language of form began in Russia and Holland, materialised at the Bauhaus and found an important spokesman in Jan Tschichold (Meggs 1983:360). Tschichold, an exceptional practitioner of the New Typography (*Die Neue Typographie*), was impressed by the first Bauhaus exhibition in August 1923, and was inevitably influenced by their concepts (Meggs 1983:342).

own unique language. This seems to show that design cannot be isolated from society and that design has become an integral part of everyday life.

After the closing of the Bauhaus in Dessau on 10 August 1933, Van der Rohe continued his training as a "private initiative" in Berlin in the same year (Bax 1991:52). Bax (1991:52) notes the following:

> At the opening [Van der Rohe] said: 'Our goal is to train architects in such a way that they can master all the areas with which architecture shares common ground, from housing to urban development, and not only construction, but also the entire furnishing, including the textiles to be used.' This goal in fact, also served as Meyer's point of departure. Based on his belief that co-operation was the hallmark of industrialised society he emphasised the collaboration between specialised artists...

Van der Rohe's years at the Bauhaus laid the foundation for his career as director of the Illinois Institute of Technology,[18] whose curriculum was based on that of the Bauhaus (Bax 1991:52).

2.2 Understanding and contextualising design

The dismantling of the Bauhaus marks a very significant turn in the history of design. Apart from the Bauhaus, there were no other noteworthy design institutions during this time, which also marks an educational need since the closing of the Bauhaus (Meggs 1989:382). Consequently, an interesting relationship between design history and design practice starts to emerge during this time (Dilnot 1984a:9). As a result, design history is utilised to be at "the service of design, as a response to particular practical problems" (Dilnot 1984a:9). In other words, design history does not simply emerge for its own sake, but rather aids in solving these so-called practical problems (Dilnot 1984a:9). However, as soon as these problems are solved, interest in the subject is likely to subside (Dilnot 1984a:9). Consequently, an absence in design history between 1936 and the late 1960s, is identified (Dilnot 1984a:9). However, this absence is not owing to a lack in design practice or design history, but instead is owed to the understated and often unrecognised efforts of designers and design historians during this time (Dilnot 1984a:9). In other words, design history and practice continued to evolve, but seemed to function under the radar.

[18] The Illinois Institute of Technology, originally known as the Armour Institute, was directed by Van der Rohe from 1938 (Bax 1991:52). Its training programme is often regarded as the "perfected 'Miesian' version of the Bauhaus training" (Bax 1991:52).

The innovative energy during this time was smothered by an attempt to turn design into a routine business function, absorbing designers into corporate structures of newly formed design departments (Meikl in Buchanan 1990:196). As a result, design was perhaps used merely as a way of making money, instead of addressing and solving serious social issues. Meikl (in Buchanan 1990:196) claims that this formal structure led to designers experiencing a "loss of voice" regarding important decisions that were to be made about design products. In other words, designers seemed to retract into the background, instead of volunteering valuable input on important issues.

Buchanan (1990:196) argues that this "loss of voice" was more literal than metaphorical, and meant the rise of specialised design publications as a platform for designers to communicate to each other about technical material. This was done with very few attempts made to communicate to a broader potential client base (Buchanan 1990:196). Buchanan (1990:196) further argues that even though higher levels of professionalism in design took place, there was a clear lack in the general understanding of design. As a result, this would need urgent attention and correction – a price few expected design would have to pay in the coming years (Buchanan 1990:196). Therefore, design needed to become more representative of what value it was supposed to add. Up until this point, one cannot help but emphasise the lack in credibility for design, especially in relation to what it represents, perhaps both physically and symbolically. This seems to be paired with the difficulty in defining design, creating the belief that design is somewhat unstable, perhaps even unpredictable. However, this unpredictability should not be seen as negative, but rather suggestive of design's ability to be a flexible and versatile process.[19]

Dilnot (1984a:9) further attributes the absence of design history to various other reasons, for example; when product design took on a Modernist approach, it did not need the historical and intellectual influence that was a more obvious requirement for the improvement of architecture. The same was predominantly true for graphic design. Dilnot (1984a:9) clearly states that apart from specialist areas – for example typography[20] and illustration – history appeared to be trivial to a discipline in the process of still shaping itself, and at the same time

[19] The flexibility and versatility of the design process starts to pre-empt design as a *wicked problems* discipline. The wicked problems approach is discussed in more detail later on in this study.
[20] This includes the transformation and mobilisation of typographic practice by William Morris, as well as other important members within typographic history, such as Stanley Morison, Daniel Berkeley Updike and Beatrice Warde (Dilnot 1984a:9). Jan Tschichold is another influential typographer during this time (Meggs 1983:342).

trying to escape the historic restrictions of its commercial art background and any association to the arts and crafts[21] attitudes.

Historically, there is no denying that craft paved the way for both art and design. During the Middle Ages, art and design had not yet manifested as "separate specialisms", but were still included within a wider range of workshop-based skills (Walker 1989:38). However, very distinct differences between craft and design can be identified in modern times. Walker (1989:38) focuses specifically on the process of making as a key differentiator, for example; in craft, the making process from start to finish is undertaken by the same person or small group of people, thus there is no separation between designer and maker (producer). Subsequently, in design the designer and maker are often different people or different groups of people (Walker 1989:38). This is perhaps an early indication of how design is striving to become more collaborative as designers and makers work together to create solutions.

Apart from these specialist areas and specialist design publications, another emerging form of design history was evident during this time. Margolin (1992:106) argues that design history did not expand based on a foundation of well-understood topics or principles, but rather because of the reactions to the initial literature in the field. Both Dilnot (1984a:8) and Margolin (1992:106) identify Nikolaus Pevsner's *Pioneers of the Modern Movement*[22] as a significant piece of literature on design history. First published in 1936, *Pioneers* introduced an account for design history that has been both condemned and celebrated by many design historians through time (Margolin 1992:106). As a result, Margolin (1992:106) questions whether any historical account can actually assist in the understanding of design. Dilnot (1984a:8) seems to grapple with a similar thought and claims that *Pioneers* is inspired by two very powerfully linked ideas:

> First, design is of great importance and significance in the modern world. Second, precisely because of this, the *form* that designing takes in this emerging world is of social and ontological importance; so too is its history. History establishes a tradition and, therefore, a coherence to an activity.

However powerful Pevsner's intention for design history, it has often been argued to be very limiting. According to Margolin (1992:107), Pevsner's "study of design was an act of discrimination", which excluded ordinary objects from those Pevsner deemed superior. For example, Pevsner clearly identified the work of Walter Gropius and his fellow pioneers as superior or "sublime", and argued that only superior works of design should form part of the

[21] According to Walker (1989:38), the word craft means "skill", especially the manual kind of skill ("handicraft"). It can also mean "trade" or "occupation" and traditionally includes pottery, jewellery, knitting and toy-making, amongst others (Walker 1989:38).
[22] From hereon referred to as *Pioneers*.

study of the history of design (Margolin 1992:107). In other words, anything that Pevsner deemed inferior was to be excluded from design history, almost as if it never existed.

In *An Enquiry into Industrial Art in England,* published in 1937, Pevsner went as far as saying that "90 per cent of British industrial art is devoid of any aesthetic merit" (Faulkner 2006:52; Margolin 1992:108). This limiting view of historical investigation is a direct cause of many attempts and efforts made to expand the history of design (Margolin 1992:108). Dilnot (1984b:5) struggles with a similar thought and claims that the exclusion of what Pevsner refers to as "unimportant works", actually restrict the material being discussed, and seems to "obscure, rather than illuminate, the design process". To understand design and the value it is supposed to add, it is important to include both "good design" and "bad design".[23] Perhaps one can argue that without *bad design*, one cannot find a proper way of measuring or understanding what *good design* is supposed to be. However, it can also be argued that *good* and *bad* in the context of design, is fairly subjective. For example, Rittel (1984:319) argues that what is good to one individual, may be bad to someone else. However, when one starts to look at design thinking, *good design* has little to do with aesthetics or taste (subjectivity) and more to do with the value it inherently adds. Design thinking focuses on more than mere aesthetics (Kelley & Kelley 2013:25) and can move us into a world of "substance and structure" (Norman 2010). Design thinking is able to move design away from "aesthetics" and consumerism, into a "wider social space of systems and society" (Nussbaum 2011).

The exclusion of so-called inferior designs, almost naturally brings into focus the development of design and design history during the 1950s and 1960s. Margolin (1992:108) argues that the "restrictive view" that Pevsner held, encouraged many efforts to widen the subject matter of design history. Thus, one can argue that the exclusion and restriction enabled other areas in design to emerge and develop. Apart from official institutions like the Bauhaus, Walker (1989:66) recommends considering other informal groups that have made significant contributions to the discourse of design. These include the alleged Independent Group[24] of which Peter Reyner Banham[25] and the pop artist, Richard Hamilton, were members (Walker 1989:66). Furthermore, this period signifies Banham's obsession with

[23] "Bad" at its most basic level, refers to the opposite of good. However, when one looks at it more closely within the context of design, it can mean "of poor quality, or below the acceptable standard", "wicked or morally unacceptable", as well as "harmful" (Hornby 2010:94).
[24] The Independent Group consisted of British artists and intellectuals who met at the Institute of Contemporary Art in London in the early 1950s (Margolin 1992:108; Walker 1989:66). Their discussions and articles on design and mass media had an enormous influence on the development of British visual culture (Walker 1989:66). Penny Sparke (1988:141) identifies other members such as, Eduardo Paolozzi, John McHale, Lawrence Alloway, Alison and Peter Smithson and Toni del Renzio.
[25] It is interesting to mention that Banham wrote his dissertation under Pevsner in the early 1950s, which signifies a strong link between them (Margolin 1992:108).

design history within the context of popular culture (Margolin 1992:108), as well as design's development in popular culture (Dilnot 1984a:10). This was the time when "design came of age" and manifested into the public's consciousness in a very different way from that of the 1930s and 1940s (Dilnot 1984a:10). Design education expanded, design became somewhat of an establishment and the mere look and style of things became a significant part of everyday life (Dilnot 1984a:10). The specialist areas that detached design from the public's attention, was now clearly overcome by the desires of popular culture and the individual's need to feature within a designed society (Dilnot 1984a:10). Consequently, design became a "fetish or a value" (Dilnot 1984a:10). The focus on the look and style of things seems quite superficial, since value in design thinking is not added merely through aesthetics. However, during this time when the war was finally over, people seemed to just want to feel good about themselves and perhaps enjoy a little bit of luxury. Society was still in the process of rebuilding itself and people could barely make their own lives better, let alone design for the improvement of other people's lives. Heiner Jacob (1988:227) argues that this time brought forth an "age of prosperity", and after years of poverty and hardship people just wanted to enjoy some comfort and luxury. Thus, there appears to be a real need for appreciation. Consequently, one can perhaps argue that during the 1930s and 1940s design was more about survival, while during the 1950s and 1960s design was more about appreciation and luxury.

At the same time Banham continued to communicate his enthusiasm for mass objects, as well as the various products of contemporary popular culture (Margolin 1992:108; Sparke 1988:141). Thus, by the late 1960s and early 1970s more pressure was applied to develop a design history that was not grounded in fine art or architecture, but rather specialised graphic and industrial design fields grounded in their own right (Dilnot 1984a:11). Walker (1989:17) asserts that design history developed as an addition to art history, and was motivated by the demands within art colleges and polytechnics.[26]

The *Conference on Design Methods* held in London in 1962, signifies the launch of design methodology as a subject or field of enquiry, as well as the start of what Nigel Cross (2006:3) identifies as the "design methods movement". Thus, the *Conference on Design Methods* seems to indicate a turning point in the history of design as an important field of enquiry. Herbert Simon (1996) established foundations for "a science of design", which talked about intellectually demanding, analytical and structural, as well as theoretical teachings about the design process. There was a desire to "'scientise' design in the 1960s" (Cross 2006:4). Even

[26] A polytechnic is an institution of higher education that offers courses in different subjects, mostly vocational or technical subjects (Hornby 2010:1134). Most polytechnics are now called, and have the same status as universities (Hornby 2010:1134).

though design developed quite organically up to this point – changing and adapting as certain aspects developed and progressed – there seemed to be little or no understanding of the actual design *process*. The attempt to 'scientise' design further highlights this issue. As a result, design was personified as a systematic, orderly process that seems to generate results – one would think – almost instantaneously. However, Buchanan (1992:15) strongly suggests that the "actual sequence of design thinking and decision making is not a simple linear process". Rittel (1984:321) further supports this notion and claims that the design process is not a "sequence of activities". As a result, Rittel attempted to find a substitute for the so-called linear design process (Buchanan 1992:15). This resulted in the argument that design is not a linear process and that the way in which designers address problems does not "yield to any linear analysis and synthesis yet proposed" (Buchanan 1992:15). Consequently, Horst Rittel and Melvin Webber (1973:160; 1984:136) suggested that the problems faced by designers are called "wicked problems". "Every wicked problem is essentially unique" (Rittel & Webber 1973:164; 1984:141), thus "every design situation is essentially unique" (Bousbaci 2008:47). Therefore, when merely looking at design's ability to be organic and flexible, the idea of instantaneous results that seem to be generated at will, is a little absurd. The scientistic propagators seemed to forget that in design, and consequently design thinking, there is hardly ever only one single, pre-determined solution to any design or social problem, but rather various possible solutions or iterations of solutions. Papanek (1984:5) states clearly that there is never one correct answer or solution to any design problem, but rather solutions that appear better than others. Therefore, when assessing the unlimited amount of solutions, some will always appear "righter" or "wronger" and the level of "rightness" in any solution is judged by the meaning that it imposes on the design (Papanek 1984:5-6). Consequently, one can argue that design and design thinking should be meaningful in order to appear *right*.

In addition, the scientistic model is also evident in the *Hochschule für Gestaltung* (HfG)[27] [28] in Ulm – the West German successor to the Bauhaus – and one of the most progressive institutions for teaching design in the 1950s and 1960s (HfG-Archiv Ulm 2011). Inge Scholl[29] and Otl Aicher were involved in the development of the Ulm Adult Education Center (vh)[30] after the end of World War Two, in an attempt to use political education and environmental

[27] Also known as the Institute of Design (Meggs 1989:382).
[28] It is interesting to note Alain Findeli's (2001:6-8) comparison between the Bauhaus's ideology and that of the HfG. Findeli (2001:7) argues that even though the initial intent with the HfG – following the "heritage of the Bauhaus" – was eventually declared invalid, a new type of unity came into being. Findeli (2001:7) argues that since the HfG was influenced by human and social sciences, "[s]cience and technology; a new unity" could very well be the new formula for Ulm going forward.
[29] Inge Scoll later became Inge Aicher-Scholl, after marrying her long time friend, Otl Aicher (HfG-Archiv Ulm 2011).
[30] The HfG-Archiv Ulm (2011) also claims the involvement of Hans Werner Richter in the initial planning of the school from 1949.

design as ways to reinforce democratic ideas and motivate a new culture (HfG-Archiv Ulm 2011). Again, no real indication is given as to what this "new culture" is supposed to represent, but the assumption that can be made is that it simply implies democracy, autonomy and freedom, specifically in relation to the main motivations behind the school in the first place.

The Geschwister Scholl Foundation was set up in the name of Hans and Sophie Scholl,[31] [32] brother and sister of Inge Scholl, to help fund this purpose-built campus (HfG-Archiv Ulm 2011; Jacob 1988:221). They later came in contact with Max Bill, a former Bauhaus student, and redirected the focus of teaching towards design (HfG-Archiv Ulm 2011). Inge Scholl, Otl Aicher, Hans Werner Richter and Max Bill founded the HfG in 1953,[33] however the official inauguration only took place in 1955 after the completion of their new building on Kuhberg (HfG-Archiv Ulm 2011; Jacob 1988:221). Bill designed the new building and was the HfG's first Rector (Jacob 1998:221; Thomson 1991:163). The school comprised of Industrial Design, Visual Communication, Building[34] and Information departments[35] (HfG-Archiv Ulm 2011; Jacob 1988:222).

Meggs (1989:382) argues that the HfG attempted to establish an experimental school to help solve the design issues of the time, as well as fulfil an educational need that had been absent since the closing of the Bauhaus. According to Heiner Jacob (1988:221), "Bill's educational goal was that of a Bauhaus-like community of the arts". Even though this was Bill's initial intent, Jacob (1988:221-222) claims that this "Bauhaus-like" idea did not procure much support, as Fine Arts had no place at Ulm. Ellen Thomson (1991:164) supports this notion by declaring the Bauhaus model obsolete in an expanding German economy. Thomson (1991:163) further ascertains that the HfG taught design in a broad sense – "design as an expression of culture" – that is evident of the early post-war period when Germany was striving to rebuild its democratic institutions and industries. This created a lot of tension as debates over the teaching methods and the curriculum started to emerge (HfG-Archiv Ulm

[31] Hans and Sophie Scholl, members of the White Rose resistance group, were arrested at Munich University for distributing anti-fascist leaflets (Jacob 1988:221). Charged with high treason, they were executed by the Nazi's in 1943 (HfG-Archiv Ulm 2011; Jacob 1988:221; Thomson 1991:163).
[32] The Geschwister Scholl Foundation became the supporting institution behind the HfG (HfG-Archiv Ulm 2011) and Inge Scholl continued to provide financial support to the HfG, up until the school's dismantling in 1968 (Jacob 1988:222).
[33] The first classes started in 1953 in temporary classrooms at the vh Ulm (HfG-Archiv Ulm 2011). Teachers like Josef Albers, Walter Peterhans, Johannes Itten and Helene Nonné-Schmidt taught the first twenty-one students (HfG-Archiv Ulm 2011). According to Jacob (1988:222), the school had around 150 students in any given year, with anything between ten and fifteen full-time teachers and forty guest lecturers.
[34] Jacob (1988:222) and Thomson (1991:164) refer to it as "Industrialised Building".
[35] According to Jacob (1988:222), the Information department was later transformed into the department of Film-making.

2011; Thomson 1991:164). Younger teachers demanded an autonomous teaching model, rooted in science and theory (HfG-Archiv Ulm 2011). They also felt that designers should be equal partners in the decision-making process, rather than superior artists (HfG-Archiv Ulm 2011). This resulted in Bill resigning as rector in 1956 and leaving the HfG altogether in 1957 (HfG-Archiv Ulm 2011).

After Bill's resignation, Tomás Maldonado, Otl Aicher and Herbert Ohl took over the directorship in a joint effort to run the school (Thomson 1991:164). According to Thomson (1991:164), they began to focus on mathematical training, sociology and cultural history, and also proposed a theory of "scientific operationalism". Design was seen as an orderly process (Thomson 1991:164) with a sequence of measurable and viable steps (Aicher 1988:232). This seemed to be the next natural progression within design as a discipline, however still with little or no real understanding of the design process. Design was still fairly new and science seemed to be the most appropriate discipline to compare it to – perhaps only because its process was very specific and at least understood for the most part. Thus, problem solving in the area of design became scientific and methodological (Meggs 1989:382).

A synthesis of life and work was also characteristic of the HfG lifestyle, which allowed for a compact study atmosphere – a key requirement for a discussion over design and social issues (HfG-Archiv Ulm 2011). Jacob (1988:226) calls it a "close-knit community, very self-contained". However, this seemed to be somewhat problematic. The late 1940s in Germany saw a time of great need, both physically and philosophically (Jacob 1988:227). By the time the HfG got underway, some fifteen years later, the economic situation had drastically changed and brought forth an age of prosperity – a life of comfort, pleasure and luxury (Jacob 1988:227). Even with this sudden discernible consumption and a changing German economy, the HfG's philosophy remained unchanged and did not allow for the fulfilment of individual or social needs (Jacob 1988:227-228). One can perhaps argue that since the HfG did not anticipate or prepare for this change they were unable to accomplish what they set out to achieve. Furthermore, the HfG's physical[36] and psychological isolation resulted in an overall detachment from society (Jacob 1988:224), whose very needs they were supposed to fulfil. According to Jacob (1988:228), the Ulm ideologists paid little attention to progression in the area of popular culture. Something as accessible as a television, an object that substantially altered society at the time, was blatantly ignored (Jacob 1988:228). However, with its many shortcomings, the HfG was well ahead of its time in one important area; the design of systems at the school led to programmed design and laid the foundation for computer-aided design

[36] The physical isolation literally refers to the school's proximity to society and its location on Kuhberg – some 45 minutes outside the city centre (Jacob 1988:224).

(Jacob 1988:22). According to Cross (2006:3), the 1960s in particular, saw the beginning of computer programs for problem solving.

Consequently, the unwillingness to accept broader issues within the HfG's idea of functionalism, led to rapid deterioration (Jacob 1988:228). When looking at educational institutions in general, they appear to be known and respected for a certain level of heritage and tradition, through which they have to impart knowledge to their students – students that will eventually have to work within society. Therefore, the unwillingness to change, as well as the institution's inability to adapt to society's needs is an interesting phenomenon, and not only evident in the HfG's history. For example, Walker (1989:65) specifically highlights vulnerabilities in institutional histories in general; one being the institution's failure to establish itself within a larger changing environment. As a result, this is a vulnerability that clearly befell the HfG.

Disparities between the HfG and the industry continued to intensify as the school focused on delivering quality, while the industry remained primarily motivated by elevating profits and return on investments (Jacob 1988:229). Rather than surrendering to outside control, the HfG dismantled in 1968 (HfG-Archiv Ulm 2011).[37] This time round, the school's failure and unwillingness to change lead to a much greater consequence – its own demise. Thus, it can be argued that the school's dismantling was caused by its poor financial situation, which was caused by the school's unwillingness to adapt and change according to society's requirements. As a result, funds from various sources were withdrawn (HfG-Archiv Ulm 2011), making the need to change that much more apparent. When looking at the situation from a design thinking perspective, both sides are somewhat problematic. For example, the industry was driven only by the idea of making money, while the school tried to create solutions for a society they were not even part of, or even worse, were not even trying to understand. However, design thinking demands a level of engagement with an environment, in order to understand the real cause of a problem, and work towards a possible solution. Design thinking is not only about making money or measuring profitability, but rather about the positive *value* it can inherently add. This is discussed in more detail in the following chapters.

[37] At the time, the Geschwister Scholl Foundation was in serious debt and as a result, teachers were made redundant and classes minimised (HfG-Archiv Ulm 2011). In and amongst various protests, the dismantling was also owed to the regional parliament's withdrawal of all funding (HfG-Archiv Ulm 2011).

2.3 From design towards design thinking

Horst Rittel, together with industrial designer, Bruce Archer, were involved in teaching at the HfG in the 1960s (HfG-Archiv Ulm 2011). Their preference for mathematical and analytical methods, for example, ergonomics and business analysis, led to massive internal disputes (HfG-Archiv Ulm 2011). Rittel, a mathematician and designer, attempted to find an alternative method for the linear, sequential design model that many were exploring at the time (Buchanan 1992:15). According to (Cross 2006:4), Rittel proposed "generations of methods", which ultimately liberated design methodology. Rittel (1984) suggested that developments in the 1960s were "first generation" methods, and that a second generation needed to emerge. Nigan Bayazit (2004:21) and Nigel Cross (2006:4) further support this notion. Bayazit (2004:21) characterises the "first generation" design methods as simplistic and immature, thus not able to solve complex, real-world problems. Therefore, the "first generation" methods needed to turn away from its systematic, rational and scientific application of knowledge, to a more participatory process where designers are collaborators with the problem owners and other stakeholders (Bayazit 2004:21-22, Rittel 1984:322). Designers are to become equal partners in the decision-making process (HfG-Archiv Ulm 2011). Bayazit (2004:21-22) calls this "user involvement" or "user participation". Moreover, Rittel (1984:322) refers to clients as "accomplices". Thus, the suggestion to move away from the scientific and systematic processes seems to be the first important step towards design thinking. Not only is there an attempt to move away from the scientistic model, but there is also an attempt to move towards participation and collaboration in design – allowing the designer and the user to become equal partners in the design process.

Moreover, Rittel proposed the "second generation design methods" to compensate for the limiting abilities of the "first generation methods" (Bayazit 2004:21). Rittel (1984:321) argues that these are "new" methods, and not simply the same methods with different characteristics. This proposal links directly to the introduction of *wicked problems* (Rittel & Webber 1973:160; 1984:136) or complex, real-world problems. In the late 1960s and early 1970s, Rittel and Webber (1973:160; 1984:136) first characterised design and planning problems as "wicked problems". Bruce Archer (1979b:17; 1984:348) further supports the concept of ill-defined problems and claims that "[i]t is widely accepted, that design problems are characterised as being ill-defined". By "ill-defined" Archer (1979b:17; 1984:348) implies that a problem exists where the necessity to solve the problem does not contain the necessary information that will empower the designer to meet the requirements of the intended solution. Simon (1984:145) calls these "ill-structured problems", since their structure lacks a clear

definition. Archer (1979b:17; 1984:348) further implies that this information is obtainable through various methods, for example; by merely seeking out the information, through thorough experimentation or even by pure chance. "Chance" in itself is something that is never certain, often unplanned and refers to the possibility of something happening (Hornby 2010:231). When looking at the word *chance* in this context, one cannot help but notice that design is anything but a scientific process with orderly steps. Thus, yet another indication that moving away from the scientistic model was indeed the correct one. *Chance* seems to imply that design is an organic, flexible process and that a solution can often just manifest itself into being. This makes design even more difficult to define, since you cannot really indicate or explain when *chance* will happen, or whether it will happen at all.

During the 1980s design was seen as a solution to the industrial decline in Britain, and Walker (1989:24; 2009:43) contends that the terms *design* and *designer* became "values in their own right".[38] [39] Dilnot (1984b:3) further contends that design not only became a value in its own right, but its elaborate functions in industrial societies were being recognised. Design became its own coherent discipline of study, based on the view that "design has its own distinct 'things to know, ways of knowing them, and ways of finding out about them'" and that design presents unique "designerly ways of knowing" (Cross 1982:221). "Designerly ways of knowing" (Cross 1982:221) seems to link closely to the notion of "learning by doing" (Arnason 2004:329), since a certain level of skills and abilities cannot be taught, but are rather learned over time through intentional practice.

Moreover, Archer (1979b:17; 1984:348) supports the idea of "designerly ways of knowing" but specifically focuses on the way of thinking that is different, when he states the following:

> [t]here exists a designerly way of thinking and communicating that is both different from scientific and scholarly ways of thinking and communicating, and as powerful as scientific and scholarly methods of enquiry when applied to its own kinds of problems.

Later on, Archer (1979a:18) calls it a "competence", which he describes as a "level of awareness of the issues in the material culture". An attempt is made to solve ambiguous social problems, which vary between education, health, information technology and so forth

[38] For example, people started referring to jeans as *designer* jeans, where designer – even though the adjective appeared unnecessary, as all jeans are inevitably designed – became a signature of uniqueness, originality and creativity; all attributes that demonstrate the level of desirability that was linked to the word *designer*, rather than the product as a whole (Walker 1989:24; 2009:43).
[39] Design during this time seems to follow a similar path to that of the 1950s and 1960s. However, it appears to have rid itself of associations with the arts and crafts movement and have managed to manifest itself into its own right. As a result, many attempts have been made since to define and establish design as its own discipline, detached from other movements.

(Stewart 2011:515; Dorst 2011:521; Lindberg *et al* [sa]:243; Waloszek 2012). Here it becomes evident that Archer (1979b:17; 1984:348) supports the concept of ill-defined or *wicked problems*, in other words, problems that cannot be solved through the scientific and scholarly ways of thinking mentioned earlier, but through a *new* kind of thinking that offers unique ways of approaching these issues. Archer (1979a:20) calls this way of thinking an approach to knowledge and a way of knowing that is differentiated from those of Science and the Humanities.

Moreover, Buchanan (1990:197) talks about a "culture of design" and design's "well-grounded place in the modern world". This differentiates design from other fields, especially through its distinct approach to ideas and ways of thinking and working (Buchanan 1990:197). It is here where the need for design thinking seems to emerge, perhaps not consciously and openly, but rather through an indication that even the "second generation" design methods are not sufficient any more. Cross (1981:4) clearly states that "like the first generation methods, these second generation methods have also met with only moderate success". This opened up a new devotion to "third generation" methods guided by a necessity to understand designers' cognitive processes (Bousbaci 2008:38).

The period between the 1960s and early 1980s "was central in the history and evolution of design thinking" (Bousbaci 2008:41). Rabah Bousbaci (2008:41) identifies two main reasons for this; firstly, research in design thinking examined a "median" position as "the wicked problems theory of design", and secondly, the "second and third generation" design methods added significant concepts to design that are still relevant today. In the mid 1980s, design started to really gain acknowledgment, when businesses started to recognise design as an important agent for corporate development (Dilnot 1984a:4). In addition, governments started to consider design as an asset for industrial rejuvenation, whilst the academic world started to consider design and its issues as a worthwhile and necessary area of study (Dilnot 1984a:4) that is worth defining (Dilnot 1984b:3).

However, design history should not be seen in isolation. Dilnot (1984a:5) states clearly that one must take into consideration the "tripartite relationship" between design history, understanding and practice, as this is of central importance to design as a whole. Not only is this "tripartite relationship" important, but Dilnot (1984b:3) believes that design is an amalgamation between an activity, the results of that activity and the value that design seems to add through the activity. Therefore, both a fragmentation and a unity are forging design into shape (Dilnot 1984b:4).

Furthermore, the role of design aesthetics cannot be properly understood or solved in practice without studying and understanding the historical context. Thus, one cannot only consider design's internal historical context, but external factors as well. Walker (1989:33; 2009:46) argues that design historians tend to be conservative, almost unwilling to admit the correspondence between design and politics, or what he refers to as design and "social injustice".[40] Guy Julier (2011:2) states clearly that design is "shaped by economic, social, political and cultural forces". Thus, design is inevitably influenced by wars,[41] revolutions and the economy (Walker 1989:33; 2009:47). Dilnot (1984b:7) contends that design may also be seen as an influencer *of* society, thus proposing the phrase "design *in* society", rather than "design *and* society". These anti-human ends are in direct conflict with what design thinking is trying to achieve, since design thinking focuses substantially on human-centered and environment-centered concerns (Owen 2005a:12-13; 2006a:3; 2006b:24).

Therefore, the emergence of design in the 1990s is evident of design's historical context, and identified as a "design decade that parallels and eventually could rival the 1930s" (Meikle in Buchanan 1990:196). By this, Meikle (in Buchanan 1990:196) suggests that design of the 1930s was something new and still in the process of shaping itself, while design of the 1990s already had the history of the 1930s behind it, as well as the growth of a so-called information age. Buchanan (1990:197) calls it "economic competitiveness" and the impetus behind the revival of design in contemporary society.

Hazel Clark (2009:165) further ascertains that design's primary purpose should be in favour of the social good, and not only for financial gain. As a result, design is not just about making money. Walker (1989:vii) seems to agree with this notion when he states the following:

> Disasters of all kinds occur with monotonous regularity in humanly devised systems. This impresses upon us the fact that good design is not simply a question of taste or style, it is literally a matter of life and death. The sheer number of failures indicates that design is too important to be left to designers or to politicians who think of it as merely a means of achieving higher profits for commercial companies or as a way of revamping their image to win elections.

[40] "Social injustice" means that a substantial amount of design during the twentieth century was aimed at anti-social and anti-human ends; for example, the design of concentration camps, gas chambers and so forth (Walker 1989:33; 2009:46).
[41] Walker (1989:34) specifically mentions the Arab-Israeli war of 1973, where the reduction of oil supplies to the West caused a major increase in the price of petrol, which resulted in an increased cost to run cars. Consequently, this created a need to redesign cars with engines that could achieve more kilometres per litre (Walker 1989:34). Thus, a political clash had an economic consequence, which ultimately enforced a design improvement.

Dilnot (1984b:3) agrees with this idea of *good design*, and argues that design inevitably adds value. "[D]esign is a good thing" and the values of design are manifested in such a way that they need no explanation (Dilnot 1984b:3). Sir Michael Bichard (2008:7), chairman of the British Design Council, states that "[g]ood design solves problems" and design's ability to add value to businesses in the global marketplace, is becoming increasingly important. Furthermore, The Design Council (2008:9) argues that "good design" is sustainable. This further expands on Bichard's (2008:7) view that "good design" delivers value; "economically, socially and environmentally".

With this concise overview of design history, some noteworthy aspects are emphasised in relation to the correlation between design and design thinking. Each individual aspect, as identified in this chapter, attempts to assist with a better understanding of design, and consequently *design thinking*. For example, this study aims to provide proof that design thinking is utilised to create improved future outcomes. This seems to link directly with the Bauhaus's initial objective; to strive for a better society through aspects of design (Bax 1991:31; Myers & Copplestone 1977:273). This is perhaps further highlighted in the Bauhaus's notion of a unity in art, architecture and design (Bax 1991:30, 35; Cross 1983:43; Heller & Fili 2006:49; Kleiner *et al* 2001:1050; Meggs 1983:330). Furthermore, the HfG Ulm attempted to create a new culture that supported both autonomy and democracy (HfG-Archiv Ulm 2011). Thus, a clear connection between the foundations of design and design thinking starts to emerge. Therefore, the next chapter explores additional corresponding aspects in more detail, in order to give a more comprehensive overview of design thinking as an approach. The next chapter not only explores different aspects of design thinking, but attempts to uncover the history and origins of design thinking. The history and origins of design thinking are pertinent in the overall understanding of design thinking as an approach.

CHAPTER 3
A HISTORY OF DESIGN THINKING

The history of design discussed in the previous chapter serves as a foundation for contextualising design thinking. As a result, some key aspects were identified to form a basis on which design thinking itself is structured. However, these aspects alone are not enough to understand the emergence of design thinking in contemporary society. Thus, an exploration into the history and origins of design thinking is crucial. The previous chapter also highlighted the changing nature of design and design history, which is pre-emptive of the way in which design thinking also changes. As a result, this chapter attempts to explain the initial need and emergence of design thinking in contemporary society.

Design thinking is argued to have different meanings, based on the different contexts within which it is applied (Johansson-Sköldberg, Woodilla & Çetinkaya 2013:121). Many recent practitioners and design advocates claim that design thinking has the ability and strategic capacity to drive innovation and transform organisations and our society (Brown 2009a:3; Kimbell 2009a:2; 2011:285; Martin 2009a:6-7). Bruce Nussbaum (2005) indicates a clear change in the assumption associated with innovation; in the 1990s innovation was mainly driven and associated with technology. However, in the twenty-first century design is the key signifier of innovation (Nussbaum 2005). Ulla Johansson and Jill Woodilla (2009:2-3) define innovation as "making something new", and claim that innovation and design thinking are closely linked. Furthermore, Ulla Johansson-Sköldberg and Jill Woodilla (2013:42) argue that innovation is the link between management and design, which is possible through design and design thinking.

3.1 Turning to design thinking: the initial need for design thinking

The term *design thinking* has gained a lot of traction over the past decade (Hassi & Laakso 2011a:1; Martin 2009a:62) in various contexts that go beyond conventional design practices (Johansson-Sköldberg *et al* 2013:121; Kimbell 2011:285). However, much of the recent literature seems to ignore the important history of design thinking that is well grounded in "academic development and debate" and spans over more than forty years (Johansson-Sköldberg *et al* 2013:121, 123).

As a result, this chapter attempts to uncover different origins of design thinking, as well as explain the different misunderstandings, contradictions and meanings within design thinking.

Moreover, this chapter attempts to highlight the differences between these seemingly different perspectives, as well as the value and values of each perspective. Thus, in order to attempt to discover the history and emergence of design thinking, one has to look at both the recent literature that has made design thinking popular over the past decade, as well as the "academic" literature that presumably spans more than four decades. Lucy Kimbell (2011:285) attempts to do so by identifying various versions of design thinking. The three versions that Kimbell (2011:285) identifies are as follow; design thinking as a cognitive process, as a general theory of design, and as a methodology that serves as a resource for innovation within organisations.

Consequently, various individuals support these different versions of design thinking. For example, design thinking as a cognitive process (Badke-Schaub *et al* 2010:39; Bousbaci 2008:38; Stewart 2011:516) supports the idea that designers' ways of thinking, knowing and doing are different and unique to other kinds of thinking, knowing and doing (Kimbell 2011). This version of design thinking often only focuses on studying the abilities of individual designers. According to Kimbell (2001:296), this version frequently examines designers outside of the context from which they are working. Consequently, this version suggests that the social, political and economic contexts within which the designer works, is of little or no importance to the design outcome. However, this stance is somewhat problematic, since the discussion on the history of design in Chapter Two and a further discussion in this Chapter, provide proof that the social, political and economic contexts within which the designer operates, is an important factor in shaping the actual design outcome or solution. It is also the other way around; design is used to shape social and political behaviours, and consequently, social and political outcomes. This can perhaps be explained through the history of the Bauhaus, as well as the history of the HfG. The Bauhaus used design to influence the way design is perceived; for example, as functional, as opposed to merely decorative or aesthetic. On the other hand, the HfG attempted to create a new culture (HfG-Archiv Ulm 2011) that supported autonomy and democracy. Both, in their own right, attempted to provide a way to improve society through design, but more importantly, both institutions influenced the changing nature of design within its own specific context.

The second version of design thinking, as a general theory of design, focuses specifically on defining the field of design, but more importantly, it stresses the influence of design and designers' position in the world (Kimbell 2011:292). Design shapes the "form, operation, appearance and perceptions" of the world we all live in (Fry 2009:3). To understand the actual design process, "it remains important to explore how political, socio-cultural, and

economic development have shaped design practices over time" (Kimbell 2011:298). Thus, the second version appears to be more historical in nature. Buchanan (1992) stresses a clear shift from the arts and crafts towards a more generalised design thinking. Consequently, Buchanan (1992:5) defines design thinking as "a new liberal art of technological culture". However, the biggest area of concern within a generalised design thinking, is that it disregards the importance of the diversity of design practices (Kimbell 2011:285), thus implying that only one set of practices is relevant to many different design disciplines.

Even though many aspects of the various design disciplines should not be generalised, some of these aspects are inherent to design and comfortably span across the various disciplines, for example abductive reasoning. Abductive[1] reasoning is the "necessary logic of design" and different to other types of reasoning, for example deductive and inductive reasoning[2] (Cross 2011:10). Cross (2011:27) argues that abductive reasoning is inherent to design, because it is strongly associated to synthesis, as opposed to analytical or evaluative activities found in more "conventional"[3] types of thinking. Furthermore, it is argued that abductive reasoning attempts to discover that "something *may* be" (Peirce in Cross 2011:27) or to discover something new, which cannot emerge through "conventional" types of logic (Peirce in Martin 2009a:64). Charles Sanders Peirce[4] (in Hartshorne & Weiss 1932:153) further believed that abductive thinking shapes a "general prediction without any positive assurance that it will succeed". Thus, one cannot prove any new idea by using "past data" through inductive or deductive logic, and

[1] Also referred to as "productive reasoning", owing to the fact that a designer has to "produce" something during the design process (March in Cross 2011:28; March in Goel 1988:229). Peirce (in Hartshorne & Weiss 1931:28) calls it "retroduction" and claims that owing to "corrupt text" it is often misunderstood and translated as abduction. Vinod Goel (1988:229) argues that Lionel March presented a "logic of design" as a direct translation from Peirce's "logic of science".

[2] Deductive reasoning is established through facts (Peirce in Hartshorne & Weiss 1932:53) and provides proof that "something *must* be" (Peirce in Cross 2011:27). It is also known as the "logic of exact sciences" (Peirce in Hartshorne & Weiss 1932:57) or the "logic of what should be" (Dunne & Martin 2006:513). Inductive reasoning is formed through a hypothesis (Peirce in Hartshorne & Weiss 1932:54) or "approximate conclusion" (Peirce in Hartshorne & Weiss 1931:28) and proves that something is "*actually* … operative" (Peirce in Cross 2011:27). It is also known as the "logic of what is" (Dunne & Martin 2006:513).

[3] The more "conventional forms of reasoning" are known as inductive and deductive reasoning (Cross 2011:27; Martin 2009a:64).

[4] It is important to note that Peirce himself never published a single book on philosophy (Hartshorne & Weiss 1931:iii). However, he published many papers, about seventy-five in total, which expressed his ideas regarding logic and pragmatism (Hartshorne & Weiss 1931:iii). Furthermore, many of Peirce's writings were in fact "unpublished manuscripts", often still in its unfinished state (Hartshorne & Weiss 1931:iv). It was only until after Peirce's death in 1914, that Harvard University's Department of Philosophy compiled all of his work into more complete volumes (Hartshorne & Weiss 1931:iv). Most of Peirce's original writings – although edited to some extent – were kept intact, in order to retain the integrity of his work (Hartshorne & Weiss 1931). Furthermore, Peirce was regarded as a "prickly misanthrope", amongst other things, which perhaps partly explains his "low profile" (Riel 2009b:66-67). Consequently, there is no "sustained body of work from which to get a true sense of his contribution to philosophy and logic" (Riel 2009b:67). As a result, most of Peirce's work referred to in this study, is done by means of other influential sources.

therefore a third mode of logic must exist (Peirce in Martin 2009a:64). Using past data actually limits the levels of inquiry, therefore one has to employ abductive thinking in order to create something new (Collins 2013:37). Pierce (in Hartshorne & Weiss 1932:426) argues that it is "absolutely worthless" to reason from a past to a future experience. Therefore, abductive reasoning is "the logic of what might be" (Dunne & Martin 2006:513; Martin 2009a:27) or how something "ought to be" (Simon 1996:114). According to Johansson-Sköldberg *et al* (2013:125), both Cross and Lawson use "abductive processes" to identify and generalise their observations, in order to "find patterns … grounded in practical experience … through practical examples". Furthermore, abductive reasoning plays an important part in design thinking, and is argued to be a prerequisite for intelligent design (Dew 2007:38). Thus, one can argue that this way of thinking is unique and aimed at creating various new possibilities.

The third version of design thinking often ignores previous literature (Kimbell 2011:293) and focuses on design thinking as a tool for business that attempts to drive innovation (Brown 2009a:3; Hassi & Laakso 2011a:1; Kelley & Kelley 2013:25; Martin 2009a:6-7, Young 2010:3). Today, this version is the most popular and perhaps the best known, as advocates thereof have published extensively (Kimbell 2011:294). Kimbell (2011:294) specifically mentions Tim Brown in this context. Apart from Brown's book, *Change by design* (2009a), he has published an article in the *Harvard Business Review* (2008a) and a joint article with Jocelyn Wyatt in the *Stanford Social Innovation Review* (2010). Brown has done various talks at TEDx conferences[5] (2008b, 2009b) and also writes on his own blog, *Design thinking. Thoughts by Tim Brown* (2012a). This version appears to support the more popular accounts of design thinking promoted by Tim Brown, David Kelley,[6] IDEO and so forth.

