

Design thinking in South Africa:
An exploratory study among
Johannesburg design agencies
using force field analysis.

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I hereby declare that this dissertation submitted for the Vega Master of Arts in Creative Brand Leadership degree to The Independent Institute of Education is my own work and has not previously been submitted to another university or higher education institute for a degree.

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Table of contents	
LIST OF FIGURES	6
LIST OF TABLES	7
ABSTRACT	8
 CHAPTER 1: INTRODUCTION	 9
1.1. Background	10
1.2. Problem statement	10
1.3. Research questions and objectives	10
1.4. Motivation for this study	12
1.5. Context of study	13
1.6. Research paradigm	14
1.7. Ethical process and limitations of the study	15
1.8. Chapter exposition	16
 CHAPTER 2: METHODOLOGY AND DATA COLLECTION	 18
2.1. Research paradigm	18
2.2. Conceptualisation and definitions	19
2.3. Research procedure	20
2.4. Key variables	21
2.5. Research design	22
2.6. Sample design and sampling methods	23
2.7. Data collection methods and fieldwork practice	27
2.8. Data capturing and data editing	28
2.9. Data analysis	30
2.10. Interpretation of data	31
2.11. Shortcomings and sources of error	31
 CHAPTER 3: LITERATURE REVIEW	 32
3.1. Introduction to the literature	33
3.1.1. Design	33
3.1.2. Design thinking	34
3.2. THE FOUR ORDERS OF DESIGN	37
3.2.1. First and second orders of design: inventing and judging	40
3.2.2. Third order of design: Deciding	43
3.2.3. Fourth order of design: evaluating	46

3.3. AN OVERVIEW OF THE PILLARS OF DESIGN THINKING	50
3.3.1. Placing people at the centre when solving problems	51
3.3.2. Collaboration as a way to build bridges between stakeholders	54
3.3.3. Holistic way of working	59
3.3.4. Integration of disciplines: multidisciplinary teams	64
3.3.5. Combination of mental processes: abductive reasoning	70
3.3.6. Wicked problems: building a shared understanding	75
3.4. DESIGN THINKING PROCESSES	81
3.4.1. Seven-stage approach	82
3.4.2. Five-stage approach	83
3.5. Conclusion	84
 CHAPTER 4: DATA ANALYSIS AND FINDINGS	 88
4.1. Analysis of data	88
4.2. Theme 1 The role of the designer	88
4.2.1. Fourth order of design: Evaluating	88
4.3. Theme 2 Characteristics of design thinking	90
4.3.1. Placing people at the centre when solving problems	90
4.3.2. Collaboration as a way to build bridges between stakeholders	92
4.3.3. Holistic way of working	95
4.3.4. Integration of various disciplines: multidisciplinary teams	97
4.3.5. Combination of mental processes: abductive reasoning	99
4.3.6. Wicked problems: building a shared understanding	101
4.3.7. Design thinking processes	103
4.4. Key findings	109
 CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS	 111
5.1. Summary of main points	112
5.2. Interpretation of results in terms of the literature review	112
5.3. Broader meaning of results	117
5.4. Conclusion	118
5.5. Limitations and implications for future research	120
 REFERENCES	 121
APPENDIX A: INTERVIEW SCHEDULE	140
APPENDIX B: PARTICIPANT CONSENT FORMS	145

List of figures

Figure 3.1.	Principles of design thinking: a revised illustration from Cerejo and Barbosa (2014)	37
Figure 3.2.	Widening domain of the designer and design process: a revised illustration from Golsby-Smith (1996)	39
Figure 3.3.	Communication scheme of the first and second orders of design: a revised illustration from Golsby-Smith (1996)	40
Figure 3.4.	<i>The dark side of the moon</i> , Pink Floyd, 1973, designed by Storm Thorgerson and George Hardie (Pinkfloyd.wikia n.d.)	41
Figure 3.5.	Opinel knife, No. 8, 1890, designed by Joseph Opinel (Opinel 2014)	42
Figure 3.6.	Initial communication scheme of the third order of design: a revised illustration from Golsby-Smith (1996)	44
Figure 3.7.	Kitimoto, school bench and table for children, 2013, designed and manufactured by Bethan Rayner and Naeem Biviji, Kenya (Studio Propolis 2015)	45
Figure 3.8.	Final communication scheme of the third order of design: a revised illustration from Golsby-Smith (1996)	46
Figure 3.9.	EACC addition, Castellón de la Plana, exposition space, 2013, designed and built by Santiago Cirugeda, Spain (Sanguigni 2015)	49
Figure 3.10.	Whole systems design framework: a revised illustration from Blizzard and Klotz (2012)	62
Figure 3.11.	Modes of a human-centred design process: a revised illustration from Stanford d.school Bootleg Bootcamp (Stanford d.school 2011)	83
Figure 4.1.	Force field analysis of Cluster A	90
Figure 4.2.	Force field analysis of Cluster B	92
Figure 4.3.	Collaboration diagram	93
Figure 4.4.	Force field analysis of Cluster C	95
Figure 4.5.	Force field analysis of Cluster D	97
Figure 4.6.	Force field analysis of Cluster E	99