Ulla Johansson, Jill Woodilla and Mehves Çetinkaya (2011:1; Johansson-Sköldberg *et al* 2013:121) support this notion and further suggest that substantial amounts of literature in books, journals and the media, as well as "popular press and semi-academic literature" have sparked enthusiasm for design thinking as a universal cure for society. Furthermore, Robert

[5] The TEDx program was started by TED.com to take the vision of "ideas worth spreading" forward (TED [sa]b). It provides support for "independent organisers who want to create a TED-like event in their own community" and prompt interesting conversations (TED [sa]b).
[6] David Kelley is the founder of Stanford University's Hasso Plattner Institute for Design – better known as the d.school – which was established in 2005 (Kelley & Kelley 2012; 2013:26-27; Tischler 2009a). Kelley is also the founder of global design consultancy, IDEO (Sutton & Hargadon 1996:689; Kelley & Kelley 2013). IDEO was established in 1991 as a merger between David Kelley Design (known for creating Apple's first mouse in 1982) and ID Two (known for creating the first laptop in 1982) (Brown & Wyatt 2010:33). According to Brown (2009a:6; Brown & Wyatt 2010:33), Kelley always used the word 'thinking' to try and explain what designers do, and inevitably the term *design thinking* endured. Linda Tischler (2009a) argues that the d.school is motivated by design thinking, the methodology made popular by Kelley.

Fabricant[7] (2010a) points to the "destructive misperception" that design thinking is a "magic elixir that can be sprinkled on anything". Despite the popularity of design thinking as a tool for business, one of the dangers is perhaps that this version is not grounded in either research of design or management studies (Kimbell 2011:294). Its "superficial and popular character is less academically anchored", and because of its practical nature within business it is often regarded as having no theoretical framework[8] (Johansson-Sköldberg *et al* 2013:121). There is also a concern regarding the "lack of scholarly attention" in the management discourse, as well as the necessity to rectify this issue when design thinking expands its theoretical foundation and practical application (Johansson-Sköldberg & Woodilla 2013:42). Furthermore, the value of the approach is argued to be highly ambiguous, as claims are not based on "empirical studies or evaluations" (Badke-Schaub *et al* 2010:39; Hassi & Laakso 2011a:1; 2011b:341). It is also less "robust" and not as accommodating as design thinking founded and argued by design scholars over many decades (Johansson-Sköldberg *et al* 2013:127). However, it is necessary to regard certain limitations of design thinking within the design discourse as a contributing factor for the sudden interest in design thinking in management discourse (Hassi & Laakso 2011a:7). As a result, there has often been a disconnect within the design disciplines, especially between theory and practice (Jung, Sonalkar, Mabogunje, Banerjee, Lande, Han & Leifer 2010:234). Thus, the suggestion is to progress design practice by means of new skills – for practitioners and academics alike – rather than merely studying or theorising over existing skills (Jung *et al* 2010:236; 239). These new skills aim to "enable designers to engage with their environment in novel ways" (Jung *et al* 2010:239). Furthermore, other issues outside of the design disciplines, for example the need to reconsider the way forward for management education, can also be seen as contributing to this sudden interest (Hassi & Laakso 2011a:7).

Johansson *et al* (2011; Johansson-Sköldberg *et al* 2013:121) share a slightly different belief regarding the various versions of design thinking, and consequently identify five different "discourses of 'designerly thinking'" each with a distinct "epistemological" origin, as well as three additional and definite origins of design thinking within management discourse, resulting in eight discourses in total. Furthermore, Johansson and Woodilla (in Johansson-Sköldberg *et al* 2013:122) identify two different discourses; one in design-orientated literature and the other in the "widely accessible business media". Badke-Schaub *et al* (2010:39) further support this claim and identify the two discourses as the "traditional design

[7] Robert Fabricant is the vice president for creative at frog design and an expert in design for social innovation (Fabricant 2009:8; 2010a; 2010b; 2013).
[8] According to Johansson-Sköldberg *et al* (2013:121), this statement was often heard at the *2011 Cambridge Design Management Conference*.

thinking approach" and the new "design thinking movement". Moreover, Lotta Hassi and Miko Laakso (2011a:2; 2011c:52, 54) indicate a clear division of the literature on design thinking into "two differing discourses". The most important thing to consider here is perhaps not the actual amount of versions (three) or discourses (eight or two) identified, but rather that different origins and perspectives of design thinking ultimately exist. Thus, a more important consideration is perhaps that Kimbell (2011:285), Johansson *et al* (2011), Johansson-Sköldberg *et al* (2013:121), Johansson and Woodilla (in Johansson-Sköldberg *et al* 2013:122), Hassi and Laakso (2011a:2; 2011c:52, 54) and Badke-Schaub *et al* (2010:39) highlight a significant difference between the origin of design thinking within design discourse and design thinking's origin within management discourse. Consequently, implying *two* main origins and directions of inquiry; the first a more theoretical and historical account of design thinking with its origins in design research and academia, and the second, a more popular, promotional account of design thinking with its origins in management discourse. The versions that Kimbell (2011:285) explains, as well as the discourses that Johansson *et al* (2011), Johansson-Sköldberg *et al* (2013:121), Johansson and Woodilla (in Johansson-Sköldberg *et al* 2013:122), Hassi and Laakso (2011a:2; 2011c:52, 54) and Badke-Schaub *et al* (2010:39) identify, will be discussed only insofar as to highlight the key differences that are relevant to this study, and those differences that could assist in uncovering the history of design thinking, as well as illuminate the causes of some of the main criticisms against design thinking, since each version or discourse appears to offer and support something unique. The design and management discourses can learn from one another and gain from one another in various ways (Badke-Schaub *et al* 2010:39). Thus, it is of utmost importance to take both discourses into account. Furthermore, there are some important correlations between the two differing discourses; both the design discourse and the management discourse are made up of a "number of subfields" and "is not one but many" (Johansson & Woodilla 2008:11). Both have shaped their own "identity" through various disciplines, which is owed to a "combination of practice and academia" (Johansson & Woodilla 2008:2).

These seemingly different perspectives of design thinking should perhaps not be discussed in isolation, but rather viewed as a kind of synthesis, for example; the unique cognitive process is essentially the driving force behind design thinking as a methodology. Therefore, the unique way of approaching and thinking (cognition) about the problems of the present is part of the core nature of the methodology known as design thinking, and thus crucial in shaping the organisations and societies of the future. Thus, in order for a discourse to "stay viable", it needs to stay current within its group of practitioners, but also remain justified to the general public as non-practitioners (Krippendorff 2005:22-23). Johansson-Sköldberg *et al*

(2013:121) further suggest developing these different perspectives or "discourses" in parallel, as currently these fail to provide useful links that can assist in establishing a collective knowledge base. Hassi and Laakso (2011a:8) also argue in favour of a "linked" research approach, in order to "evaluate … validity" and strengthen the current understanding of design thinking. Consequently, the very nature of design thinking, as a process grounded in the synthetic nature of design, suggests a combined approach. Furthermore, Harold Nelson and Erik Stolterman (2012:21) argue that the "Western world" have flooded our society with "analytic and reductive thinking", and consequently damaged the synthetic and integrative nature of design thinking. Thus, in order to effectively manage change in the twenty-first century, it is crucial that we gather all the broken pieces in our society and "weave them back into new patterns, integrating their wisdom into a more holistic fabric of life" (Nelson & Stolterman 2012:21).

Therefore, this chapter attempts to uncover the history of design thinking in relation to its academic or theoretical progression, as well as its more recent status as a tool for business. What is essential to consider is the fact that design thinking clearly falls into the branch of design discourse that deals specifically with design praxis. Furthermore, design thinking is arguably one aspect of the discourse on design management and is interrogated with this in mind. Many of the characteristics of design thinking stem from the unique components that govern design and how designers do things. These characteristics are discussed in more detail in Chapter Four.

Furthermore, many of the theorists and practitioners of design thinking seem to acknowledge and promote design thinking in a single-minded fashion and not from a critical or theoretical perspective. However, "the history of design thinking is more complex" (Kimbell 2011:289). Both Kimbell (2011:289) and Johansson and Woodilla (2009:3) point to the fact that much of the recent public advancement of design thinking is connected to one design consultancy, IDEO. Furthermore, IDEO began to promote itself as "an innovation company", as opposed to a design agency (Johansson-Sköldberg *et al* 2013:127). This may be partly true, since IDEO ([sa]b; 2012:81) clearly promotes itself as a company that helps businesses "innovate and grow". However, IDEO ([sa]b; 2012:81, emphasis added) still refers to itself as a "*design firm* that takes a human-centered approach". This interesting to note, but perhaps not the bigger issue at hand. For example, many of the recent books on design thinking offer very "little theory development" (Johansson-Sköldberg *et al* 2013:122). Furthermore, many of

these contentions[9] seem to actually compromise the essence of design thinking (Kimbell 2011:285), since it often removes design from its meaning and context (Johansson-Sköldberg *et al* 2013:127). This consequently presents areas of greater concern.

Consequently, this study aims to critically analyse these contentions and assumptions, and attempts to illuminate the characteristics that truly add to the direction taken by design thinking. The aspects and characteristics identified in this study are therefore not discussed to retrofit any specific opinion or promotion, but considered only to the extent that these so-called characteristics add real value to the direction taken by design thinking, whether theoretical or practical in nature. The intention of design thinking is to include everything *good* about design practices, "decoupled from any one field or discipline of design" (Kimbell 2011:289). This again emphasises the necessity to consider the different versions (or discourses) of design thinking more holistically, as opposed to in isolation. A synthesis of these versions (or discourses) is perhaps a viable way of approaching design thinking, as despite their differences, design thinking should only consider what is good about design praxis and each version seems to add its own value and values to the overall direction taken by design thinking. Thus, it can be argued that design thinking is gradually being regarded as a proposed way of thinking.

The development from design to design thinking mirrors the growing interest of the importance of design in business in recent years. Brown (2009a:7) mentions a clear shift from "industrial manufacturing to knowledge creation and service delivery", with innovation at the forefront of this change. This also includes new processes, services, and so forth, as opposed to merely creating new "physical" products (Brown 2009a:7). This mirrors a clear shift from a focus on product to a focus on process.

During the 1970s, when design management originated as an academic area, designers attempted to highlight the importance and relevance of design within management practice (Johansson-Sköldberg *et al* 2013:127). However, this seemed to negate the importance of design within context, as it tried to verify design through logical or rational descriptions (Johansson-Sköldberg *et al* 2013:127). The designer's way of working was used as an invitation to managers to share in the designer's world, and not the other way around

[9] Kimbell (2011:285-286) identifies three main issues; firstly, many of the opinions are based on a "dualism between thinking and knowing, and acting in the world", secondly, the broader view on design thinking does not take the diverse nature of designers and design practice into account, and lastly, design thinking is based on "theories of design" that privies the designer as the central figure and negotiator in design practice. These issues seem to stem directly from the different versions of design thinking and link to the three versions respectively.

(Johansson-Sköldberg *et al* 2013:127). Consequently, design thinking was seen as a gateway for design to provide insight into innovation, as it "enabled innovation … as a way to deal with a complex reality" (Johansson-Sköldberg *et al* 2013:127). According to Johansson-Sköldberg *et al* (2013:127), Kotler and Rath first mentioned design as a strategic tool in 1984. However, a continuous discussion around design thinking happened only about two decades later (Johansson-Sköldberg *et al* 2013:127).

These rational models of innovation (Johansson & Woodilla in Johansson-Sköldberg *et al* 2013:127) created a great need for more creativity (Johansson-Sköldberg *et al* 2013:127). Therefore, in recent years the strategic capacity of design thinking is argued to have innovative potential within the management and business arenas (Brown 2009a:3; Clark & Smith 2008:8; Lindberg, Gumienny, Jobst & Meinel [sa]:243-244; Kimbell 2009a:2; Martin 2009a:6-7; Serrat 2010:1; Stewart 2011:515). Design[10] itself is functioning within a much larger and more complex field, and thus taking on a new position in the world (Kimbell 2011:286). Therefore, some consider both design and design thinking as powerful assets to bring about societal change, with new approaches and ideas being pursued to push design beyond its mere limits as a business tool (Chick & Micklethwaite 2011:25; Kimbell 2011:286). Susan Stewart (2011:515) contends that "social, cultural and technological transformations" during the later part of the twentieth century have also shaped new contexts and practices for design. This is shaping a growing interest in design thinking and its attempt to solve ambiguous social issues, which vary between education, health, information technology and so forth (Stewart 2011:515; Dorst 2011:521; Lindberg *et al* [sa]:243; Waloszek 2012). Bruce Nussbaum (2007) argues that design has the ability to move beyond mere fashion, products and services, and into "education, transportation, economics and politics". However, this reconstruction of knowledge and practice has resulted in an uneasy synthesis, both within academic research as well as business (Kimbell 2011:286). This causes many to question the core assumptions within design thinking (Kimbell 2011:286), with some going as far as calling it a "failed experiment" (Nussbaum 2001).

At a point in time when designers are facing new challenges in seemingly different contexts, it becomes crucial to determine design's place within society (Kimbell 2011:286). A discussion on design thinking and the various versions thereof are perhaps better understood in relation to the context of design itself. Therefore, discussing some of the corresponding aspects between design and design thinking become a key point of consideration. As a result, design should be understood within an established set of practices (Kimbell 2011:287), even

[10] In this instance, Kimbell (2011:286) specifically mentions design in the context of a studio and thus as a "professional" field of practice.

though many claim that design thinking has "failed" (Nussbaum 2011). Furthermore, a need arises to understand and clarify design thinking's function, instead of looking at it as a "disembodied and ahistorical cognitive style" (Kimbell 2011:287).

When design thinking became particularly popular more than a decade ago, it suggested answering some of the questions that became apparent during a global, "mediatised" society (Kimbell 2011:287) with designers at the forefront as "cultural intermediaries"[11] (Julier 2000:173). Designers are seen as "interpreters" of cultural change, and as a result are able to create new "cultural forms" (Kimbell 2011:287). Thus, "designers are engaged in nothing less than the manufacture of contemporary reality" (Poyner 2009:176), and are able to impress meaning and "symbolic significance" upon artefacts (Du Gay, Hall, Janes, Mackay & Negus 2009:349). However, the one distinguishing factor of design thinking is its more prevalent status in recent[12] years, as well as the assumed value in management discussions, more specifically within business schools (Kimbell 2011:287). Therefore, design is regarded as a primary driving force behind innovation,[13] with designers offering unique ways of addressing issues within society (Kimbell 2011:287). Johansson-Sköldberg *et al* (2013:127) further suggest that one cannot consider innovation without taking design into account, and it is from this popular notion that design thinking is best understood. Therefore, innovation encompasses design practice or the way in which designers "make sense of their task", as well as "'a way of thinking' that non-designers can also use" (Johansson-Sköldberg *et al* 2013:127). Thus, this chapter further attempts to highlight some of design's unique ways of working and thinking, in an attempt to assess the real value added to the direction taken by design thinking.

David Dunne and Roger Martin[14] (2006:517) propose a clear difference between design and design thinking, and claim that design thinking is the way designers *think*. For example, the

[11] Julier (2000:173) refers to designers as "both cultural and *technological* intermediaries", which is an extension of Pierre Bourdieu's idea. Du Gay *et al* (2009:349) also refer to "cultural intermediaries" as a phrase synonymous with Bordieu. Moreover, Hazel Clark (2009:165) mentions "cultural intermediaries" by referring to the introduction of Rick Poyner's, *Design is about democracy* (2009), and the way in which designers are able to shape society.
[12] Kimbell (2011:287) identifies the "last five years" as the most recent development in design thinking, and its prominence in business is credited to this timeframe.
[13] Kimbell (2011:287) claims that innovation is necessary to counteract the pressure that organisations are experiencing, in order to "maintain or grow market share", as well as expand "user satisfaction and effectiveness" within the marketplace. This is where design's unique way of approaching such issues becomes apparent.
[14] Roger Martin is the Dean of the Rotman School of Management at the University of Toronto with experience in management consulting (Johansson-Sköldberg *et al* 2013:128; Kimbell 2011:293; Martin 2009a). Martin (2009a; Collins 2013:36; Young 2010:4) is of the opinion that design thinking gives business a "competitive advantage". Martin's view on design thinking is directed predominantly towards the methods used by business managers and how businesses function holistically, and he focuses more on systems, rather than individual cognitive styles (Kimbell 2011:295).

mental processes used to design objects, services or systems, as opposed to the end result that is often merely beautiful or functional (Dunne & Martin 2006:517). However, what seems to be implied here, is that thinking is only reserved for the design thinking process and that the design process itself does not require any thinking, which is certainly not the case. Perhaps the main argument here should attempt to illustrate that the thinking is *different* because it focuses on more than just aesthetics (form) and function. Even though *thinking* is specifically mentioned in this context, one cannot help but reason that *doing* and *knowing* should also be included here. Thinking, doing and knowing are clearly included as part of the first version of design thinking, as identified by Kimbell (2011). One of the unique aspects of design thinking is the focus on "form and content" (Buchanan 2001c:35). However, Buchanan (2001c:35) does not suggest a "rejection of function, but a recognition that unless designers grasp the significant content of the products they create, their work will come to little consequence or may even lead to harm in our complex world". This further highlights the necessity to appropriately understand design thinking, especially in relation to design.

Lindberg *et al* ([sa]:243) further argue that design thinking is the "study of cognitive processes that are manifested in design action". This appears to specifically highlight the importance of *doing* and *knowing* in the context of design *thinking*. Stewart (2011:516) identifies a change from "functionality" and "semiotics" in design, to participation and value in design thinking. Prasad Boradkar ([sa]:2) contends that design thinking focuses on more than just form.[15] The idea that aesthetics[16] is less important than ever before, will allow design thinking to take preference in the twenty-first century and enable design thinkers to focus on more complex social issues. These accounts bear evidence of how design has changed over time, into what appears to be at least a partial representation of design thinking.

[15] In the early 1970s, Christopher Alexander was of the opinion that design was about assigning form and order to tangible things, which resulted in an entire "school of thought" (Kimbell 2011:290). Therefore, the notion that form is part of the essence of what designers *do*, is still an important aspect to consider (Kimbell 2011:290). Simon (1996:111) on the other hand, is less concerned with artefacts and their form, and more concerned with our actions as being "abstract" – aimed at reaching a preferred end state. Even though neither Alexander nor Simon specifically emphasise design thinking, their accounts of design are often the two main schools of thought followed by most design thinking researchers (Kimbell 2011:291). It can perhaps then be argued that design thinking applied to any "form" (or tangible thing) is not at all unimportant, but rather that it can also be applied to abstract (or intangible) things, such as services, experiences and so forth. Buchanan (1992:16) further suggests that moving away from design's heritage – which originated in craft and industrial production – will make way for a more generalised version of design thinking that can be "applied to any area of human experience" – whether tangible (object) or intangible (system). Hilary Collins (2013:36) ascertains that the application of design practice to *intangible* issues is essentially what is "termed design thinking".
[16] Jocelyne Le Boeuf (2006:8) articulates a clear shift regarding the "concept of beauty" from the twentieth to the twenty-first century, namely; beauty's initial connection with goodness has now shifted to a "quest for meaning".

Kees Dorst (2010:131; 2011:521) argues that an eagerness to apply these new design practices creates a sudden need for a clear understanding of design thinking. Brown (2008a; Brown & Katz 2011:381; Nussbaum 2011; Walters 2011a) contends that design thinking is more strategic and will lead to substantially advanced forms of value, as opposed to the previous, tactical (design) approach where designers are expected to take existing ideas and make them more aesthetic, resulting in very limited or incremental value creation. Design thinking is more about "newness… than improvement" (Johansson & Woodilla 2008:18). Martin (2009a:18-19) argues that former thinking modes – in this case, analytical thinking or what he likes to call "exploitation"[17] – will only strengthen current knowledge and therefore yield no more than incremental changes. The assumption that can be made is that design thinking can enable new ways of thinking and bring forth new knowledge, which will result in new ways of approaching contemporary issues.

Therefore, one can argue that design thinking further facilitates the idea of *what could be*, or a perception of possibility, by moving beyond incremental changes to something that is assumed to be much more significant, or even completely new. "What could be" seems to relate strongly to the notion of what "may be", a quintessence that spans many of the definitions of design. What "may be" is also the very thing that abductive reasoning – or the logic of design – attempts to uncover (Peirce in Cross 2011:10, 27). Nelson and Stolterman (2012:35) further ascertain that inquiry into the "ideal is not only a form of reflective, abstract, or conceptual inquiry, but is also action oriented". When motivated by design intent, it focuses on innovation and creation (Nelson & Stolterman 2012:35). Furthermore, focusing on what is "desirable" (the ideal) is a fundamental step towards the "ultimate design goal of creating the not-yet-existing" (Nelson & Stolterman 2012:35). In *The sciences of the artificial*, Herbert Simon (1996:114) is concerned with "what ought to be" as opposed to what already exists ("what is"), consequently emphasising a sense of possibility and potential. Simon (1996:111) is especially concerned with a designer's ability to turn "existing situations into preferred ones". This implies that design thinking has the intention to improve any current situation, and consequently human life. Even though Simon does not emphasise design thinking (Kimbell 2011:291) or actually never uses the term design thinking (Johansson-Sköldberg *et al* 2013:124), there seems to be a clear link between Simon's (1996:111) "preferred" situations and the betterment of society through design thinking. This

[17] The opposite of "exploitation" in this context is "exploration" (Martin 2009a:18-19). According to Martin (2009a:18), management theorist James March defined "exploration" as the "search for new knowledge", and "exploitation" as an attempt to maximise "existing knowledge". Martin (2009a:19) further explains that organisations that rely on exploitation only, "will exhaust itself in due course". This implies that by exploiting the same knowledge, thus making incremental changes to existing knowledge, is not enough to keep businesses afloat. On the other hand however, relying on "exploration" only, can have similar dire consequences (Martin 2009a:19).

again highlights the link between design thinking and abductive reasoning, through what Martin (2009a:17; Dunne & Martin 2006:513) refers to as "the logic of what might be". Thus, one can argue that abductive reasoning enhances a sense of possibility.

Many of the characteristics of design thinking stem from the unique components that govern design and how designers do things. Nigel Cross (1982:221) claims that "design has its own distinct 'things to know, ways of knowing them, and ways of finding out about them'". Cross (1982:221; 1990:134; 2001:55; 2006:5; 2010:99) offers that design presents unique "designerly ways of knowing". Design is about both problem "identification" and solution "generation" (Lawson 2005:117), and both problems and solutions evolve simultaneously (Collins 2013:37). Bryan Lawson (2005:296) argues that problems and solutions are "inseparable". Moreover, Lindberg *et al* ([sa]:244) places the "problem and solution space" under one term, "problem solving", which proves useful in determining how design problems are formulated, framed and understood. Design is regarded as a "dualistic" method that considers both the problem and solution space (Lindberg *et al* [sa]:244). Beckman and Barry (2007:44) further contend that innovation is not only about problem solving, but problem "finding" as well. Thus, one can argue that *solution-based* approach and *problem-solving* method rely on the same premise, and are like two sides of the same coin – each focusing on opposite sides thereof. The intent is to address (solve) societal problems with the best possible result (solution). Problem-solving implies that you are looking for a solution, whilst solution-based implies that you have a problem that needs solving, inherently addressing the same issue. Therefore, the identification and framing of the problem, as well as finding the right solution, becomes equally important (Beckman & Barry 2007:44).

Moreover, "[d]esign ability is founded on the resolution of ill-defined problems by adopting a solution-focussing strategy and productive … styles of thinking" (Cross 1990:132). Cross (1982:223-224) further contends that since designers approach problem-solving in a solution-focused manner, it positions design as a coherent discipline of study and unmistakably different from the sciences and the humanities.[18] Owen (2005a:5; 2006b:17) further suggests a difference between design thinking and scientific thinking. However, Owen (2005a:10; 2006b:22) implies that a relationship exists between the two types of thinking, which is grounded in creative thinking. Thus, a "designer brings a unique way of looking at problems and finding solutions" (Kimbell 2011:292).

[18] Johansson-Sköldberg *et al* (2013:124) are of the opinion that Simon shared a similar sentiment and argued that design includes all "conscious activities to create artefacts", and is thus distinctly different from the sciences (natural and social) and the humanities. Thus, Simon (1996:114) focused on design as a way of creation, rather than with what already exists.

These accounts result in areas of design that clearly correspond with areas in design thinking. There is also the suggestion that a clear correlation exists between the skills that designers have learned over time and the ability to practice design thinking to some extent. The designer's ability and sensibility to identify and compare human needs (or desires) within the restrictions of business practice become clear (Brown 2009a:4; 2008a; Kelley & Kelley 2013:19-21; Waloszek 2012). Designers who practice design thinking are known for taking a "human-centered approach to problem solving", as opposed to technology-centered or organisation-centered approaches (Kimbell 2011:287). Design thinking is a methodology that inspires and encapsulates a vast scope of innovation and design activities and is driven by a human-centered design essence (Brown 2008a; Brown 2009a:39; Kelley & Kelley 2013:15), which places human beings at the core of the design process (Young 2010:5). Consequently, innovation is driven by a comprehensive understanding and clear observation of peoples' wants, needs, likes and dislikes regarding certain products, as well as the way these products are made, packaged and so forth (Brown 2008a; Brown 2009a:42; Serrat 2010:3). Therefore, "[o]bservation is at the core of the innovation process" (Beckman & Barry 2007:35).

In recent years, the need for innovation in business has illuminated a requirement for new resources, available in the form of creative individuals who are able to shape new contemporary contexts (Kimbell 2011:288). However, this stance seems to limit design thinking as a skill merely for professionals. This resulted from many unresolved issues regarding the responsibility and value in business (Kimbell 2011:288), as well as the inadequacy[19] of the current ways of thinking and managing to deal with current business frameworks (Tsoukas & Chia 2002:568). Brown (2009a:8; Brown & Katz 2011:381) talks about the "evolution from design doing to design thinking" and claims that from a business perspective, design has become too important to be left to designers alone. What Brown seems to imply is not that designers could not be skilled design thinkers, nor that they do not have the capability to add real value to the direction taken by design thinking, but that their points of view, skill-sets and abilities in isolation could be limited, and that inputs from other professions are also necessary. What seems to be implied here is that even though designers' inputs and skill-sets into design thinking are invaluable and unique, it is not the only important input, since other points of view are necessary in order to consider solutions from many different perspectives. Therefore, it also speaks to the interdisciplinary approach found in design practice within contemporary society. Thus, leaving design thinking to any other

[19] The inadequacy mentioned here, is not limited to business administration and management alone, but stretches into global challenges as well; for example climate change and the varied distribution of resources (Kimbell 2011:288). Haridimos Tsoukas and Robert Chia (2002:568) specifically argue in favour of frameworks that embrace and manage *changing* business environments.

one department within a business could be just as limiting (Clark & Smith 2008:11). Brown (2009a:4) further contends that design thinking skills should be placed in the hands of people who have never thought of themselves as designers to help establish design thinking as the next important step. The importance of this step is somewhat unclear, but Brown seems to imply that by using people from other professions, backgrounds and skill-sets, will allow design thinking to be applied to a wider range of problems – the kinds of complex problems that would benefit greatly from other points of view. Brown (2008a) further contends that design thinkers are not necessarily created only by design schools, but that many individuals outside the professional design field have a natural ability to practice design thinking – an ability that can be unlocked with the right development and experience.

Brown (2009a:37) claims that the problems that have confronted designers in the twentieth century[20] are not the same problems that will define the twenty-first,[21] with the problems of the latter shaping a need for design thinking, as well as aiding in establishing design thinking as a methodology. Martin (2004:9) further contends that the twenty-first century is transforming into a value-driven world, with "value creation … moving back to the world". Therefore, the assumption that can be made is that design thinking will assist in solving the more complex problems of the present and as a result, shape our new value-conscious world, whilst establishing itself as a new way of working and thinking.

Buchanan (1992:21) mentions the "masters of this new liberal art"[22] and claims that these individuals' mode of thinking is becoming more intelligible to all individuals in daily life. Design thinking draws on an aptitude we all have, which is often ignored by more traditional problem-solving practices (Brown & Wyatt 2010:33). Simultaneously, the next generation of designers should not only be comfortable in the studio, but well informed[23] in the boardroom[24] as well (Brown 2009a:38; Clark & Smith 2008:8; Walters 2011a). Dunne and Martin (2006:522) have a similar thought in mind and draw a parallel between designers and business executives and claim that the approaches linked to business success is irrespective of the behaviour of a particular profession. This seems to suggest that the unique approaches that

[20] Twentieth century problems in this context refer to what has traditionally been known as graphic design problems with solutions in the form of logos, brochures and so forth. Designers were concerned with improving the "look and functionality of products" (Brown & Wyatt 2010:32).
[21] Twenty-first century problems refer to more complex societal issues; from adult illiteracy to global warming, as well as other complex issues that stem from these (Brown 2009a:37).
[22] Liberal art in this instance refers to design thinking.
[23] Walters (2011a; 2011b) refers specifically to a more strategic role that some designers may want to take within the business arena. However, this is not the role that all designers will have to take, as there will always be a place for designers to do the work that they have always been doing (Walters 2011a; 2011b).
[24] Grant Young (2010:4) provides an example of "design's shift to the boardroom" in the designation of Mike Parker as the chief executive officer of sports clothing brand, Nike.

designers and business executives take are what constitutes (business) success, irrespective of their profession. Martin (2004:9) contends that managers will have to become "more like designers". Ria van Zyl (2008:[sp]) further suggests that "designers and design thinking are integrated, with designers' roles extended beyond physical design activities to intellectual and emotional design thinking". Designers should therefore provide knowledge and expertise, as opposed to merely providing technical skills and managing projects in isolation (Van Zyl 2008:[sp]). The knowledge and expertise mentioned here is not necessarily oriented towards any type of specific skill, but rather towards a particular kind of process or way of thinking. Peter Rowe (in Kimbell 2011:291) argues that design professionals have a sporadic way of approaching their work and rely on intuition, as well as facts. Owen (2007:17) mentions "applied creativity", which includes both "knowing" and "doing". *Knowing* and *doing* seem to imply links between intuition and fact, respectively. Owen (2005b:12) further contends that it is not owed to designers' "special abilities to create" that they need to be acknowledged, but rather because of the way designers think and the approach they present to problem-finding and problem-solving.

However, Owen (2005a:14) suggests "special ways of design thinking"[25] that are virtually inherent in the design process and being taught "tacitly in today's design education programs". Owen (2005a:15) further argues that these programs create "ample opportunity" to develop skills in design thinking, because a preference already exists on the student's side by simply choosing design as a career. This seems to suggest that designers have an advantage in acquiring design thinking skills. "Design thinking begins with the skills designers have learned over many decades" (Brown 2009a:4). Design thinking becomes a "simplified version" of explaining designers' abilities within design practice, which can be consolidated into academic and practical management discourse (Johansson-Sköldberg *et al* 2013:123).

These contentions all point towards the same thing: design thinking does not nullify design in any way, but is rather the next step in the evolution of design in the twenty-first century. Buchanan (2001b:3) took it a step further and identified the middle of a design thinking "revolution". Van Zyl (2008:[sp]) contends that this "revolution" moved design from a predominantly submissive activity to something quite contrary, by creating new understandings where economic development and the prosperity of our society are at the forefront. This appears to be more in line with what design thinking represents today, which may indicate that the design thinking "revolution" as such, is something of the past. It could

[25] The "special ways" that Owen (2005a:14) mentions, refers to the characteristics he identifies as being inherent to design thinking and design thinking's ways of working. These characteristics are discussed in more detail in Chapter Four.

perhaps be argued that design thinking is now more established as a methodology and can therefore be seen as an acceptable or even *proposed* way of thinking about the issues of the present. It is therefore valuable to reconsider the foundations of design thinking beyond the design professions (Kimbell 2009b:2) and beyond design's conventional limits (Brown 2012b:18; Clark & Smith 2008:14). Design thinking's strategic capacity has the ability to solve problems within business, as well as add real value to solutions that address social issues. Therefore, a need arises to understand how design thinking is encouraged within discussions around innovation and social change (Kimbell 2011:289). Tim Brown (2009a:3) concludes with the following:

> What we need is an approach to innovation that is powerful, affective, and broadly accessible, that can be integrated into all aspects of business and society, and that individuals and teams can use to generate breakthrough ideas that are implemented and therefore have an impact. Design thinking … offers just such an approach.

3.2 The foundations of design thinking and its recent popular status in contemporary society

Various efforts have been made to uncover the basis for design thinking and one aspect that makes this surprisingly difficult is the inability to find an appropriate and inclusive definition for *design*. This difficulty however, seems to prove exactly what design, and consequently, design thinking is – that is, continually changing and expanding in its definitions and applications (Boradkar [sa]:5; Brown 2012b:17; Buchanan 1992:5; Stewart 2011:515). According to Wolfgang Jonas (2011), design is in a permanent state of "transition", which is nothing new and nothing to be concerned about. In fact, the insinuation is to embrace this state of "transition" as a driver for societal transformation and changes that are more than incremental.

There is not just one design thinking discourse, but many, just as there are various *design* discourses[26] (Johansson-Sköldberg *et al* 2013:131). Johansson-Sköldberg *et al* (2013:131; 132) further claim that there is no "use in trying to find a single definition … of design thinking", as no singular definition exists. This also relates to the large number of design definitions. Thus, the wide range of explanations used to describe design thinking is attributable to it being used as reference to the "application of specific design techniques", but

[26] Johansson-Sköldberg *et al* (2013:131) compare design to music, and claim that just as there are no "generic 'musicians'", design thinking cannot be one generic discourse. "To talk about design and leaving the designer out is like talking about musicians and leaving the music out: a musician is identified by his or her instrument and the style of music played" (Johansson-Sköldberg *et al* 2013:131).

also to the wider principles that these methods represent (Young 2010:5). Only through considerable effort to understand, articulate and clarify design thinking in various activities and practices, can its true value be understood (Dorst 2011:531).

Buchanan (1992:6) elaborates on the need for integrating various fields that is coherent with the flexibility[27] of design (and consequently design thinking) as an activity. The integrative capacity that is mentioned here aims to establish design thinking as an imperative in solving the more complex problems of the present. According to Buchanan (1992:6), these explorations regarding the integration of knowledge, is the reason we turn to *design thinking*. Design thinking is also different from design,[28] since design thinking is aimed at solving bigger, more complex issues. Additionally, the previously "narrow origins" of design are not able to facilitate what Jonas (2011) calls "the great transformation". In other words, we cannot rely on design alone to enforce change. The "great transformation" seems to imply that a better or improved society can exist, which perhaps means that society functions more efficiently or even more harmoniously. Cross (2005b:4) is of the opinion that a "better life for a growing population" signifies more energy production and sustainable processing of resources. In *Designing for people,* Henry Dreyfuss (1955:24) is very clear on the improvement that design can bring about, when he states:

> [i]f … people are made safer, more comfortable, more eager to purchase, more efficient – or even just plain happier – the designer has succeeded.

However, this account and many others seem to only refer to *design* as a way to bring about change. According to Johansson-Sköldberg *et al* (2013:125), Buchanan's (1992) article, *Wicked problems in design thinking,* serves as a "foundational reference" for both design thinking as a discourse, as well as for design as a whole. The premise on which the article is based, argues that *design thinking* is the next step in the evolution of design, but more importantly, the problems faced in the design thinking process is significantly different and more complex than the problems normally faced in the design process (Buchanan 1992). Design thinking is aimed at solving more indefinite, vague design problems, also called "wicked problems" (Buchanan 1992:15; Collopy 2009a; Lindberg *et al* 2010:246; Rittel & Webber 1973:159; 1984:136; Waloszek 2012). Rittel and Webber (1973:160; 1984:136) first

[27] Kimbell (2011:288) is of the opinion that apart from designers, professionals such as musicians, visual artists, computer-programmers and opinion-makers strive to find meaning in their work, which is represented by "flexibility, autonomy, and creativity" that often muddles the boundaries between their professional and personal lives.
[28] The process, as opposed to the product of design thinking is different from that of design. However, the two aspects are inextricably linked.

introduced the term *wicked problems*[29] to describe and substantiate the complexities of contemporary problems and consequently, to differentiate "planning"[30] problems from scientific problems. It offers a way to address vague, organisational issues, because "designers embrace these problems as a challenge" (Dunne & Martin 2006:517-518). It is necessary to note that *wicked* does not refer to a problem's moral (immoral) or ethical (unethical) components, suggested through Hornby's (2010:1699) definition of *wicked* as "morally bad". Rittel and Webber (1973:160; 1984:136) clearly state that these are called "wicked" not because the attributes themselves are "ethically deplorable". The term is rather used to describe the *trickiness* of these so-called complex, social problems, as well as the difficulties that arise from trying to define or solve such problems (Rittel & Webber 1973:160; 1984:136). The word "tame" is considered the opposite of *wicked* in this context, and the former is often used to describe scientific problems, where the outcome of the assignment is clear from the outset (Rittel & Webber 1973:160; 1984:136). Wicked problems are often also referred to as "ill-formed" (Owen 2005a:16; 2006b:27), "ill-structured" (Simon 1984:145) or "ill-defined" problems (Archer 1979b:17; 1984:348; Cross 1992:5; Riel 2009c:94). Cross (2011:293-294) argues that designers often treat all problems as ill-defined, even if they are not. Cross (2005a:16) further contends that design thinking's characteristics add value to teams dealing with "ill-formed" problems.

The initial need for design thinking starts to surface from a necessity not only to solve, but also to define these more complex, social issues. This relates to Beckman and Barry's (2007:44) contention that innovation is not only about problem solving, but problem "finding" as well. As a result, the identification and framing of the problem, as well as finding the right solution, becomes equally important (Beckman & Barry 2007:44). Lawson (2005:292) refers to "naming" and "framing" based on concepts identified by Donald Schön. Framing involves "viewing the design situation in a particular way", which enables the designer to manage complex problems by "giving structure and direction to thinking while … temporarily suspending some issues" (Lawson 2005:292). On the other hand, "naming" refers to the identification of *wicked problems* (Lawson 2005:292). Jennifer Riel (2009c:95) further suggests that dealing with wicked problems demands that one understands the "nature of the problem itself". Understanding the problem is the primary aim, whilst solving the problem

[29] Rittel and Webber (1973:161-167; 1984:136-144) proposed ten characteristics that help define and understand *wicked problems*. The relevant characteristics are discussed in more detail in Chapter Five.
[30] Rittel and Webber (1973:158) claim that "[d]uring the industrial age, the idea of planning, in common with the idea of professionalism, was dominated by the pervasive idea of efficiency". However, in recent years this "idea of planning" has significantly changed (Rittel & Webber 1973:159). Planning problems, "the kinds of problems that planners deal with – societal problems – are inherently different from the problems that scientists … deal with" (Rittel & Webber 1973:160; 1984:135-136). Therefore, "planning problems are inherently wicked" (Rittel & Webber 1973:160; 1984:136).

becomes secondary (Riel 2009c:95). Thus, the problems are not necessarily *wicked* only because of "higher degree[s] of complexity", but also because it is a significantly different type of problem (Conklin in Conklin, Basadur & VanPatter 2007:3).

C. West Churchman (in Riel 2009c:94) described wicked problems as "a class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing".[31] Buchanan (1992:15-16) further suggests that "wicked problems is a class of social systems problems" that are fundamentally indeterminate,[32] and implies that there are "no definitive conditions or limits to design problems". As a result, "wicked problems are ill-defined", as well as unique in origin, nature and interpretation (Riel 2009c:94). Wicked problems are thus "different, messy and reactive" (Martin 2012:3) and traditional (analytical) problem-solving processes cannot resolve such issues (Riel 2009c:94). *Wicked problems* is a phrase synonymous with design thinking and perhaps one of the earliest identifiers of the types of problems faced in the design thinking process. The wicked problems approach to design thinking is less concerned with how individual designers do things, and more about the necessity to "define design's role in the world" (Kimbell 2011:292). This appears to be most in line with the second version of design thinking mentioned earlier. According to Buchanan (1992:15), Rittel made an attempt to find a substitute for the linear, sequential model that was so often explored during the design process. A linear process often appeared fascinating, because it seemed to resemble some logical understanding of the design process. However, Buchanan (1992:15) strongly suggests the opposite:

> … some critics were quick to point out two obvious points of weakness: one, the actual sequence of design thinking and decision making is not a simple linear process; and two, the problems addressed by designers do not, in actual practice, yield to any linear analysis and synthesis yet proposed.

The identification of design strategies that could address wicked problems is therefore of utmost importance to design thinking (Stewart 2011:516). According to Bayazit (2004:21), Rittel suggested more controversial methods to solve these supposed wicked problems and ascertained that earlier design methodologies were too simplistic and immature to solve the

[31] It is important to note that Buchanan (1992:15) cites this same definition, but claims that it was published in Rittel's first report on wicked problems. However, Buchanan (1992:16) clearly states that Rittel was influenced by C. West Churchman's *Wicked problems* article, which was published in *Management Science* in 1967. VanPatter (in Conklin *et al* 2007:2) further claims that the exact date of origin of the term is attributed to one of two dates; either to 1967 when C. West Churchman described Rittel's introduction of the term, or to Rittel and Webber's article in 1973.

[32] Buchanan (1992:16) claims that this is better understood in relation to Rittel and Webber's (1973:161-167; 1984:136-144) ten characteristics or "properties" of wicked problems, since these characteristics highlight the uncertainty of approaching such problems. The most relevant characteristics are discussed in more detail in Chapter Five.

more complex, real-world problems. Rittel identified these earlier methodologies as "first generation" methods (Bayazit 2004:18). The "first generation" methods moved from a "romantic, intuitive, and artistic model" to include a more "logical and rationalist" model (Bousbaci 2008:40). Beckman and Barry (2007:26) contend that these methods were influenced by "optimisation techniques" and "systems thinking approaches". These approaches prompted designers to "decompose" problems into smaller tasks, which could then be solved individually by experts in various fields (Beckman & Barry 2007:26). However, this way of working was not effective in solving more complex design problems, as many followers were unable to unify these methods into one coherent solution (Beckman & Barry 2007:26). John Pourdehnad, Erica Wexler and Dennis Wilson (2011:8) further contend that the "first generation" methods relied heavily on professionalism. For instance, the professional designer was regarded as the owner of all knowledge and expertise, consequently incomprehensible to the user (Pourdehnad *et al* 2011:8). Design thinking on the other hand, relies greatly on collaboration and a necessity to involve all stakeholders in the design thinking process.

As a result, Rittel proposed a design methodology that would be more sufficient to solve the kinds of complex problems that were starting to surface (Bayazit 2004:21; Cross 2006:4). These were called "second generation" methods (Bayazit 2004:21; Beckman & Barry 2007:26; Rittel 1984). Rabah Bousbaci (2008:38) uses the phrase "generation game" – a phrase adopted from Nigel Cross – to refer to the first, second and third generation methods, as well as what design thinking was referred to from the late 1950s to early 1960s. During the *Creative Industries Convention* in 2010, Andrea Goetze (2010) notes the importance of collaboration, as well as the value of outside perspectives to act as a source of guidance. In other words, collaboration is not only a "structured … approach" between designers, but an involvement of the users as well (Goetze 2010). Pourdehnad *et al* (2011:8) argue that this is possible through the "second generation" methods. Jeff Conklin (in Conklin *et al* 2007:5) further contends that Rittel and Webber's "contribution was well ahead of its time" and assists in understanding the importance of collaboration. Beckman and Barry (2007:26) further contend that the "second generation" methods rely on "design as a social process", which allowed more stakeholders to be involved in the process, as opposed to the previous over-reliance on experts. The "second generation" methods also allowed design to change from a distinctly problem-solving process, to a problem-framing process with the primary aim of reaching a "collectively acceptable starting point" (Beckman & Barry 2007:26). However, Cross (1981:4) claims that "like the first generation methods, these second generation methods have also met with only moderate success". This opened up a new devotion to "third generation" methods guided by a necessity to understand designers' cognitive processes (Bousbaci 2008:38). Furthermore, in the early

1980s there was a new shift towards what is known today as the "reflective turn" (Bousbaci 2008:39). As a result, Donald Schön (1983) proposed a more in-depth vision of the "reflective turn" by means of the "reflective practitioner". Part of being a "reflective practitioner" requires that an individual judges his or her own actions (Schön 1983), as well as "reframe problems based on [this] judgement" (Kimbell 2009a:4). The reflective practitioner perhaps also ties in with contemporary requirements for a human-centered design language.

The introduction and identification of *wicked problems*, as well as the less immature way of solving these problems, are key differentiators between design and design thinking. Thus, it is somewhat unclear as to what Bayazit (2004:21) means by "immature". *Immature* can be defined as "not fully developed" (Hornby 2001:749). Thus, one can argue that the methods were perhaps undeveloped or even underdeveloped, and therefore not sophisticated enough to solve more complex issues. This therefore establishes an obvious need for design to evolve to design thinking, with the latter being able to solve more complex problems in a more mature way. The simplicity and immaturity mentioned, also refer to the more systematic, rational application of knowledge that would need to make way for a more "participatory and argumentative" process (Bousbaci 2008:38), or what Bayazit (2004:21) calls "user involvement". Roger Martin (2009c:3) seems to agree with the idea of participation, when he states the following:

> Wicked problems call for us to harness all of the creativity and knowledge at our disposal. By working to enable shared understanding and commitment, we have the collective power to shape our organisations – and the world – for the better.

When one starts to look at complex, real-world problems, one cannot help but notice the importance of people in this context. Rittel and Webber (1973:167; 1984:144) identify a need and a responsibility to solve wicked problems as a way to improve the world we live in. Moreover, Buchanan (1992:8) states a clear connection between design thinking (design) and contemporary life and claims that all areas in contemporary life, to some extent, rely on design thinking (design) as a "significant factor in shaping human experience". Again, this highlights the importance of expanding the meanings and applications of design thinking, making it "universal in scope" and applicable to any area of human experience (Buchanan 1992:16). It is therefore important to state that design, and consequently design thinking, will never be dissolved: in a world that is ever-changing, design thinking must and will continually change with it. Thus, "[c]hange is a vital part of our everyday experience of life" (Nelson & Stolterman 2012:20). Consequently, as part of a new "reflective practice", design thinking could be positioned from a universal perspective, and applied to a wide variety of problems in order to gain a better comprehension of design (Bousbaci 2008:39). Stewart (2011:516)

contends that other sectors are often encouraged to engage with design because it is recognised as "an agent of change". With Stewart's contention we turn to the next section of this chapter to determine the context(s) within which design thinking can act as an agent of change.

3.3 Exploring the significance of context in design thinking

This section of the chapter briefly determines the importance of context in design thinking in an attempt to reveal certain characteristics that are pertinent to design thinking. Characteristics are identified to determine the nature of design thinking (Owen 2006a:16, 18), because there is an overall uncertainty surrounding the nature and the value of design thinking (Dorst 2011:531). Furthermore, Hassi and Laakso (2011a:2) propose to characterise design thinking "in more detail" in order to establish a foundation for "determining its value". Thus, in order to determine the value and values of design thinking by means of characteristics, one has to understand the importance of the context within which these characteristics operate.

When considering the relevance and importance of the various characteristics in design thinking, the context within which design thinking and its characteristics operate, becomes important. Design thinking is not a one-fits-all methodology (Kelley & Kelley 2013:21), therefore context in design thinking is significant. Design thinking is methodical, but not "formulaic" (Sato 2009:42). Design thinking is a "heuristic"[33] (Martin 2009:11) and relies on an individual's skills and expertise to decide which "framework, method or tools to apply" to a specific problem (Sato 2009:42-43). Design thinking, by means of design research, is aimed at understanding people's behaviours within the context of their own social settings (Sato 2009:41). Thus, understanding and considering the wider[34] context is an important part of innovation practice (Young 2010:7).

Furthermore, Victor Papanek (1984:xx) talks about a "bad fit", and explains that when richer nations try to enforce their own "state of development" on poorer countries, it is indeed a "bad fit". Papanek (1984:xx) specifically mentions Russia, The United States of America and Japan when referring to richer nations. Furthermore, Papanek (1984:xx) elaborates on the level of development, but more specifically the "identity building, education and self-

[33] "Heuristics are open-ended prompts to think or act in a particular way" (Moldoveanu 2009:10). Martin (2009:11) defines a "heuristic" as a "rule of thumb" or a way of explaining things when they are no longer a mystery. For example, Isaac Newton's rule of gravity (a heuristic) became the "rule of thumb" for determining how objects fall to the ground (Martin 2009:10-12). Before Newton determined such a "rule of thumb", the way objects fall to the ground and why, was thus still regarded as a mystery (Martin 2009:10-12).
[34] Young (2010:7) uses a simple example from Eero Saarinen, in which the wider context considers "a chair in a room, a room in a house, a house in an environment, an environment in a city plan".

reliance" that is not yet developed and much less visible in poorer countries. Therefore, trying to apply the same methods and thinking of the former to the latter, is indeed a *bad fit*, since the context of application is inappropriate. Furthermore, a *bad fit* seems to comment on the idea of promotion in design thinking. As has been discussed, many of the present-day writers on design thinking seem to promote design thinking only in an attempt to promote their own ideas, which ultimately leads to the retrofitting of solutions to coincide with design thinking. Consequently, what Papanek (1984:xx) seems to imply, is that the relevance of a solution in one context will not necessarily transfer successfully to the next. Papanek (1984:xx) further contends that one should not "hand a loaded gun to a baby", which refers to the foolishness (and danger) in trying to hand a fully-operative factory to a country with unskilled and untrained people.

This clearly states the importance of context and relevance in design thinking, especially when applied to any unique situation. This can be further explained by philosophers William James and John Dewey's work in the late nineteenth century (Martin 2009a:64). For James and Dewey, acquiring knowledge was not an abstract or conceptual activity, but rather the "interaction with and inquiry into the world around them" (Martin 2009a:64). Therefore, inquiry was not aimed at finding absolute truths, but rather an "evolving interaction with a context or environment" (Martin 2009a:64). Beckman and Barry (2007:29) further argue that "the innovation process is grounded in deep understanding of the context of engagement". Moreover, design thinking has different meanings, depending on the context within which it functions (Johansson-Sköldberg *et al* 2013:121).

The origins of design thinking discussed in this chapter starts to illuminate some key aspects within design thinking. Furthermore, it starts to map the documented domain that covers design thinking by taking into account both design thinking's well-established history, as well as its more recent popular status. However, in order to determine the actual value and values of design thinking as an approach, a more detailed discussion is necessary. For example, Hassi and Laakso (2011a:2) suggest *characterising* design thinking more thoroughly in order to establish a foundation for "determining its value". Moreover, Dorst (2010:131) argues that an explanation of design thinking, as well as clarification around the term assists in understanding the "nature of design thinking". Characteristics in design thinking can also be used to describe the nature of design thinking (Owen 2006:16, 18). Thus, it seems valuable to identify and discuss some of the important characteristics in design thinking in more detail. Consequently, a more comprehensive discussion regarding the characteristics of design thinking follows in Chapter Four.

CHAPTER 4
EXPLORING THE UNIQUE VALUE AND VALUES OF THE CHARACTERISTICS OF DESIGN THINKING

The previous chapter outlined the history and origins of design thinking in such a way as to build a foundation for design thinking as an approach. Even though these accounts attempt to clarify design thinking's provenance, it offers little insight into the actual value and values thereof. Apart from suggestions (Johansson-Sköldberg *et al* 2013:121; Hassi & Laakso 2011a:8) to consider the various origins or discourses in combination, there is still no real indication regarding value and values. Furthermore, design thinking as a concept is not well understood and the "literature on which it is based is contradictory" (Kimbell 2009a:1). Thus, the definitions of design and design thinking are often insufficient, and do not provide enough clarification about its true worth. As a result, the *value* of the approach is unclear and many of the contentions are not based on empirical research (Badke-Schaub *et al* 2010:39; Hassi & Laakso 2011a:1; 2011b:341). Therefore, one has to consider another way in which to identify the value and values in design thinking. An explanation of design thinking, as well as clarification around the term assists in understanding the "nature of design thinking" (Dorst 2010:131). Moreover, since the nature of design thinking is so complex, one has to find a "common link" between the language used in design and business, in order to determine the real value and effectiveness of design thinking as an approach (Collins 2013:38).

Once again, one has to highlight the importance of the words *value* and *values*, respectively. *Value* is used to refer to the assumed *goodness* of design thinking as an approach. In other words, *value* is used to refer to the idea that design thinking may ensure improved future outcomes by being inherently good (even moral). The term *values* is used to refer to the additional worth that design thinking may add to any outcome, by means of unique characteristics. Thus, each characteristic is argued to possess its own value (or worth), and when combined under design thinking, they indeed result in *values*. In other words, the individual *values* form part of the overall *value* of design thinking as an approach.

Thus, if definitions of design thinking are causing more confusion and very little empirical research exists to determine design thinking's true value and values, one has to consider another way in order to clarify its worth. Therefore, this chapter explores just such a way, through an attempt to identify and discuss characteristics of design thinking. An exploration of the various characteristics of design thinking in this chapter, not only attempts to identify and briefly discuss these characteristics, but aims to reveal the inherent or assumed values that

direct them. Moreover, such an exploration intends to uncover what merits and pitfalls each characteristic may have for any design strategy, solution or future result.[1] Each characteristic should be considered only insofar as what it contributes through its core value and values. Moreover, characteristics in design thinking can be used to describe the nature of design thinking (Owen 2006:16; 18) and perhaps assist in a more comprehensive understanding of design thinking.

4.1 Design thinking in contemporary discourse

4.1.1 Characteristics of design thinking

Many accounts of contemporary design thinking seem to focus on promoting design thinking within a business context, with the intention of solving various challenges within these organisations. However, many ignore some of the important literature that constitutes the origins of design thinking (Kimbell 2011:293) in a writing style that is evident of "excessive praise" (Johansson-Sköldberg *et al* 2013:124). Design thinking originated with academics doing research within various design disciplines, and has scope far beyond only the business domain (Kimbell 2011:293).

It has become clear that design thinking has recently moved into new areas other than the traditional design disciplines, for example strategy and service design (Hassi & Laakso 2011a:3; Kimbell 2009a). However, this has caused much confusion around the term and raises the inevitable question around *value*. The uncertainty around "application levels" is partly to blame for the overall uncertainty surrounding the nature and the value of design thinking (Dorst 2011:531). Thus, identifying and discussing characteristics of design thinking are perhaps helpful in gaining a better understanding regarding the nature of design thinking. Consequently, Hassi and Laakso (2011a:2) propose to characterise design thinking "in more detail" in order to establish a foundation for "determining its value to innovation and management". Furthermore, Dorst (2010:138) claims that design thinking is a very specific and deliberate way of thinking, which has reached a professional status within the design disciplines. Moreover, it can be argued that design thinking is not merely "a single way of thinking", but rather encompasses *ways* of thinking that evolves as designers gain more experience (Dorst 2010:135). However, design thinking still lacks a clear definition (Hassi & Laakso 2011a:5). Thus, in order to gain a better understanding of design thinking, Badke-Schaub *et al* (2010:44) suggest detailing the fundamentals of design thinking as characteristics.

[1] Future result refers to what has previously been described as real-world problems or societal issues, as well as the intended or presumed value and values that design thinking may add to this result.

Therefore, this chapter explores various characteristics of design thinking, but further attempts to identify and discuss these characteristics in more detail. Moreover, this chapter aims to illuminate the value and values of design thinking by means of a discussion regarding the characteristics identified.

However, in order to understand the nature of design, and consequently the nature of design thinking, there is a need to understand the concept and significance of value. To determine the "ensoulment" or core nature of something, one has to understand "value and meaning" (Nelson & Stolterman 2012:193) as two deliberately separate ideas. The first of these two ideas relates to the intrinsic value of something, and the degree to which it is "organically unified" (Nozick 1989:164). Thus, the "organic unity" of something determines its true value (Nozick 1989:164). Secondly, we also want our lives to have meaning, thus value cannot be the only appropriate assessment criteria (Nozick 1989:166). Therefore, value relates to something much bigger; meaning (Nozick 1989:166). Robert Nozick (1989:166) argues that value is not merely one specific thing, but encapsulates "other dimensions of evaluation" as well. For example, the concept of value is used as an "overarching category for everything good" (Nozick 1989:166). In other words, the various ways in which something is considered good are represented by different types of value, but also by a close proximity towards that something (Nozick 1989:166). Thus, by understanding the difference between *value* and *meaning* in this way, designers can start to comprehend the nature of design (Nelson & Stolterman 2012:193), and consequently design thinking. The intrinsic value, or core nature of something, is captured as part of a single entity or unified whole,[2] and is the main reason why people show appreciation towards a particular something (Nelson & Stolterman 2012:194). Spending time to truly value a design is as important as creating that design, because the individual is in close proximity towards it (Nelson & Stolterman 2012:194). However, the definition of value is not contingent on a specific context or even a "larger system", because as humans we are inept to evaluate things that are part of reality based merely on intrinsic value (Nelson & Stolterman 2012:194). Nelson and Stolterman (2012:194) argue that our methods to evaluate designs are usually more intentional and driven by a specific purpose, for example; something has to be useful or even relevant in order for us to attach *meaning* to that particular design, and consequently attach meaning to our own lives. From this understanding, perhaps the biggest difficulty is that value can be somewhat subjective. Thus, determining the exact or only value of something can become somewhat demanding. However, what Nelson and Stolterman (2012:194) seem to suggest is that more than one value can be attached to one single thing. Since value is regarded as something *good*

[2] This is what Nozick (1989:164) refers to this as an "organic unity".

(Nozick 1989:166), the value and values of something are determined with this in mind. Thus, the individual characteristics identified in this chapter are discussed with the above in mind, but also to serve as a foundation in the discussion regarding the value and values of design thinking as an approach.

The characteristics discussed in this chapter are based on the two main origins or directions of design thinking, as identified in Chapter Three. The first set of characteristics is identified by Charles Owen (2005a:12-14; 2006a:3-5; 2006b:24-25) and presents the more theoretical account of design thinking with its origins in design research and academia. The second set gives an account of Tim Brown's (2008a; 2009a:49-62, 71-77, 85-86) characteristics, which presents the more popular, promotional account of design thinking with its origins in management discourse.

Owing to Owen's more theoretical approach, it seems both necessary and helpful to juxtapose Owen's (2005a:12-14; 2006a:3-5; 2006b:24-25) characteristics with those identified by Brown (2008a; 2009a:49-62, 71-77, 85-86), which appear to be more practical in nature. Furthermore, Brown's notion of design thinking is based on experience, rather than research (Johansson-Sköldberg *et al* 2013:130), and is thus helpful in this regard.

4.1.2 Charles Owen on design thinking

Design thinking is a way of thinking that corresponds to other ways of thinking, for example scientific thinking, but offers unique ways of addressing problems and opportunities limited almost exclusively to innovation (Owen 2006a:3). Apart from creativity as the most obvious prerequisite for design thinking, other "elusive" characteristics[3] that are not as commonly shared are also identified (Owen 2005a:12; 2006a:3; 2006b:23-24).

Owen's identification and description of these characteristics inform a starting point for discussion in this section of the chapter, but only to the extent that it explains the characteristics, as well as the value and values that these characteristics may add to or subtract from the direction taken by design thinking. Many of Owen's characteristics lack detail in relation to the actual value and values within design thinking, which in itself is a critique that needs to be highlighted. In such cases, a further investigation into other sources attempts to reveal the value and values that these characteristics may add to or subtract from a more holistic view of design thinking. However, each characteristic is identified and described, first

[3] Characteristics are often referred to as attributes (Martin 2009a:71), however for consistency and clarity, the word *characteristics* is used throughout.

and foremost, from Owen's point of view. Thus, the initial reference to and description of the characteristics explained in this section is clearly stated and outlined by Owen (2005a:12-14; 2006a:3-5; 2006b:23-25) as "characteristics of design thinking".

Most, if not all of Owen's (2006a; 2006b) characteristics are explained and defined using designers as the contributors or owners of these characteristics. However, it is clearly stated that these are "gathered under design thinking" (Owen 2006a:3) or "special ways of design thinking" (Owen 2006b:25). These characteristics are not commonly considered in tertiary environments and are mostly acquired as "tacit knowledge", through experience rather than being specifically taught (Owen 2005a:14; 2006a:5; 2006b:25). According to Owen (2006b:25), this is ideal for a tertiary education environment, as design courses are often "several years in length and directed toward a career in design". This allows sufficient time and opportunity to acquire design thinking skills (Owen 2006b:25). Thus, Owen seems to imply that design thinking and its characteristics are not acquired by learning, but rather by doing[4] and experiencing; they are understood, rather than taught. Furthermore, Martin (2009a:64) contends that American philosophers William James and John Dewey argued that "one could gain understanding only through one's own experiences". Dewey (1998:47) suggests that learning is a continuous "reconstruction of experience" that unifies new and old experiences in a continuous learning process. In other words, every experience should prepare an individual for future experiences of a "deeper and more expansive quality" (Dewey 1998:47). Kevin McCullagh (2010) further supports this idea and claims that designers do not learn by studying or rehearsing a theory, but rather "by doing",[5] which results in the achievement of an accepted level of expertise as a professional designer, through "tacit knowledge". Designers develop this ability through experience or formal design education

[4] Wang (2013:4) is of the opinion that through Aristotle's concept of *technē,* or knowing by making, design is seen as a logical activity, in and of itself. *Technē* is the origin of the word "technology", which is important, since design is often understood as the quintessence of "technological invention" (Wang 2013:5). Technology is also functional by definition, "it is pragmatic and has social value" (Wang 2013:9). At its core, *technē* means "skill" (Tiles 1984:49), "making" or "knowing", consequently "knowing by making" (Wang 2013:5), or "making is knowing" (Wang 2013:10). Thus, "knowing by making" appears to be based on the same premise as "learning by doing", as the action is based on knowledge acquired through continuous effort or practice. Furthermore, Robert Meagher (1988:159) suggests that "making" is at the core of human action and "*technē* is making something into something it is not". J.E. Tiles (1984:53) suggests that "*technē* pursues [only] what is good" (as implied by Plato). Meagher (1988:160) further argues that *technē* is the deliberate action taken to turn "matter" into something it had not been before, but also into something that we intended it to be. This further strengthens the connection between *technē* and "learning by doing", as both rely on the notion of deliberate action, as well as intent through this action.

[5] *Doing* relates directly to the core definition of design, first and foremost as a verb. For example, design is about planning or making something (Hornby 2010:396) or deciding how something will look (Hornby 2010:396). Buchanan (1992:8) argues that "there is no area of contemporary life where design – the plan, project, or working hypothesis … is not a significant factor in shaping human experience". Therefore, design is the action taken to plan, create or decide something.

(Chick & Micklethwaite 2011:19). Designers accumulate knowledge by developing it from one design problem to the next (Schön 2009:110). Cross (2004:427-428) further ascertains that expertise is the result of a "dedicated application" to a specific field of interest that develops over time. Studies done on expertise show that it "requires a minimum period of practice and sustained involvement before performance reaches an international peer-level of achievement" (Cross 2004:428).

Malcolm Gladwell (2008:35-42) further supports the idea of *learning by doing* by introducing the "10,000-hour rule". *In Outliers. The story of success*, Gladwell (2008:35-42) argues that one can master a specific skill or ability in approximately ten thousand hours of continuous effort or practice. Gladwell (2008:38) bases his "10,000-hour rule" on a study done by psychologists, K. Anders Ericsson, Ralf Krampe and Clemens Tesch-Romer in 1993. Ericsson, Krampe and Tesch-Romer (1993) introduced a term called "deliberate practice" to explain the influence hard work has on skills development, as opposed to merely being born with innate talent. This study (Ericsson *et al* 1993) ascertains that expert skills can be achieved through at least ten years of practice, which is the equivalent of Gladwell's (2008:35-42) 10,000 hours of practice. Gladwell (2008:35-42) argues that an individual can accomplish 10,000 hours of practice, by deliberately and intentionally working towards the goal of getting better at a specific skill, for approximately three hours per day for a period of ten years.

4.1.2.1 Conditioned inventiveness

According to Owen (2005a:12; 2006a:3; 2006b:24), "conditioned inventiveness" is aimed at inventing new ideas, as opposed to merely "discovering" something that already exists as in the case of scientific thinking. Van Zyl (2008:[sp]) agrees with this notion and argues that filtering through facts to discover insights relate to scientific thinking, whilst inventing new patterns and ideas in order to address possibilities, relate to design thinking. These new inventions are aimed at addressing facts and possibilities (Owen 2006b:17).

According to Johansson-Sköldberg *et al* (2013:124), Herbert Simon also clearly differentiated between actions that create something new versus actions that deal with "existing reality". Since Simon has never differentiated between "artistic creation" and engineering, it further suggests that his view on design creates an "objective framework for the field of design" (Johansson-Sköldberg *et al* 2013:124-125). This is especially evident in *The sciences of the artificial*, where Simon (1996:114) highlights a sense of possibility and potential through "what ought to be". Simon (1996:111) specifically highlights the designer's ability to turn

"existing situations into preferred ones". "Preferred" refers to a choice in favour of something, because that something is inevitably better (Hornby 2010:1152). This implies that design thinking has the ability to improve any current situation, and consequently human life. Martin (2009a:27) further suggests that design thinking, which is based on "abductive reasoning", is the logic of "what might be". This mode of reasoning can perhaps be argued to further create a sense of possibility, which is enhanced by the invention of something new.

However, the effectiveness of innovation is significantly enhanced when design thinking is combined with other types of thinking, as individuals from other disciplines offer unique inputs into the process (Owen 2006a:5). Owen (2005a:5; 2006b:17) further contends that "[d]esign thinking is in many ways the obverse of scientific thinking".[6] By this, Owen does not imply scientific and design thinking are mere opposites, but rather insists that a balance or a complementary relationship exists between the two types of thinking. "The source of the complementation lies in deeply rooted differences in ways of thinking" (Owen 2005a:7; 2006b:19). Buchanan (1992:6) comes to the conclusion that

> The significance of seeking a scientific basis for design does not lie in the likelihood of reducing design to one or another of the sciences … Rather, it lies in a concern to connect and integrate useful knowledge from the arts and sciences alike, but in ways that are suited to the problems and purposes of the present. Designers, are exploring concrete integrations of knowledge that will combine theory with practice for new productive purposes, and this is the reason why we turn to design thinking…

Combining science thinking with design thinking is much more valuable than isolating either as a source of guidance, as both are highly influenced by creative thinking (Owen 2005a:10; 2006b:22). Thus, it can be argued that both scientific and design thinking rely greatly on creativity (Owen 2005a:12; 2006b:23). The designer creates new "patterns and concepts" and therefore new possibilities, whilst the scientist filters through existing facts to discover patterns or insights that already exist (Owen 2005a:5). Thus, with the increasing complexity of today's problems, a need arises for ideas to merge our understanding and insights into new creative solutions (Owen 2005a:5). Furthermore, Martin (2009a:6), suggests that a balance exists between analytical and intuitive thinking. Moreover, Martin (2009a:18)

[6] Robert Bauer and Ward Eagen (2008:64) argue that relying too much on analytical thinking creates many of the shortcomings in organisations, and claim that analytical thinking is part of design thinking, as opposed to the opposite thereof. Design thinking could be advantageous to organisations, and possibly turn such organisations into "design agents" (Bauer & Eagen 2008:64). According to Martin (2009a:62), "analytics" is the opposite of intuition, the same as science is the opposite of art. Martin (2009a:63) further contends that deductive and inductive logic is "grounded in the scientific tradition". Therefore, one can argue that analytical thinking and scientific thinking are essentially the same thing, or at least regarded as having similar qualities. Both analytical and scientific thinking rely on declarative logic – inductive and deductive reasoning – and not on intuition or abductive reasoning (Martin 2009a:62-64).

suggests that a balance exists between "exploitation" and "exploration", which further supports analytical and intuitive thinking respectively. Therefore, the assumed value of "conditioned inventiveness" lies in combining and balancing scientific thinking with design thinking, in order to create new and better solutions, as neither should function alone in an attempt for future success.

4.1.2.2 Human-centered focus

Very few factors are able to control science, technology and the arts (Owen 2005a:12; 2006a:3; 2006b:24). In other words, exploration starts where discovery leads (Owen 2005a:12; 2006a:3; 2006b:24). Design on the other hand, is mainly client-focused[7] (Owen 2005a:13; 2006a:3; 2006b:24) and directed by a client's needs, wants, likes or dislikes. Design thinking must therefore always evaluate how products and services will answer to a client's needs (Owen 2005a:13; 2006a:3; 2006b:24). Customers[8] are often unsure of what they want or need (Lester, Piore & Malek 1998), thus responding to their wants or needs is not always an easy task. The interactions or conversations between designers and customers are therefore key, as this often brings about areas of interest and possible ways to serve those needs (Lester *et al* 1998).

4.1.2.3 Environment-centered concern

In recent years, the environment has become an additional, ubiquitous client and design thinkers are as concerned with environmental issues,[9] as they are with human-centered issues (Owen 2005a:13; 2006a:3; 2006b:24). Owen (2005a:10) further contends that design exists within the "world of the artificial" and displays certain values associated with human needs, as well as environmental needs brought about by human behaviours. This suggests an important connection between human and environmental needs, or human-centered and environment-centered concerns. Therefore, these concerns do not necessarily exist separately, but are rather interlinked and significantly impacted by one another.

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[7] It is interesting to note Owen's (2006a:3; 2006b:24) use of the word "client" in this context. This seems to imply that the client is the only focus, and that the end-user becomes somewhat less important. This study however, aims to illuminate the importance of all the stakeholders in the design thinking process. Therefore, the focus on the client's needs alone is not in line with the empathic and collaborative nature of design thinking as a methodology. Van Zyl (2008:[sp]) supports this notion when she mentions "participants", which include the designer, client and the end-user.

[8] Lester *et al* (1998) mentions the word "customer", which seems to further imply "client". In this case however, customer may also refer to the end-user, but the intention is not clear.

[9] Owen (2006a:3; 2006b:24) mentions "sustainable design" in this context, however this is only one aspect of sustainability itself. A more detailed discussion on the subject follows in Chapter Six.

The *values* that Owen (2005a:7-10) mentions are identified in order to display the foundations and differences between various fields of study and practice. Each field of study is understood and practiced within its own set of values; for example, design exists because of a need to create "form" (Owen 2005a:10). Therefore, the designer or "form giver" creates order through values such as "cultural fit", "appropriateness", "effectiveness" and so forth (Owen 2005a:10). Solutions are then measured on a level of better or worse, whilst taking these values into account. Better or worse, as opposed to right or wrong, is an appropriate measure for a field like design, because multiple solutions can be equally successful, based on culturally judged conditions (Owen 2005a:10). There is never just one correct answer or solution to any design problem, but rather solutions that appear better than others (Papanek 1984:5). Therefore, when assessing the unlimited amount of solutions, some will always be more right or more wrong, and the level of "rightness" in any solution is judged by the meaning that it imposes on the design (Papanek 1984:5-6).

Moreover, Owen (2005a:16; 2005b:3) raises a concern for the seriousness and uncertainty of these issues that are often impossible to anticipate, and he explains the influential impact certain issues have on the manifestation of other issues. For example; our growing population is causing serious concerns in the form of resource depletion and global warming, which will consequently cause more "disasters on increasingly grander scales" (Owen 2005a:16). Global population growth and the problems it has caused, are possibly the "most serious threats ever" to our society (Owen 2005b:3). This is perhaps a good example of a typical *wicked problem*. One of the ten characteristics of wicked problems ascertains that every wicked problem can be the manifestation or "symptom" of another "higher level" problem (Rittel & Webber 1973:165; 1984:141-142). Therefore, the assumption that can be made is that if we are not concerned with human-centered issues, other more serious ("higher level") issues will cause even greater threats to our society. Therefore, addressing perhaps a slightly smaller issue could well have a positive exponential impact on a much larger issue. However, Owen (2005b:6) suggests that owing to humankind's tenacity and resourcefulness, we may well be able to free ourselves and the environment from possible devastation.

Thus, the "ultimate value" created through human-centered and environment-centered design thinking is the commitment to consider the interests of both humankind and the environment in all projects (Owen 2005a:13; 2006a:3; 2006b:24). As a result, design thinkers have a responsibility to ensure that humankind and the environment are always considered and taken care of (Owen 2005a:13; 2006a:3; 2006b:24). Furthermore, Hans Jonas (1984) asserts that human existence relies on our attempts to take care of our planet and its future. This is clear in

the following quote: "[a]ct so that the effects of your actions are compatible with the permanence of genuine human life" (Jonas 1984:11).

4.1.2.4 Ability to visualise

Most of what designers do is conceived visually, and this ability helps to consolidate ideas that are often perceived differently by various individuals in a discussion (Owen 2005a:13; 2006a:4; 2006b:24). According to James Wang (2013:13), Aristotle claimed that we have to imagine or visualise an action to estimate "both its practical outcome and its ultimate worth". The cognitive value of visualisation or imagination is therefore pertinent to design theory and practice (Wang 2013:13). One's "ability to visualise" (Owen 2005a:13; 2006a:4; 2006b:24) or to use "visual thinking" is not only about illustrating ideas, but rather a means of *expressing* ideas in a visual way (Brown 2009a:80). Design thinking builds assumptions from "incomplete information" using intuition and abduction, as well as different ways to express ideas, such as "sketching and modelling" (Collins 2013:37). Bryan Lawson (2005:291) contends that designers use "a form of representation" to express solutions or even parts of solutions. These can be expressed using language ("words"), but is most often visualised by means of drawings of some kind or another (Lawson 2005:291).

Since designers often struggle to explain what they do, the ability to visualise or to portray visually what they do, is of utmost importance (Van Zyl 2008:[sp]). Imagination and the idea of "what might be", as identified by Van Zyl (2008:[sp]), are both closely linked to visualisation. It can therefore be argued that one's "ability to visualise" (Owen 2005a:13; 2006a:4; 2006b:24) links closely to "conditioned inventiveness" (Owen 2005a:12; 2006a:3; 2006b:24), as both rely on the premise of "what might be". Therefore, the assumed value of this characteristic lies in using one's "ability to visualise" as a tool to create or invent new possibilities. Thus, one suggestion would be to merge these two characteristics into a single characteristic in order to encompass more value in design thinking. Helen Walters (2011b) further suggests that visualising ideas are "only successful when it creates actual value". Thus, the value lies in taking these visualisations and making them tangible in the marketplace (Walters 2011b).

4.1.2.5 Tempered optimism

Optimism[10] in the creative process is of utmost importance and designers are educated and encouraged to use optimism and proaction as ways of working (Owen 2005a:13; 2006a:4; 2006b:24). "[D]esigners must be able to turn on enthusiasm on demand" (Owen 2005a:13; 2006a:4; 2006b:24). Optimism is the need to take immediate action when solving problems and is inspired by the "belief that you have a reasonable hope of success" (Kelley & Kelley 2013:47). Being proactive is the ability to make something happen, as opposed to waiting for something to happen and responding to it (Hornby 2010:1167). Tom and David Kelley (2013:32) are of the opinion that proaction is inspired by the belief that you can guide the direction of your own life. In a conversation with Tom and David Kelley (2013:32), Roger Martin claimed that "designers … act with intention", meaning that the choices designers make are always novel and intentional. Kevin Clark and Ron Smith (2008:8) further support this idea when they claim that "design is about making intent real" and that the act of designing is about bringing something new into the world with intention.

Design as a process constitutes the act of organising and "patterning" towards a suitable and predicted result (Papanek 1984:3). Designers view the world from the perspective that everything is an opportunity to make things better and they are always enthusiastic to make that change (Kelley & Kelley 2013:32). Design thinking can motivate "considered changes" in society and help shape the world we want to live in (Chick & Micklethwaite 2011:7). "Design can and must become a way in which … people can participate in changing society" (Papanek 1984:xiv).

Optimism is assumed to add value to design thinking through proaction, which is a typical way of approaching work in an optimistic way. Working proactively is perhaps a valuable way to consider how we could approach human-centered and environmental issues. Many of these issues are addressed only after the fact and when they are often already disastrous. Therefore, acting proactively before these issues are irreversible is a good place to start. Proactively addressing such issues is perhaps easier said than done, but a possible way to consider such issues. Therefore, proaction guided by optimism and intention, could well have a massive impact on the value design thinking can add to any future result.

[10] This is a good example of how Owen fails to explain *why* optimism is important. Owen (2005a:13; 2006a:4; 2006b:24) merely states that "enthusiasm on demand" is a prerequisite for any designer, but does not offer any means or further explanation of how design thinking will benefit from this characteristic. There is no direct or specific value associated with optimism, apart from assumptions and conclusions made through the use of various other sources.

4.1.2.6 Bias for adaptivity

Adaptivity is the designer's ability to create versatile products that are uniquely suited to the user's needs (Owen 2005a:13; 2006a:4; 2006b:24). Consequently, these needs will evolve over time, which will drive products to change as well (Owen 2005a:13; 2006a:4; 2006b:24). As we have seen, design continually changes and will continue to change over time. Design itself is adapting to be more applicable to contemporary methods and strategies (Clark & Smith 2008:11). The designer's ability to adapt to these changes, as well as design thinking's flexibility, create a sense of hope that value creation on various levels is achievable within the framework of this methodology.

The value created through adaptivity appears to be encapsulated within the word itself; to adapt. This implies that no matter what the nature of the problem, both the design thinker and design thinking have the ability to adapt, even if the nature of the problem or the problem itself changes. Therefore, no matter how or when the problem changes, there will always be a way to solve such problems. This is perhaps another characteristic that displays both its own value, whilst highlighting the need to solve *wicked problems* in design thinking. One of the ten characteristics of wicked problems ascertains that "every wicked problem is essentially unique" (Rittel & Webber 1973:164; 1984:141). Rittel and Webber (1973:164; 1984:141) further claim that despite some similarities between existing problems and previous problems, there will most likely be one distinct feature that is of "overriding importance". This suggests that no two problems – no matter how similar they may appear – can be resolved in the same way. Thus, the design thinker's ability to adapt to each unique problem may prove useful in solving various kinds of wicked problems.

4.1.2.7 Predisposition toward multi-functionality

Owen (2005a:13; 2006a:4; 2006b:24) contends that "solutions to problems need not be mono-functional", and designers often work towards solutions with multiple benefits. Owen (2005a:13; 2006a:4; 2006b:24) seems to imply that design thinking works towards addressing a problem's intrinsic and specific benefits, whilst always keeping sight of the bigger picture. Clark and Smith (2008:11) further ascertain that the improvement of products is necessary on a multi-functional level, and that incorporating various aspects of a business into any strategy, is equally important.

4.1.2.8 Systemic vision

Design thinking is "holistic" and in more recent years designers have regarded problems more openly and widely (Owen 2005a:13; 2006a:4; 2006a:24). Systemic refers to the overall workings of a system and how each component within that system is considered – hardware, software, concepts and so forth – to create a so-called holistic solution (Owen 2005a:13; 2006a:4; 2006b:24). Cross (2011:75) further concludes that one of the key strategic aspects of design thinking is that it takes a "broad 'systems approach' to the problem, rather than accepting narrow problem criteria".[11] Consequently, owing to design thinking, design has become more conscious of the system (Nussbaum 2011).

The "systemic vision" that Owen (2005a:13; 2006a:4; 2006a:24) identifies links closely to "multi-functionality" (Owen 2005a:13; 2006a:4; 2006b:24), since being conscious of the system and all of its components, designers become more conscious of the various benefits within that system. Furthermore, addressing problems more openly and widely creates the necessity not only to focus on one aspect of the problem, but on multiple aspects simultaneously. A sense of "pluralism" is created within the systemic way of thinking, as well as a move towards "knowledge-based and learning organisations" (Van Zyl 2008:[sp]).

As a result, the suggestion is to combine Owen's (2005a:13; 2006a:4; 2006a:24) "systemic vision" and "multi-functionality" into a single characteristic. It would appear more valuable to approach these two characteristics simultaneously, because in combination these provide a better understanding of why these are of value in the first place. In other words, looking at problems more openly and widely (Owen 2005a:13; 2006a:4; 2006a:24), will hopefully assist in creating a more holistic sense of design thinking. Thus, a "systemic" view is needed in order to move towards a more holistic view of design thinking, and thus create the best possible value.

4.1.2.9 View of the generalist

Owen (2005a:14; 2006a:4; 2006b:24) is of the opinion that "design thinking is highly generalist in preparation and execution". In stating this, Owen does not disregard the importance of specialists in any way, but rather emphasises the need for specialists to extend themselves across disciplines where and when possible. Thus, allowing various disciplines to

[11] Cross (2011:75) came to this conclusion after conducting several studies on exemplary designers. Cross (2011:29) argues that a better understanding of design thinking is gained by conducting and studying case studies.

integrate and create holistic solutions. During the earlier stages of design's development, design disciplines and subjects became increasingly fragmented (Buchanan 1992:5) and the common view was that specialisation within these various disciplines is what drives knowledge to further heights – a view that is often still held today. However, the fragmentation of different subject matters has lead to a need for integrating various disciplines with the hope of expanding our knowledge to serve the purpose of improving human life (Buchanan 1992:6). With this in mind, the inception of design thinking in the twentieth century is crucial. Furthermore, Nussbaum (2011) argues that design thinking assisted in breaking design out of a specialised and limited foundation, and coupled it with more important social issues we face today.

Owen's (2005a:14; 2006a:4; 2006b:24) "view of the generalist" seems to relate directly to the idea of the "T-shaped" thinker, as advocated by Tim Brown (2009a:27) and Bill Moggridge (in Walters 2011a). According to Brown (2009a:27), such an individual possesses a "depth of skill" (vertical axis of the T), which allows them to contribute to any outcome in a "tangible" way. This type of expertise is difficult to acquire, but not difficult to identify (Brown 2009a:27). Furthermore, design thinkers are believed to "cross the T", because they possess the capability and tendency to work across various disciplines (Brown 2009a:27). According to Brown (2009a:27), this is a rare trait, as many skilled designers and researchers find it difficult to survive in the world of complex problems. Even though these individuals may play an important role, they will most likely continue to operate in the "downstream world of design execution" (Brown 2009a:27).

Furthermore, Owen (2005a:14; 2006a:4; 2006b:24-25) states that for original ideas to take shape, a more extensive knowledge base is likely to enhance creativity. Therefore, in order for knowledge to progress, one has to try to "see new things or to see things in a new way" (Martin 2009a:68). This links closely to Owen's (2005a:13; 2006a:4; 2006b:24) "predisposition toward multi-functionality" and "systemic vision" as characteristics. For example, by taking a more generalist approach, it allows for a "systemic" view to take shape, because various individuals' points of view are able to consider the whole system. The same is true for multi-functionality – the more points of view there are, the more likely it may appear to create a solution with multiple benefits or improvements. Once again, perhaps the real value lies in considering these characteristics in combination, as opposed to in isolation.

4.1.2.10 Ability to use language as a tool

Language is not only used to communicate, but it is also a valuable tool in the design thinking process (Owen 2005a:14; 2006a:4; 2006b:24). Owen (1993) argues that design is a creative process in which we use language and tools to create "artefacts". Schön (2009:111) further suggests that artefacts are created through "design knowledge and reasoning", thus reiterating Owen's (1993) point. As discussed in Chapter Two, language is one important aspect in our society that continually changes and will continue to change over time, especially in the field of design. As a result, our ability to design has co-evolved with society (Owen in Beckman & Barry 2007:27). In other words, our ability to express design has evolved. Thus, the changing nature of language creates an opportunity to express design appropriately, even if design itself continues to change.

Moreover, Owen (2005a:14; 2006a:4; 2006b:25) identifies and describes three types of language, namely; visual language, which is used to graphically represent concepts, mathematical language, which is used to explore the feasibility of a concept with approximate calculations, and verbal language, which is used to explain and describe concepts that may not be visually obvious. Thus, the assumption that can be made is that through various types of language, designers have a unique way of communicating, since they can express themselves across these different types of language. However, this assumption offers no real means of why this combination could add actual value. So, perhaps one can argue that since designers' way of thinking, knowing and doing is different to other types of thinking, knowing and doing (Cross 1982:221; 1990:134; 2001:55; 2006:5), their way of expressing themselves through various types of language, is different as well. In other words, design presents its own unique "designerly ways of knowing" (Cross 1982:221; 1990:134; 2001:55; 2006:5; 2010:99).

Moreover, Cross (2011:140) argues that "design ability is something that everyone has", at least to a certain extent. The latter claim appears to negate the designer's unique position in the design thinking process. However, upon closer investigation it is certainly not the case. Cross (2011:140) argues that even though we all have a "design ability" to some extent, some individuals will develop "higher levels" of this ability through training and development. Owen (2006b:25) further contends that since design courses are often "several years in length" and aimed at completing a career in design, it allows sufficient time and opportunity to acquire design thinking skills. Thus, because designers' skills are developed through an educational system and their careers, their abilities become that much more important, since it is much more developed. Kimbell (2011:292) further contends that the designer has a "unique

way of looking at problems and finding solutions". Thus, designers' ability to express themselves through the various types of language, allow them to take a unique stance in the design thinking process and offer unique points of view. Therefore, the assumed value of this characteristic lies in the unique way in which designers combine the different types of language in the design thinking process.

Furthermore, using (visual) language as a tool is closely linked to a designer's ability to visualise – a unique capability that is not commonly shared amongst all individuals – making the designer's position in the design thinking process even more unique. Expressing ourselves by means of words and numbers are necessary, however only "drawing can simultaneously reveal both the functional characteristics of an idea and its emotional content" (Brown 2009a:80).

4.1.2.11 Affinity for teamwork

Recent developments in the design industry and good interpersonal skills as part of the designer's expert skill-set, encourages and enables teamwork or collaboration (Owen 2005a:14; 2006a:5; 2006b:24). "Design thinking today is highly influenced by this, and designers routinely work closely with other designers and experts from other fields" (Owen 2005a:14; 2006a:5; 2006b:25). A designer's ability to be generalist in development and implementation (Owen 2005a:14; 2006a:4; 2006b:24), to communicate across disciplines as well as visualise concepts (Van Zyl 2008:[sp]), make them a very valuable resource in a methodology that relies on multidisciplinary approaches. Teamwork is of utmost importance in conventional design practices, as well as in design as a cohesive activity that involves collaboration among various other disciplines (Cross 2011:91). Therefore, understanding the significance of collaboration in design thinking is important for "future development" (Cross 2011:92).