Figure 4.7.	Rea[c]ting illustration	101
Figure 4.8.	Force field analysis of Cluster F	101
Figure 4.9.	Force field analysis of Cluster G	103
Figure 4.10.	Process of ideation, implementation and production	104
Figure 4.11.	Closed-ended process	105
Figure 4.12.	Open-ended play process	105
Figure 4.13.	Force field analysis of Cluster H	106
Figure 4.14.	Force field analysis of Cluster I	109
Figure 4.15.	Force field analysis of Theme 1	109
Figure 4.16.	Force field analysis of Theme 2	111

List of tables

Table 2.1.	Methodological procedure for the application of the proposed data collection method	20
Table 2.2.	Interview roster	28
Table 2.3.	Analysis of data according to themes and clusters	30
Table 2.4.	Description of number of participants	31
Table 3.1.	Buchanan's matrix: human abilities and design disciplines: a revised table from Buchanan (2001, 1998)	38

Abstract

The aim of this research is twofold. The first aim of this study explains how the role of the visual designer has widened and consequently influenced other spheres, such as being part of the decision-making process during problem-solving activities. Second, the research aims to explain how and why design thinking can assist with solving problems, adding value and promoting innovation in the brand leadership space. In this regard, the notion of design leaders is identified as a way for organisations to develop a more design-minded culture, be more competitive and develop new approaches to innovation. The aim is to investigate the core of design thinking from its original perspective as a problem solving activity to promote design solutions. An interview schedule developed from the literature review, contains open-ended questions regarding the four orders of design, as well as the six pillars of design thinking. Five South African design agencies are identified from which individuals were interviewed using an interview schedule. The following clusters are investigated: the four orders of design, human-centred approach, collaboration, holistic approach, multidisciplinary design teams, abductive reasoning, wicked problems, and stages in the process of design thinking and the South African design landscape.

The study concludes that there is a lack of understanding of what exactly designers do. It is observed that designers need to have self-confidence and should not function in silos. This may assist them in developing design-minded organisations and, more importantly, act as design leaders. Not only designers but non-designers too need to realise that they themselves are at the centre of the problem-solving process (Brown 2008) and that organisations should make use of design leaders for future success. Second to this are the enormous benefits that design thinking may hold for the entire South African economic sector. The data point out that although design thinking exists as a theory, in reality people do not apply the unique and integrative characteristics of design thinking. South Africa presents adequate opportunities for designers to engage in and apply design thinking, not only to solve complex problems but also to add value to peoples' lives.

CHAPTER 1: Introduction

1.1. Background

This dissertation describes research that was conducted to determine to what extent the designer instigates ideation and practice in design thinking. The research also describes what design thinking could bring to the practice of design/visual communication in its intended form as an approach to design problem solving. This study is necessary because of the increasingly important notion that design and indeed design thinking could assist with creative problem solving, add value to an organisation, and promote innovation (Bason 2014; Du Plessis, Sehume, Martin 2014; Beckman & Barry 2007). Within this context, design thinking offers a new and exciting model for multidisciplinary teams across areas as wide as engineering and science.

Design thinking could benefit any type of organisation by making use of team intelligence, creativity and the desire to make a meaningful impact on the lives of customers. Lockwood (2010) in particular believes that design leadership and design strategy are outputs of effective design thinking and design management. These two outputs generally lie in the areas of integrating design into business. Design leaders (Lockwood 2010; Clark & Smith 2010; Borja de Mozota 2010) are consequently identified as people who assist organisations to develop more design-minded cultures and who help create new approaches to innovation (Jenkins 2010).

The rest of this chapter discusses the reasons for engaging in this study and looks at our ever-changing world as the context for the future success of design thinking. The research design can be justified within the context of an interpretive paradigm (Burrell & Morgan 1979). For the purpose of this study the term paradigm refers to a set of assumptions, concepts and practices that represent a way of viewing reality for the community that shares them (Göktürk n.d.). More specifically an interpretive paradigm tries to explain the constancy of behaviour from the viewpoint of the individual (Krauss 2005; Burrell & Morgan 1979). The twofold aim of the study is explained by referring to the role of the designer and the characteristics of design thinking. Specific research questions and objectives are outlined to achieve the aims

of this study. The motivation and context of this study is unpacked followed by a description of the research paradigm, ethical process and limitations of the study. This chapter concludes with an outline of the chapter contents of the rest of the dissertation.