Kelley and Kelley (2013:175) argue that teamwork is necessary to "achieve innovation at scale". As a result, concepts need to be shared and discussed amongst team members, which could result in disagreements amongst team members (Cross 2011:93). However, a team has to arrive at a collective understanding of the problem (Cross 2011:93), and thus a collective and shared understanding of possible solutions. Each team member has a role and relationship to play – whether formally established or not – often with some members in more senior or leadership roles than others (Cross 2011:92). Thus, another possible way to resolve disagreements is perhaps to consider and discuss the roles and responsibilities of each team member upfront, and allowing one person to take control if disagreements cannot be resolved. This is where persuasion (Cross 2011:91) in teamwork becomes important as well.

Furthermore, Kelley and Kelley (2013:175) argue for the importance of the right combination of people within a team, from "leadership" to "grassroots activism". IDEO ([sa]a:13) further supports this idea and claims that by "intentionally assembling the right team of people"[12] can increase the possibility of finding a successful solution.

The "generalist" approach discussed earlier is important in this context as well, as it creates the opportunity for the designer to add value from another perspective. This is where an interdisciplinary approach as opposed to a multi-disciplinary approach becomes apparent, which will be discussed in more detail later on.

4.1.2.12 Facility for avoiding the necessity of choice

Design thinking is based on the premise that making choices between alternative solutions is not the preferred way to solve problems, but that the integration of "competing alternatives" or the characteristics thereof will assist in formulating better solutions (Owen 2005a:14; 2006a:5; 2006b:25). This relates to what Martin (2009a:165; Martin & Riel 2011:6) calls, integrative thinking. Integrative thinking is the ability to confront two (or more) conflicting ideas – rather than selecting one or the other – to create a solution that is better, but still includes attributes of both and that which is still "superior to each (or all)" (Martin 2009a:165). Consequently, design thinking is the implementation of integrative thinking in an attempt to solve the tension between analytical and intuitive thinking or between "exploitation" and "exploration" (Martin 2009a:165). Thus, the value of integrative thinking (Brown 2008a; Martin 2008:5, Martin 2009a:165; Martin & Riel 2011:6) or "avoiding the necessity of choice" (Owen 2005a:14; 2006a:5; 2006b:25), lies in creating better solutions through integrating the best of two opposing (possible) solutions into one coherent solution.

4.1.2.13 Self-governing practicality

Even though design is based on inventiveness and the designer's ability to act and respond intuitively, design thinking embodies a sense of practicality and functionality of a solution within the scope of free exploration (Owen 2005a:14; 2006a:5; 2006b:25). In other words, even though design thinking relies on intuitive thinking, a sense of practicality is necessary for a solution to take shape. Therefore, even though design thinking depends on one's ability to be intuitive in order to create "meaningful" ideas, those ideas have to be functional as well (Kelley & Kelley 2013:25).

[12] In order for a team to work best, three to eight individuals, of which one is the "facilitator", should be assembled (IDEO [sa]a:13).

4.1.2.14 Ability to work systematically with qualitative information

The maturity of design research and the development of design methodology over time have made design more reliant on qualitative, rather than quantitative research techniques[13] (Owen 2005a:14; 2006a:5; 2006b:25). The former is based on the quality of something (Hornby 2010:1198), in this case the quality of the research, as opposed to the quantity thereof. This suggests that more research is not necessarily better. Qualitative research techniques are also more applicable to conceptual problems within more complex systems (Owen 2005a:14; 2006a:5). Qualitative research forms a key part of the design thinking process, because putting people at the core of the process creates a better understanding of their behaviours, wants and needs (Young 2010:6). Thus, observational techniques, often highlighted in anthropology and ethnographic research, are valuable when attempting to make sense of the complexity of human beings within society (Weber 2009:11-13).

Owen's characteristics in general are somewhat open-ended and theoretical in nature. Most of the characteristics do not offer any specific value and values to the direction taken by design thinking, however in many instances an interpretation thereof can be used to *suggest* value. This is possible through the choice of language used, as well as the initial descriptions of the characteristics themselves. Owen's contentions appear to follow the first version of design thinking identified by Kimbell (2011:285), and mostly take into account the unique ways in which individual designers do things. More importantly, Owen's contentions relate to the theoretical account of design thinking with its origins in design research and academia.

Furthermore, Owen often fails to mention the context within which the designer works, as well as the affects that context may have on any future result. However, the characteristics that focus on human-centered (Owen 2005a:12; 2006a:3; 2006b:24) and environment-centered (Owen 2005a:13; 2006a:3; 2006b:24) issues, suggest that Owen considers context as an important aspect, even though it may only be the context within which the designer is able or willing to intervene. Furthermore, even though Owen does not explicitly mention context, he is quite clear about the importance thereof. For example, as an introduction to some of his papers, Owen (2004; 2005a; 2005b; 2006b) specifically mentions issues like population growth and pressured resources in order to highlight contexts that need serious attention.

[13] Quantitative research techniques, such as focus groups and surveys are claimed to be less effective than for instance, observational techniques (Young 2010:6). The latter aims to understand the end-user's behaviour by placing the researcher in the end-user's own context (or setting), whilst reducing the end-user's awareness of their own behaviour (Weber 2009:20). Furthermore, observational research techniques can also reveal tacit knowledge (Sanders 2001:[sp]).

4.1.3 Tim Brown on design thinking

Brown (2008a; 2009a:49-62, 71-77, 85-86) identifies additional characteristics, which will serve as a guide to identify design thinkers, or what he likes to call "a design thinker's personality profile". However, what is most fascinating about Brown's work in general, is his use of real-world examples that appear to provide proof that his views on design thinking have practical value. In other words, his view on design thinking seems to provide tangibility to design thinking from a business perspective.

However useful Brown's characteristics may seem, there are some important factors to keep in mind regarding his view on design thinking. According to Kimbell (2011:293-294), Brown does not make much use of research conducted in either design or management studies, and his view on design thinking seems to ignore some of the important literature that constitutes the history and origins of design thinking. Even though links may "naturally" appear between design thinking in design discourse and design thinking within management discourse, these are not clearly indicated (Johansson-Sköldberg *et al* 2013:128).

Owing to the fact that Brown does not make use of academic research (Kimbell 2011:293-294), his view on design thinking often appears single-minded or promotional in nature. What is meant here, is that his view on design thinking does not consider a critical or theoretical approach and seems to support mostly projects from his own consultancy IDEO. As a result, Brown's view often appears retrofitted or promotional in nature.[14] Furthermore, Kimbell (2011:289) and Johansson-Sköldberg *et al* (2013:127-128) argue that most of the recent literature on design thinking in business is linked to IDEO only. This seems to suggest that design thinking used as a resource to business only assists Brown further in stating his case. Brown narrates "stories" that suggest everyone, especially business people and social innovators, should use IDEO's methods or their "secret formula" (Johansson-Sköldberg *et al* 2013:128). Martin (2009a:142) has even gone as far as calling it design thinking "attributes of IDEO".

Even though Brown's stories are convincing, these have no theoretical framework apart from his depiction of a "circular process" (Johansson-Sköldberg *et al* 2013:128). Kimbell (2011:294) further suggests that some of Brown's findings appear to be based on research, because he "rehearses many of the findings" as such, for example seeing design thinking as a fundamentally "exploratory process". Since Brown never really claims that any of his findings are academic, the issue here is perhaps not his view on design thinking or the lack of

[14] Since Brown's accounts largely stem from IDEO case studies and examples, one could perhaps also question how many of these projects he was actually directly involved in.

research conducted, but rather a concern with design's position in the world when it is "mobilised" within a business[15] framework (Kimbell 2011:293). As a result, without any theoretical framework, the intention of making design practices comprehensible to managers "provide insightful anecdotes or lists of best practices", at best (Johansson-Sköldberg *et al* 2013:128). Since design is considered "an agent of change" (Stewart 2011:516), it has to be considered outside of its typical context and considered elsewhere, for example within business contexts. Thus, the issue here is not the use of design thinking as a catalyst for change in business, but rather doing so without consideration for design thinking's long, academic history that is grounded in design practice.

Contradictory to these claims, one has to consider the value in Brown's, as well as IDEO's pragmatic approach to design thinking. IDEO's ([sa]a; 2012) Human Centered Design (HCD) toolkit, as well as their Design Thinking for Educators (DT for Ed) toolkit are good examples of this approach. IDEO's ([sa]a:3) main aim, through the HCD toolkit, is to assist organisations in helping communities in need. The toolkit does not offer solutions, but rather "techniques, methods, tips, and worksheets" that serve as a guide to create and implement solutions (IDEO [sa]a:5). In addition, these techniques and methods can be used to best suit a specific context, and can also be combined with other existing organisational methods (IDEO [sa]a:5). Moreover, the DT for Ed toolkit offers similar techniques and guidelines, but specifically focuses on helping educators understand design thinking within their own contexts (IDEO 2012). Furthermore, IDEO's hands-on experience, as well as its affiliation with Stanford University, makes it both reliable and academically credible as a source for promoting design thinking (Johansson-Sköldberg *et al* 2013:127). Johansson and Woodilla (2009:3) further note a strong link between IDEO and Stanford University through the d.school[16] at Stanford. This appears to further popularise IDEO's account of design thinking, whilst giving credibility to their point of view. Thus, one can argue that through credible institutions such as the d.school at Stanford, Brown's view on design thinking is pertinent for this study.

[15] According to Kimbell (2011:293), Roger Martin is another advocate that has repositioned design thinking within a "managerialist" or business framework. Martin (Riel 2009a:85) also has a direct link with IDEO, through work done for Procter & Gamble in 2001. However, according to Johansson-Sköldberg *et al* (2013:128), Martin advocates from a very different perspective and has revised his "earlier models" since working with IDEO. Johansson-Sköldberg *et al* (2013:128) further argue that Martin is more interested in the cognitive approaches of business executives and stresses the importance of applying more than just analytical thinking.

[16] The d.school, formally known as Stanford University's Hasso Plattner Institute for Design, was founded by David Kelley in 2005 (Kelley & Kelley 2012; 2013:26-27; Tischler 2009a). The d.school is motivated by design thinking (Tischler 2009a).

Brown's identification and description of his own characteristics continue the discussion in this section of the chapter. As with Owen,[17] Brown's characteristics are only discussed to the extent that it explains the unique characteristics, as well as the value and values that these characteristics may add to or subtract from the direction taken by design thinking. In the event that characteristics lack detail in relation to the actual value and values within design thinking, other sources are consulted in an attempt to reveal the value and values that these characteristics may add to or subtract from design thinking. However, the characteristics that Brown (2008a; 2009a:49-62, 71-77, 85-86) identifies are discussed, first and foremost, from Brown's own point of view. The characteristics that Brown (2008a; 2009a:49-62, 71-77, 85-86) identifies include empathy, integrative thinking, optimism, experimentalism and collaboration.

4.1.3.1 Empathy

According to Brown (2008a; Serrat 2010:2), empathy is the ability to maintain a "people first" approach and to imagine the world from various points of view – those of clients, end-users and co-workers. It is important to point out another difference between design and design thinking. The term *consumer* or "statistic" (Holt 2011:152) is most often used in conjunction with design, whilst *end-user* (Kelley & Kelley 2013:85) is used with design thinking. This difference often implies that a consumer merely uses up or expends designed products and is usually only considered at the end of the design process. As a result, no "'real' person" is ever mentioned or consulted for an opinion (Holt 2011:152). Thus, the consumer becomes dehumanised to some extent. End-user on the other hand, is used more in line with participatory design and collaboration (Brown 2008a; Holt 2011:152, Kelley & Kelley 2013:85), where the end-user is also an active stakeholder in the design thinking process – informing key decisions from the start of the process, along the way and up until the end of the process. This is somewhat counterintuitive, as from a linguistic perspective, the term *end-user* seems to indicate *at the end*, making it appear more suited to design at first glance. Furthermore, Anne Chick and Paul Micklethwaite (2011:33) argue that a clear change from "passive consumption to … active participation" is taking place in design thinking. Ezio Manzini (2006:11) supports this idea and claims that users need to "move from passive to active involvement". Therefore, identifying with the end-user occurs on an emotional level and not merely on a figurative level (Holt 2011:152). Furthermore, co-design, which includes

[17] Some overlap or repetition of certain characteristics may occur, as Owen discusses characteristics from a more theoretical framework within the discourse of design praxis, whilst Brown's discussion is more practical in nature within a management or business framework. However, it is important to discuss these characteristics independently and take into consideration both the theoretical and practical positions, until such time as they are able to merge, interlink or discussed simultaneously.

the end-user in the design thinking process, positions the end-users or "consumers as creative participants rather than as passive recipients" (Suri & Howard 2006:248). Co-design can create social value during the initial user engagement phase, as this phase determines the necessity to produce certain products (Sanders & Simons 2009). The social value of co-design is encouraged by the ambition for "longer term, humanistic, and more sustainable ways of living" (Sanders & Simons 2009). Thus, both the beneficiary and the contributor are important from a "people-centered" point of view (Collopy 2009a).

Empathy is the ability to comprehend another person's feelings or experience (Hornby 2010:479; IDEO 2012:11; Kelley & Kelley 2013:85), understanding something from their perspective (Waloszek 2012) or really engaging with the people whose lives you are trying to change (Berger 2010). Each person's perspective[18] is therefore unique, as they are influenced by their own experiences from unique contexts, which will result in unique solutions (Lombardi [sa]; Merholz 2009). This implies that looking at problems from more than one point of view can create better solutions, since more aspects are considered in the problem-solving space. Without understanding the powerful and unique aspects of people, a solution is bound to fail (Mossayeb 2013) or is at the very least a mere incremental improvement.

Therefore, empathy is the ability to observe the world in meticulous detail, enabling design thinkers to imagine solutions that meet both obvious and more latent needs. The aim of design thinking, through empathy, is turning these observations into insights that will improve lives, whether in the form of products or services (Brown & Katz 2011:382). Observation creates an opportunity to really understand what people do (or want), as opposed to what they say they do (or want) (Fast Company Staff 2006) and is used to make sense of peoples' "spoken and unspoken" needs (Clark & Smith 2008:11) as we acknowledge why people behave the way they do (Kelley & Kelley 2013:85). People's behaviours inform a starting point for a range of unfulfilled needs "as they improvise their way through their daily lives" (Brown & Wyatt 2010:33). Observation however, is not the only important aspect to consider in the empathy domain, but requesting feedback from the end-user is also vital, as this will inform important decisions along the design thinking process (Waloszek 2012). Understanding what motivates

[18] Kimbell (2011:295) contends that without referencing perspectives or social theories more openly, design thinkers will most likely miss opportunities that can enlighten the actual context into which they are intervening. Considering such factors and allowing these factors to shape or direct one's findings, is in line with the social sciences, and of utmost importance to explorations within practice and theory (Kimbell 2011:295, 300). Therefore, unique perspectives are of utmost importance, especially when considering the various references that can shape or direct one's findings, for example, factors such as theory, politics and so forth. Tony Fry (in Kimbell 2011:300) contends that design practice is shaped by a designer's own theoretical and political responsibilities.

people, and gaining access to their core beliefs, go beyond merely observing their actions (Kelley & Kelley 2013:20).

Matthew Holt (2011:152) argues that empathic design is a form of collaboration and is based on the approachability and autonomy that drives the design thinking process. Consequently, empathy distinguishes academic thinking from design thinking (Brown & Katz 2011:382) through insights that reflect what the end-user wants (Brown 2008c) and a commitment to pay close attention to people's needs (Berger 2010). Holt (2011:152) argues that even though a change from a technology-centered to a human-centered methodology is taking place, the former is based on sympathetic tendencies in design, especially the "compassion for the ... worker" presented during the Arts and Crafts Movement. Holt seems to imply that *empathy* in design thinking is the evolved counterpart of *sympathy* in design. Holt (2011:153) argues that both *sympathy* and *empathy* are based on the idea of a "utopian moment", which design has always strived for. Therefore, the assumption that can be made is that empathic design is the next embodiment of this utopia, which always strives for a *betterment* or *improvement* of society.

The core value of empathy is human-centered design, or rather; human-centered design is based on the belief that empathy for the end-user is essential (Collopy 2009a; Holt 2011:151; Mossayeb 2013). In other words, empathy for the end-user is essential so that design thinking can be affective on a human-centered level. This implies that design thinking will only be effective and able to solve issues on a human-centered level if empathy is an important part of the process, or an important characteristic of any design thinker. By taking a human-centered approach and focusing on the end-user's needs, design thinking has the potential to move designers away from solutions that will not necessarily be useful to the end-user (Young 2010:15). A "less-documented" contribution of design thinking – instead of focusing on the outcomes of the process or the innovation thereof – is to focus on the obvious "reduction of social and natural capital waste" when designers move away from inferior solutions that will not meet the requirements of a project (Young 2010:15). Design thinking is not merely human-centered, but "deeply human in and of itself" (Brown 2009a:4). As humans, we are inherently empathic[19] (Scarry 1985:[sp]). In an interview with Avi Solomon (2012), David Kelley takes empathy to a whole new level by stating that "[h]aving empathy for people was so exciting". Kelley's view appears to be somewhat promotional, rather than critical or theoretical in nature. However, it somehow bears evidence of the profoundly human side of design thinking, suggested through the excitement in Kelley's statement. The excitement experienced in the design thinking process, is therefore perhaps not too far removed from

[19] Elaine Scarry (1985:[sp]) uses the term "sentient" to describe the empathic nature of humans.

Owen's (2005a:13; 2006a:4; 2006b:24) idea of "tempered optimism". The excitement suggests a sense of optimism and simultaneously creates a sense of possibility. Kelley (in Solomon 2012) further claims that empathy for people is one of the characteristics in designers that are of utmost importance. Furthermore, in an interview with Gaynor Aaltonen (2010), Dan Pink argues that empathy is a vital aspect for any successful design. The d.school at Stanford (2009; 2010) argues for a "focus on human values", the complement of empathy, which clearly emphasises the value created through focusing on people through a "human-centered design process".

In addition to design thinking's focus on creating human-centered products and services, the process itself is also profoundly human – intuitive[20] and pattern conscious, as well as reliant on our ability to create meaningful, functional ideas by expressing these ideas through media other than language or images (Brown 2009a:4; Brown & Wyatt 2010:33; Kelley & Kelley 2013:25). According to Victor Papanek (1984:4), "[d]esign is the conscious and intuitive effort to impose meaningful order". The suggestion however, is not to run a company based only on feelings and intuition[21] (Kelley & Kelley 2013:25). Intuition is often regarded as a risky[22] term to use in the application of design thinking in business, since it relies on a person's gut feeling, which can be seen as irresponsible, erratic or disorganised in a predominantly systematic and analytical environment. Many influential theorists and management consultants even suggest that value can only be created by driving out "gut feelings and instincts" by replacing it with robust strategies that rely on quantitative analysis (Martin 2009a:5). However, Cross (2011:10) suggests that intuitive thinking is key to the

[20] According to Kelley and Kelley (2013:25), intuition is an innate, yet trainable human ability and links closely to the notion of *learning by doing*. Papanek (1984:4) claims that even though intuition influences design in a profound way, it is difficult to define as an activity or skill. Intuition plays a key role on a "subconscious, unconscious or preconscious level", especially during the creation of images and concepts (Papanek 1984:4).

[21] Despite the importance of taking a human-centered approach, an organisation's goals are just as important. A balance has to exist between the end-user's needs, the organisation's needs and technology, in order to create results that are beneficial to all (Sato 2009:48). Brown (2009a:18) mentions "three overlapping criteria for successful ideas", namely "desirability", "feasibility" and "viability". In the second edition of IDEO's ([sa]a:6-7) HCD Toolkit, these are referred to as "the three lenses of human-centered design". These exist as constraints that need to reflect the balance between end-users and the organisation in any design thinking result (Brown 2009a:18; Kelley & Kelley 2013:19-21). These constraints are not necessarily created equally (Brown 2009a:18), therefore each problem needs to be determined and solved in a unique way.

[22] According to Kimbell (2011:294), Brown suggests that since designers are prepared and capable of understanding the problems end-users face, they "more or less feel their way through to a new solution". This contention however, makes part of the process appear nothing more than a shot in the dark, with no real foundation in the unique skill-sets that designers can offer. The designer's efforts appear to be nullified to nothing more than "feeling", which is simply not the case. However, Martin (2009a:24) explains that the reason why many managers turn to analytical thinking, is because they are familiar with this way of working and because "the alternative appears quite frightening". Analytical thinking has its foundations in the past, either in common practices or as observations of events that have already happened (Martin 2009a:24) and are thus less frightening.

design process and a type of reasoning "not based upon conventional forms of logical inferences". This again highlights the importance of abductive reasoning, or what Cross (2011:10) refers to as the "necessary logic of design". Furthermore, too much dependence on systematic and analytical processes can be just as risky (Brown 2009a:4; Brown & Wyatt 2010:33; Kelley & Kelley 2013:25). It is perhaps here where the promotion of design thinking in business and its so-called single-minded view becomes problematic. Even though Brown argues for design thinking in business, one cannot help but notice the uneasiness with which some of these characteristics blend with business approaches and thinking. They seem "utterly incommensurable" (Martin 2009a:6). However, Martin (2009a:6) argues that a reconciliation between analysis and intuition is necessary, as neither "alone is enough". This also refers to the balance between design and business (Martin 2009a). For example, Martin (2009a:6), suggests a balance between analytical and intuitive thinking, as well as a balance between "exploitation" and "exploration" (Martin 2009a:18), which further supports analytical and intuitive thinking respectively. Martin (2009a:6) calls this reconciliation or balance, *design thinking*.

4.1.3.2 Integrative thinking

Design thinking is the "capacity … for integrative thinking" (Brown 2009a:85). Design thinking is holistic (Owen 2006a:4) and integrative (Collopy 2009a). Integrative thinkers do not rely on systematic[23] processes alone, but have the capacity to see all of the important aspects of a problem and create unconventional solutions by integrating these aspects into one coherent solution (Brown 2008a; Martin 2008:5). Integrative thinking is the capacity not only to consider any one possible solution, but to find the best of two seemingly contradictory solutions, combining these solutions and creating a better, synthesised whole (Martin 2009a:165; Martin & Riel 2011:6). The ability to hold two opposing ideas in productive tension, whilst thinking your way through to a new and better idea, is known as the "opposable mind" (Martin 2008:6). Martin (2008:6) is of the opinion that we are all born with an "opposable mind", and that we can improve this ability through continuous effort. Both Brown (2009a:8) and Martin (2004:19) are firm believers in knowledge created through doing by means of continuous effort.

Martin (2009:165-166) contends that design thinking – practiced by good designers – has something to offer managers, and will enable them to create entirely novel ideas, rather than merely choosing between alternatives. The goal of integrative thinking is to "create more value

[23] Thus, one can argue that a systematic process creates "either or" scenarios, which is coupled with more logical reasoning and thinking approaches.

than is created by simply choosing or compromising" (Riel & Martin 2012:7) which results in a solution "superior to either opposing idea" (Martin 2008:5; 2009a:165). This results in taking the best part of one solution and combining it with the best part of another contradictory solution, and creating a better whole. Integrative thinking is thus the exchange between analysis and synthesis – taking problems apart and fusing ideas together. Synthesis is often the most difficult part, as integrative thinkers are trying to put ideas together that are most often contradictory and in conflict (Brown 2008b; Berger 2010). Integrative thinkers have the ability to express the true potential of an idea, as well as highlight what is actually possible (Martin & Riel 2011:8). Consequently, one of the key values that can be identified within the domain of integrative thinking is the origination of these possibilities. The assumption that can be made is that through integrative thinking and its potential to create a better whole, anything is possible. Integrative thinking links directly to Owen's (2005a:14; 2006a:5; 2006b:25) characteristic, the "facility for avoiding the necessity of choice". Therefore, the value of integrative thinking (Brown 2008a; Martin 2008:5; Martin 2009a:165, Martin & Riel 2011:6) or "avoiding the necessity of choice" (Owen 2005a:14; 2006a:5; 2006b:25) lies in creating the best possible solution by merging two opposing ideas together into one coherent and better solution.

4.1.3.3 Optimism

"Being a designer means being an optimist" (Manzini 2009:4). Design thinkers are of the opinion that even with the most challenging constraints and problems, at least one possible solution will be better than any of the existing ones (Brown 2008a; IDEO 2012:11). Hornby (2010:1033) defines optimism as the belief that good things will happen and that something will be a success. Optimism is the "unshakable belief that things could be better than they are" (Brown 2009a:76). Optimism, from these accounts seems to imply a sense of confidence or assurance that something will work out for the better, and that improvement will inevitably take place. Kelley and Kelley (2013:18) share this view and claim that a creative mindset is what enables us to look beyond what already exists. "Creative confidence is an … optimistic way of looking at what is possible" (Kelley & Kelley 2013:18). Brown (2009a:77) further contends that "optimism requires confidence".

Optimism, as identified by Brown (2009a:76-77) relates directly to Owen's (2005a:13; 2006a:4; 2006b:24) idea of "tempered optimism", and how designers are educated and encouraged to use this in combination with proaction as a way of working. Thus, the value of optimism in design thinking is embedded in the belief or confidence to pursue solutions proactively.

Furthermore, a link between integrative thinking and optimism appears to happen quite naturally; the former creates possibilities by merging ideas together into better possibilities, whilst the latter creates the belief and confidence to pursue these possibilities. As a result, being optimistic and having the confidence to employ integrative thinking proactively, could well have a massive impact on problems in desperate need of better solutions.

4.1.3.4 Experimentalism

Ground-breaking innovation is not grounded in gradual improvements, but relies on the ability to explore constraints and ask questions that will allow a solution to take a whole different direction – and this is where experimentalism is key (Brown 2008a). Experimentation is the "permission to fail" and to learn from mistakes, in order to create something better than before (IDEO 2012:11). What seems to be implied here is that experimentalism (experimentation) creates an opportunity for *new* solutions to take shape and create real value. Experimentation is the "exploration" of novel ideas (Kelley & Kelley 2013:23). Design's purpose is to create something that has "never existed before" (Johansson & Woodilla 2008:12). Thus, research in design needs to be experimental rather than "descriptive" (Johansson & Woodilla 2008:12).

Experimentation further imbues a sense of curiosity, which results in the need to explore, to learn more and to create solutions that did not exist before. Brown (2009a:76) states this point clearly:

> The obvious counterpart to an attitude of experimentation is a climate of optimism. Sometimes the state of the world makes this difficult to sustain, but the fact remains that curiosity does not thrive in organisations that have grown cynical. Ideas are smothered before they have a chance to come to life.

This notion creates a clear link between experimentation and optimism in design thinking. Furthermore, without optimism the determination to experiment will eventually disappear (Brown 2009a:76). The value inherent in experimentation is thus linked to the value created through working optimistically towards better solutions.

4.1.3.5 Collaboration

Brown (2008a) is of the opinion that the growing complexity of products, services and experiences, is forcing the lone creator to make way for the "enthusiastic interdisciplinary collaborator". Brown (2008a) further contends that the best design thinkers do not only work with individuals from other disciplines, but they are often knowledgeable and well versed in more than one discipline. Design teams that work in this way have a much better chance of

creating novel ideas, because the different team members approach the problem from different points of view (IDEO [sa]a:13; 2012:11).

The core value of collaboration is through the implementation of interdisciplinary teams to ensure that many different points of view are considered for possible solutions or improved future results. Brown (2008a) suggests an interdisciplinary approach to teamwork, which consists of individuals from various disciplines and backgrounds, and are fluent in more than one discipline. However, Beckman and Barry (2007:52) suggest an interesting and somewhat different approach to selecting innovation teams, which is embedded in what they call "learning styles". Beckman and Barry (2007:48) propose that putting together innovation teams requires choosing individuals from different backgrounds, as well as different personality types, which results in different "communication styles" or "languages". However, "cross-disciplinary" teams, which should consist of an "appropriate balance" between the various learning styles, should still employ this approach (Beckman & Barry 2007:48). Each learning style described by Beckman and Barry (2007:28-52), is linked to certain professions or certain types of professions, which is influenced by personality type, educational specialisation, career and so forth. For example, an "accommodating style" is most suited for creating solutions, and this learning style is often found in individuals that pursue careers in education, communication, nursing and so forth (Beckman & Barry 2007:44). Therefore, because individuals who display certain learning styles often gravitate towards certain (types of) professions, setting up an innovation team with this approach can prove quite helpful. This can perhaps deepen the diversity of the interdisciplinary team, by not merely choosing individuals from various disciplines, but across various learning styles and personality types as well.

Furthermore, it is important to note Brown's (2008a) use of the word "interdisciplinary", instead of multidisciplinary. The latter is simply the collaboration or working together of individuals from various disciplines, where each individual is knowledgeable in only one discipline. Brown (2008a) suggests an interdisciplinary approach to teamwork, which consists of individuals from various disciplines and backgrounds that are fluent in *more than one* discipline. Therefore, interdisciplinary implies better collaboration, since any individual skilled in more than one discipline is more valuable, because the input they can provide is much more diverse when combined with the knowledge of other such individuals. Furthermore, in an interdisciplinary team there is "collective ownership of ideas" for which everyone in the team takes responsibility (Brown 2009a:28). It is becoming more obvious that a shift towards collaborative ways of solving problems is a necessity (Pourdehnad *et al* 2011:2), that diverse perspectives and teamwork are crucial (Fast Company Staff 2006),

because the problems we are facing today are too complex to solve on an individual level (Van Zyl 2008:[sp]). This again highlights the importance of the "T-shaped" thinker (Brown 2009a:27; Moggridge in Walters 2011a). "T-shaped" thinkers possess a "depth of skill" that allows them to contribute to any outcome in a "tangible" way, as well as the ability to work across different disciplines (Brown 2009a:27).

Collaboration or teamwork is necessary to "achieve innovation at scale" (Kelley & Kelley 2013:175). Furthermore, the right combination of people within a team, from "leadership" to "grassroots activism" is utterly important (Kelley & Kelley 2013:175). Thus, the value of teamwork is embedded in combining different points of view, different skill-sets, different levels of expertise and different experiences into solving problems more holistically. Therefore, taking a teamwork approach relies on considering many different aspects of a problem before finally settling on a solution.

Teamwork in design thinking further implies that better solutions are created when five people contribute to a problem for one day, rather than one person attempting to solve the same problem for five days (Fast Company Staff 2006). However, contradictory to this belief is that teams have been reported to produce fewer and less creative solutions than when "individual responses were randomly combined into groups" (Goldschmidt & Badke-Schaub 2010:202). However, in practice, the value of teamwork (brainstorming in groups) is not limited to the amount or quality of ideas, but also relies on the distribution of knowledge and social bonding, as demonstrated by a study done at IDEO by Robert Sutton and Andrew Hargadon (1996:699-700). It also creates a knowledge base regarding products, which could possibly be used on other future products[24] (Sutton & Hargadon 1996:695-699). Furthermore, in a teamwork environment there are "benefits that go beyond idea generation and solution design" (Young2010:8), which includes unity and motivation amongst team members, as well as multiple interpretations of the same problem (Suri & Howard in 2006:248).

4.2 The merits and pitfalls of the characteristics of design thinking

This part of the chapter attempts to identify and discuss some of the potential merits and pitfalls of the characteristics of design thinking. These are discussed only to the extent of considering the characteristics identified by Owen (2005a:12-14; 2006a:3-5; 2006b:24-25)

[24] Sutton and Hargadon (1996:695) call this "supporting the organisational memory of design solutions". Knowledge or "memory" is "stored" in three ways; firstly, in the minds of individuals who participated in the brainstorming session, secondly, by means of prototypes developed during the sessions and kept for future reference, and thirdly, through ideas developed during these sessions, which are archived or even recorded on videotapes (Sutton & Hargadon 1996:699).

and Brown (2008a; 2009a:49-62, 71-77, 85-86), which covers both a theoretical overview and more practical approach, respectively.

4.2.1 Identifying the characteristics of design thinking

Since design thinking is such a widely misunderstood and ill-defined concept, it is necessary to identify and discuss some key characteristics within design thinking. This gives context to the methodology, as well as establishes a framework from which to start. Without a basic framework, it becomes somewhat demanding, if not impossible to understand where, when and how to apply design thinking. Moreover, characteristics help determine the true nature of design thinking (Owen 2006a:16, 18), because there is an overall uncertainty surrounding the nature and the value of design thinking (Dorst 2011:531). Furthermore, Hassi and Laakso (2011a:2) propose to characterise design thinking "in more detail" in order to establish a foundation for "determining its value". Thus, the identification and discussion around the characteristics start to paint a clearer picture around the true nature of design thinking.

Merely identifying some key characteristics will hopefully assist in understanding what to look for in design thinkers and design thinking, as well as assist in creating a method for determining whether a solution driven by design thinking is successful or not. Therefore, the merit in identifying these key characteristics lies in the establishment of a framework or starting point. The identification itself however, creates a pitfall at the same time. Since design thinking is such a flexible methodology, and there is no definite way of applying it to various problems, the characteristics of design thinking should perhaps be considered in a similar way. For example, not as a fixed or predetermined set of attributes, but rather as adaptable or flexible as the methodology itself. The characteristics should therefore be considered as an outline of sorts, as opposed to a defined set of attributes. Hassi and Laakso (2011a:5) further ascertain that characteristics should be seen as "suggestive rather than inclusive". Therefore, the pitfall lies in the possibility of considering these characteristics as fixed or predetermined – unable to adapt when necessary. Consequently, from this perspective design thinking may once again be considered as a fixed, one-fits-all methodology, which according to Kelley and Kelley (2013:21) is certainly not the case. Furthermore, considering the definition of design thinking as a "list of constituents" can be considered problematic, as such a list is never complete, can be "non-inclusive" and includes elements "at different levels of granularity" (Hassi & Laakso 2011a:6). Thus, highlighting the importance of considering these characteristics as an outline, or what Hassi and Laakso (2011a:6) refer to as a "framework [that] functions as a solid base for further development" in understanding design thinking as a concept.

When looking at the various characteristics, one cannot help but wonder to what extent a design thinker is fluent in each characteristic. For example, one individual could be well versed in all of the characteristics, but one. This would not necessarily revoke their status as design thinker, but may imply that one area of their skill-set needs practice or improvement. Design thinking as a "learning by doing" (Kelley & Kelley 2013:25) methodology makes this possible, as skills development is encouraged in an environment that allows for experience to enhance one's abilities. As a design thinker and design practitioner, Brown (2009a:8) is a firm believer in knowledge created through doing, and he identifies his own "principles and practices that make for great design thinking". It would seem obvious that if a solution is somewhat unsuccessful, some characteristic(s) of design thinking may be missing. This however, would not be easy to prove, but could be an interesting place to start. This perhaps highlights the importance of a characteristic such as collaboration, since the lack of one characteristic in any one individual can easily be filled by the presence of that specific characteristic in any other individual. This again emphasises design thinking's flexibility, and how it can and should adapt to a specific context or problem. Furthermore, it perhaps highlights the merit in IDEO's ([sa]a) view on design thinking through the HCD toolkit. The HCD toolkit (IDEO [sa]a) focuses on the idea that each situation or context draws upon different characteristics if and when necessary. Thus, not all of the characteristics will necessarily be present in any given design situation.

Furthermore, another merit in identifying and detailing the characteristics of design thinking, is encapsulated in a proposed synthesis[25] between the different characteristics. It appears necessary to consider all of the characteristics simultaneously, as opposed to looking at any of these in isolation. Hassi and Laakso (2011a:6) grapple with a similar idea and propose that "elements should not be considered as separate or mutually exclusive units, but rather as partly overlapping depictions of central attributes" associated with design thinking. The advantages or disadvantages of the characteristics should thus not be discussed individually, but rather be included in an overall discussion regarding the value and values of design thinking. This structure demonstrates how design thinking can be regarded as a "bundle of certain elements that are interlinked and manifested through practices, thinking and mentality" (Hassi & Laakso 2011a:6).

[25] What is meant here is not necessarily to put all of the characteristics together in one single characteristic, but rather to combine and consider certain characteristics together in any discussion. These characteristics are not necessarily combined to encapsulate more information or data, but are rather directed towards creating more value through the combination of each characteristic's core essence. This is merely a proposed method of inquiry in an attempt to illuminate and understand the unique value and values created through these so-called characteristics of design thinking.

As mentioned, some of the characteristics appear more valuable when considered in combination with other characteristics. For example, optimism in design thinking is an important characteristic employed to pursue new possibilities through integrative thinking. However, it is integrative thinking that appears to give direction and purpose to optimism. Optimism as a characteristic may be valuable in itself, but the suggestion is that it can be even more valuable when directed with purpose and intent. Another example is collaboration. Collaboration is perhaps more valuable as a characteristic when combined with something such as, Owen's (2005a:14; 2006a:4; 2006b:24) "view of the generalist". For example, as much as individuals need to extend themselves across disciplines, it is more valuable if more than one of these individuals collaborate together in order to find better solutions. This is where Brown's (2008a) emphasis on interdisciplinary teams can be highlighted. The best design thinkers do not only work with individuals from other disciplines, but are often knowledgeable and familiar with more than one discipline (Brown 2008a).

Moreover, another reason why a synthesis between characteristics could prove helpful is taken from design thinking itself. Cross (2011:27) argues that abductive reasoning is inherent to design, because it is strongly associated to synthesis, as opposed to analytical or evaluative activities found in other types of thinking. Thus, synthesis is the essence of abductive thinking and by extension, the essence of design thinking. In addition, many other aspects of design thinking rely heavily on synthesis; for example, integrative thinking relies greatly on a synthesis between two opposing ideas (Martin & Riel 2011:6), which is argued to create more value than either of the ideas in isolation (Martin 2008:5). It would therefore appear both logical and valuable to synthesise some of the characteristics, in order to create better ideas and better value.

On the contrary, one of the main pitfalls seems to arise from the various versions of design thinking, as these accounts focus on very different aspects of design thinking. Each version seems to acknowledge different aspects, and consequently, different characteristics needed to practice design thinking. This is evident in the contrast between Owen (2005a:12-14; 2006a:3-5; 2006b:24-25) and Brown's (2008a; 2009a:49-62, 71-77, 85-86) examples. The confusion that arises from these different versions is part of the reason why these versions could perhaps be more valuable in combination. Again, this synthesis is merely a suggestion and would thus only consider the aspects that truly add to the direction taken by design thinking. Design thinking is meant to encompass everything good about design practices, regardless of any

design field or discipline (Kimbell 2011:289). As a result, each version adds its own value[26] to design thinking, and by synthesising these versions (or parts of these versions) is perhaps a way of considering design thinking more holistically. Therefore, it remains important to explore design thinking from a theoretical and practical, as well as a historical perspective.

4.2.2 The language used to describe the characteristics of design thinking

The language and terminology used to define design thinking is often regarded as one of the biggest pitfalls, which may also result in some misunderstandings or misinterpretations of the characteristics that guide design thinking. Even though some of the characteristics appear to be specifically defined, there is still a lot of room left for interpretation. It is therefore of utmost importance to consider the linguistic aspects of the words and definitions used, as language in design and design thinking, is always an important consideration. "Language matters" and it often seems that we are underestimating the value of our ideas with the impetus behind the current choice of language (Pourdehnad *et al* 2011:6).

When one starts to look at the values that drive each characteristic, some overlap or repetition becomes apparent, which in itself can become somewhat unclear, especially when similar values underpin and support different terms. Therefore, it is necessary to understand each characteristic, not only from a definition point of view, but also from the value and values it adds to or subtracts from the notion of design thinking. These values are essentially driving the uniqueness of each characteristic, as well as its own importance in design thinking as a methodology.

4.2.3 Nominating additional aspects as characteristics

Identifying the different characteristics may reveal partly or even more comprehensively, what is referred to as the *nature* of design thinking. However, it reveals very little regarding the actual design thinking *process*. Dorst (2010:131) mentions that an explanation of design thinking and clarification around the term assists in understanding the "nature of design thinking". Owen (2006a:16; 18) further mentions the "nature of design thinking" and explains how it is different from other ways of thinking. As a result, Owen (2006a) introduces

[26] The first version considers aspects of thinking, knowing and doing that are unique to design praxis (Kimbell 2011:285). The second version gives a historical account of design and considers design thinking within this context, whilst also considering the political, social and economical contexts within which the designer (or design thinker) is working and intervening (Kimbell 2011:292). The last version considers the powerful influence design thinking can have on innovation within business, as well as establish design (and design thinking) within a business environment (Kimbell 2011:293-294).

characteristics that are a distinct part of design (and design thinking). Thus, most of the characteristics identified by Owen (2005a:12-14; 2006a:3-5; 2006b:24-25) and Brown (2008a; 2009a:49-62, 71-77, 85-86) partly attribute to an understanding of the *nature* of design thinking, but not the actual *process*. Apart from characteristics such as "experimentalism" and "collaboration" (Brown 2008a) or "teamwork" (Owen 2005a:14; 2006a:5; 2006b:24), very few of the characteristics seem to relate directly or indirectly to the actual design thinking process. Since design thinking is supported by a strong "set of tools, processes, roles and environments" (Collopy 2009a), it becomes necessary to clarify and understand it from different vantage points.

Therefore, this part of the chapter attempts to nominate additional aspects (or characteristics) within design thinking, which appear throughout and within other characteristics, but are not formally identified as such. However, the additional characteristics identified in this part of the chapter focuses more on design thinking as a *process*, and less on its nature. Thus, from this perspective additional characteristics are discussed in an attempt to illuminate the importance of design thinking as a process.

4.2.3.1 Constraints

Constraints is not specifically mentioned as a characteristic of design thinking, but it is important to emphasise its relevance as part of other characteristics; for example optimism and experimentalism as described by Brown (2008a; 2009a). Constraints bring challenge and exhilaration to the problem (Dunne & Martin 2006:513, 519; Martin 2004:9; Serrat 2010:4) and its objective view encourages risk when creating new ideas (Fast Company Staff 2006).

Designers have developed skills that allow for a way of thinking that does not fear constraints, but rather embraces constraints as opportunities to solve *wicked problems* (Dunne & Martin 2006:518). According to Dunne and Martin (2006:513), this is also true for exceptional business leaders – they are drawn to constrained environments in which they desire to accomplish the impossible. Nelson and Stolterman (2012:160) refer to "restrictions" that control the design problem. "[T]ime, material, resources, and … money" are listed as the most common (Nelson & Stolterman 2012:193). However, even under the most "restricted" circumstances, there is always a possibility of creating something with all the "qualities and attributes of excellence" (Nelson & Stolterman 2012:193).

Furthermore, Brown (2009a:17) suggests that design is impossible without constraints and that a true designer "has a willingness to embrace constraints". Brown (2009a:18) further argues that an enthusiasm towards constraints is a foundational step in the process of design thinking and establishes the framework in which the project will ultimately exist. Constraints in design thinking relies on the premise that what limits, also enables. Limiting circumstances therefore enable more creativity, not less (Kelley & Kelley 2013:127).

Even though constraints may not seem like a typical characteristic to define a process, its implication as part of the different phases of the process, makes it an important aspect to consider. Design thinking as a process is often described through various phases (Brown 2009a:16; Kelley & Kelley 2013:22-24) or as the movement between ideation and prototyping (Saffer 2005). Brown (2009a:16) identifies three phases in the design thinking process, namely; inspiration, ideation and implementation. Kelley and Kelly (2013:22-24) provide a slightly different version of these phases,[27] namely; inspiration,[28] synthesis, ideation[29] (and experimentation) and implementation.[30] At the start of the design thinking process (the inspiration phase), the brief itself consists of a number of cognitive constraints that assist in shaping the framework from which to start, setting in place guidelines to assess improvement and establish the objectives of the intended solution (Brown & Wyatt 2010:33). Thus, the brief (or constraints within the brief) serves as the starting point of the process. However, a brief should not be seen as a dictation of any sort, nor the actual solution to the problem, but rather as a space that allows for intuition and "serendipity" to enable great ideas (Brown & Wyatt 2010:33). Constraints and objectives can also change during the process (Razzouk & Shute 2012:341), which further emphasises the flexibility of design thinking as a process.

4.2.3.2 Prototyping

Johansson-Sköldberg and Woodilla (2013:43) are of the opinion that prototyping is one of the "most basic elements of design thinking". Moreover, Kelley and Kelley (2013:23) clearly links experimentation to prototyping. Thus, experimentation, by means of prototyping, is one of the characteristics that assists in understanding design thinking as a *process*. Prototypes are

[27] It is interesting to note that in the DT for Ed toolkit, IDEO (2012:15) offers yet another version of the different phases. These are identified as "discovery", "interpretation", "ideation", "experimentation" and "evolution" (IDEO 2012:15).
[28] The inspiration phase is used in relation to the problem, which inspires an opportunity to look for a possible solution (Brown 2009a:16).
[29] The ideation phase is the "process of generating, developing, and testing ideas" (Brown 2009a:16).
[30] Implementation is the last step of the process and relates to the actual production of any product or service and how it fits into the marketplace (Brown 2009a:16).

basic,[31] initial models of various ideas that are substantial enough for users to interact with (Kelley & Kelley 2013:23). A prototype is a "physical prop" that enhances one's imagination and is the "best evidence of experimentation" (Brown 2009a:87-88). Prototyping allows one to experiment with various ideas, before settling on one idea and investing in it too early (Kelley & Kelley 2013:23). During this process, ideas can be refined and evaluated until such time as one idea is considered the best or most suitable (Brown 2009a:89).

Furthermore, Paul Backett (2011) describes prototyping as a way to "think and make with your hands", which forms part of the iterative nature of the design thinking process. Prototypes[32] should be "fast", "disposable" and "focused" (Harrelson 2009), and used to test or communicate ideas in their development stage (Young 2010:10). In addition to the benefit of refining a product, prototyping can also illuminate issues early on in the process (Young 2010:19). For example, any unexpected effects can be dealt with in the appropriate way – either eliminated should this be negative or enhanced should it be positive (Young 2010:19). Prototyping also links to practicality, or what Owen (2005a:14; 2006a:5; 2006b:25) refers to as "self-governing practicality". In this context it refers to the appropriateness of solutions and the fact that these solutions depend on very specific contexts, hence the need for prototypes to test relevance and appropriateness.

4.2.3.3 Exploratory and iterative nature of design thinking as a process

Design thinking is not a linear process (Winchester 2011), but rather an exploratory and iterative process (Braha & Reich 2003:185). This suggests that solutions are improved until an "optimal solution is found" (Razzouk & Shute 2010:337). Thus, certain aspects of the process are repeated until such time as a satisfying result is reached. Furthermore, the action of repeating something (with minimal adjustments) to reach perfection, can be argued to link to the idea of *learning by doing* or *deliberate practice*.

"[D]eliberate practice" goes far beyond just hard work and is aimed at regularly developing one's own skills intentionally and with effort (Ericsson 2014; Ericsson *et al* 1993). This can

[31] Both Brown (2009a:89) and Kelley and Kelley (2013:23) use the term "quick and dirty" to explain how prototypes should be approached. This simply means that early prototypes should be very basic, and only through various stages of refinement and adjustment will these become less rough, more refined and hopefully final. Furthermore, prototypes do not have to be "physical objects", but can include services, software trials and so forth (Brown 2009a:88; Kelley & Kelley 2013:23).
[32] These can range from "low-fidelity prototypes" and are "rough and ready examples" produced with little consideration for durability, which test ideas (Young 2010:10-11). "[H]igh fidelity prototypes" are more functional and durable, and serve as "early test units" that are close representations of the intended final product and can be used to test production processes (Young 2010:11).

perhaps be associated with *frequent failures*. The notion of "frequent failures" is strongly related to design thinking as an iterative process (Berger 2010). Brown and Wyatt (2010:35) argue that failure through experimentation (early on) in the process "act as a source of learning" and is an essential requirement for creating solutions that have real-world value. Walters (2011a) supports this idea and claims that failures can be expressed as a way of learning and can prove to be a "useful exercise". Scott Belsky (2013:19-19) argues that smaller failures help to "course-correct along the way", and serve as an opportunity to learn from mistakes. The faster we move through various iterations, the quicker we learn and improve (Brown 2012b:19). Thus, by experimenting in this way, better solutions can often be found much quicker (Winchester 2010; 2011).

Furthermore, design thinking represents an approach that makes use of empathy and prototyping to find new insights when analytical processes and the gathering of data is not sufficient to solve the problem at hand (Kelley & Kelley 2013:25). The iterative nature of the process makes it predominantly exploratory (Brown 2009a:16), which allows the prototyping phase to happen quickly and sufficiently. Brown's (2009a:16) identification of the three phases (inspiration, ideation and implementation) in the design thinking process, provides a better understanding of the exploratory and iterative nature of the process. Brown (2009a:16) is of the opinion that these phases do not necessarily follow a linear path, but is rather iterative or organic in nature, which allows the design thinker to move freely between these phases, often back and forth, to solve problems and find solutions. This is similar to the "circular process" mentioned by Johansson-Sköldberg *et al* (2013:128). Grant Young (2010:9) further mentions a "non-linear and iterative" process in design thinking, which allows a project to be divided into smaller parts (or iterations) where sub-sections of the larger deliverable are clarified over a period of time. Buchanan (1992:15) continues this argument when he states the following:

> However, some critics were quick to point out two obvious points of weakness: one, the actual sequence of design thinking and decision making is not a simple linear process; and two, the problems addressed by designers do not, in actual practice, yield to any linear analysis and synthesis yet proposed.

This should not be seen as the problem it is made out to be, but rather as an opportunity to utilise design thinking's true potential. Since it is unlike any linear or systematic process, it has the ability to add value to solutions and solve problems in ways that have never been seen or experienced before. Thus, there is a need for analysis and synthesis to work together (Walters 2011a).

The different phases that Brown (2009a:16) and Kelley and Kelley (2013:22-24) identify are also important in this context. Kelley and Kelley (2013:21-22) argue that design thinking is

often an adaptation or variation of the different phases. Thus, the important thing to consider is not the amount of phases in the process, but rather that the different phases assist in explaining design thinking as an exploratory process. It again highlights the flexibility of the process. Furthermore, Owen (in Beckman & Barry 2007:27) describes similar "recognisable phases" in the design process, and argues that even though these phases are rarely applied in the same sequence, they often start with analytic[33] phases and end with synthetic phases. Owen (1998:11-12) suggests that the analytic and synthetic phases can function on both theoretical and practical levels, which allow the contributor to form an understanding from knowledge acquired through practice (or "action"). Once again, highlighting the importance of *learning by doing*.

As mentioned earlier, there may be merit in considering characteristics of design thinking simultaneously, as opposed to in isolation. The additional characteristics nominated, start to illustrate how integrated and interlinked these characteristics truly are. For example, prototyping cannot be explored successfully without consideration for the iterative and exploratory nature of the process. Furthermore, without constraints the most suitable prototype cannot be created or reviewed for a certain outcome. Peirce (in Hartshorne & Weiss 1932:153; in Martin 2009a:25) argues that it is impossible to prove any new idea upfront, and all new ideas can only be substantiated through the progression of future events. Jones (2009:79, emphasis added) further ascertains that one of the biggest challenges in the design process is owed to the designer's responsibility to "*predict* a future state", which cannot be explored in advance. Therefore, only by going back and forth through the different phases – by means of iteration and exploration – can a prototype be reviewed and consequently validated (or discarded). Peirce (in Martin 2009a:64) further ascertained that new ideas cannot take shape (or be substantiated) using "past data", neither inductively or deductively. Once again, the importance of abductive reasoning comes into play.

The identification and discussion of the characteristics in this chapter give a clearer sense of the positive and lasting impacts that design thinking can have on any future outcome. However, there has been continued debate around its actual value, values and effectiveness, and as a result, various criticisms have surfaced and continue to surface. These criticisms are an important consideration in understanding the issues surrounding design thinking, especially if the aim is to establish design thinking as an essential way forward in solving complex issues. Therefore, the next chapter serves as a basis for identifying and discussing the most common criticisms launched against design thinking.

[33] The analytical phases consist of searching for and understanding the problem (finding and discovery), whilst the synthetic phases consist of experimenting and inventing (making) (Owen 1998:11-15).

CHAPTER 5
AN INVESTIGATION INTO THE VARIOUS CRITICISMS AGAINST DESIGN THINKING

Design thinking as an approach is highly complex, both in its history and origins, as well as its structure. Thus, even though the history and origins of design thinking, as well as a discussion regarding its characteristics, start to paint a clearer picture of design thinking as an approach, it still remains a rather complex and elusive concept. Many of the misconceptions surrounding the term *design thinking* are causing confusion and misunderstanding. As a result, various criticisms have been initiated against design thinking as a methodology.

Even though many believe in design thinking's ability to drive innovation and reshape our world (Brown 2009a:3; Kimbell 2009a:2; 2011:285; Martin 2009a:6-7), there are some obvious areas of concern. One of the most widely recognised issues in the discourse on design thinking is the inability to explain and frame design thinking properly. Nussbaum (2011) argues that "[t]he construction and framing of design thinking itself has become a key issue". Cross (2011:29) has gone as far as describing design thinking as "ineffable". This, as Helen Walters (2011a) suggests, originates from the fact that there had been no unanimous decision on an actual definition for design thinking. Moreover, the term itself is confused and the "literature on which it is based is contradictory" (Kimbell 2009a:1). Van Zyl (2008:2) argues that even though design thinking as a design concept is widely understood, it is still in need of a coherent definition. Both a "shared understanding" and a "detailed description" of design thinking is necessary in order to determine the possibilities and value of design thinking (Hassi & Laakso 2011a:2). Hilary Collins (2013:36, emphasis added) further argues for a "need to develop a *common* understanding and language … for engaging in design thinking".

Despite its popularity and "being the subject of a vast number of articles and books", the definition of design thinking is unclear and success of the approach is just as vague (Hassi & Laakso 2011a:1). Hassi and Laakso (2011a:1; 2) suggest that more "empirical research on design thinking" is needed, in order to better understand the relationship between the various discourses, as well as to differentiate design thinking from non-design thinking approaches. Furthermore, Badke-Schaub *et al* (2010:39) suggest that better theoretical integration is needed owing to the fragmentation of empirical results, especially in relation to the long-established research history on design thinking. In addition, the more contemporary idea of design thinking is not based on empirical research and is often too general and ambitious (Badke-Schaub *et al* 2010:39).

As a result, this chapter attempts to identify the most common criticisms against design thinking, as well as the various reasons behind these criticisms. These criticisms are discussed only insofar as to illuminate and explain certain key concerns within design thinking in an attempt to identify areas of clarification and possible improvement. In many cases these criticisms often lead to an apparent necessity to consider alternative terminology or buzzwords, and these are discussed accordingly. Furthermore, this chapter attempts to highlight some of the important contributions of design thinking, and explain why design thinking should not be discarded too quickly.

5.1 Identifying the most common criticisms against design thinking and exploring the reasons behind the most common criticisms

First and foremost, the term design thinking is confusing and conflicting (Kimbell 2009a:1). Design thinking is articulated through different meanings, based on the different contexts within which it is applied (Johansson-Sköldberg *et al* 2013:121). Many claim that design thinking has the ability and strategic capacity to drive innovation and transform organisations and even our society (Brown 2009a:3; Kimbell 2009a:2; 2011:285; Martin 2009a:6-7). In addition, there is also the belief that design thinking presents ways of "designerly thinking" (Johansson-Sköldberg *et al* 2013:121) or "designerly ways of knowing" (Cross 1982:221; 1990:134; 2001:55; 2006:5; 2010:99). Herewith, Cross (2010:99) suggests that design thinking represents a form of intelligence that is different from other forms of intelligence. Thus, design thinking can be viewed as a unique way of approaching problems, since the way of thinking is unique.

Furthermore, there is a clear division[1] of the literature on design thinking into "two differing discourses" (Hassi & Laakso 2011a:2; 2011c:52, 54), namely a "design discourse" and a "management discourse" (Johansson & Woodilla in Hassi & Laakso 2011a:2). This notion – with some variation – is further supported by Kimbell (2011:285), Johansson *et al* (2011), Johansson-Sköldberg *et al* (2013:121), Johansson and Woodilla (in Johansson-Sköldberg *et al* 2013:122) and Badke-Schaub *et al* (2010:39). As a result, there is a lot of confusion, since many struggle to articulate when and where to apply design thinking, because of its expansion into newer areas. Some believe that the expansion creates an opportunity to have an influence beyond the traditional design profession (Dorst *et al* 2010:9), whilst others argue that these expansions are causing design thinking to lose its meaning (Cross 2010:99). Nevertheless, the important thing is that design thinking should only "encompass everything

[1] Please refer to Chapter Three for a more detailed discussion regarding the different versions or discourses in design thinking.

good about designerly practices", irrespective of the specific field or discipline within which it operates (Kimbell 2011:289).

In addition to the confusion surrounding the term, there are also issues around its sudden popular status, which is mostly linked to the so-called "management discourse", as identified earlier by Johansson and Woodilla (in Hassi & Laakso 2011a:2). Moreover, a substantial amount of "hype" surrounds the term, which "has not gone unnoticed in the academia" (Hassi & Laakso 2011a:1). Johansson and Woodilla (in Hassi & Laakso 2011a:1) specifically refer to the "hype" as problematic, because it seems to simplify the current state of design thinking. Cross (2010:99) grapples with a similar thought and claims that design thinking has "become such a common-place concept" that it risks losing its meaning. Furthermore, Kees Dorst (2011:531) claims that popular literature often combines "many disparate, vaguely creative activities" under the term *design thinking*. Sam Ford (2012) argues that in many ways design thinking has been "used in vain" and by trying to keep a "purist definition" it actually limits design thinking's ability to transform in the business world. Moreover, literature in the management discourse is in need of a "conceptualisation" and "operationalisation" to determine whether design thinking can be applied to scenarios outside the traditional design fields, as well as to determine the possible "benefits and limitations" thereof (Hassi & Laakso 2011a:2). A new common belief ascertains that design thinking includes many "forms of thinking and intelligence" (Cross 2010:99), which in itself is problematic. Cross (2010:99) is quite clear on this point:

> The current extension of concepts of design thinking beyond the core design disciplines (so that managers, medics and administrators might all be 'design thinkers') is an indicator of the undermining and weakening of the very concept of design thinking. At its *Business Week* worst, design thinking becomes merely another way of making a profit.

Apart from design thinking losing its meaning (Cross 2010:99), Badke-Schaub *et al* (2010:41) point out that management literature often proclaim design thinking to be a remedy for every business problem and that a successful outcome is always guaranteed. Johansson-Sköldberg *et al* (2013:121) further suggest that the significant amount of literature have sparked enthusiasm for design thinking as a universal cure for society. Furthermore, Fabricant (2010a) points to the "destructive misperception" that design thinking is a "magic elixir that can be sprinkled on anything".

Regardless of the merit in taking a design approach, the term *design thinking* has become so common that chances are it may become yet another "meaningless fashionable term without true business value" (Pourdehnad *et al* 2011:6). This as Nussbaum (2011) suggests, may be

owed to businesses turning design thinking into a "linear, gated, by-the-book methodology that delivered, at best, incremental change and innovation". As a result, many claim that design thinking does not work, mostly because they try to transform it into a "[s]tage-gate process" and do not know how to implement it (Winchester 2011).

The issue here is not that design thinking is regarded as a *methodology* or *process* that can facilitate change, but rather that design thinking is argued to guarantee a successful outcome every time. Moreover, the issue is that design thinking is often regarded as a general solution to problems that require very specific and contextual solutions. This is perhaps further highlighted in Brown's (2009a:37) suggestion that design thinking should form part of any company's fundamental ways of working. In this instance, Brown offers no specific guidance of how this can and should be done. Again, the issue here is not that design thinking can bring about change, but rather that the way to establish this change is somewhat unclear. Moreover, success cannot always be guaranteed, since there is no general way to apply design thinking and therefore no general way to establish design thinking into existing business frameworks. Thus, the confusion surrounding design thinking's value and values intensifies. However, contradictory to this, there is still the argument in favour of Brown's pragmatic approach to design thinking. This approach becomes more apparent in IDEO's ([sa]a:5) HCD toolkit as a way of offering "techniques, methods, tips, and worksheets" that serve as a *guide* to create and facilitate change. The techniques and methods described in the HCD toolkit can be adapted to best suit a specific context or situation and can also be combined with other existing organisational methods (IDEO [sa]a:5). Thus, even though Brown does not always explicitly articulate how to bring about change or how to implement design thinking into existing business frameworks, there is perhaps some merit in IDEO's pragmatic approach, which Brown clearly supports.

Consequently, Hassi and Laakso (2011a:2) propose[2] to characterise design thinking "in more detail" in order to establish a foundation for "determining its value to innovation and management". In addition, Hassi and Laakso (2011a:8) suggest that the management discourse builds on design research in order to gain a better understanding of design thinking, as well as the potential value it may hold for management. However, managers were looking for "tidy ways" to guarantee innovation success (Walters 2011b). Consequently, for design thinking to be appealing to the business world driven by processes, it was essentially stripped of the "mess", conflict, failure, emotions and iteration that form part of the creative process (Brown

[2] Hassi and Laakso (2011a:2) propose to do this via empirical research, but also through literature reviews and interviews conducted with "experts representing both the academic and practitioner view of design thinking".

in Nussbaum 2011; Collins 2013:36). Nevertheless, some companies embraced this "mess" with their process and true innovation inevitably took place (Brown in Nussbaum 2011; Collins 2013:36).

Apart from the division of the literature on design thinking, another issue that makes the term surprisingly confusing is the actual language used to describe the term. The words used to encapsulate the term *design thinking*, have sparked many debates. Pourdehnad *et al* (2011:6) ascertain that very little designing *or* thinking have gone into the term itself. The term design thinking at first glance appears to relate to "thinking" in design only. However, the term encapsulates much more than thinking and much more than the cognitive process instilled to facilitate thinking. Thus, one cannot help but reason that *doing* and *knowing* should also be included here. Thinking, doing and knowing are clearly included in the first version of design thinking, as identified by Kimbell (2011:285). Kimbell (2011:291-292) substantiates that this type of thinking, knowing and doing are different and unique to other kinds of thinking, knowing and doing. This is further ascertained by Cross's (1982:221; 1990:134; 2001:55; 2006:5; 2010:99) "designerly ways of knowing", which is based on the contention that design as a field of study is distinctly different from other fields of study. More specifically, Cross (1982) argues that the field of design is distinctly different from that of the sciences and the humanities. Thus, the assumption that can be made is that design thinking can add value to any specific outcome, since it is unique in its approach and ways of working.

Therefore, even upon a casual exploration, what design thinking is supposed to be is not well understood, neither by the public nor those who claim to practice it (Kimbell 2011:288). Anna Rylander (in Kimbell 2011:288) points out that it is "hard enough understanding design and thinking, let alone design thinking". Badke-Schaub *et al* (2010:39) support this idea and argue that it becomes increasingly difficult to explain a complex notion such as intelligence or a practice such as design. Thus, there is no surprise that those who support design thinking's application to business have trouble articulating what it is (Kimbell 2011:288-289). Consequently, the practice of design thinking by managers, who are not educated as traditional designers, is still to be explored and understood in design thinking literature (Terrey 2010:369). Thus, the emergence of literature regarding "design-led" businesses could well be the way forward (Terrey 2010:369). This suggests that design thinking and relating design methods are viable ways to view transformation in management discourse (Martin & Dunne 2006:512).

As highlighted, one of the key criticisms against design thinking is that it is often unclear as to when and how it should be applied. The uncertainty around "application levels" is partly to

blame for the "general confusion" surrounding the nature and the value of design thinking (Dorst 2011:531). This in turn results in the confusion of *who* should apply it as well, which is often just as vague. Therefore, the trouble arises from an uncertainty as to "whether all designers can do it, whether it is something new or just a different name for what good designers have always done, and why it may be a good thing that non-designers can learn it and do it too – or perhaps they do it already" (Kimbell 2011:289).

As a result, Collopy (2009b) warns against determining a framework of "what and how", as this may endanger a "movement aimed at expanding the kinds of thinking that managers, policy makers and citizens engage in". The alternative is to rather establish "an arsenal of methods and techniques" that can be applied to the various problems in these various practices (Collopy 2009b). Thus, these methods and techniques can be adapted to suit a specific context (Collopy 2009b). This is further highlighted in IDEO's ([sa]a:5) HCD toolkit, in which the toolkit serves as a *guide* that offers "techniques, methods, tips, and worksheets", which help facilitate change. Furthermore, the characteristics of design thinking also serve as an outline of sorts, as opposed to a fixed set of attributes, as discussed previously. It should be seen as "suggestive rather than inclusive" (Hassi & Laakso 2011a:5). What seems to be the biggest concern here, is that by determining a strict framework for applying design thinking, it may suppress design thinking's flexibility and adaptability to various different contexts. It also highlights the misconception that design thinking is a foolproof, analytical process that can be applied "as is" to any problem, without fail. Helen Walters (2011b) is clear when she claims, "[a] codified, repeatable, reusable practice contradicts the nature of innovation". Beckman and Barry (2007:28) further contend that the "codification" and formal structure of the innovation process over the past twenty years have left many companies struggling to innovate as they strive to solve more complex problems. Design thinking is not a one-fits-all methodology (Kelley & Kelley 2013:21) and needs to be applied to a relevant situation or context. Design thinking is methodical, but not "formulaic" (Sato 2009:42). It is not a "plug and play system you can simply install and roll out", but rather a flexible and nimble process (Walters 2011a). This seems to derive from *design* as a flexible process. Since the design process itself is often personal to the designer applying it, it should not be thought of as a single process we all follow in the same way (Chick & Micklethwaite 2011:18). Design thinking works in a similarly flexible way. Consequently, the actual appropriateness of design thinking and *when* it is applied becomes an important issue to address. Walters (2011b) articulates the issue here:

> The authors of *Designing for Growth* outline their own experiment in design thinking – as applied to the design of their book's cover. [It is] meant as a

> cute interlude, but it highlights a huge issue: a book cover is not a design thinking problem, [it is] a graphic design problem.

From this, it becomes clear that design thinking is often too loosely applied to any type of problem, which results in incremental improvements at best, and not the transformation on a societal level as it is intended to be. However, there is always merit in the incremental improvements that graphic design will inevitably have on existing products, but that is graphic design appropriately applied to a graphic design problem. The issue highlighted here is that when *design thinking* is applied inappropriately – to the wrong type of problem, for instance, to graphic design problems – the value that it is intended to create, will most likely never reach its full potential. Design thinking does not "negate nor replace" design in any way but is rather "a tool to be used appropriately" (Walters 2011a). There will always be a place for designers to continue the work that they have been doing for so long, "and thank heavens for those who are good at it" (Walters 2011b).

The notion of incremental changes brings forth another important consideration, which suggests that incremental changes through innovation should not be discarded too quickly. Papanek (in Jones 1977:91) argues that in order for us to sustain ourselves as a society, we should approach change one problem at a time. Chick and Micklethwaite (2011:55) state this point clearly:

> Rather than seeking to save the world in one fell swoop, designers should recognise the cumulative impact of incremental changes. While baby-steps and micro-innovations may not fill the lofty ambitions of the most vocal advocates of design thinking, they may nonetheless be effective in bringing about change in less spectacular ways.

Chick and Micklethwaite (2011:55) continue this thought by highlighting the need for human-centered approaches that specifically aim to alter our attitudes and behaviours. Monique Sternin (in Brown & Wyatt 2010:32) argues that design thinking as a human-centered approach, enables solutions that are applicable to very distinct social circumstances and may not necessarily work outside of that particular context.[3] Once again, this suggests that incremental changes are also valid, but only insofar as they are relevant to the appropriate issue. Design thinking should therefore be applied to the relevant context; for example more complex, real-world problems and not to the so-called graphic design problems that require

[3] According to Beckman and Barry (2007:31), context functions on various different levels, for example, "physical and situational surroundings, language, character, culture, and history". These levels present a foundation for "meaning and significance attached to roles and behaviour" (Beckman & Barry 2007:31). It is important to note that the "context" which Beckman and Barry (2007:31) refer to, is specifically situated within "observation" as part of the innovation process, as well as the role context plays within the observation phase.

mere aesthetic or functional solutions; for example a new logo or book cover. Design thinking focuses on more than mere aesthetics (Kelley & Kelley 2013:25) and can move us into a world of "substance and structure" (Norman 2010). Furthermore, Buchanan (1992:18) claims that "the activities of design thinking are easily forgotten or are reduced to the kind of product that is finally produced". These products,[4] aesthetic as they may often be, do not answer the real questions (Hawkins 1977:114). According to Nussbaum (2011), one of the most important contributions of design thinking is its ability to move design away from "aesthetics" and consumerism, into a "wider social space of systems and society". Don Norman (2010) ascertains that design thinking forces businesses to view design in a different way. Thus, the addition of *thinking* assumes that "design is more than a pretty face" (Norman 2010). Nussbaum (2011) suggests that the development of human-centered design would not have been possible without design thinking.

This seems to open up yet another point of discussion, as knowing how to apply design thinking from one problem to the next is somewhat unclear and unnerving, since unique factors for each problem come into play. Some of the companies[5] that have successfully implemented design thinking "defined it according to their own terms, executing initiatives that were appropriate to their own internal cultures" (Walters 2011a). This appears to be in line with what Brown (2009a:37) suggests when he argues that design thinking needs to become part of a company's fundamental ways of working. This is further highlighted by IDEO's ([sa]a:5) HCD toolkit, but more specifically, the way in which the techniques and methods described in the toolkit can be combined with existing organisational methods.

Sam Ford (2012) further contends that design thinking should not be limited to a "narrow box", and that a "hybrid of this approach" has led many companies to develop their own (new) ways of thinking. However, this often leads to confusion, as many fail to reproduce these successes (Walters 2011a). Thus, design thinking should perhaps be seen as a "paradigm shift", as opposed to a fixed set of processes or methods that should be reproduced as is (Collins 2013:39). As a result, the flexibility of design thinking becomes key. The flexibility of design thinking can often appear unreliable, since there is no fixed way of solving one problem to the next. However, it is just this flexibility and adaptability that makes it applicable to a variety of complex problems, taken that it is in some way adapted to suit that specific problem. This again

[4] Hawkins (1977:114) specifically refers to overpriced products, such as Zandra Rhodes dresses and Hicks interiors.
[5] Walters (2011a) mentions Procter & Gamble and General Electric as examples. Martin (2008:7-8; 2009a:7) also mentions Procter & Gamble as a company that have successfully employed design thinking in their way of working. Ford (2012) uses the work of Carol Sanford and Grant McCracken as examples.

highlights what Nussbaum (2011; Collins 2013:36) refers to as the "mess" of the process, and companies that have embraced this "mess along with the process" have managed to really innovate. Design thinking is about "synthesising the messy, chaotic, confusing and often contradictory intellect of [different] experts" to address particularly complex problems (Walters 2011a). This highlights the importance of expanding the methods and techniques (Collopy 2009b), as well as the meanings and applications of design thinking. Buchanan (1992:16) argues that design problems are characterised as "wicked", since design has no specific "subject matter" of its own other than a designer's own perception thereof. Thus, the subject matter on which design is based has the potential to become "universal in scope", because design thinking may be applied to any area of human existence (Buchanan 1992:16). Thus, even though the methods, techniques, meanings and applications of design thinking need to expand, there appears to be a greater need for a universal understanding of design and design thinking.

It further substantiates design thinking's dependence on context and the need for design and design thinking to continually change. Thus, design thinking becomes a "significant factor in shaping human experience" (Buchanan 1992:8), because it is contingent on its own changing and expanding nature. Even though many criticise the recent expansions of design thinking into the management and business areas, this more popular account of design thinking has made it more accessible (or at the very least tried to do so) within a widening domain. It perhaps also facilitates a better understanding of design and design thinking in contemporary society, which has become a necessary consideration when attempting to apply it.

Apart from the more obvious issues of *when* and *how* to apply design thinking, there has also been very little indication of *who* exactly is responsible for design thinking and to what extent. With designers taking on more strategic roles and working together with business executives to ensure innovation success, it becomes somewhat unclear as to *who* is responsible for which part of the process. There is often no clarification on who needs to execute it or how it can be accomplished at scale (Walters 2011a). Clients are often under the impression that design thinkers — in their opinion, creative individuals — ought to partner with businesses to solve creative problems in the form of graphic design solutions (logos, brochures and so forth), instead of providing design solutions to businesses in the form of thinking and innovation. Conversely, creatives are generally under the impression that they should change the way people think and innovate in addition to merely providing graphic design solutions. Walters (2011b) further claims that it is of utmost importance to define the role each individual will take in the design thinking process in order to understand "who does what, when". "In popular culture, everyone might be a designer but in management …

everyone should be a design thinker" (Kimbell 2009a:2). Thus, each team member has a role and relationship to play, with some members in more senior or leadership roles than others (Cross 2011:92).

With the above in mind, there is also the inevitable issue around integrating design into existing business frameworks. For example, Walters (2011b) argues that "contrasting practices and systems of business and design continue to be a stumbling block to progress". It is at the "nexus" of design and business that the successful businesses of the future will continue to flourish (Walters 2011a). The segregation between design and business is often quite obvious in many organisations, and therefore the "two worlds" of design and business need to learn how to meet midway (Walters 2011a). Thus, Walters (2011a) suggests considering some important aspects upfront, for example; figuring out how to implement design thinking, finding ways to "motivate and engage" staff and setting up measurable outcomes to determine the "real value of … achievements".

Even though there is much work to be done in terms of integrating design thinking into existing business frameworks, some argue that both disciplines can learn from each other. For example, Badke-Schaub *et al* (2010:39) are of the opinion that the traditional design thinking approach has a broad history, however is fragmented and lacks proper integration. In addition, the more recent view on design thinking relies more on ambition and a generalised understanding of design thinking, without having a foundation in empirical research (Badke-Schaub *et al* 2010:39). Therefore, Badke-Schaub *et al* (2010:39) suggest that the different design thinking approaches could benefit from one another in various ways. Martin ([sa]) further ascertains that design and business need to make use of each other's unique abilities. Martin ([sa]) argues that a detachment exists because of an inability to understand the other field's way of working or thinking. Even though Martin writes from a strictly business and managerial background, he always strives to find a balance between design and business. For example, he suggests a balance between analytical and intuitive thinking (Martin 2009a:6, 165; [sa]). Martin (2009a:18, 165; [sa]) further argues for a balance between "exploitation" and "exploration", which further supports analytical and intuitive thinking respectively. Therefore, the assumption that can be made is that both design and business are equally important and neither can function alone in an attempt for future innovation success.

In addition, Lindberg *et al* (2010:245) also argue for a balance between certain aspects, for example; a balance between divergent and convergent thinking, as opposed to either functioning in isolation. Only by successfully balancing certain aspects can design thinking

ensure innovative and suitable solutions to specific contexts (Lindberg *et al* 2010:245). Furthermore, because the knowledge created through design thinking initiates from a "multi-perspective understanding" – by featuring both representational and rational perspectives – there is a better chance of creating solutions that can solve *wicked problems* (Lindberg *et al* 2010:245).

Thus, if senior people do not find a way to harmonise the way in which their teams work, design thinking will have very little influence (Walters 2011b). John Miziolek (2012) shares this thought and claims that if there is no leadership to establish the outline of design thinking in business, it will remain unfocused with little "follow-through". This responsibility rests on both design and business (Walters 2011b). Design should not "live in a bubble and designers need to bridge the divide between their world and business, not just lob ideas over the fence and hope for the best" (Walters 2011b). Thus, "it takes a particular type of person [to] span those two worlds" (Walters 2011b).

5.2 Moving away from design thinking and towards new concepts and buzzwords

The inconsistencies in application and articulation of design thinking have forced many writers, theorists and practitioners to disregard its importance and latch onto newer and perhaps less refined conceptual frameworks. However, this behaviour is causing even more confusion, as new conceptual frameworks are undoubtedly paired with more terminology and attempts at more definitions. Chick and Micklethwaite (2011:55) argue that newer terms can be confusing if they attempt to define the same thing. These new ways of thinking should not necessarily be discarded, as they may offer real value, but we should remain critical and sceptical about whether these terms actually offer anything *new* (Chick & Micklethwaite 2011:55). In order to establish a new definition, one has to articulate the areas that are included *and* excluded from that specific concept (Badke-Schaub *et al* 2010:39).

Kimbell (2009a) for example, articulates some of the key issues with the term design thinking, but tries to move away from it too quickly by introducing new terminology.[6] Kimbell's (2009a) primary reason for moving to new terminology is encouraged by the confusion surrounding the term itself. Nussbaum (2011) does the same by declaring the end of design thinking and introducing the notion of "creative intelligence (CQ)". It seems that

[6] Kimbell (2009a) introduces the terms "design-as-practice" and "designs-in-practice" in an attempt to progress the understanding of designers' work and value creation in our society. Kimbell (2009a) argues that design thinking is no longer useful to design narratives, and suggests discarding design thinking altogether.

even before design thinking is interrogated or thoroughly understood, substitute terms are hastily introduced. Without properly clarifying the current frameworks within design thinking, it is inevitable that these newer concepts risk treading the same path of contradiction and confusion. Even though new definitions (or attempts at definitions) may offer unique benefits, these are often exposed and subject to considerable amounts of criticism (Badke-Schaub *et al* 2010:39). Nonetheless, when new concepts are well-defined, they are often less ambiguous and can help facilitate communication and a shared understanding between various fields and disciplines (Badke-Schaub *et al* 2010:39). This further highlights the importance of defining design thinking, in order to establish a universal understanding thereof. Thus, the aspects that are excluded from concepts are as important as those that are included.

However, regardless of the uncertainty and discussions surrounding the term, it is quite clear that design thinking has recently moved into new areas other than the traditional design disciplines, for example strategy and service design (Hassi & Laakso 2011a:3; Kimbell 2009a). This creates an opportunity for designers to apply their influence in areas other than their traditional design profession (Dorst, Stewart, Staudinger, Paton & Dong 2010:9). In contrast, there is the feeling that these expansions are causing design thinking to lose its meaning and that designers need to take back design thinking meant to be practiced by "skilled, educated" designers (Cross 2010:99).

In addition to the introduction of new terminology, there is also scepticism about whether design thinking itself actually offers anything new. Don Norman (2010) claims that design thinking is nothing more than "good, old-fashioned creative thinking". Moreover, Collopy (2009b) suggests that design thinking is strongly related to systems thinking. Nelson and Stolterman (2012:61) further suggest that "outcomes of systemic thinking are mirrored in design thinking". Thus, the only way for design thinking to "have a lasting impact" is by learning from mistakes made on other related concepts (Collopy 2009b).

Furthermore, Bill Winchester (2011) also mentions "creative intelligence" in relation to design thinking. However, Winchester (2011) claims that even though he does not know much about creative intelligence as a "buzzword", there are a "few basic things that creative people possess" that have not been developed in other individuals. These "basic things" include a "broad curiosity of everything in the world", the ability to forge new solutions between seemingly "dissimilar things" and a "fundamental lack of fear" (Winchester 2011). This seems to suggest that creative individuals are endowed with unique skills that other non-

creative individuals do not possess. Winchester (2011) further implies that these skills are owed to an individual's creative intelligence. However, some of these skills are similar to some of the characteristics of design thinking identified earlier. For example, "curiosity" seems to link closely to a sense of optimism. Optimism in the creative process is of utmost importance and designers are encouraged to use optimism as a way of working (Owen 2005a:13; 2006a:4; 2006b:24). Optimism is strongly linked to proaction (Owen 2005a:13; 2006a:4; 2006b:24), as discussed earlier. On the other hand, curiosity is the need to be inquisitive about the world around us, and to act proactively in order to make the necessary changes. Furthermore, curiosity is a "strong desire" to comprehend something (Hornby 2010:358). In other words, curiosity is about showing an interest in the world by observing and attempting to understand that world. Thus, the assumption that can be made is that curiosity creates a better understanding of the world, which could lead to the creation of something that had not existed before. Consequently, there is a sense of "conditioned inventiveness" (Owen 2005a:12; 2006a:3; 2006b:24) embedded in curiosity.

Furthermore, creating new ideas from "dissimilar things" (Winchester 2011), seems to relate directly to what Brown (2009a:85) and Martin (2009a:165) refer to as integrative thinking, as well as Owen's (2005a:14; 2006a:5; 2006b:25) "facility for avoiding the necessity of choice". Therefore, from this perspective, one can perhaps argue that creative intelligence does not necessarily offer anything new or significantly different, but rather relies heavily on existing aspects or characteristics of design thinking. Creative intelligence is perhaps much more complex than Winchester's (2011) view thereof, however this study cannot go into more detail regarding creative intelligence. In spite thereof, Winchester (2011) clearly argues that if you want to implement design thinking or the next best thing, you have to understand the power of creativity and hire people that think differently, are fearless and like to play.

Furthermore, Winchester (2011) suggests that you can encourage these skills, "nurture it, coddle it". This again suggests a close relation to design thinking, by means of *learning by doing*. These types of skills can be acquired as "tacit knowledge", through experience rather than being specifically taught (Owen 2005a:14; 2006a:5; 2006b:25; Schön 2009:110). Cross (2011:140) suggests that even though we all have a "design ability" to some extent, some individuals will develop "higher levels" of this ability through training and development. Higher levels of accomplishment in many creative realms are therefore more achievable among all human beings (Shenk 2011:51). Carol Dweck (2006:7) seems to grapple with the same thought and claims that through a "growth mindset … a person's true potential is unknown (and unknowable) … impossible to foresee what can be accomplished with years of

passion, toil, and training". According to Kelley and Kelley (2013:31), Dweck has done extensive research on the subject and claims that despite our innate talent and even our intelligence quotient (IQ), we can develop our abilities through (intentional) effort and experience. As Dorst (2010:133) points out:

> … although many of the activities that designers do … are quite universal, and thus it would be inappropriate to claim them as exclusive to design or design thinking, some of these activities have been professionalised in the design disciplines in ways that could be valuable for other disciplines.

Design thinking starts with the skills and expertise that "designers have learned over many decades" (Brown 2009a:4). Design expertise is the result of a "dedicated application" to a specific field of interest that develops over time (Cross 2004:427-428). As a result, design thinking becomes a "simplified version" of explaining designers' abilities within design practice (Johansson-Sköldberg *et al* 2013:123). However, Brown (2008a) further suggests that design thinkers are not necessarily created only by design schools, but that many individuals outside the professional design field have a natural ability to practice design thinking, which can be developed through the right experience. This again suggests that creative intelligence is merely another term for what design thinking has ultimately become.

5.3 Why design thinking should not be discarded and discredited too quickly

Owing to its expansion into other areas, design thinking can be seen as an "exciting new paradigm" for dealing with issues in areas such as education, information technology and healthcare (Dorst *et al* 2010:9). "[G]eneral access to the ways of design thinking" can equip us with new ways of engaging in our contemporary world (Buchanan 2001c:38). By allowing others to understand the significance of design thinking, we also contribute to a better understanding of design that can serve others in the future in ways we cannot possibly anticipate (Buchanan 2001c:38-39). "[D]esign offers a way of thinking about the world that is significant for addressing many of the problems" we face in contemporary society (Buchanan 2001c:38).

As a result, one of the most important contributions of design thinking is that it moved design away from "aesthetics" and consumerism, into a "wider social space of systems and society" (Nussbaum 2011). Businesses were forced to view design in a unique way, because of design thinking (Norman 2010). According to Nussbaum (2011), the development of human-centered design would not have been possible without design thinking.[7] Design

[7] However, it is important to mention that the proposition of human-centered design existed even before the popular emergence of design thinking.

thinking created an opportunity for "the design community to be heard and valued in its approach", as well as for trained designers to have an influence on the world outside the traditional design professions (Dorst *et al* 2010:9).

The changing nature of design itself is perhaps also adding to the difficulty of defining *design thinking* as a concept. Buchanan (1992) emphasises the changing nature of design; from the arts and crafts towards a more general design thinking. Since design is contingent on a continually changing context, its definition will also continually change. This is also true for design thinking. Moreover, concepts will change owing to the changing nature of knowledge, as well as the addition of new knowledge (Badke-Schaub *et al* 2010:3). As a result, the addition of new knowledge creates both a need and an opportunity to solve problems in a different way. Within this context, one cannot help but highlight *wicked problems* in design thinking, since one of the most important additions of new knowledge is the way in which design thinking is utilised in order to solve wicked problems. Wicked problems are important, since design thinking is aimed at solving these more indefinite, ambiguous design problems (Lindberg *et al* 2010:246; Buchanan 1992:15; Collopy 2009a; Rittel & Webber 1973:159; Waloszek 2012). *Wicked problems* is closely associated with design thinking and perhaps one of the earliest identifiers of the types of problems faced in the design thinking process. Thus, it can be argued that wicked problems influenced the changing nature of design, into what we now know as design thinking. As a result, the approach to solving wicked problems further established the need to "define design's role in the world" (Kimbell 2011:292).

Since wicked problems are fundamentally indeterminate, there are "no definitive conditions or limits to design problems" (Buchanan 1992:15-16). As a result, "wicked problems are ill-defined", as well as unique in origin, nature and interpretation (Riel 2009c:94; Rittel & Webber 1973:160; 1984:136). Therefore, the identification of design strategies that could address wicked problems is of utmost importance to design thinking (Stewart 2011:516). The introduction and identification of wicked problems establish an obvious need for design to evolve to design thinking, with the latter being able to solve the more complex problems in contemporary society. Again, this highlights the importance of understanding and expanding the meanings and applications of design thinking, so that design thinking can become inclusive and appropriate to any area of human existence (Buchanan 1992:16).

The initial need for design thinking started to surface from a necessity not only to solve, but also to *define* these more complex, social issues. Beckman and Barry (2007:44) argue that innovation is not only about problem solving, but problem "finding" as well. The

identification and framing of the problem become as important as finding the right solution (Beckman & Barry 2007:44), since problems and solutions are "inseparable" (Lawson 2005:296). Therefore, dealing with wicked problems demands that one understands the "nature of the problem itself" (Riel 2009c:95). Thus, understanding the problem becomes primary, whilst solving it becomes secondary (Riel 2009c:95).

Rittel and Webber (1973:161-167; 1984:136-144) further established the importance of understanding complex problems by proposing ten characteristics that would help define and explain *wicked problems*. Some of the characteristics are as follow: there is no conclusive formulation of any problem, solutions are either good or bad (never true or false), there is no instantaneous method to test or validate a solution, every wicked problem can be the manifestation of another wicked problem, and every wicked problem is fundamentally unique (Rittel & Webber 1973:161-167; 1984:136-144). According to Nelson and Stolterman (2012:16), these characteristics do not describe a way to determine solutions to these problems, but are rather used to describe the actual nature of wicked problems. Furthermore, these characteristics are neither subject to uncomplicated methods, nor simple identification (Nelson & Stolterman 2012:16). If these are considered seriously, the wickedness of these types of problems can lead to what Nelson and Stolterman (2012:16) refer to as "paralysis". This paralysis is often ignored, since many believe that wicked problems can be made simpler, as well as paraphrased as tame problems (Nelson & Stolterman 2012:16). This however, intensifies the wickedness of the original problem and leads to even greater difficulties in attempting to solve such problems (Nelson & Stolterman 2012:16). This again highlights the importance of understanding the problem before one attempts to find a solution.

Moreover, it concludes that very few of our everyday circumstances – those that have any significance – can be described as anything other than *wicked problems* (Nelson & Stolterman 2012:17). For example, there can never be only one ultimate solution to these kinds of problems (Nelson & Stolterman 2012:17). As a result, there is not only one correct approach or methodology for solving such problems, and it is not possible to develop a single, thorough interpretation of these problems from the start (Nelson & Stolterman 2012:17). This further ascertains that "every wicked problem is essentially unique" (Rittel & Webber 1973:164; 1984:141), and therefore requires a unique methodology, process or approach to solve such problems. This in itself is an important discovery, since design thinking is not "formulaic" (Sato 2009:42), but rather a flexible and nimble process (Walters 2011a) that can and should adapt to any context or circumstance. Therefore, the idea that every wicked problem is unique (Rittel & Webber 1973:164; 1984:141), creates an

opportunity for design thinking to create real value. Design thinking in itself is a unique way of approaching problems, but more importantly, it is a flexible process that can and should be adapted to solve some of society's most complex problems. Consequently, the strategies developed to deal with wicked problems are unique in character and type, since it is "required for dealing with the complexity, ambiguity, and epistemological uniqueness" of such problems (Nelson & Stolterman 2012:17).

Thus, the problems are not necessarily wicked only because of their "higher degree[s] of complexity", but because it is a substantially *different kind* of problem (Conklin in Conklin *et al* 2007:3). Rittel and Webber's (1973:161-167; 1984:136-144) ten characteristics further support this notion. Once again, one has to draw attention to the unique contextual circumstances surrounding these problems, as outlined by Nelson and Stolterman (2012:16):

> These characteristics are the result of the limits and paradoxes of reason when applied to real-world situations in human affairs that are unique, contingent, unpredictable, and complex.

The unpredictability of these circumstances and the effects of these circumstances bring forth another important consideration. Our focus on problems – whether wicked or otherwise – as a reasonable explanation for wanting to act on humanity's behalf, "has limited our ability to frame change as an outcome of intention and purpose" (Nelson & Stolterman 2012:17). This "means that wise action, or wisdom, is starved of its potential" (Nelson in Nelson & Stolterman 2012:17). Thus, acting wisely becomes an important way to solve problems with intention and purpose. Nelson and Stolterman (2012:17) explain:

> Wisdom – specifically that which we call design wisdom – is a much richer concept than problem solving, because it shifts one's thoughts from focusing only on avoiding undesirable states, to focusing on intentional actions that lead to states of reality which are desirable and appropriate.

Thus, even if a design is clearly honourable and proves to originate from "the best of human potential", that design can often lead to unpredictable consequences over and above the more sought-after results (Nelson & Stolterman 2012:185). Often this results "out of not knowing enough about the complexity of the design context prior to designing, and not understanding enough about the dynamics of introducing a new set of relationships or variables into a complex environment" (Nelson & Stolterman 2012:185). This further highlights the importance of understanding and framing the problem, before attempting to find a solution. Dorst (2010:135) further supports this notion and claims that the framing of a problem is important, since design problems "are not stable, but changeable". Design problems are indeterminate and always susceptible to translation (Buchanan 1992:16; Dorst 2010:135). Thus, the reframing of problems will not only assist in finding novel ways to solve problems,

but will also assist in understanding which solutions are realistic and practical to achieve with the specific problem space (Dorst 2010:135). The reframing of a problem further assists in understanding the actual problem, as well as a productive way forward (Dorst 2010:135). As a result, the actual problem is often not the same as the initial problem explained by the client (Dorst 2010:135).

Since design thinking is unique as a problem-finding (problem-framing) *and* problem-solving approach, it can perhaps assist in anticipating some of these changes. Furthermore, the changing nature of design thinking supports this suggestion. Therefore, the assumption that can be made is that by acquiring the necessary knowledge in relation to problems can assist in solving such problems in the most desired way. However, some of these unintended consequences cannot be avoided by acquiring more knowledge or even more information (Nelson & Stolterman 2012:185). Therefore, ensuring that all outcomes are good is not always feasible, since it is impossible to obtain all the necessary knowledge for any such problem (Nelson & Stolterman 2012:185). Therefore, when adjustments are made to the "real world" decisions are made in the "absence of perfect knowledge", which will inevitably result in many unintended consequences (Nelson & Stolterman 2012:185). Moreover, Nelson and Stolterman (2012:185) contend that it is not possible to foresee or manage every consequence of a "design intervention" made in the context of a very specific environment. Furthermore, Peirce (in Martin 2009a:25) contends that it is impossible to prove any new idea or concept upfront. All new ideas can only be substantiated through the progression of future events (Peirce in Martin 2009a:25).

Furthermore, the notion of good and bad solutions is important in this context, not only in the consideration of wicked problems in design thinking, but as the premise on which design itself is based. As a result, good and bad solutions start to highlight the importance of responsibility in design thinking. Furthermore, responsibility is directly linked to intention, as well as ethics. Therefore, the next chapter discusses the role of ethics and responsibility in design thinking.

CHAPTER 6
EXPLORING THE ETHICS AND RESPONSIBILITIES THAT UNDERPIN DESIGN THINKING

From the points of discussion thus far, it has become clear that design thinking as an approach is unique, and that it offers unique ways of approaching issues in various contexts. In order to achieve this, design thinking requires a clear articulation and understanding, which further assists in determining its value and values, both as a methodology and process. Above all, it requires intention and purpose through responsible action. In other words, design thinking's future development depends, first and foremost, on a responsibility to both articulate and understand its true worth and potential. As a result, one has to consider the responsibilities and the ethics that underpin design thinking.

This chapter attempts to identify some key ethical considerations and responsibilities within design thinking. It is fairly difficult to explain either ethics or responsibilities as their own points of enquiry, without consideration for the other. Therefore, this chapter attempts to explore both aspects on an individual level, but not without a clear and deliberate consciousness of the other. Furthermore, this chapter not only explores the ethics and responsibilities of design thinking, but also the possible implications that solutions may have on our future society. These implications often touch on the subject of sustainability, not only from an environmentally friendly perspective, but in relation to sustainable solutions as well.

6.1 Ethics in design thinking

This part of the chapter attempts to explain ethics, as well as the impact and importance of ethics in any design thinking solution. *Ethics* commonly refers to the moral principles that determine or control an individual's behaviour (Hornby 2010:500). Moreover, *morals* can be used to describe the ideals that determine right and wrong behaviour, but more importantly, *good* behaviour (Hornby 2010:959). According to Cameron Tonkinwise (2004:[sp]), if ethics is a representation of "being just", then morality forms part of specific cultural and historical guidelines that determine such outcomes. Therefore, a "code of ethics" can also be called a morality (Tonkinwise 2004:[sp]). However, Tonkinwise (2004:[sp]) argues that morality is somewhat of a bad habit, because trying to teach children to be civilised, moral beings is not only a painful experience, but by having to do so in such a "mechanistic fashion" reveals how artificial our morality truly is. The existence of morality (or a "moral conduct") does not

mean the existence of ethics, as the former could be a "set of imitated character traits"[1] (Tonkinwise 2004:[sp]). Furthermore, Tonkinwise (2004:[sp]) argues that ethics or "being ethical" is what really matters and that moral behaviour could also be seen as unethical. Therefore, being ethical must only be a way of being and not the knowledge of such a way of being – it needs to be separate from our "conscious intentions" (Tonkinwise 2004:[sp]). If ethics is not something we can learn by occupying ourselves with honourable behaviour, then we are inevitably unsustainable[2] as a society (Tonkinwise 2004:[sp]). Therefore, by doing what is right is the only way of knowing it is right, because it is practiced without thinking about it[3] (Tonkinwise 2004:[sp]) and without learning such behaviour. This way of considering ethical behaviour, seems to link directly to the notion of *learning by doing*. Thus, only by doing or practicing can we truly learn and know how to behave ethically. C. West Churchman (1979:118) further suggests that ethics is not a "body of theory substantiated by facts", but rather a process of continuous discussion. In other words, it is a reasoning process in which all of humanity needs to participate (Churchman 1979:118).

The design community has always considered an "ethical dimension" in their work, which has sparked interest and debate at many design conferences (Johansson & Woodilla 2008:13). As a result, design has moved away from its focus on function towards a focus on "human consciousness" (Burrell & Morgan 1979:32-33). In other words, design has moved towards a "radical humanist paradigm" that includes aspects such as "subjectivism" and "radical change" (Burrell & Morgan 1979:32-33). Owing to the increasing awareness of how design has changed, as well as the evolving social and environmental challenges that design is addressing, designers themselves are also evolving (Chick & Micklethwaite 2011:6). Victor Papanek (1984:ix, 102) claims that design has become the "most powerful tool" in shaping our environments, our society and ourselves. This calls for greater moral and social responsibilities from designers, as well as a better "understanding of the people"[4] (Papanek 1984:ix). There is also an increased awareness of design's role in accomplishing sustainable development (Young 2010:13). Chick and Micklethwaite (2011:6; Thackara 2005:7) argue that designers are becoming more mindful about addressing design problems, especially in relation to their own actions. Being mindful requires someone to be conscious of his or her

[1] This assumes that people may deliberately behave the way they are supposed to behave, which nonetheless can lead to immoral outcomes (Tonkinwise 2004:[sp]).
[2] "It is unsustainable not because it is destroying nature, but because it has no nature" (Tonkinwise 2004:[sp]).
[3] According to Tonkinwise (2004:[sp]), Aristotle called this *akrasia* – the gap between morals and ethics or the gap between knowing what is right, but not doing what is right.
[4] The "understanding" that Papanek (1984:ix) mentions here, serves a dual purpose; not only does it refer to the designer's understanding of people, but also the awareness of the public regarding the design process.

responsibilities (Hornby 2010:940), but more importantly, it requires someone to act sensibly in order to make (good) judgements (Hornby 2010:1345). Thus, it requires an "ethical sensibility" on the part of the designer[5] (Findeli 2001:16). Consequently, the mindfulness (Chick & Micklethwaite 2011:6; Thackara 2005:7) mentioned, seems to imply a more sensible way of approaching these social and environmental issues, perhaps even a more responsible way of addressing such issues. Nelson and Stolterman (2012:191) expand on the idea of mindfulness and its significance in the way designers work:

> As a designer, measuring our own steps along the design path, this is what we are, in our more noble moments, striving to create — designs that emanate soul, that are part of something unbounded by time, place, and material. Consciously or unconsciously, we are in constant evaluative relationships with the designs making up our reality. The forms these types of discerning judgment take are not always obvious. Given the importance of this mindfulness, we will spend some time trying to understand how we connect appreciatively to the world, specifically the artificial world that we ourselves are responsible for having created.

Nelson and Stolterman (2012:191) use "soul" to describe the core of a "holistic, architectonic design". Therefore, the force that such a design encompasses through its beauty, morality and functionality often affects us on an emotional level (Nelson & Stolterman 2012:191). This perhaps further highlights our need to act sensibly, but also sensitively towards the world around us. Papanek (1984:39) argues that our sensitivity regarding "genuine" needs have expanded, and as designers we must provide solutions to "real human and social needs". Therefore, there is not only a need to address these social, environmental and political issues in a more responsible and appropriate way, but also a need to consider the impact or consequences of these changes. Chick and Micklethwaite (2011:23) are clear on this point:

> The design of 'futures' … has far-reaching consequences not only for our material world … but also for our mental life. The more ambitious the nature of the design outcome, the more responsibility we have to consider the implications of the change it might entail.

Thus, Ezio Manzini (2006:9) argues for a notion of "ethics of responsibility",[6] which means that for something to be considered "ethically relevant", one cannot merely consider the intentions behind any action, but the consequences and outcomes of that action as well. Jens Kabo and Caroline Baillie (2009:323, emphasis added) support this notion and argue that being "response-able means being aware of the consequences of different actions and trying to respond accordingly … to be *able to respond"*. Steven Heller (2003:x) further ascertains that each "designer must be professionally, culturally, and socially responsible for the impact"

[5] Alain Findeli (2001:16) believes that it is possible to develop and reinforce this skill through "some kind of basic design education".
[6] "Ethics of responsibility" was first introduced by Max Weber and later expanded on by Hans Jonas (Manzini 2006:9).

of their work on society or "citizenry". Therefore, each good "citizen" must understand the consequences and reactions of their actions, as well as understand that each of these actions has an influence on others (Heller 2003:x). Emily Campbell (2009:7) argues that *all* citizens have a responsibility to "re-awaken [their] own resourcefulness". Thus, all citizens (including non-professionals) can be resourceful, and they should not have to wait for "professional problem-solvers" to solve problems for them (Campbell 2009:7). In other words, *all* citizens have a responsibility to be inventive and independent (Campbell 2009:7). Thus, by expressing "certain ethical positions" design can exist in ethical ways, which will result in "sustained new ways of living" with bigger significance than mere attempts at reducing environmental impacts (Tonkinwise 2004:[sp]). Thus, if the purpose of design is to create something with a positive and enduring impact on our world – and we positively strive towards this purpose – then our development as human beings are consequently expanded and honoured (Nelson & Stolterman 2012:192).

An increasing number of debates surrounding the proposition of design have forced some to consider design outside of the mere professional or business spheres. Design is gradually being regarded as an attitude,[7] as much as a profession (Chick & Micklethwaite 2011:23). An attitude in this context considers the values and beliefs of any individual surrounding a certain issue, which prompts the individual to act and respond in certain ways (Chick & Micklethwaite 2011:23). Morals and ethics start to play a key role here, as most individuals' moral or ethical inclination will hopefully determine the type of work they consider, as well as how they would typically conduct such work. A designer's theoretical[8] judgement on a social and moral level must be considered even before he starts to design, to determine whether the products he is expected to design is worth his attention (Papanek 1984:55). The worthiness or "merit" of one's work determines whether a design will be socially good or not (Papanek 1984:55).

Morals and ethics do not only play a role on an individual level, but a collective level as well. For instance, consider a scenario in any design studio or business alike. If the head of the company shares similar ethical values to any individual, the assumption is that it would be easier for this individual to sustain their own morals and ethics. And consequently, the design outcome will be ethically considered, as well as supported and encouraged in an ethical or moral way (by both parties). For example, Dreyfuss (1955:24) argues that a designer will only

[7] This seems to link with Brown's (2008a) contention that any individual can be a design thinker, and that you do not necessarily have to be educated in a design school.
[8] Theoretical in this context seems to indicate the difficulty to make any other judgement, since the actual design project has not yet started. The suggestion here is to make a judgement based on previous experiences and the practical outcomes of such projects, which is perhaps the main source of influence to determine whether a project is worth considering. The designer's intuition, as a source of inquiry, perhaps starts to play a key role here.

jeopardise up to a point, but never compromise on "design principles he knows to be sound". In other words, an ethical or moral consideration implies that a designer is not willing to compromise on what he believes to be (morally) good. Manzini (2006:13) further contends that designers have a responsibility regarding society's collective wellbeing. By this, Manzini (2006:13) does not imply designers should force their opinions on others – whether good or bad – but rather that designers have the necessary tools to consider the quality of things, as well as the social and collective wellbeing they attempt to create.

Therefore, embracing design as an attitude gives designers the responsibility to consider what kind of designer they really hope to be (Chick & Micklethwaite 2011:24), as well as make designers more "conscientious" about addressing projects with real need (Hawkins 1977:114). However, the responsibilities of designers and design thinkers do not stop here. For example, there is not only a responsibility regarding which issues to address or how to address these issues. There is also a responsibility in knowing "which method to apply and when" (Pourdehnad *et al* 2011:6).

Furthermore, one can suggest that a designer's[9] ethical duty is not limited to any single project, but should be considered on a bigger scale. Understanding the bigger context is an important part of innovation practice (Young 2010:7). Papanek (1984:xix) argues that "we are all citizens of one global[10] village and we have an obligation to those in need". Thus, apart from the responsibility designers and design thinkers have in creating good and socially sound solutions, they also have the basic responsibility to get involved (Papanek 1984:56). By not acting on this responsibility designers actually waste their "responsible creative abilities" (Papanek 1984:56). Without responsibility, a designer's skills and talents will be "wasted on waste" (Glaser in Heller 2003:x). Therefore, the designer and design thinker's responsibility should be active and proactive, rather than passive. Designers cannot "afford to be passive anymore" (McCoy 2003:2). As discussed earlier, proaction is considered a valuable aspect of design thinking, which forms part of Owen's (2005a:13; 2006a:4; 2006b:24) characteristic, "tempered optimism".

Despite the seemingly obvious need to act responsibly and proactively, some theorists argue that many designers inconspicuously hesitate to consider all their work ethically. According

[9] In *Design for the real world*, Papanek (1984) specifically mentions designers as the holders of moral and ethical responsibilities and never actually mentions design thinkers. However, this study has indicated that design has changed into its next embodiment; design thinking. Therefore, the complexities that Papanek (1984) mentions are in line with what design thinking has now become.
[10] This "global" consideration is both "pressing and complex", as knowing how to bridge the divide between North and South will not be an easy task (Papanek 1984:xix).

to James Wang (2013:4), Aristotle's theories[11] appear to validate design activity by protecting the baffling reluctance of many designers to devote themselves to social ethics.[12] Wang (2013:4) explains the relevance of Aristotle as follows:

> According to Aristotle's theory of the practical intellect, makers – those who work with *technē* – are concerned only with the excellence of making, in contrast with doers – those who work prudentially to establish justice and who are very concerned about public values and social effects. The critics of design want designers to be doers, too; but because designers are essentially makers, transforming themselves into public servants is often difficult, if not impossible.

The reason for this is not as obvious as suggesting that designers "lack proper social conscience", but rather that the "social impact of their work resides more in the intellectual realm than in the moral one" (Wang 2013:4). Furthermore, Kabo and Baillie (2009:317) contend that even though design institutions acknowledge that this type of behaviour is necessary, it has not always been as imminent in practice. In other words, students seem to understand their ethical obligation to promote "social justice", but do not know how or when to take the necessary action (Kabo & Baillie 2009:322-323). As a result, creativity is somewhat impervious to thinking in a way that considers social effects, and the reason for this is unknown (Wang 2013:4).

In contrast to Wang (2013:4), Owen (2004:6-7; 2005a:5; 2005b:8) attaches a slightly different responsibility to the "makers" of society. Owen (2004:6-7; 2005a:5; 2005b:8) argues that "makers" are "responsible for the built environment in which we live and work". The "makers" demonstrate creativity through invention, and synthesise their knowledge into original patterns, compositions and ideas that express new possibilities (Owen 2004:6; 2005a:5; 2005b:8). In this instance, Owen seems to attach a certain responsibility to the *makers* of society, by implying that the *makers* are the ones who shape society. As a result, Owen (2004:6-7; 2005a:5; 2005b:8) seems to suggest that the *makers* can (and perhaps should) consider all their work responsibly (and ethically), because they shape the world we all live in. Katherine McCoy (2003:2) further supports this idea and claims that designers are the ones who "participate in shaping our … society". However, Wang (2013:13-14) further suggests that creating something "good" does not rely on the morals or values of the maker, and that an individual with questionable morals can also create something that is "good". Moreover, Nelson and Stolterman (2012:190) claim that designers need to fully engage in the "tension … between doing good or evil in our all too real world". Therefore, it is of utmost

[11] Design is "first and foremost a matter of working with formal causes, to transform them into final causes" (Wang 2013:4). Therefore, designers should never allow their activity to be hijacked by social activists or consumers (Wang 2013:4).
[12] This includes "social justice and environmental sustainability" (Wang 2013:4).

importance to create a "design culture to act as a crucible for this intense and demanding work" (Nelson & Stolterman 2012:190). The best possible outcome of design praxis is to create something for "the greater good" (Clark 2009:164). This again highlights the importance of acting and living responsibly in our ever-changing and complex world.

Another important phrase to consider is what Tim Brown and Barry Katz (2011:383) refer to as "collective altruism". Altruism refers to an individual's unselfish behaviour, or behaviour that focuses on the well-being of others at some cost to ourselves (Chick & Micklethwaite 2011:67; Jones 1977:92). In more recent years, many designers have become aware of their involvement in "consumerism" as a lot of their work is aimed at selling more products (Campbell 2009:5). Thus, one of the most important contributions of design thinking is that it moved design away from "aesthetics" and consumerism, into a "wider social space of systems and society" (Nussbaum 2011), which perhaps further highlights the need to work in an altruistic way. With altruism in mind, one cannot help but connect it to empathy and a sense of humanity, as the only way to work in an unselfish way is by considering the needs of others, and by taking responsibility to serve those needs. This altruistic behaviour is often driven by a new generation of designers and their need to commit to something other than the "corporate bottom line" (Chick & Micklethwaite 2011:67; Murlis 1977:54).

Furthermore, altruism is often associated with design for need or design for development (Chick & Micklethwaite 2011:67) and does not necessarily focus on issues only after the fact. Altruism serves as a safeguard of sorts, which is not merely responsive to already disastrous issues (Chick & Micklethwaite 2011:69). John Murlis (1977:54) supports this idea and claims that contributions to disaster relief are often inadequate, as they do not address real needs. The responsive approach mentioned here is often seen in disaster relief scenarios, where disaster relief organisations merely approach other organisations or individuals to fund such projects (Murlis 1977:54). However, altruism is about much more than funding or giving out charity to already disastrous situations. Therefore, it can be suggested that altruism is a proactive way of approaching social issues. Altruism should lead, rather than be led by changing circumstances (Chick & Micklethwaite 2011:69). The assumption that can be made is that altruism is an attitude or behaviour, as opposed to merely a funding strategy for commercial gain. It is obvious that funding plays a key role, as without funding many of these projects would not be viable or achievable. Nonetheless, the funding should not be used for a company's own commercial gain or for any other selfish means. Altruism by its very nature is unselfish and should thus only be approached in such a way.

6.2 Responsibilities in design thinking

Within design thinking, sustainability is inevitably one aspect that needs serious consideration. Not merely from an environmentally friendly perspective, but from a societal perspective as well. Young (2010:13) identifies four "facets" in relation to environmentally sustainable outcomes, namely; "eco-design" (efficiency of materials, recycling, durability and so forth), "design for purpose" (serving end-user's needs by designing the "right … stuff"), "design for behaviour" (aimed at changing human behaviours) and "systems design" (designing for the right context within a system).

In more recent years "eco-design and design for sustainability" in particular, have surfaced as important areas of exploration in design research and practice (Johansson & Woodilla 2008:13). "Eco-design" focuses more on managing the harmful impact of products on the environment by means of recyclable materials (Behrisch, Ramirez & Giurco 2011:1779; Young 2010:13), whilst "design for sustainability" focuses on revolutionary transformation across various social systems (Johansson & Woodilla 2008:13; Manzini 2009:12). Thus, the main difference between these two areas asserts that eco-design focuses on singular issues, whilst design for sustainability focuses on more complex (systemic) issues. In other words, the purpose of eco-design is based on the idea of creating products that are more efficient, durable and recyclable, thus the object and the design thereof becomes important. On the other hand, design for sustainability focuses on transformation across social systems. Thus, one can argue that design for sustainability attempts to solve more complex, *wicked problems*, which links closely to design thinking. This is an important differentiation, since these two areas serve very different purposes, and perhaps further highlights the difference between design and design thinking. However, this does not necessarily open up completely new ways of defining sustainable design, but rather serves as a reminder that all design has to be sustainable in order for it to be considered good (Chick & Micklethwaite 2011:116). In this instance, Chick and Micklethwaite (2011:116) clearly associates *good design* with sustainability. This serves as a reminder of how any design or design thinking outcome should be considered. Therefore, any design thinking outcome needs to be measured by its individual level of goodness, with sustainability as one important aspect that helps to determine the nature of the outcome.

As part of "environment-centered concern", Owen (2006a:3; 2006b:24) specifically highlights "sustainable design". However, this is only one aspect of sustainability itself. Sustainable design is often referred to as "green" design and focuses more on single issues such as,

materials (recyclable and recycled goods) or energy consumption, as well as the inevitable issue around cost (Chick & Micklethwaite 2011:27, 104). This is similar to what Behrisch *et al* (2011:1779) and Young (2010:13) refer to as "eco-design", which focuses on the use of recyclable materials. However, design thinking offers ways of serving the environment in ways other than merely choosing environmentally safe(r) substrates, which has been the case in the more common "green" or "eco-design" practices. Design thinking – which is more in line with design for sustainability, as opposed to sustainable design – by its very nature considers issues of sustainability (Chick & Micklethwaite 2011:6). The environment and our society are under immense pressure and merely choosing environmentally safe(r) substrates will not necessarily create the value or sustainability encouraged by design thinking, but will most likely result in mere incremental changes. Do not understand this incorrectly; it is of utmost importance to consider environmentally safe(r) substrates in the production of goods and services, where and when possible, as this will consequently reduce our carbon-footprint, hopefully to the extent that we will be able to sustain and inhabit this planet for many years to come. However, sustainable design, or rather, design for sustainability should not stop there. It is not within the scope of this study to go into more depth on the choice of substrate or the way forward for creating sustainable solutions, but the impact our society has on the environment should enjoy much more consideration.

As designers and businesses we should act more responsibly by finding better ways to move beyond these single-minded issues. Choosing environmentally safe(r) substrates is often seen as merely substituting one bad substrate for another equally harmful one. Chick and Micklethwaite (2011:91) argue that we often focus on sustainability issues in isolation and actually miss the bigger picture, for example, our lifestyles are what we seriously need to address. This is evident in Chick and Micklethwaite's (2011:91) example of substituting plastic bags with more robust fabric ones; the issue here is not the actual plastic, but rather our excessive consumption of resources and our inability to act and live responsibly. Tonkinwise (2004:[sp]) further argues that sustainability is somewhat hypocritical, because as consumers we are aware of and "actively concerned" with issues of sustainability, while still "shopping avidly". Whether we use plastic or fabric bags are beside the point, as we are still excessively consuming without thinking twice about changing our actual lifestyles. This often results in a false sense of achievement, since living a sustainable life is about much more than "saying no to plastic bags" if we are still flying to the Caribbean on vacation (Chick & Micklethwaite 2011:91).

Moreover, Tony Fry (2009:3) argues that "[n]ature alone cannot sustain us: we are too many, we have done too much ecological damage". Manzini (2006:13) grapples with a similar idea and argues that our planet will not be able to sustain the actual *weight* of six to eight billion people "approaching western standards of consumption". Today, only twenty per cent of the population consumes approximately eighty per cent of the planet's available resources (Manzini 2006:13). Therefore, if the eighty per cent is successful in reaching western standards of living and consumption, our society could possibly face large-scale environmental disasters (Manzini 2006:13). On the other hand, if the remaining eighty per cent is unsuccessful, we may well face social disasters, since eighty per cent of the population will remain passive onlookers "with no real chance of taking part [in our] highly interconnected and globalised society" (Manzini 2006:13). Thus, if we as designers and design thinkers do not attempt to sustain the environment, the environment will be unable to sustain us as a society.

In relation to design for sustainability, Chick and Micklethwaite (2011:91) discuss the nature and impact of our excessive consumption as a society. The excessive consumption and the issue of merely substituting one bad thing for another equally harmful one, creates the belief that any product or service is substitutable and consequently, disposable. Papanek (1984:87) raises a concern regarding the disposability of products,[13] especially the ease with which these products are being disposed of. Research conducted for the United Nations Environment Programme (UNEP) by McCann-Erickson Worldgroup in 2002, further supports this notion. In this instance, the youth is labelled as both "hedonists and idealists", as "[t]hey want to have it all: a sustainable planet *and* their favourite brands" (Timmins & Portalier 2002:10). They are "the 'use and throw' generation, but … they have dreams of a private and wonderful world" (Timmins & Portalier 2002:10). They are unaware of the consequences of their actions and even though they are incapable of changing the world, they still "want the world to change" (Timmins & Portalier 2002:10).

Papanek (1984:87) fears that this type of behaviour will inevitably lead to society considering everything as disposable, including our morals and values. "That which we throw away, we fail to value" (Papanek 1984:87). This perhaps starts to highlight the way in which design thinking is a reflection of our morals and ethics. Furthermore, it seems to imply that our responsibility as design thinkers is perhaps both dualistic and symbiotic in nature, because it

[13] Papanek (1984:87) specifically mentions the automobile industry during the 1980s and the ease with which people replaced their cars with newer models, therefore *disposing* of the older models. The risk in this behaviour lies in the continuation of this attitude into other areas, for instance in considering a product such as a car in such a way, will inevitably lead to other smaller objects to be considered the same; as "throwaway" items (Papanek 1984:87).

is contingent on our morals and ethics, and vice versa. It appears dualistic in nature, since it speaks to both the responsibility of considering products and services in a moral, ethical and valuable way, without losing our own morals, ethics and values. Furthermore, it lies in realising that these products and services and the way in which they are used, is a reflection of our own moral and ethical inclination. It appears symbiotic in nature, since the products or services we design rely heavily on our moral and ethical inclination, but the validity and responsibility of our morals and ethics rely greatly on the products or services we ultimately create, as well as the value we attach to these. In other words, if something is considered to be more sustainable (by being less disposable) we will inevitably attach more value to it. More importantly, because we have taken enough care in making it more sustainable (or less disposable), we have taken responsibility and thereby displayed the value of our own morals and ethics.

Moreover, Papanek (1984:87) argues that if we design products to be disposed of, we practice inadequate care in design. Tonkinwise (2004:[sp]) seems to grapple with the same thought and highlights the importance of design in ethics. According to Tonkinwise (2004:[sp]), ethics is mostly akin to "human-to-human" interactions, however the ethics of material things are also important. Society, or "the social" is represented by material things (Tonkinwise 2004:[sp]). Therefore, in order to preserve or transform society we also have to consider the ethics of things (Tonkinwise 2004:[sp]). "[E]thics by/in design is the only sustainable form of ethics, the only form of ethics that can sustain itself" (Tonkinwise 2004:[sp]). Albert Borgmann (1995:13-14) argues that the morals or ethics of material things are inherent in the magnitude to which these things cultivate the best in all of us. In other words, we "judge the quality of our material culture" by the things we design (Borgmann 1995:13). Therefore, the importance of the responsibility of designers and design thinkers are highlighted once again.

As a result, sustainable solutions play an important role in all design and design thinking solutions. What is important is the possibility of continuing the solution, even if the designer or design thinker is no longer involved in the process, thus creating awareness and developing the end-users' skills to use design for their own benefit (Chick & Micklethwaite 2011:149; Gomez 1977:41). This would mean that the intended end-user is encouraged to continue using the solution, as well as be empowered with the necessary tools or skills to be able to sustain the solution on their own.

The consideration for sustainable practice in business has also been well documented (Young 2010:12). Chad White and Emma Stewart (2008:5) further suggest that various risks and

opportunities will force businesses to stay "relevant and viable in domestic and global economies", since considering environmental and social impacts have become "more than a nice thing to do". Further research suggests that if organisations are not attentive to this "revolution" of sustainability, they will most likely "lose competitive advantage" (Hawken, Lovins & Lovins 1999:xiii). Regardless of the increased awareness, there is still much to be done in order for business activities to become sustainable (Young 2010:12) as our systems and consumption behaviours are often "physically, ethically and spiritually unsustainable" (Walker in Young 2010:12). Campbell (2009:2) further suggests that owing to the evolution of sustainable activities, design is often motivated by "commercial imperatives, personal reputation, functional economy and fine craftsmanship for its own sake than by social benefit". Katherine McCoy (2003:2) argues that owing to our changing world, our values have significantly deteriorated. Consequently, our work ethics have declined in order to support "self-interest, … corporate greed, and resentment between ethnic groups and economic classes" (McCoy 2003:2). This perhaps further highlights the importance of altruism in design thinking, as well as the need to commit to something other than the "corporate bottom line" (Chick & Micklethwaite 2011:67; Murlis 1977:54).

Carol Sanford (2011:xl-xli) argues that businesses have an obligation towards responsibility. This means firstly to commit to customers' need, secondly to staff members and partners, thirdly the environment and community, and lastly, the shareholders of the business (Sanford 2011:29). A rational way to make responsibility a key consideration within any business (or any department of that business) is achievable through aspects of empathy and creativity (Sanford 2011:58). Furthermore, a higher level of responsibility is possible through an understanding of one's own actions and how it can improve social systems (Sanford 2011:xl). Thus, what Sanford seems to imply is that it would appear rational – even obvious – to achieve responsibility through these aspects. Both empathy (Brown 2008a; Serrat 2010:2) and creativity (Owen 2005a:12; 2006a:3; 2006b:23-24) are important aspects or characteristics of design thinking. Thus, the suggestion is that responsibility and sustainability become possible through characteristics of design thinking. In other words, design thinking should only include what is good about design practices (Kimbell 2011:289) and good design should by its very nature be sustainable (Chick & Micklethwaite 2011:116).

However, being "good at design, or helping others to become good at design, does not assure that good design will be the outcome" (Nelson & Stolterman 2012:188). Design praxis and design theory are contingent on human intention, because as humans we are not limited to certain characteristics that ensure our intentions (or our designs) are good (Nelson &

Stolterman 2012:188). Steven Heller (2003:ix) argues that "'goodness' is subjective" and any individual can be a good designer without being a good citizen. Campbell (2009:2) supports this notion and argues that "good design … is not a guarantee of good citizenship". If good design adds value to society – in ways other than aesthetically or stylistically – then design and citizenship must be considered simultaneously (Heller 2003:ix). Thus, in order to "accept design as a legitimate and sensible human activity" – when evil is always incorporated into our daily lives – one has to accept the essence of design and prepare appropriately (Nelson & Stolterman 2012:188). This includes the determination to accept the most "uncertain, contradictory, dangerous, and promising summons" that design has to offer (Nelson & Stolterman 2012:188). This consequently highlights the responsibility to act with intention, determination and preparation.

With the idea of determination and preparation in mind, it brings forth other areas of concern. Consequently, the issue here is perhaps not only about acting responsibly, but rather understanding what this actually means. As with design thinking, one can perhaps argue that one of the issues around sustainability and responsibility is the misunderstanding around its application and meaning. For example, because design thinking is such a misunderstood and contradictory concept (Kimbell 2009a:1), many of the so-called design thinking solutions are often applied inappropriately. As a result, the supposed value it creates is misaligned or perhaps even misinterpreted. Thus, one can argue that the same contention applies here. Since many do not understand the real issues around sustainability and what it actually entails, it becomes somewhat demanding to act in a responsible way. Thus, the suggestion is to spend enough time explaining and understanding these terms, so that we can hopefully act in a more informed and intentional way. Therefore, by understanding, one can learn and finally act (do).

In addition to the above, Alphonso Gomez (1977:41) identifies a socially responsible role for designers in developing countries. According to Gomez (1977:41), this responsibility is enclosed in the education of professional designers, but also the participation of businesses involved in design practices. Papanek (1984:ix; xviii) argues that designers have a "social and moral responsibility" to design for people whose (basic) needs are not being met. When we consider these basic needs, one cannot help but turn to the third world. However, design for need is not only about serving the third world. Some serious issues that need as much attention as any other, include first world issues such as obesity, consumerism and immigration (Chick & Micklethwaite 2011:162). Therefore, it is more about empowering the people we are trying to serve by giving them the means to continue this change when we as designers are no longer involved in the process (Chick & Micklethwaite 2011:149; Gomez 1977:41). Therefore, it is

about harnessing awareness and developing skills to use design for their own benefit (Chick & Micklethwaite 2011:149; Gomez 1977:41). In this way design thinking can continue to act as a methodology for sustainable change.

Furthermore, Papanek (1984:67) identifies what he likes to call "minorities" in society, which often become the main target groups of designers when designing for need. However, after much deliberation, Papanek (1984:67-68) contends that as human beings we are all in some way part of a minority group at some stage in our lives. For example, at some stage in our lives we are all children in need of education, and as we become adolescent, middle-aged and older, we are still in need of various services; for example further education, medical services and so forth (Papanek 1984:67-68). Therefore, "we all belong to special need groups" and once these groups are joined together, we are indeed fulfilling the needs of the majority (Papanek 1984:68). Thus, seeing the whole, instead of the individual parts that make up society, becomes utterly important (Papanek 1984:68). It is in the identification of majority groups that Papanek (1984:68) proposes a possible solution in the form of "self-tithing". "Tithe" is a medieval[14] word used to describe a ten per cent sacrifice or offering that one makes to those in need. Papanek (1984:68-69) argues that designers should also give back ten per cent; not necessarily in the form of money or donations, but rather ten per cent of their "ideas and talents" to those in need. The structure of "self-tithing" is not important and can be "four hours out of every forty, one working day out of every ten, or ideally, every tenth year, to be spent as a sort of sabbatical, designing for many instead of designing for money" (Papanek 1984:69). Therefore, the responsibility lies in taking action, no matter whose lives we are trying to improve. Self-tithing (Papanek 1984:68) seems to link directly to the notion of altruism, as both rely on (self) sacrifice and consequently, unselfish behaviour.

Apart from the more obvious issues around responsibility, there are other less explicit issues as well. For example, Buchanan (2001b:6) argues that in the past, knowledge was often fragmented, and because of this fragmentation it became difficult to "know and understand the world" in a way that will enable people to "act knowledgeably and responsibly in practical life". As a result, design has become a "pathway" to "connect and integrate knowledge", which will determine valuable outcomes for social life, especially in more recent disciplines (Buchanan 2001b:7). Thus, as designers we have a duty to act responsibly in practical life by striving to really understand such (fragmented) knowledge (Buchanan 2001b:7). Martin (2009a:18-19) further contends that older ways of thinking will only strengthen current knowledge, and thus yield no more than incremental changes. Therefore,

[14] In medieval times the poor man was expected to set aside ten per cent of his crop, whilst the rich man often gave ten per cent of his income to feed those in need (Papanek 1984:68).

one can argue that by understanding knowledge, we should be able to approach knowledge in a different way. Thus, in order to approach knowledge and knowledge creation in a new way, we have to enable new ways of thinking, as well as new ways of approaching contemporary issues. This again highlights the importance of *understanding* issues of sustainability and responsibility, so that new solutions can bring forth intentional and sustainable change.

Furthermore, in order to achieve this, there is also the argument for a collective knowledge base. Johansson-Sköldberg *et al* (2013:121) suggest developing the different perspectives or "discourses" of design thinking in parallel, in order to provide useful links that can assist in establishing a collective knowledge base. Hassi and Laakso (2011a:8) also argue in favour of a "linked" approach, in order to "evaluate … validity" and strengthen the current understanding of design thinking. Consequently, by taking a linked or collective approach, a better understanding of design thinking is possible, and thus a better understanding of the responsibilities required to practice good design thinking.

6.3 Why ethics and responsibilities should play a key role in design thinking

Since design has shifted into a new "transformation" of "form and content", as opposed to the old theme of "form and function", the content we create as design thinkers becomes utterly important (Buchanan 2001c:35). Herewith, Buchanan (2001c:35) suggests that designers acknowledge the significance of the content they create, otherwise their work will have minimal consequences, or worse, be harmful to our complex[15] world. McCoy (2003:2) argues that owing to our "multicultural society", we are experiencing a meltdown of shared values, which need to create a sense of purpose to our society. Nelson and Stolterman (2012:212) suggest that "[n]ow, more than ever, there is a need for serious dialogue on design responsibility", because our world is radically changing the "foundations, structure, and dynamics of our social reality" as a whole.

Furthermore, there is a need to link "practice and ultimate purpose" in design, and this purpose can only be found in the values and intrinsic life of the people within any country (Buchanan 2001c:36). This again highlights the importance of people in the context of design thinking. Nelson and Stolterman (2012:2) argue that "the culture of inquiry and action that infuses design thinking is an essential part of the variety of human traditions of being in the world – of 'human being'". Buchanan (2001c:36-37) calls it the "first principles" of design – "the principles on which our work is ultimately grounded and justified". Furthermore, Nelson and Stolterman (2012:5) argue that the "foundations" of design can be regarded as similar to

[15] It is important to note that wicked problems influenced the changing nature of design.

the "first principles" of other practices, such as the sciences. Thus, these "first principles" can be regarded as the "foundations" or "fundamentals" on which design itself is based (Nelson & Stolterman 2012:5). Moreover, these principles define human dignity (Buchanan 2001c:37). Thus, by taking into consideration the importance of people, we can and should establish and substantiate our work. However, to do so in a good or positive way is not always possible.

For example, within a South African context, Robben Island is a typical "symbol of twentieth-century design gone mad", because it is not appropriately grounded in this "first principle" of human dignity (Buchanan 2001c:37). Another disturbing symbol of design is the Holocaust, which was "one of the most thoroughly designed experiences of the twentieth century, with careful attention to every obscene detail" (Buchanan 2001c:38). Walker (1989:33; 2009:46) calls it "social injustice" and claims that a substantial amount of design during the twentieth century was aimed at anti-social and anti-human ends. This brings to mind what Nelson and Stolterman (2012:183-190) refer to as "the evil of design",[16] and the way in which design is often trapped between different paradoxes. These paradoxes create a certain amount of tension, which cannot be avoided and is ultimately part of human existence (Nelson & Stolterman 2012:183). The most fascinating paradox of "good design" is the tension between being "magnificent and evil" (Nelson & Stolterman 2012:183). Nelson and Stolterman (2012:185) explain:

> Design is evil when that which is not desired nevertheless is made manifest because of design activity – whether by chance, necessity, or intention – and becomes part of the world. To a lesser degree, evil in design is something that disrupts balance, harmony, order, and other meaning-making qualities of human existence. … In every case, evil is not merely the absence of something desired but also the presence of something immensely unsettling and undesirable.

Consequently, "design is [and should be] fundamentally grounded in human dignity and human rights" (Buchanan 2001c:36). This may seem an easy statement to consider. However, Buchanan (2001c:37) claims that within design it has always been difficult to discuss the

[16] Nelson and Stolterman (2012:186-188) claim that "evil" fits into three different categories. The first category is "natural evil", which is a fundamental part "of the process of change" and also includes changes achieved through design (Nelson & Stolterman 2012:186). This kind of evil is inevitably part of life and through a "creative act, something new is brought into the world at the expense of the old – which is then destroyed" (Nelson & Stolterman 2012:186). The second category is "accidental evil", which "happens out of ignorance, carelessness, or inattention and is not the outcome of an intention to do harm" (Nelson & Stolterman 2012:187). The third category is that of "willful evil" (Nelson & Stolterman 2012:188). Within a design context, it includes power over others without consideration for any humanitarian outcomes, thus "acting on people's behalf without their contractual consent to do so" (Nelson & Stolterman 2012:188). Furthermore, it describes the "destruction of life, especially human life and life-giving essence" (Nelson & Stolterman 2012:188).

"ethical and political implications of design", as well as to have sound discussions around the true purpose and value of design. Despite the fact that the "splendour of a particular design is clearly apparent and bears witness to the best of human potential, that design often has aberrant effects, in addition to those desired and expected" (Nelson & Stolterman 2012:185). Alongside the advantages of the "[g]reater good" are unwanted and unforeseeable outcomes (Bauman 2009:168-169). Thus, to claim that "design is grounded in human dignity and human rights" is no small deed (Buchanan 2001c:37). However, despite the difficulty in addressing these issues and understanding the significance of human rights in design, this provides designers with the opportunity to explore moral and ethical issues from a *new* point of view (Buchanan 2001c:37). Human existence is a "whole" made up of many smaller parts, for example "poetics, rhetoric, … and ethics; because when humans act, they act as whole humans" (Bousbaci 2008:50). It is in this instance that human-centered design becomes utterly important. The main belief of design thinking is that human beings are at the core of our work (Buchanan 2001c:37). The magnitude of this meaning often goes to waste when we reduce human-centered design to issues of function or utility, and it is merely referred to as "user-centered design" (Buchanan 2001c:37). Utility is important, but it is when we move beyond ergonomics, sociology and so forth and towards "an affirmation of human dignity", that human-centered design is truly honoured (Buchanan 2001c:37). Design is not only an embellishment of society, but also a discipline that can forge value into reality through responsible action (Buchanan 2001c:38). Design is in everything; the way we communicate, plan, take action and the way we shape our daily lives (Buchanan 2001c:38). Furthermore, design is the way we make sense of our complex reality that forms the foundation of human culture and the way we express our values (Buchanan 2001c:38).

In *The Design Way*, Nelson and Stolterman (2012:2) attempt to explain how we can and should embark on deliberately understanding "the reality of the human condition", as well as the varying aspects within that reality; be it possibilities, complexities or profound challenges. This is done by means of explaining design and the role of design in our changing world (Nelson & Stolterman 2012:2). The "rapidly" changing world we live in – whether predictable or not, intentional or by chance – gives designers the opportunity to act with intention in order to create "desired change" (Nelson & Stolterman 2012:2). Acting with intention by means of design, "enables us to create conditions, systems, and artefacts that facilitate the unfolding of human potential" in a way that is more predictable (Nelson & Stolterman 2012:2). Furthermore, intention needs to be included as an "agent of change" if we want to establish design thinking as a long-lasting practice (Nelson & Stolterman 2012:19).

Within the context of desired or preferred change, one can further highlight the importance of obligation or ethical purpose through Herbert Simon (1996:111) and C. West Churchman (1979:82). Simon (1996:111, 114) argues that a designer has the ability to turn "existing situations into preferred ones" through the notion of "what ought to be". Churchman (in Nelson & Stolterman 2012:83) connects what "ought to be" with obligation and ethical purpose by means of integrity and social justice. Churchman (1979:82) further suggests that the world can be modelled by decisions, and that the "decision maker" is responsible for this change. Bauman (2009:168) agrees with this notion and argues that the contemporary "way of being" is fixated on the idea of change by dismissing "what 'merely is'" in an attempt to create "what could, and … ought, to be". This seems to clearly link the foundation of abductive thinking – what ought to be – with ethical purpose and responsibility. Thus, the assumption that can be made is that responsible action and ethical obligation can be facilitated by means of abductive thinking. Therefore, since abductive thinking is inherent to design (Cross 2011:27), design itself facilitates responsible and ethical behaviour – or at the very least attempts to do so. In other words, abductive thinking – "what ought to be" (Simon 1996:114; Churchman in Nelson & Stolterman 2012:83), what "may be" (Peirce in Cross 2011:27) or what "might be" (Martin 2009a:27) – creates a sense of possibility, which is achievable through intentional design or design thinking. Furthermore, this sense of possibility links directly to the idea of improved future outcomes, through what Peirce (in Hartshorne & Weiss 1932:79) calls *esse in futuro*, or the "future is potential". Thus, by acting intentionally, responsibly and ethically, design thinking can create desired or preferred change. However, this intent is not just about ethics and responsibility, but is a combination between various aspects. Consequently, Nelson and Stolterman (2012:106-107) argue that intentional action consists of a relative balance between aesthetics, ethics and purpose.

Nonetheless, the desire to create preferred change raises another important issue. Design and design thinking's ability to create "a new reality" (Nelson & Stolterman 2012:209) and the belief that it is not a "formulaic" process (Sato 2009:42), highlights the fact that the outcome of the process cannot be validated in advance. Furthermore, it also highlights the importance of context, as stated before. Peirce (in Hartshorne & Weiss 1932:153; in Martin 2009a:25) claims that it is impossible to prove any new idea upfront and that all new ideas can only be substantiated through the progression of future events. Nelson and Stolterman (2012:209) support this notion and claim that "no theories, methods, techniques, or tools … can calculate, predict, or envision the truly best future reality". Jones (2009:79, emphasis added) further claims that part of the difficulty in the design process is owed to the designer's obligation to "*predict* a future state", which cannot be explored in advance. In fact, it is "worthless" to

reason from a past to a future experience (Peirce in Hartshorne & Weiss 1932:426). Thus, it becomes somewhat demanding to determine the place of responsibility and ethics, if the outcome of the process is unknown until after the process is completed. However, Nelson and Stolterman (2012:209) clearly state that a designer's responsibility is inevitable and can be guaranteed only by establishing one's own design core. Heller (2003:x) further argues that a designer's responsibility and accountability relies on "some moral standard", which ensures good design, even if the client is immoral. Thus, validating or judging ideas upfront rely greatly on one's own core values and not only on universal knowledge (Nelson & Stolterman 2012:209). This suggests that even though designers cannot know the outcome of their own work in advance, they cannot avoid acting responsibly or ethically. Thus, one can perhaps argue that the bigger responsibility is inherent in understanding, building and relying on one's own morals and ethics in order to always act in such a way. This again highlights the importance of ethics and responsibility in design thinking.

In addition, the designer must be considered a "self-reflective individual" whose core character becomes visible only through his or her own "values, beliefs, sensibility, reason, ethics, and aesthetics" (Nelson & Stolterman 2012:209-210). Ethics determines the way in which our actions affect others, but focuses specifically on "right action" (Clark 2009:164). This can only be achieved by consistently testing one's own ideas and processes by means of self-reflection (Nelson & Stolterman 2012:210). Self-reflection is done through what Donald Schön (1983:49-50; 276-278; 1995:[sp]) refers to as "reflection-in-action" and "reflection-on-action". The former refers to the specific judgement or action of each part of the process without separating "knowing from doing" (Schön 1983:49-68; 2009:110). Thus, what we know is unveiled by our actions (Schön 1995:[sp]). The latter refers to any delayed judgement made towards the process, and focuses reflectively on the methods of our overall (design) actions (Schön 1983:276-278). "Reflection-in-action" is closely linked to "tacit knowledge" or *learning by doing*, since the patterns of our behaviours are implied in our own actions (Schön 1983:49, 54; 1995:[sp]).

Therefore, designers have to come to terms with design responsibility as a vital part of their character, even though it may be a stressful and demanding part of the process (Nelson & Stolterman 2012:210). However, Nelson and Stolterman (2012:210) suggest that by understanding the true *nature* of design one can understand one's own responsibility, and thus reduce the stress and pressure experienced. Furthermore, Nelson and Stolterman (2012:210) suggest that by doing so, one can enhance the joy experienced in the creative process, because there is an understanding and acceptance of one's own abilities and shortcomings. Owing to

this understanding and acceptance, there is an opportunity to validate and justify one's own work because it is based on more than mere habit or convention (Nussbaum 1997:293). Consequently, there is a feeling of accountability and ownership, which creates a better understanding of "good and … bad" (Nussbaum 1997:293). Thus, one can argue that through accountability and ownership there is a clear understanding of good and bad design. This highlights the importance of individual responsibility that cannot be neglected or ascertained by other external means, but only by focusing on one's own character (Nelson & Stolterman 2012:211). Milton Glaser (in Heller 2003:x) argues that the secret lies in asking questions whose answers will yield responsible decisions. This further highlights how responsibility is partly grounded in a better understanding of morals and ethics, which consequently builds a sense of trust in one's own morals and ethics in order to act in such a way. Furthermore, the designer's responsibility is about understanding what or who they are designing for, and whether it will be worth it on a moral and ethical level.

Designers have a responsibility, not only towards their clients, but also towards a "higher [social] authority", as well as the environment (Nelson & Stolterman 2012:211). A designer's commitment to responsibility is an opportunity to do good design, hopefully with fewer accidental or unfortunate consequences (Nelson & Stolterman 2012:211). By accepting responsibility as part of the design process, designers can learn to reduce these negative outcomes by means of further education, training and "ongoing self-reflection" (Nelson & Stolterman 2012:211). A better comprehension of design can be accomplished through a better understanding and reflection on our own responsibilities (Nelson & Stolterman 2012:211). However, the responsibility not only lies with the designer, but also with society, so that there is a shared responsibility of all design outcomes (Nelson & Stolterman 2012:212). In other words, *all* citizens have a responsibility to be "resourceful" and independent (Campbell 2009:7) in finding solutions to society's biggest concerns. This perhaps also highlights an obligation towards more socially responsible design education. Thus, even though each designer's individual contribution cannot be primarily responsible for the majority of changes brought forth in our society, these major changes are the consequence of many incremental contributions (Nelson & Stolterman 2012:212). Therefore, designers should acknowledge the "cumulative impact of incremental changes" (Chick & Micklethwaite 2011:55). As a result, each designer's role becomes utterly important in the world we all live in (Nelson & Stolterman 2012:212). This further highlights the importance of incremental changes. If the accumulation of many incremental changes (or contributions) is the cause of major concerns, then the contribution of many smaller improvements (positive changes) can bring forth major improvements (positive changes). If we intend to

sustain ourselves as a society, we should approach change one problem at a time (Papanek in Jones 1977:91).

Moreover, in order to understand responsibility and ethics, one has to consider the final motivation behind conducting such work. For example, Aristotle's notion of *eudaimonia* claims that the "final cause of being human" is happiness (Wang 2013:8). Jocelyne Le Boeuf (2006:7) grapples with the same thought and argues that the Greek origin of ethics can be defined as "a way to conduct ones [*sic*] life well in order to reach happiness". Furthermore, ethics can only be realistic in relation to one's search for happiness (Churchman 1979:119). Thus, happiness can never be dependent on pure functionality (Wang 2013:8). Wang (2013:8) clearly links happiness to design ethics:

> Happiness is the greatest human good that can be desired only for itself; therefore, happiness is the final cause of being human. This idea comes into play when we consider the place of ethics in design theory and practice.

Rittel and Webber (1973:155) further argue that "[t]here is nothing like the undisputable public good". However, the danger in considering happiness as the final cause of any design result is perhaps that each individual's definition of happiness is somewhat different. Thus, if one has to consider ethics only as a commitment to the "common good", it may well cause many debates on how to reach such a commitment (Le Boeuf 2006:7). According to Le Boeuf (2006:7), the philosophical notions that have defined ethics in more recent times have been more varied and often include outcomes such as self-indulgence and functionality. Thus, it becomes clear that ethics rely on one's own definition of happiness, as well as one's own perception of human beings and their place in the world (Le Boeuf 2006:7). Therefore, one can perhaps argue that each individual's perception of *good* is also different, and perhaps the reason why not all design can be considered *good*.

However, many proponents of the "[p]lanning … sciences" refuse to believe that "planning for betterment is impossible" (Rittel & Webber 1973:158). Churchman (1979:144, emphasis added) suggests that "if betterment is possible, it *should* take place". Rittel and Webber (1973:159) further claim that the "*outputs* of [our] actions" are determined in terms of value and if "what we are doing is the *right* thing to do". Moreover, the wicked problems approach declares a clear responsibility on the part of the "planner" or designer. For example, the tenth characteristic of wicked problems states that the "planner has no right to be wrong" (Rittel & Webber 1973:166-167; 1984:143-144). Rittel and Webber (1973:167; 1984:144) claim that one of the objectives of solving wicked problems is to "improve some characteristics of the world … people live" in. In other words, we are all responsible for our own actions, and

accountable for the results of such actions (Rittel & Webber 1973:167; 1984:144). Therefore, it again highlights the importance of understanding one's own ethical and moral responsibilities so that the intention of any outcome is to create happiness by creating something that is *good*. Consequently, it becomes clear that the design thinker's responsibility lies in considering all their work ethically, as well as the social effects that their work may have on any future outcome. The assumption that can be made is that by wanting to contribute to the social good, all design work has to be considered on a human-centered level, thus highlighting the importance of people once again.

Once again, one of the most important factors regarding ethics and responsibilities in design thinking, relies on our ability to articulate and understand what these terms actually entail. It has become clear that many of the aspects discussed rely on personal experience and individual responsibility. Thus, we are all responsible for our own actions and for the wellbeing of our planet, since we are all citizens of one global society. By understanding our own responsibilities, we can enhance the joy experienced in the creative process, because there is an understanding and acceptance of our own abilities and shortcomings (Nelson & Stolterman 2012:210). Dilnot (2009:189) suggests that a need for ethics is incorporated in the need to be more responsible. More importantly, the need for ethics is incorporated in a "search for *lessons*" on how to be responsible (Dilnot 2009:189). In other words, the onus is on all of us to become more knowledgeable towards an understanding of our own roles and shortcomings, so that we can act in a more ethical and responsible way.

CHAPTER 7
CONCLUSION

Throughout this study, it has become clear that design thinking as an approach is highly complex. Firstly, design thinking is regarded as the evolved counterpart of design – the latter being highly complex to begin with. Design as a concept is not well understood, since it often refers to many different things. For example, design refers to an activity, the results of that activity and the value that design seems to add (or subtract) through the activity (Dilnot 1984b:3). Walker (1989:23; 2009:42) further suggests that design can be identified as both a process and the result of that process. Thus, design is regarded as many disparate things, with no inclusive or comprehensive definition. As a result, no single definition of design thinking is satisfactory.

Secondly, design thinking is a highly flexible process (Buchanan 1992:5; Walters 2011a) that is contingent on constant change and reinvention (Margolin 1992:114). Design thinking is not a one-fits-all methodology (Kelley & Kelley 2013:21), therefore context in design thinking is of utmost importance. In addition, the problems and contexts within which design thinking operates are unique, complex and ever-changing. This in itself complicates the matter even further.

Thirdly, the understanding of design thinking is subject to an understanding of its history. This study has argued that design thinking has two main origins, resulting in two main discourses. This was argued by means of various sources (Badke-Schaub *et al* 2010:39; Hassi & Laakso 2011a:2; 2011c:52, 54; Johansson *et al* 2011; Johansson-Sköldberg *et al* 2013:121; Kimbell 2011:285). Consequently, a well-established history with its origins in design research and academia is identified (Johansson-Sköldberg *et al* 2013:121, 123), as well as a more recent, popular account with its origins in management discourse (Kimbell 2011:287).

Lastly, the combination of all of the above contentions make design thinking difficult to measure in terms of value or success. However, it has become clear that design thinking as a methodology and process has value and values to add to any future outcome, given that enough responsibility and care are taken when applying it to various problems in various different contexts. Furthermore, a thorough understanding of design thinking is pertinent for future success, which was highlighted and interrogated throughout this study. In addition, this study arrived at a more thorough understanding of design thinking by means of characteristics. In other words, by exploring various characteristics of design thinking, this study not merely

identified and superficially discussed them, but also revealed the inherent or assumed value and values that direct them. Moreover, such an exploration uncovered what merits and pitfalls each characteristic may have for any design strategy, solution or future result.

Once again, it becomes important to highlight the difference between *value* and *values*, respectively. *Value* is used, first and foremost, to refer to the assumed *goodness* of design thinking as an approach. In other words, this study has indicated that *value* in design thinking may ensure improved future outcomes, as well as create solutions that are inherently good – or even moral and ethical. The term *values* was used to refer to the additional worth that design thinking may add to any outcome, by means of unique characteristics. Thus, each characteristic was argued to possess its own value (or worth). As a result, when these are combined under a single term, design thinking, they indeed result in *values*. In other words, the individual *values* form part of the overall *value* of design thinking as an approach.

7.1 Summary of chapters

The study commenced in Chapter One, which detailed the background and aims of the study, as well as summarised the context and relevance of the study. Chapter One continued with a literature review, which further contextualised the study by highlighting important literature consulted in the study. Thereafter, the theoretical framework and research methodology was noted. Chapter One gave an overview of the different chapters, by summarising the key points of each chapter.

Chapter Two explored, in brief, a chronological history of design with some focus on design activity, research and education. Chapter Two illuminated certain aspects within design activity, research and education that were argued to influence and inform the emergence of design thinking in contemporary society.

To start with, it was noted that design as a concept is not well understood, since it often refers to many different things. Dilnot (1984b:3) argues that design refers to an activity, the results of that activity and the value that design seems to add (or subtract) through the activity. Walker (1989:23; 2009:42) further suggests that design is ambiguous, since it can be identified as both a process and the result of that process. Thus, design is regarded as many disparate things, with no inclusive or comprehensive definition. The reason for this is expressed as an inadequacy to define the true nature of design as a discipline (Buchanan 1992:5; Walker 1989:23; 2009:42). Moreover, adequate definitions for design become

somewhat demanding, since design is a highly flexible activity (Buchanan 1992:5), which is contingent upon constant change and reinvention (Margolin 1992:114).

Furthermore, Chapter Two explored the history of design with the Bauhaus school as the main point of departure. The profound influence of the Bauhaus on contemporary design, as well as the school's main objectives illustrate its importance for this study. The Bauhaus not only strived to create a better society (Bax 1991:31), but also attempted to create unity in art, architecture and design (Bax 1991:30, 35; Heller & Fili 2006:49; Kleiner *et al* 2001:1050; Meggs 1983:330), which is fundamental to "all branches of design" (Cross 1983:43).

Chapter Two briefly introduced the concept of *wicked problems,* which signifies a noteworthy change in the kind of problems encountered in contemporary society. More importantly, it was argued that the previous design methods were insufficient in solving more complex problems (Bayazit 2004:21; Cross 2006:4; Rittel 1984), and thus the second and third generations of design methods were introduced.

Furthermore, it was stated that design presents its own unique "designerly ways of knowing" (Cross 1982:221). Since design was seen as a value in its own right it was gradually being regarded as a noteworthy area of study (Dilnot 1984a:3, 4) that is worth defining (Dilnot 1984b:3).

In conclusion, Chapter Two started to illuminate the importance of *good design* as an important factor in determining the value that design, and ultimately design thinking can add to any future outcome. Certain key areas of differentiation between design and design thinking were noted and briefly discussed.

Chapter Three discussed various reasons behind the emergence of design thinking. More importantly, it discussed different origins of design thinking in relation to its well-established history, as well as its more recent popular status. Many different points of view regarding the origins of design thinking were taken into consideration (Badke-Schaub *et al* 2010:39; Hassi & Laakso 2011a:2; 2011c:52, 54; Johansson *et al* 2011, Johansson-Sköldberg *et al* 2013:121; Johansson & Woodilla in Johansson-Sköldberg *et al* 2013:122; Kimbell 2011:285). However, it was concluded that only *two* main origins exist. Firstly, the well-established discourse on design thinking with its origins in design research and academia, which has a history of more than four decades (Johansson-Sköldberg *et al* 2013:121, 123). Secondly, a more recent and popular account of design thinking with its origins in management discourse, which is a little

more than a decade old (Kimbell 2011:287). The latter is often argued to be more promotional in nature, since it is not grounded in design research and academia (Kimbell 2011:294). These two main points of origin were discussed with the purpose of highlighting certain values of design thinking, since each origin is argued to add its own distinct value and values. Consequently, this informed an interesting critique on the subject of design thinking, since many contradictory points of view were taken into account.

Furthermore, it was established that design thinking has expanded into other areas beyond the conventional design practice (Johansson-Sköldberg *et al* 2013:121; Kimbell 2011:285). Consequently, design thinking has different meanings, based on the different contexts within which it is applied (Johansson-Sköldberg *et al* 2013:121), and is therefore not well understood (Kimbell 2009a:1). Thus, Chapter Three partly focused on the inability to define and understand design thinking, as well as various reasons behind the misunderstanding and misinterpretation of design thinking as a methodology.

Moreover, Chapter Three discussed the differentiation between design and design thinking in more detail, but also focused on areas in design that corresponds with areas in design thinking. Consequently, influencing the emergence of design thinking in a noteworthy way. This can be seen in aspects such as abductive thinking or the "necessary logic of design" (Cross 2011:10), which comfortably spans the various design disciplines and is the foundation on which design itself is based. Consequently, Chapter Three argued that design thinking has its own unique ways of thinking, made possible through abductive thinking. As a result, abductive thinking is argued to create a sense of possibility. Even though design thinking offers unique ways of thinking and approaching contemporary issues, it was determined that aspects of design thinking can be learned over time by means of tacit knowledge (Owen 2005a:14). Moreover, the creation of an alternative possibility was argued to be a prerequisite of design thinking, since design thinking should always strive to create better futures. Thus, it can be concluded that design thinking should only include what is good about design practices (Kimbell 2011:289).

Chapter Three continued the discussion on wicked problems, as well as their significance in design thinking discourse. Design thinking is aimed at solving more indefinite, vague design problems, also called "wicked problems" (Buchanan 1992:15; Collopy 2009a; Lindberg *et al* 2010:246; Rittel & Webber 1973:159; Waloszek 2012). Moreover, it was argued that design thinking is important in attempting to define (Beckman & Barry 2007:44; Lawson 2005:292) and understand (Riel 2009c:95) these so-called wicked problems. *Wicked problems* is a

phrase synonymous with design thinking and perhaps one of the earliest identifiers of the types of problems faced in the design thinking process. In conclusion, it was argued that the wicked problems approach to design thinking is fundamental in defining "design's role in the world" (Kimbell 2011:292).

Chapter Four continued the argument regarding the misunderstanding and misinterpretation of design thinking, with the aim of introducing a different way to understand and interpret the concept. Thus, Chapter Four introduced characteristics of design thinking, as well as the value and values that these characteristics may add to or subtract from any future outcome. Since design thinking is aimed at *improved* future outcomes, it became important to understand the real value and values that such an approach may add. Very few of the sources consulted actually referred to value and values in design thinking, let alone how to understand or determine such value. Consequently, the value of design thinking is unclear (Badke-Schaub *et al* 2010:39; Hassi & Laakso 2011a:1; 2011b:341). Thus, in order to gain a better understanding of design thinking, the foundation of design thinking was outlined as characteristics. Badke-Schaub *et al* (2010:44) further suggest outlining the fundamentals of design thinking as characteristics. Hassi and Laakso (2011a:2) further suggested that an in-depth characterisation of design thinking will assist in establishing a foundation for "determining its value".

Thus, Chapter Four introduced and comprehensively discussed characteristics of design thinking. It focused especially on characteristics identified by Charles Owen and Tim Brown, which were informed by the two main origins of design thinking. The first set of characteristics identified by Charles Owen (2005a:12; 2006a:3; 2006b:23-24), presented a more theoretical account of design thinking with its origins in design research and academia. The second set gave an account of Tim Brown's (2008a; 2009a:49-62, 71-77, 85-86) characteristics, which presented the more popular, promotional account of design thinking with its origins in management discourse. Moreover, this chapter illustrated the value and values of design thinking by means of these characteristics.

Since many of the characteristics identified and discussed by Owen and Brown often appear superficial, it became necessary to include discussions and interpretations of other influential sources. Therefore, these sources assisted in highlighting the value and values of the characteristics of design thinking more explicitly. Furthermore, it highlighted the importance of considering a synthesis of the characteristics, since many of the characteristics can add more value in combination with others.

In addition, Chapter Four identified some merits and pitfalls of the characteristics of design thinking, in order to understand and determine the worthiness of such an approach. It was concluded that the identification and discussion around characteristics assist in understanding design thinking from a different perspective. Therefore, rather than merely explaining design thinking by means of a definition, one can consider individual parts, aspects or characteristics of design thinking in order to gain a more holistic understanding thereof. Chapter Four concluded with a brief discussion of additional characteristics that explained design thinking as a *process*, as opposed to merely focusing on the *nature* of design thinking as a methodology. It was noted that the characteristics identified by Owen (2005a:12; 2006a:3; 2006b:23-24) and Brown (2008a; 2009a:49-62, 71-77, 85-86) mostly discuss the *nature* of design thinking. However, there was a need to understand design thinking as a process, and therefore additional characteristics were identified and discussed.

Chapter Five investigated various criticisms against design thinking, by means of identifying and discussing the most common criticisms. The general confusion around design thinking was further highlighted (Cross 2011:29; Kimbell 2009a:1; Nussbaum 2011; Walters 2011a), as well as identified as one of the main reasons for many of the criticisms initiated against design thinking. Thus, it was concluded that many of the criticisms were owed to the general misunderstanding of the concept. It was noted that since many theorists and practitioners do not understand design thinking, how to apply it or the value it can add to any future outcome, many choose to move away from design thinking towards new conceptual frameworks. For example, Collopy (2009c), Kimbell (2009a), Nussbaum (2011) and Winchester (2011) specifically introduce new concepts. However, it was argued that many of these so-called *new* concepts do not actually offer anything new and risk treading the same path of confusion and contradiction. Therefore, it was suggested that design thinking should rather be explained and understood in more detail, before moving away from it too quickly and introducing *new* concepts. It was argued that many of these so-called *new* concepts merely exhibit aspects or characteristics similar to those identified in design thinking as part of this study. Thus, even upon a casual exploration, one can really question the so-called *newness* of these terms.

Furthermore, Chapter Five argued that the expansion of design thinking into other areas has attracted considerable attention and hype around the term. It was argued that the "hype" becomes problematic, because it seems to simplify the current state of design thinking (Johansson & Woodilla in Hassi & Laakso 2011a:1). Since design thinking's sudden popular status, it has often been "used in vain" (Ford 2012) and "become such a common-place concept", that it risks losing its meaning (Cross 2010:99). Thus, the need to articulate and

understand design thinking was further highlighted, since the only way to apply design thinking appropriately is through a thorough understanding thereof. Furthermore, a need for more empirical research on design thinking was identified in order to better understand design thinking and its application to various discourses and contexts (Badke-Schaub *et al* 2010:39; Hassi & Laakso 2011a:1, 2). However, the framework of this study could not include any such research in detail.

Moreover, by means of a comprehensive exploration into design thinking, this study has indicated that design thinking has unique value and values to add, and should therefore not be discredited too quickly. This study has demonstrated that design thinking is a powerful tool to be used *appropriately*, and should therefore be understood more thoroughly. Since vast amounts of literature on the subject exist, and continue to exist, it can perhaps be said that design thinking is here to stay.

Chapter Six explored the role that ethics and responsibilities play in design thinking. This chapter explored each aspect on an individual level, but with a clear and deliberate consciousness of the other. Furthermore, this chapter specifically indicated how interlinked these two aspects are, and that ethics cannot be considered and discussed without responsibility, and vice versa.

Furthermore, Chapter Six delved into the role that ethics and responsibility play in relation to sustainable solutions. In addition, this chapter argued that many aspects of sustainability exist in our complex world, and that designers and businesses should consider all of these aspects in any future outcome. There is also a clear need to educate end-users and create awareness, so that the end-users can sustain solutions on their own when the designer is no longer involved (Chick & Micklethwaite 2011:149; Gomez 1977:41). Thus, designers' responsibilities go beyond merely creating sound solutions. It was further noted that *all* citizens are responsible for the world we live in. Therefore, we all share in the responsibility to sustain ourselves as a society (Campbell 2009:7; Nelson & Stolterman 2012:212).

Moreover, the importance of *good* design was highlighted as an essential requirement for any future outcome. Therefore, the intention, consequences and outcomes of any action are fundamental in achieving *good* design and *good* citizenship (Heller 2003:x). However, it was argued that even if *good* design is the intention, many unforeseen circumstances could result in less-than-ideal outcomes (Nelson & Stolterman 2012:188). Thus, Chapter Six further highlighted the need to understand design thinking more holistically. More importantly, it

highlighted the importance of creating more knowledge, as well as integrating existing knowledge, which will determine valuable outcomes for social life (Buchanan 2001b:7). As a result, designers have a duty to act responsibly by striving to really understand such knowledge (Buchanan 2001b:7).

Chapter Seven summarised the study by means of a brief introduction. In addition, the main points of discussion in each chapter were summarised in order to conclude each point briefly. Furthermore, Chapter Seven notes the contribution and limitations of the study, and suggests areas for further research. The study comes to an end with concluding remarks.

7.2 Contribution of the study

This study explored the value and values of design thinking, as well as the value and values created through characteristics of design thinking. In order to achieve this, many opinions and arguments were discussed, compared and critiqued. As a result, this study concluded that *two* main points of origin exist in design thinking, which further informed the framework of the study. More importantly, Charles Owen and Tim Brown's characteristics were compared based on these two points of origin, as well as discussed and critiqued more extensively. Prior to writing this dissertation, a literature review suggested that no such comparison existed; neither in relation to one another, nor in relation to the two distinct origins. Furthermore, no other literature to date, explicitly explored the value and values of design thinking by means of characteristics. In fact, generally, existing literature rarely goes into much detail regarding characteristics of design thinking, let alone the value and values created as a result of such characteristics. Thus, one can perhaps argue that existing literature often explains and defines characteristics in a more superficial way, which merely determines the meaning of such characteristics. In other words, existing literature merely mentions and describes characteristics in an attempt to interpret its meaning, and is often not done in much detail.

Throughout this study it has become clear that design thinking as a methodology and process has value and values to add to any future outcome, given that enough responsibility and care are taken when applying it to different problems in different contexts. In addition, this study arrived at a more thorough understanding of design thinking by means of characteristics. In other words, by exploring various characteristics of design thinking, this study not merely identified and superficially discussed them, but also revealed the inherent value and values that direct them. Furthermore, such an exploration uncovered what merits and pitfalls each characteristic may have for any design strategy, solution or future result.

Moreover, this study is written from a South African's point of view, which in itself can be seen as an important contribution to the discourse on design thinking. A literature review suggested that very little research on design thinking exists from or within a South African context. More importantly, no other literature examining the value and values of design thinking was found from a South African point of view.

7.3 Limitations of the study and suggestions for further research

While the aims and objectives of the study have been reached, a variety of subjects have not yet been explored. To start with, this study excluded examples and case studies, which in itself could be an interesting addition to a study on design thinking. More importantly, since very little literature exists from a South African perspective, it could prove interesting to explore case studies in closer proximity to this country. However, even though few sources explicitly link design thinking to South Africa, some interesting examples and case studies attempt to explain design thinking within a South African context. These projects have a closer proximity to design thinking, since design thinking is specifically mentioned as the driving force behind these projects, at least once. For example; Project Masiluleke is linked to design thinking on multiple occasions (Fabricant 2009:8; 2010a; 2010b; 2013; Project Masiluleke [sa]a), whilst Community Individual Development Association (CIDA) University is linked to design thinking in only one source (Riel & Martin 2012:4-9). As a result, one can perhaps argue that these projects attempted to solve *wicked problems* within a very unique South African context, using design thinking as the main driving force.

Project Masiluleke is an initiative launched in 2008 by frog design under leadership of Robert Fabricant (2009:8; 2010a; 2010b; 2013). Project Masiluleke makes use of mobile technology to fight human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS), as well as tuberculosis (TB) in KwaZulu Natal, South Africa (Fabricant 2009:8; 2010b; Project Masiluleke [sa]a). The initiative relies on mobile technology as a "high-impact, low-cost tool" (Fabricant 2009:8; Project Masiluleke [sa]a; [sa]b) in the form of a basic text message, which motivates individuals to "reach out for information on HIV testing and treatment" (Fabricant 2013). Please Call Me (PCM) text messages – a free form of text message used extensively in South Africa, as well as the rest of Africa – are used to circulate healthcare information to the general public (Project Masiluleke [sa]a; [sa]b). A PCM message creates an opportunity to communicate behavioural change that is "culturally relevant and written in local languages", and consists of 120 character messages that are freely available (Project Masiluleke [sa]b). Since the start of the project, approximately 685 million PCM

messages have been sent out, driving over one and a half million calls to the National AIDS Helpline (Project Masiluleke [sa]a).

On the other hand, the CIDA University was established to provide business education to young students from previously disadvantaged backgrounds, and those typically excluded from the South African[1] tertiary education system (Heaton 2008:738; Raufflet 2009:191). At the end of the apartheid era, the "new" South Africa's vision was to create opportunities for all South Africans, especially those groups previously excluded (Raufflet 2009:193). The CIDA University exemplifies an educational body that strives to serve businesses' needs for a skilled workforce, as well as the country's need for a higher percentage of educated students (Raufflet 2009:191). Dennis Heaton (2008:738) argues that CIDA University's educational model is very distinct[2] and specifically adapted to create opportunities for students that do not typically have access to business schools. Therefore, CIDA University provides students with the necessary "access to relevant training and employment opportunities", which contributes to the student's overall welfare (Raufflet 2009:191), as well as the overall welfare of the country.

In June 2000, the then Minister of Education, Kadir Asmal, opened the *Design Education Forum of Southern Africa* by expressing both a necessity and opportunity for design development in South Africa (Buchanan 2001c:35). Asmal's address further investigated the foundations of design founded in "cultural values and political principles" enclosed in the new South African Constitution (Buchanan 2001c:35). The South African Constitution embarks on the declaration of cultural rights that are appropriate in the context of the "current historical period in the development of human rights" (Buchanan 2001c:36). An attempt is made to harmonise civil, political, economic and social rights within a new structure of cultural values and rights, which further highlights the significance of human dignity (Buchanan 2001c:36). Thus, it would be interesting to explore where and how these examples and case studies fit within the structure of human dignity. Not only from a South African perspective, but perhaps also from a broader exploration on human dignity in our world.

Furthermore, apart from the initial change that these case studies aim to achieve, the reality and value of such case studies are not always well defined. Therefore, an exploration into the value and values of design thinking in relation to examples and case studies could prove

[1] It is important to mention, that even though previously disadvantaged teenagers have limited access to tertiary education, tertiary education in South Africa in general, is inaccessible to many (Raufflet 2009:192).
[2] Heaton (2008:745) argues that the CIDA University model is a "radical new paradigm for management education". However, John Bruton (2008:751) contests this claim by explaining that even though certain aspects of the CIDA University model is unique and innovative within a South African context, much of what is promoted as "radical and new is [in fact] tried and true".

interesting. Many of the case studies are discussed superficially, with little indication of actual value or even success. Even though success stories are great, they are often not based on actual research findings. The value of design thinking as an approach is argued to be highly ambiguous and claims of success are not based on "empirical … evaluations" (Badke-Schaub *et al* 2010:39; Hassi & Laakso 2011a:1; 2011b:341). Badke-Schaub *et al* (2010:40) further argue that aspects of design thinking in general are discussed superficially with no consideration for design thinking's long "traditional" history. As a result, these examples do not objectively examine research findings and appear somewhat promotional in nature. Therefore, a critical study that focuses on an in-depth discussion regarding case studies can be interesting and useful, as design thinking continues the battle for meaning and value in our complex world. Cross (2011:29) further suggests that conducting and studying case studies can help gain a better understanding of design thinking. Moreover, the success or failure of each outcome creates an opportunity to measure the relevance or importance of characteristics, as well as the value and values that these inherently add to or subtract from the outcome within a design thinking context.

Furthermore, these case studies are important since they start to represent, at least partially, what Buchanan (2001c:35) calls "the reshaping of South Africa by design". Even though this was argued some years ago, it still remains true for South Africa, even today. In light of South Africa's "colonial and apartheid past", a great deal still needs to be done to permanently remove the social and economic inequalities that are still evident today (Cassim 2013:124-125). However, many attempts have been made in South Africa to take this vision forward. For example, the initial plans for Design Indaba started to emerge at a time when South Africa was at the point of recreating itself (Winkler 2001). The Design Indaba is a platform that strives to create "a better world through creativity" by bringing together creative individuals from around the world (About Design Indaba [sa]). The Design Indaba accommodates an online publication[3] (designindaba.com) and hosts a yearly conference, which promotes outstanding design initiatives (About Design Indaba [sa]). The conference brings together some of the world's best creative talents, and has done so since 1995 (About Design Indaba [sa]). Moreover, the Design Indaba Expo, launched in 2004, is a way to "facilitate growth within the South African creative economy" (Design Indaba 2015). The Expo also creates jobs, some directly and indirectly through the platform (Design Indaba 2015).

In addition, the Design Indaba has also covered the subject of *design thinking* extensively, through both the online publication and the yearly conference. A mere search of the term on

[3] The online publication is the biggest of its kind in South Africa, with over 100 000 unique visitors each month (Design Indaba [sa]).

the Design Indaba website, reveals over five thousand articles related to design thinking (Search Design Indaba [sa]), and this number is likely to grow rapidly as more success stories and methods of application are shared. Thus, it becomes clear that the Design Indaba is an important platform, since it both communicates and encourages the use of design and design thinking as catalysts for change in South Africa, and the world.

In addition to the Design Indaba, there is also the World Design Capital (WDC) International Design Conference held by the International Council of Societies of Industrial Design (ICSID) every two years (Cassim 2014:166; The city of Cape Town's … [sa]; What is the WDC? [sa]a). Since 1957, ICSID has attempted to expand the social impact of design across the globe (The city of Cape Town's … [sa]; What is the WDC? [sa]a). The vision of the WDC programme is to use design as a "strategic tool" (Cassim 2013:124; 2014:166) in order to nurture and inspire the use of design to "further the social, economic and cultural development of the world's cities" (Cassim 2013:124; The city of Cape Town's … [sa]; What is the WDC? [sa]b). Moreover, a need arises to manage cities accurately and successfully, which is often paired with "managing cities *creatively*" (Cassim 2013:123, emphasis added).

The WDC Conference was hosted in Cape Town in 2014, which has since the end of apartheid, taken the responsibility to redesign itself as a world-class design hub (World Design Capital Cape Town 2014 [sa]). Cape Town's bid concept, 'Live Design. Transform Life.' placed a strong emphasis on socially responsible design, and focused specifically on eradicating "imbalances" and segregation created in the past (Sewchurran 2014; The city of Cape Town's … [sa]). Furthermore, the use of design for "innovation purposes" is also evident in this concept (Cassim 2014:166). The bid concept was also aimed at rebuilding, reconnecting and repositioning Cape Town to further eradicate cultural differences (Cassim 2013:122; The city of Cape Town's … [sa]). Cape Town is known for its rich heritage, and boasts both diversity and creative talent, making it "the gateway to the African continent" (The city of Cape Town's … [sa]; World Design Capital Cape Town 2014 [sa]).

Richard Perez (in Sewchurran 2014), programme director for the WDC Cape Town, argues that design thinking contributes to a successful structure for better implementation and engagement with end-users. Thus, a growing interest in "practical design thinking, participatory methods and people-centered solutions" to real-world problems, made Cape Town the perfect host and inspiration for the rest of the world's cities (The city of Cape Town's … [sa]). The year 2014 also symbolised a significant turn in South Africa's history, and marked a twenty-year commemoration in favour of democracy (Cassim 2013:124; The

city of Cape Town's … [sa]). Cape Town further aims to transform the city into one of the "most inclusive, sustainable, liveable and productive" cities on the African continent (The city of Cape Town's … [sa]). Furthermore, since design in South African does not mimic European design any more, creating "locally meaningful and relevant" design helps put South African on the map (Du Plessis in Cassim 2014:168). However, the success of the conference is contingent on putting these discussions into practice (Cassim 2014:169) and establishing a basis on how to "move forward" (Lee in Cassim 2014:169).

Even though this study embarked on an initial exploration regarding ethics and responsibilities in design thinking, a more in-depth study on the subject can prove interesting. This could also relate to a possible exploration into human dignity, as well as the responsibility to act and work in a dignified way. Moreover, the notion of sustainability – especially in relation to creating solutions that can be continued by the people whose lives we are trying to change – could be explored further. Thus, fulfilling a necessity to create solutions that can be sustained for longer periods of time, by equipping end-users with the necessary tools to further improve their own lives. Perhaps there is a way to not only create awareness amongst citizens' responsibilities, but rather equipping them with the necessary tools to act and live appropriately.

It has to be noted that the relationship between various texts regarding design thinking as a subject, is at its core vastly extensive, and allows for many more comparisons and points of enquiry. However, this study has limited the number of enquiries to specifically focus on an interrogation of the value and values of design thinking by means of a comprehensive critical study.

7.4 Concluding remarks

This study has attempted to show the significance of value and values within a *design thinking* context. Furthermore, it aimed to illuminate some of the key issues with the term, in an attempt to illustrate the value and values inherent in the approach. Much of the criticism on design thinking originates from a general misunderstanding of the term, as well as the different origins of design thinking, as illustrated throughout this study.

It is important to continue the discussion on design thinking, in order to attempt to truly understand the meaning of value and values in our complex world. In fact, as we continue this search for meaning and value, designers may need to engage in finding and communicating "new sources of value" (Julier 2011:7). More importantly, the mindfulness that designers and

design thinkers start to employ in their work will hopefully continue this search for value and meaning. If individuals start to become more mindful, they seem to become more aware of the changes that others are attempting to embrace. “Imagine a future where shared ideals and moral values point the way!” (Jongerius & Schouwenberg 2015:5).

SOURCES CONSULTED

Aaltonen, G. 2010. *Business thinking in the knowledge economy*. [O]. Available: www.theguardian.com/service-design/question-and-answer Accessed 5 August 2015.

About Design Indaba. [Sa]. [O]. Available: www.designindaba.com/about-us Accessed 29 July 2015.

Aicher, O. 1988 (1975). Appendix Three. HfG Ulm: a concise history, in HfG Ulm: a personal view of an experiment in democracy and design education. Translated by H Jacob. *Journal of Design History* 1(3/4):231-234.

Archer, LB. 1979a. The three R's. *Design Studies* 1(1):18-20.

Archer, LB. 1979b. Whatever became of design methodology? *Design Studies* 1(1):17-18.

Archer, LB. 1984. Whatever became of design methodology?, in *Developments in design methodology,* edited by N Cross. Chichester: John Wiley:347-349.

Arnason, HH. 2004. *History of modern art*. Fifth edition. New Jersey: Prentice Hall.

Backett, P. 2011. *Prototyping: learning to think and make with your hands*. [O]. Available: http://www.core77.com/posts/20482/Prototyping-learning-to-think-and-make-with-your-hands-by-Paul-Backett Accessed 5 July 2015.

Badke-Schaub, P, Roozenburg, N & Cardoso, C. 2010. Design thinking: a paradigm on its way from dilution to meaninglessness?, in *DTRS8 Interpreting design thinking. Symposium proceedings,* edited by K Dorst, S Stewart, I Staudinger, B Paton & A Dong. Sydney: DAB Documents:39-49.

Bauer, RM & Eagen, WM. 2008. Design thinking – epistemic plurality in management and organisation. *Aesthesis* 2(3):64-74.

Bauman, Z. 2009. In the beginning was design or the waste of order-building, in *Design studies. A reader,* edited by H Clark & D Brody. Oxford: Berg:166-169.

Bax, M. 1991. *Bauhaus lecture notes 1930-1933*. Amsterdam: Architectura.

Bayazit, N. 2004. Investigating design: a review of forty years of design research. *Design Issues* 20(1):16-29.

Beckman, SL & Barry, M. 2007. Innovation as a learning process: embedding design thinking. *California Management Review* 50(1), Fall:24-55.

Behrisch, J, Ramirez, M & Giurco, D. 2011. Representation of ecodesign practice: international comparison of industrial design consultancies. *Sustainability* 3:1778-1791.

Belsky, S. 2013. You're a free radical, run with it, *in Maximise your potential: grow your expertise, take bold risks & build an incredible career,* edited by JK Glei. Las Vegas: Amazon:17-20.

Berger, W. 2010. *The four phases of design thinking*. [O]. Available: https://hbr.org/2010/07/the-four-phases-of-design-thin Accessed 15 February 2012.

Bichard, M. 2008. *Foreword. The good design plan. National design strategy and Design Council delivery plan 2008–11*. [O]. Available: www.atvinnuvegaraduneyti.is/media/acrobat/the-good-design-plan_designcouncil.pdf Accessed 28 July 2011.

Bicknell, J & McQuiston, L (eds). 1977. *Design for need. The social contribution of design*. Oxford: Pergamon Press.

Boradkar, P. 2010. Design as problem solving, in *The Oxford handbook of interdisciplinarity,* edited by R Frodeman. New York: Oxford University Press:273-287.

Borgmann, A. 1995. The depth of design, in *Discovering design. Explorations in design studies*, edited by R Buchanan & V Margolin. Chicago: University of Chicago Press:13-22.

Bousbaci, R. 2008. "Models of man" in design thinking: the "bounded rationality" episode. *Design Issues* 24(4):38-52.

Brown, T. 2008a. *Design thinking*. [O]. Available: http://hbr.org/2008/06/design-thinking/ Accessed 19 March 2012.

Brown, T. 2008b. Tales of creativity and play, *for Serious Play Conference*. [Video recording]. Available: http://www.ted.com/talks/tim_brown_urges_designers_to_think_big Accessed 28 April 2015.

Brown, T. 2008c. *What does design thinking feel like?* [O]. Available: http://designthinking.ideo.com/?p=51 Accessed 25 April 2012.

Brown, T. 2009a. *Change by design. How design thinking transforms organisations and inspires innovation*. New York: HarperCollins.

Brown, T. 2009b. Designers – think big!, *for TEDGlobal Conference*. [Video recording]. Available: http://www.ted.com/talks/tim_brown_urges_designers_to_think_big Accessed 28 April 2015.

Brown, T. 2012a. *Design thinking. Thoughts by Tim Brown*. [O]. Available: http://designthinking.ideo.com Accessed 25 April 2012.

Brown, T. 2012b. From blueprint to genetic code: the merits of an evolutionary approach to design. *Rotman Magazine* Spring:16-21.

Brown, T & Katz, B. 2011. Change by design. *J Prod Innov Manag* 28:381-383.

Brown, T & Wyatt, J. 2010. Design thinking for social innovation. *Stanford Social Innovation Review* 1, Winter:30-35.

Bruton, JM. 2008. The South African experience: beyond the CIDA model. *Journal of Management Education* 32(6):750-766.

Buchanan, R. 1990. Myth and maturity: towards a new order in the decade of design. *Design Studies* 11(4):195-201.

Buchanan, R. 1992. Wicked problems in design thinking. *Design Issues* 8(2):5-21.

Buchanan, R. 1998. Branzi's dilemma: design in contemporary culture. *Design Issues* 14(1):3-20.

Buchanan, R. 2001a. Children of the moving present: the ecology of culture and the search for causes in design. *Design Studies* 17(1):67-84.

Buchanan, R. 2001b. Design research and the new learning. *Design Issues* 17(4):3-21.

Buchanan, R. 2001c. Human dignity and human rights: thoughts on the principles of human-centered design. *Design Issues* 17(3):35-39.

Buchanan, R & Margolin, V (eds). 1995. *Discovering design. Explorations in design studies*. Chicago: University of Chicago Press.

Burrell, G & Morgan, G. 1979. *Sociological paradigms and organisational analysis. Elements of the sociology of corporate life*. Aldershot: Ashgate.

Campbell, E. 2009. *You know more than you think you do: design as resourcefulness & self-reliance*. [O]. Available: https://www.thersa.org/globalassets/pdfs/blogs/rsa_designandsociety_pamphlet.pdf Accessed 6 July 2015.

Cassim, F. 2013. Finding the mother in the mother city: reclaiming Cape Town through design. *Image & Text* 21:122-139.

Cassim, F. 2014. Conference report. 'Make a plan' – Design Policy Conference. *Image & Text* 24:166-169.

Chick, A & Micklethwaite, P. 2011. *Design for sustainable change. How design and designers can drive the sustainability agenda*. Lausanne: AVA.

Christiaans, H & Dorst, K. 1992. An empirical study into design thinking, in *Research in design thinking,* edited by N Cross, K Dorst & N Roozenburg. Delft: Delft University Press:119-126.

Churchman, CW. 1979. *The systems approach and its enemies*. New York: Basic.

Clark, H. 2009. Introduction, in *Design studies. A reader,* edited by H Clark & D Brody. Oxford: Berg:164-165.

Clark, H & Brody, D (eds). 2009. *Design studies. A reader*. Oxford: Berg.

Clark, K & Smith, R. 2008. Unleashing the power of design thinking. *Design Management Review* Summer:8-15.

Collins, H. 2013. Can design thinking still add value? *DMI* Summer:35-39.

Collopy, F. 2009a. *Just what is design thinking? – the view from the blogosphere*. [O]. Available: http://www.fastcompany.com/1211691/just-what-design-thinking—-view-blogosphere
Accessed 9 January 2013.

Collopy, F. 2009b. *Lessons learned – why the failure of systems thinking should inform the future of design thinking*. [O]. Available: http://www.fastcompany.com/1291598/lessons-learned-why-failure-systems-thinking-should-inform-future-design-thinking
Accessed 9 January 2013.

Collopy, F. 2009c. *Thinking about 'design thinking'* [O]. Available: http://www.fastcompany.com/blog/fred-collopy/manage-designing/thinking-about-design-thinking
Accessed 13 February 2012.

Conklin, J, Basadur, M & VanPatter, GK. 2007. Rethinking wicked problems. Unpacking paradigms, bridging universes. *NextD Journal | ReReThinking Design* 10(1):1-30.

Cross, A. 1980. Design and general education. *Design Studies* 1(4):202-206.

Cross, A. 1983. The educational background to the Bauhaus. *Design Studies* 4(1):43-52.

Cross, N. 1981. The coming of post-industrial design. *Design Studies* 2(1):3-7.

Cross, N. 1982. Designerly ways of knowing. *Design Studies* 3(4):221-227.

Cross, N. 1984 (ed). *Developments in design methodology*. Chichester: John Wiley.

Cross, N. 1990. The nature and nurture of design ability. *Design Studies* 11(3):127-140.

Cross, N. 1992. Research in design thinking, in *Research in design thinking*, edited by N Cross, K Dorst & N Roozenburg. Delft: Delft University Press:3-10.

Cross, N. 2001. Designerly ways of knowing: design discipline versus design science. *Design Issues* 17(3):49-55.

Cross, N. 2004. Expertise in design: an overview. *Design Studies* 25(5):427-441.

Cross, N. 2006. Forty years of design research. *Design Research Quarterly* 1(2):3-5.

Cross, N. 2007. *Designerly ways of knowing*. Basel: Birkhäuser Verlag.

Cross, N. 2010. Design thinking as a form of intelligence, *in DTRS8 Interpreting design thinking. Symposium proceedings,* edited by K Dorst, S Stewart, I Staudinger, B Paton & A Dong. Sydney: DAB Documents:99-105.

Cross, N. 2011. *Design thinking. Understanding how designers think and work.* Oxford: Berg.

Cross, N, Dorst, K & Roozenburg, N (eds). 1992. *Research in design thinking.* Delft: Delft University Press.

Day, BD & Mabie, GE (eds). 1998. *Experience and education: the 60th anniversary edition.* Second edition. Indianapolis: Kappa Delta Pi.

Design Council. 2008. *The good design plan. National design strategy and Design Council delivery plan 2008–11.* [O]. Available: www.atvinnuvegaraduneyti.is/media/acrobat/the-good-design-plan_designcouncil.pdf Accessed 28 July 2011.

Design Indaba. 2015. *The way forward for Design Indaba Expo.* [O]. Available: www.designindaba.com/articles/design-indaba-news/way-forward-design-indaba-expo Accessed 29 July 2015.

Dew, N. 2007. Abduction: a pre-condition for the intelligent design of strategy. *Journal of Business Strategy* 28(4):38-45.

Dewey, J. 1998. *Experience and education: the 60th anniversary edition*, edited by BD Day & GE Mabie. Second edition. Indianapolis: Kappa Delta Pi.

Dilnot, C. 1984a. The state of design history. Part I: mapping the field. *Design Issues* 1(1):4-23.

Dilnot, C. 1984b. The state of design history. Part II: problems and possibilities. *Design Issues* 1(2):3-20.

Dilnot, C. 2009. Ethics in design. Ten questions, in *Design studies. A reader,* edited by H Clark & D Brody. Oxford: Berg:180-190.

Dorst, K. 2006. *Understanding design.* Second edition. Amsterdam: BIS.

Dorst, K. 2010. The nature of design thinking, *in DTRS8 Interpreting design thinking. Symposium proceedings,* edited by K Dorst, S Stewart, I Staudinger, B Paton & A Dong. Sydney: DAB Documents:131-139.

Dorst, K. 2011. The core of 'design thinking' and its application. *Design Studies* 32(6):521-532.

Dorst, K, Stewart, S, Staudinger, I, Paton, B & Dong, A (eds). 2010. *DTRS8 Interpreting design thinking. Symposium proceedings.* Sydney: DAB Documents.

Dreyfuss, H. 1955. *Designing for people.* New York: Simon & Schuster.

Droste, M. 1993. *Bauhaus 1919-1933.* Berlin: Benedikt Taschen.

D.school. 2009. *D.school bootcamp bootleg.* [O]. Available: http://dschool.stanford.edu/wp-content/uploads/2009/12/bootcampbootleg20091.pdf Accessed 19 March 2014.

D.school. 2010. *Bootcamp bootleg*. [O]. Available:
http://dschool.stanford.edu/wp-content/uploads/2011/03/
bootcampbootleg2010v2slim.pdf
Accessed 19 March 2014.

Du Gay, P, Hall, S, Janes, L, Mackay, H & Negus, K. 2009. The Sony walkman, in *Design studies. A reader,* edited by H Clark & D Brody. Oxford: Berg:347-353.

Dunne, D & Martin, R. 2006. Design thinking and how it will change management education: an interview and discussion. *Academy of Management Learning & Education* 5(4):512-523.

Dweck, CS. 2006. *Mindset: the new psychology of success*. New York: Random House.

Ericsson, KA. 2014. How to gain the benefits of the expert performance approach in domains where the correctness of decisions are not readily available: a reply to Weiss and Shanteau. *Applied Cognitive Psychology* 28:485:463.

Ericsson, KA, Krampe, RT & Tesch-Romer, C. 1993. The role of deliberate practice in the acquisition of expert performance. *Psychological Review* 100(3):363-406.

Fabricant, R. 2009. Project Masiluleke. *Interactions* November, December:8.

Fabricant, R. 2010a. *In defense of design imperialism*. [O]. Available:
http://designmind.frogdesign.com/blog/in-defense-of-design-imperialism.html
Accessed 6 September 2013.

Fabricant, R. 2010b. *Social innovation step by step*. [O]. Available:
http://designmind.frogdesign.com/blog/social-innovation-step-by-step.html
Accessed 6 September 2013.

Fabricant, R. 2013. *Design is a privilege: an update on frog's mobile mandate and social-sector impact* [O]. Available:
http://designmind.frogdesign.com/blog/design-is-a-privilege-an-update-on-frog-s-mobile-mandate-and-social-sector-impact.html
Accessed 6 September 2013.

Fast Company Staff. 2006. *Design thinking … what is that?* [O]. Available:
http://www.fastcompany.com/919258/design-thinking-what
Accessed 8 January 2013.

Faulkner, P. 2006. Pevsner's Morris. *The Journal of William Morris Studies* Winter:49-71.

Findeli, A. 2001. Rethinking design education for the 21st century: theoretical, methodological, and ethical discussion. *Design Issues* 17(1):5-17.

Fleming, W. 1995. *Arts & ideas*. Ninth edition. [Sl]: Wadsworth.

Ford, S. 2012. *Reports of design thinking's death were an exaggeration*. [O]. Available:
http://www.fastcompany.com/1811688/reports-design-thinkings-death-were-exaggeration
Accessed: 8 January 2013.

Frank, S. 2008. Review. Bauhaus culture: from Weimar to the Cold War by Kathleen James-Chakraborty. *Journal of the Society of Architectural Historians* 67(1):140-142.

Frascara, J. Introduction: rethinking design. *Design Issues* 17(1):1-4.

Frodeman, R (ed). 2010. *The Oxford handbook of interdisciplinarity*. New York: Oxford University Press.

Fry, T. 2009. *Design futuring. Sustainability, ethics and new practice*. Oxford: Berg.

Gladwell, M. 2008. *Outliers. The story of success*. New York: Little Brown.

Glei, JK (ed). 2013. *Maximise your potential: grow your expertise, take bold risks & build an incredible career*. Las Vegas: Amazon.

Goel, V. 1988. Complicating the 'logic of design'. *Design Studies* 9(4):229-234.

Goetze, A. 2010. Interview, *for Creative Industries Convention*. [Video recording]. Available: https://vimeo.com/9402566
Accessed 5 July 2015.

Goldschmidt, G & Badke-Schaub, P. 2010. The design-psychology indispensible research partnership, *in DTRS8 Interpreting design thinking. Symposium proceedings,* edited by K Dorst, S Stewart, I Staudinger, B Paton & A Dong. Sydney: DAB Documents:199-209.

Gomez, A. 1977. The need for design education in developing countries, in *Design for need. The social contribution of design,* edited by J Bicknell & L McQuiston. Oxford: Pergamon Press:39-41.

Gropius, W. 1948. Teaching the arts of design. *College Art Journal* 7(3):160-164.

Han, BC, Sonalkar, N, Lande, M, Jung, M & Leifer, L. 2010. Design basis: insights about design thinking from the perspective of decision analysis, *in DTRS8 Interpreting design thinking. Symposium proceedings,* edited by K Dorst, S Stewart, I Staudinger, B Paton & A Dong. Sydney: DAB Documents:211-217.

Harrelson, D. 2009. *Rapid prototyping tools revisited*. [O]. Available: http://www.adaptivepath.com/ideas/rapid-prototyping-tools-revisited/
Accessed 5 July 2015.

Hartshorne, C & Weiss, P (eds). 1931. *Collected papers by Charles Sanders Peirce. Volume I. Principles of philosophy*. Cambridge: Harvard University Press.

Hartshorne, C & Weiss, P (eds). 1932. *Collected papers by Charles Sanders Peirce. Volume II. Elements of logic*. Cambridge: Harvard University Press.

Hassi, ELM & Laakso, MS. 2011a. Conceptions of design thinking in the design and management discourses. Open questions and possible directions for research. Paper presented at Proceedings of IASDR2011, the Fourth World Conference on Design Research, edited by NFM Roozenburg, LL Chen & PJ Stappers, 31 October - 4 November, Delft, Netherlands.

Hassi, ELM & Laakso, MS. 2011b. Conceptions of design thinking in the management discourse. Paper presented at The Endless End, the Ninth International European Academy of Design Conference, 4-7 May, University of Porto, School of Fine Arts, Porto, Portugal.

Hassi, L & Laakso, M. 2011c. Making sense of design thinking, in *International Design Business Management (IDBM) Volume One*, edited by T Karjalainen, M Koria & M Salimäki. Aalto University, Helsinki: IDBM:50-62.

Hawken, P, Lovins, AB & Lovins, LH. 1999. *Natural capitalism. The next industrial evolution*. London: Earthscan.

Hawkins, O. 1977. Person to person design, in *Design for need. The social contribution of design,* edited by J Bicknell & L McQuiston. Oxford: Pergamon Press:114-117.

Heaton, DP. 2008. An innovative model of management education for the poor: the South African experience. *Journal of Management Education* 32(6):738-749.

Heller, S. 2003. Introduction, in *Citizen designer. Perspectives on design responsibility,* edited by S Heller & V Vienne. New York: Allworth Press:ix-xi.

Heller, S & Fili, L. 2006. *Stylepedia. A guide to graphic design mannerisms, quirks, and conceits*. San Francisco: Chronicle.

Heller, S & Vienne, V (eds). 2003. *Citizen designer. Perspectives on design responsibility*. New York: Allworth Press.

Heskett, J. 2001. Past, present, and future in design for industry. *Design Issues* 17(1):18-26.

HfG-Archiv Ulm. 2011. [O]. Available:
http://www.hfg-archiv.ulm.de/english/the_hfg_ulm/
Accessed 21 May 2013.

Holt, M. 2011. The limits of empathy: utopianism, absorption and theatricality in design. *The Design Journal* 14(2):151-164.

Hornby, AS. 2010. *Oxford advanced learner's dictionary of current English*, edited by J Turnbull, D Lea, D Parkinson, P Phillips, B Francis, S Webb, V Bull & M Ashby. Eighth edition. Oxford: Oxford University Press.

IDEO. [Sa]a. *Human centered design toolkit*. Second edition. [O]. Available:
www.ideo.com/images/uploads/hcd_toolkit/IDEO_HCD_Toolkit.pdf
Accessed 25 February 2014.

IDEO. [Sa]b. *About IDEO*. [O]. Available:
http://www.ideo.com/about/
Accessed 5 July 2015.

IDEO. [Sa]c. *Locations: Palo Alto*. [O]. Available:
http://www.ideo.com/locations/palo-alto
Accessed 5 July 2015.

IDEO. 2012. *Design thinking for educators*. Second edition. [O]. Available: http://designthinkingforeducators.com/ Accessed 28 January 2013.

Institute of Design. [Sa]. *Charles L. Owen* [O]. Available: https://www.id.iit.edu/people/charles-l-owen#expand Accessed 6 August 2015.

Jackson, F. 1993. Review. Design for the real world: human ecology and social change by Victor Papanek. *Journal of Design History* 6(4):307-310.

Jacob, H. 1988. HfG Ulm: a personal view of an experiment in democracy and design education. *Journal of Design History* 1(3/4):221-234.

Jewkes, R, Nduna, M, Levin, J, Jama, N, Dunkle, K, Khuzwayo, N, Koss, M, Puren, A, Wood, K & Duvvury, N. 2006. A cluster randomised-controlled trial to determine the effectiveness of Stepping Stones in preventing HIV infections and promoting safer sexual behaviour amongst youth in the rural Eastern Cape, South Africa: trial design, methods and baseline finding. *Tropical Medicine and International Health* 11(1):3-16.

Johansson, U & Woodilla, J. 2008. Towards a better paradigmatic partnership between design and management. Paper presented at the International DMI Education Conference, Design thinking: new challenges for designers, managers, and organisations, 14-15 April, ESSEC Business School, Cery-Pointoise, France.

Johansson, U & Woodilla, J. 2009. Towards an epistemological merger of design thinking, strategy and innovation. Paper presented at the Eighth European Academy of Design Conference, 1-3 April, The Robert Gordon University, Aberdeen, Scotland.

Johansson, U & Woodilla, J. 2011. Creating a synergistic dialogue among design thinking, strategy, and innovation, in *International Design Business Management (IDBM) Volume One*, edited by T Karjalainen, M Koria & M Salimäki. Aalto University, Helsinki: IDBM:64-72.

Johansson, U, Woodilla, J & Çetinkaya, M. 2011. The emperor's new clothes or the magic wand? The past, present and future of design thinking. Article presented at the First Cambridge Academic Design Management Conference, 7-8 September, Cambridge.

Johansson-Sköldberg, U & Woodilla, J. 2013. Arguing for design thinking interventions as a form of artistic interventions. *Swedish Design Research Journal* 2:40-47.

Johansson-Sköldberg, U, Woodilla, J & Çetinkaya, M. 2013. Design thinking: past, present and possible futures. *Creativity and Innovation Management* 22(2):121-146.

Jonas, H. 1984. *The imperative of responsibility: in search of an ethics for the technological age*. Chicago: University of Chicago Press.

Jonas, W. 2011. A sense of vertigo. Design thinking as general problem solver? Article presented at the Ninth European Academy of Design Conference, May, Porto, Portugal.

Jones, JC. 2009. What is designing?, in *Design studies. A reader,* edited by H Clark & D Brody. Oxford: Berg:77-80.

Jones, PL. 1977. Designing for need – radio talk, in *Design for need. The social contribution of design,* edited by J Bicknell & L McQuiston. Oxford: Pergamon Press:91-94.

Jongerius, H & Schouwenberg, L. 2015. *Beyond the new. A search for ideals in design*. [O]. Available: www.designindaba.com/sites/default/files/node/news/19835/files/beyond-new-manifest-embargo-until-april-10th-2015.pdf Accessed 15 April 2015.

Julier, G. 2000. *The culture of design*. London: Sage.

Julier, G. 2006. From visual culture to design culture. *Design Studies* 22(1):64-76.

Julier, G. 2011. Political economies of design activism and the public sector. Paper presented at the Nordic Research Conference, Helsinki.

Jung, M, Sonalkar, N, Mabogunje, A, Banerjee, B, Lande, M, Han, C & Leifer, L. 2010. Designing perception-action theories: theory-building for design practice, *in DTRS8 Interpreting design thinking. Symposium proceedings,* edited by K Dorst, S Stewart, I Staudinger, B Paton & A Dong. Sydney: DAB Documents:233-241.

Kabo, J & Baillie, C. 2009. Seeing through the lens of social justice: a threshold for engineering. *European Journal of Engineering Education* 34(4):317-325.

Karjalainen, T, Koria, M & Salimäki, M (eds). 2011. *International Design Business Management (IDBM) Volume One*. Aalto University, Helsinki: IDBM.

Kelley, T & Kelley, D. 2012. *Reclaim your creative confidence*. [O]. Available: https://hbr.org/2012/12/reclaim-your-creative-confidence/ar/print Accessed 19 March 2014.

Kelley, T & Kelley, D. 2013. *Creative confidence. Unleashing the creative potential within us all*. London: William Collins.

Kimbell, L. 2009a. Beyond design thinking: design-as-practice and designs-in-practice. Paper presented at the CRESC Conference, September, Manchester.

Kimbell, L. 2009b. *Design practices in design thinking*. [O]. Available: http://www.lucykimbell.com/stuff/Practicedesignthinking.pdf Accessed 29 June 2012.

Kimbell, L. 2011. Rethinking design thinking: part I. *Design and Culture* 3(3):285-306.

Kimbell, L. 2012. Rethinking design thinking: part II. *Design and Culture* 4(2):129-148.

Kleiner, A. 2001. *The bottom line on ethics*. [O]. Available: http://www.strategy-business.com/article/14272 Accessed 10 April 2014.

Kleiner, FS, Mamiya, CJ & Tansey, RG. 2001. *Gardner's art through the ages*. Eleventh edition. Fort Worth: Harcourt.

Krippendorff, K. 2005. *The semantic turn: a new foundation for design*. [Sl]: CRC Press.

Lawson, B. 2005. *How designers think. The design process demystified*. Fourth edition. Oxford: Elsevier.

Le Boeuf, J. 2006. Ethics: design, ethics and humanism, in *Nantes. Cumulus Working Papers,* edited by E Salmi & L Anusionwu. Helsinki: University of Art and Design:7-8.

Leonard, D & Rayport, JF. 1997. *Spark innovation through empathic design*. [O]. Available: http://hbr.org/1997/11/spark-innovation-through-empathic-design/ar/1 Accessed 15 February 2012.

Lester, RK, Piore, MJ & Malek, KM. 1998. *Interpretive management: what general managers can learn from design*. [O]. Available: https://hbr.org/1998/03/interpretive-management-what-general-managers-can-learn-from-design/ar/1 Accessed 15 February 2012.

Lindberg, T, Gumienny, R, Jobst, B & Meinel, C. 2010. Is there a need for a design thinking process?, *in DTRS8 Interpreting design thinking. Symposium proceedings,* edited by K Dorst, S Stewart, I Staudinger, B Paton & A Dong. Sydney: DAB Documents: 243-254.

Lombardi, V. [Sa]. *What is design thinking?* [O]. Available: http://noisebetweenstations.com/personal/weblogs/?page_id=1688 Accessed 30 December 2014.

Manzini, E. 2006. Design, ethics and sustainability. Guidelines for a transition phase, in *Nantes. Cumulus Working Papers,* edited by E Salmi & L Anusionwu. Helsinki: University of Art and Design:9-15.

Manzini, E. 2009. Viewpoint. New design knowledge. *Design Studies* 30(1):4-12.

Margolin, V. 1992. Design history or design studies: subject matter and methods. *Design Studies* 13(2):104-116.

Martin, R. 2004. The design of business. *Rotman Management* Winter:7-10.

Martin, R. 2008. Choices, conflict and the creative spark: the problem-solving power of integrative thinking. *Rotman Magazine* Winter:4-8.

Martin, R. 2009a. *The design of business. Why design thinking is the next competitive advantage*. Massachusetts: Harvard Business Press.

Martin, R. 2009b. The science and art of business. *Rotman Magazine* Winter:4-8.

Martin, R. 2009c. Wicked problems. *Rotman Magazine* Winter:3.

Martin, R. 2012. Wicked problems II. *Rotman Magazine* Spring:3.

Martin, R. [Sa]. *Design thinking*. [O]. Available: http://rogerlmartin.com/devotions/design-thinking/ Accessed 12 February 2013.

Martin, R & Riel, J. 2011. The mash up: merging ideas takes more than wishful thinking; it takes integrative thinking. *Rotman Magazine* Winter:4-9.

McCann-Erickson Worldgroup. 2002. *Can sustainability sell?* [O]. Available: www.pnuma.org/eficienciarecursos/documentos/can_susta.pdf Accessed 7 April 2015.

McCoy, K. 2003. Good citizenship. Design as a social and political force, in *Citizen designer. Perspectives on design responsibility*, edited by S Heller & V Vienne. New York: Allworth Press:2-8.

McCullagh, K. 2010. *Design thinking: everywhere and nowhere, reflections on the big re-think*. [O]. Available: http://www.core77.com/blog/featured_items/design_thinkingeverywhere_and_nowhere_reflections_on_the_big_re-think__16277.asp Accessed 19 March 2012.

Meagher, R. 1988. Technē. *Perspecta* 24:158-164.

Meggs, PB. 1983. *The history of graphic design*. New York: Van Nostrand Reinhold.

Merholz, P. 2009. *Why design thinking won't save you*. [O]. Available: https://hbr.org/2009/10/why-design-thinking-wont-save.html Accessed 15 February 2012.

Miziolek, J. 2012. *Design thinking starts at the top*. [O]. Available: http://www.fastcompany.com/print/3002635 Accessed: 8 January 2013.

Moldoveanu, M. 2009. Hunches, heuristics, and algorithms: a quick note, in *The design of business. Why design thinking is the next competitive advantage,* by R Martin. Massachusetts: Harvard Business Press:10-11.

Mossayeb, S. 2013. *How design thinking could help solve the skills gap*. [O]. Available: http://magazine.good.is/articles/how-design-thinking-could-help-solve-the-skills-gap Accessed 13 February 2013.

Murlis, J. 1977. The role of the designer in disaster relief, in *Design for need. The social contribution of design,* edited by J Bicknell & L McQuiston. Oxford: Pergamon Press:54-63.

Myers, BL & Copplestone, T. 1977. *The family encyclopedia of art*. New York: Holt, Rinehart & Winston.

Nelson, G. 1957. *Problems of design*. New York: Whitney.

Nelson, HG & Stolterman, E. 2012. *The design way*. Second edition. Cambridge: MIT Press.

Norman, D. 2010. *Design thinking: a useful myth*. [O]. Available: http://www.core77.com/blog/columns/design_thinking_a_useful_myth_16790.asp Accessed 23 December 2014.

Nozick, R. 1989. *The examined life: philosophical meditations*. New York: Simon & Schuster.

Nussbaum, B. 2004. *The power of design*. [O]. Available:
http://www.businessweek.com/stories/2004-05-16/the-power-of-design
Accessed 25 April 2012.

Nussbaum, B. 2005. *Getting schooled in innovation*. [O]. Available:
www.ritasue.com/downloads/BusWeek10305RSS.pdf
Accessed 25 April 2012.

Nussbaum, B. 2007. *Are designers the enemy of design?* [O]. Available:
http://www.businessweek.com/innovate/NussbaumOnDesign/archives/2007/03/are_designers_t.html
Accessed 18 November 2014.

Nussbaum, B. 2011. *Design thinking is a failed experiment. So what's next?* [O]. Available:
http://www.fastcodesign.com/1663558/design-thinking-is-a-failed-experiment-so-whats-next
Accessed 27 April 2012.

Nussbaum, MC. 1997. *Cultivating humanity: a classical defense of reform in liberal education*. [Sl]: [sn].

Owen, CL. 1993. *Considering design fundamentally. Models for design planning*. [O]. Available:
https://www.id.iit.edu/models/considering-design-fundamentally
Accessed 5 July 2015.

Owen, CL. 1998. Viewpoint. Design research: building the knowledge base. *Design Studies* 19(1):9-20.

Owen, CL. 2004. Responsible design. Achieving living excellence: implications, warnings and a call to action. Speech given at eDesign2004 International Conference on environmental design for living excellence 2004: contemporary issues and solutions, 13-14 December, University Teknologi MARA, Shah Alam, Selangor, Malaysia.

Owen, CL. 2005a. *Design thinking. What it is. Why it is different. Where it has new value*. [O]. Available:
https://www.id.iit.edu/wp-content/uploads/2015/03/Design-thinking-what-it-is-owen_korea05.pdf
Accessed 30 April 2015.

Owen, CL. 2005b. *Societal responsibilities. Growing the role of design*. [O]. Available:
https://www.id iit.edu/wp-content/uploads/2015/03/Societal-responsibilities-Owen_taiwan05.pdf
Accessed 30 April 2015.

Owen, CL. 2006a. *Design thinking: driving innovation*. [O]. Available:
https://www.id.iit.edu/wp-content/uploads/2015/03/Design-thinking-driving-innovation-owen_desthink06.pdf
Accessed 30 April 2015.

Owen, CL. 2006b. Design thinking: notes on its nature and use. *Design Research Quarterly* 1(2):16-27.

Owen, CL. 2007. Education for design. Design for education. Paper presented at the American Educational Research Association, Annual meeting, 12 April, Chicago, Illinois.

Papanek, V. 1984. *Design for the real world. Human ecology and social change*. Second edition. London: Thames & Hudson.

Pevsner, N. 1936. Post-war tendencies in German art schools. *Journal of the Royal Society of Arts* 84(4339):247-262.

Pourdehnad, J, Wexler, ER & Wilson, DV. 2011. Systems & design thinking: a conceptual framework for their integration. Paper presented at the International Society for the Systems Sciences (ISSS), Fifty Fifth Annual Conference, All together now: working across disciplines, 17-22 July, University of Hull, United Kingdom.

Poyner, R. 2009. Design is about democracy, in *Design studies. A reader,* edited by H Clark & D Brody. Oxford: Berg:176-179.

Project Masiluleke. [Sa]a. [O]. Available: http://poptech.org/project_m/ Accessed 7 October 2014.

Project Masiluleke. [Sa]b. [O]. Available: http://poptech.org/system/uploaded_files/27/original/Project_Masiluleke_Brief.pdf Accessed 7 October 2014.

Raufflet, E. 2009. Mobilising business for post-secondary education: CIDA University, South Africa. *Journal of Business Ethics* 89:191:202.

Razzouk, R & Shute, V. 2012. What is design thinking and why is it important? *Review of Educational Research* 82:330-348.

Reyburn, D. 2008. Nomads at a crossroads (x-roads): a framework for ethical design in South Africa. *Image & Text* 14:6-17.

Riel, J. 2009a. Building a design thinking organisation from within, in *The design of business. Why design thinking is the next competitive advantage,* by R Martin. Massachusetts: Harvard Business Press:83-86.

Riel, J. 2009b. Why you've never heard of Charles Sanders Peirce, in *The design of business. Why design thinking is the next competitive advantage,* by R Martin. Massachusetts: Harvard Business Press: 66-67.

Riel, J. 2009c. Wicked problems, in *The design of business. Why design thinking is the next competitive advantage,* by R Martin. Massachusetts: Harvard Business Press: 94-95.

Riel, J & Martin, R. 2012. Integrative thinking three ways: creative resolutions to wicked problems. *Rotman Magazine* Spring:4-9.

Rittel, HWJ. 1984. Second-generation design methods, interviewed by DP Grant & J Protzen, in *Developments in design methodology,* edited by N Cross. Chichester: John Wiley:317-327.

Rittel, HWJ & Webber, MM. 1973. Dilemmas in a general theory of planning. *Policy Sciences* 4:155-169.

Rittel, HWJ & Webber, MM. 1984. Planning problems are wicked problems, in *Developments in design methodology,* edited by N Cross. Chichester: John Wiley & Sons: 135-144.

Roozenburg, NFM, Chen, LL & Stappers, PJ (eds). 2011. Proceedings of IASDR2011, the Fourth World Conference on Design Research, 31 October-4 November, Delft, Netherlands.

Rule, A. 2008. *The revolution will not be designed*. [O]. Available: http://inthesetimes.com/article/3464/the_revolution_will_not_be_designed Accessed 5 July 2015.

Saffer, D. 2005. *Thinking about design thinking*. [O]. Available: http://www.odannyboy.com/blog/new_archives/2005/03/thinking_about.html Accessed 30 December 2014.

Salmi, E & Anusionwu, L (eds). 2006. *Nantes. Cumulus Working Papers*. Helsinki: University of Art and Design.

Sanders, EBN. 2001. Virtuosos of the experience domain. Paper presented at Proceedings of the 2001 IDSA Education Conference.

Sanders, L & Simons, G. 2009. *A social vision for value co-creation in design*. [O]. Available: http://timreview.ca/article/310 Accessed 5 July 2015.

Sanford, C. 2011. *The responsible business. Reimagining sustainability and success*. San Francisco: Jossey-Bass.

Sato, S. 2009. Beyond good: great innovations through design. *Journal of Business Strategy* 30(2):40-49.

Schön, DA. 1983. *The reflective practitioner. How professionals think in action*. New York: Basic.

Schön, DA. 1995. The new scholarship requires a new epistemology. *Change* 27(6):sp.

Schön, DA. 2009. Designing. Rules, types and worlds, in *Design studies. A reader,* edited by H Clark & D Brody. Oxford: Berg:110-114.

Serrat, O. 2010. *Design thinking*. [O]. Available: http://digitalcommons.ilr.cornell.edu/intl/181 Accessed 29 June 2012.

Sewchurran, K. 2014. *#MakeChange: think like a designer*. [O]. Available: http://www.designindaba.com/articles/point-view/makechange-think-designer Accessed 10 August 2015.

Shenk, D. 2011. *The genius in all of us. Why everything you've been told about genetics, talent and intelligence is wrong*. London: Icon.

Simon, HA. 1984. The structure of ill-structured problems, in *Developments in design methodology,* edited by N Cross. Chichester: John Wiley:145-166.

Simon, HA. 1988. The science of design: creating the artificial. *Design Issues* 4(1):67-82.

Simon, HA. 1996. *The sciences of the artificial*. Third edition. Cambridge: MIT Press.

Solomon, A. 2012. *Design for social good: an interview with David Kelley*. [O]. Available: http://boingboing.net/2012/09/22/design-thinking-for-social-goo.html Accessed 13 February 2013.

Sotamaa, Y. 2006. Ethics and the global responsibility, in *Nantes. Cumulus Working Papers,* edited by E Salmi & L Anusionwu. Helsinki: University of Art and Design:5-6.

Sparke, P. 1988. Peter Reyner Banham 1922-1988. *Journal of Design History* 1(2):141-142.

Stewart, SC. 2011. Editorial. Interpreting design thinking. *Design Studies* 32(6):515-520.

Suri, JF & Howard SG. 2006. Going deeper, seeing further: enhancing ethnographic interpretations to reveal more meaningful opportunities for design. *Journal of Advertising Research* 1:246-250.

Sutton, RI & Hargadon, A. 1996. Brainstorming groups in context: effectiveness in a product design firm. *Administrative Science Quarterly* 41(4):685-718.

TED. [Sa]a. *Our organisation*. [O]. Available: https://www.ted.com/about/our-organization Accessed 23 July 2015.

TED. [Sa]b. *TEDx program*. [O]. Available: https://www.ted.com/about/programs-initiatives/tedx-program Accessed 23 July 2015.

Terrey, N. 2010. Design thinking situated practice: non-designers – designing, *in DTRS8 Interpreting design thinking. Symposium proceedings,* edited by K Dorst, S Stewart, I Staudinger, B Paton & A Dong. Sydney: DAB Documents:369-379.

Thackara, J. 2005. *In the bubble. Designing in a complex world*. Cambridge: MIT Press.

The city of Cape Town's successful bid to be World Design Capital 2014. [Sa]. [O]. Available: http://www.capetown2014.co.za/about/ Accessed 29 July 2015.

Thomson, EM. 1991. Review. Ulm design: the morality of objects by Herbert Lindinger & David Britt. *Art Documentation: Journal of the Art Libraries Society of North America* 10(3):163-164.

Tiles, JE. 1984. "Technē" and moral expertise. *Philosophy* 59(227):49-66.

Timmins, J & Portalier, J. 2002. Hedonism versus hair shirts, *in Can sustainability sell?* [O]. Available: www.pnuma.org/eficienciarecursos/documentos/can_susta.pdf Accessed 7 April 2015.

Tischler, L. 2009a. *Ideo's David Kelley on "design thinking"*. [O]. Available: http://www.fastcompany.com/1139331/ideos-david-kelley-design-thinking Accessed 8 January 2013.

Tischler, L. 2009b. *Want to improve democracy? Try design thinking*. [O]. Available: http://www.fastcompany.com/1371803/want-improve-democracy-try-design-thinking Accessed 8 January 2013.

Tonkinwise, C. 2004. Ethics by design; or the ethos of things. *Design Philosophy Papers* (2):sp.

Tonkinwise, C. 2011. A taste for practices: unrepressing style in design thinking. *Design Studies* 32(6):533-545.

Tsoukas, H & Chia, R. 2002. On organisational becoming: rethinking organisational change. *Organisation Science* 13(5):567-582.

Turnbull, J, Lea, D, Parkinson, D, Phillips, P, Francis, B, Webb, S, Bull, V & Ashby, M (eds). 2010. *Oxford advanced learner's dictionary of current English*. Eighth edition. Oxford: Oxford University Press.

Van Zyl, R (HM). 2008. Buchanan's design thinking matrix: implications for SMMEs. Paper presented at the International DMI Education Conference, Design thinking: new challenges for designers, managers and organisations, 14-15 April, ESSEC Business School, Cergy-Pointoise, Paris, France.

Walker, JA. 1989. *Design history and the history of design*. London: Pluto.

Walker, JA. 2009. Defining the object of study, in *Design studies. A reader,* edited by H Clark & D Brody. Oxford: Berg:42-48.

Waloszek, G. 2012. *Introduction to design thinking*. [O]. Available: http://www.sapdesignguild.org/community/design/print_design_thinking.asp Accessed 13 February 2013.

Walters, H. 2011a. *"Design thinking" isn't a miracle cure, but here's how it helps*. [O]. Available: http://www.fastcodesign.com/1663480 Accessed 2 January 2012.

Walters, H. 2011b. *The real problems with design thinking*. [O]. Available: http://helenwalters.com/2011/07/22/the-real-problems-with-design-thinking/ Accessed 4 June 2012.

Wang, J. 2013. The importance of Aristotle to design thinking. *Design Issues* 29(2):4-15.

Weber, LM. 2009. Design ethnography: strategy for visual communications. Graduate thesis, Visual Communication Design, University of Washington.

What is the WDC? [Sa]a. *History*. [O]. Available: http://www.worlddesigncapital.com/what-is-the-wdc/history/ Accessed 29 July 2015.

What is the WDC? [Sa]b. *Vision and mission*. [O]. Available:
http://www.worlddesigncapital.com/what-is-the-wdc/vision-and-mission/
Accessed 29 July 2015.

White, C & Stewart, E. 2008. *Aligned for sustainable design. An a-b-c-d approach to making better products*. [O]. Available:
http://www.bsr.org/reports/bsr_sustainable_design_report_0508.pdf
Accessed 18 November 2014.

Winchester, B. 2010. *To succeed at design thinking, look at the Bible*. [O]. Available:
http://www.lsb.com/blog/to-succeed-at-design-thinking-look-to-the-bible/
Accessed 29 December 2014.

Winchester, B. 2011. *Is design thinking really dead?* [O]. Available:
http://www.lsb.com/blog/is-design-thinking-really-dead/
Accessed 15 February 2010.

Winchester, WW (III). 2009. Catalysing a perfect storm: mobile phone-based HIV-prevention behavioural interventions. *Interactions* November, December:6-12.

Winkler, M. 2001. *Design Indaba mission: critical*. [O]. Available:
www.designindaba.com/articles/design-indaba-news/design-indaba-mission-critical
Accessed 29 July 2015.

World Design Capital Cape Town 2014. [Sa]. [O]. Available:
www.icsid.org/projects/world_design_capital/articles1290.htm
Accessed 29 July 2015.

Wroblewski, L. 2007. *Tim Brown: innovation through design thinking*. [O]. Available:
http://www.lukew.com/ff/entry.asp?451
Accessed 30 December 2014.

Young, G. 2010. *Design thinking and sustainability*. [O]. Available:
http://zum.io/wp-content/uploads/2010/06/Design-thinking-and-sustainability.pdf
Accessed 22 April 2014.