1.2. Problem statement

The aim of this research is twofold. The first aim of this study is to explain how the role of the designer has widened and consequently influenced other spheres. Second, the research aims to explain how and why design thinking could assist with problem solving, adding value and promoting innovation. The aim is to investigate the core of design thinking from its original perspective as a problem-solving activity to foster design solutions. The proposed approach for this study is that design thinking theory is not necessarily applied in the reality of design practices. From these two perspectives, the outcome of this study is ideally to overcome the gap between rational scientific thinkers and the more intuitive design thinkers (Borja de Mozota 2010; Williams & Newton 2007). This problematic communication gap was recently discussed among design educators at a conference to promote a better understanding between secondary and tertiary educational institutions (The Idea Collective: Innovative Design Education Africa, 6–7 May 2016, South Africa). Although design education is beyond the scope of this study it is worth noting that a recurring theme was discussed between designers and educators, namely how can design thinking be applied to help solve problems?

1.3. Research questions and objectives

The following two critical questions were formulated in an effort to achieve the aims of this study.

In the context of the design agency,

1. To what extent is the designer the sole instigator of ideation and practitioner of design thinking?
2. What can design thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving?

By answering Question 1, this study hopes to identify to what extent the designer instigates ideation and to establish the link between design thinking and the role of designers. The views of several authors on design thinking (Cerejo & Barbosa 2014; Bason 2014; Kimbell 2011; Anderson 2007; Buchanan 2001; Golsby-Smith 1996) guided this research to question whether the designer is indeed the sole instigator of ideation and practitioner of design thinking. The role of the designer has shifted from solving basic problems to working on more complex ones. Designers have moved away from working independently in a single-discipline focus to being part of collaborative multidisciplinary teams (Lockwood 2010). Design leaders are creating new approaches to innovation and are becoming agents of cultural change (Jenkins 2010). This study investigates where the designer might be situated in the design process of design thinking, be it somewhere between being the main agent and working in collaborative teams. It therefore considers how design thinking is situated in common practice as a way of understanding what designers do.

By answering Question 2 this study further hopes to show the emerging importance of applying design thinking as an approach to problem solving. Zwart (2014) acknowledges the importance of design thinking, and argues that the rise in the profile of design thinking in the business arena has led to a need to be proficient in these methods. Competent design thinkers are therefore required to be creative practitioners in 2014 and beyond (Zwart 2014; Bason 2014; Steinbeck 2011). This is a pertinent statement regarding the current state of design in the South African context. Even within the design realm, design thinking may be partly ignored and even taken for granted, despite a long history of academic development (Johansson-Sköldberg, Woodilla & Çetinkaya 2013).

This study is focused on design thinking as a front-end innovation process and does not investigate design strategy. It does not look at design thinking as a way of making the big idea commercially viable nor does it aim to explain the interrelated activities of design that add up to net commercial gain and competitive advantage for organisations (Fraser 2010). It is therefore not the intention of the study to identify design thinking as a way to design business strategies and business models for enterprise success. Rather, this research is focused on how design thinking could be applied to address visual design challenges in an effort to foster creative problem solving and to define the role of the designer. The roles of design and designers have shifted in the past decade and are now recognised as key business assets that

add value. The changes in the role of creativity and design in business are here to stay and it is vital for organisations to develop a more design-minded way of working (Lockwood 2010).

The methodologies of design thinking as applied in its intended form to the design paradigm have not been significantly investigated (Du Plessis et al. 2014). Although the academic literature yields an extensive range of studies on human-centred design, collaboration, the holistic nature of design thinking, abductive reasoning and wicked problems, there is a gap in research that explores the potential needs for design thinking in the South African design landscape. The term *design* refers to a diverse variety of creative productivity. This study focuses on the visual design output from the South African design studios that were interviewed. These types of design outputs include brand identity, print design and the involvement of designers in the problem-solving process.

1.4. Motivation for this study

I have been practising as a graphic designer since graduating in 1997. During this time, I became increasingly aware that my work as a professional designer was simply regarded by many as a traditional way of producing artefacts and visual designs by using form and function, a sentiment shared by Cerejo and Barbosa (2014). The South African design industry seems quite unaware of the full potential of design thinking as a way to solve problems and not merely to produce artefacts of aesthetic value.

Furthermore, senior designers were never part of initial brief-in sessions; nor did they partake in strategic meetings with design agency clients. It seems as if designers do not form part of the stakeholder group who are supposed to solve problems. Cerejo and Barbosa (2014) say that this may happen because of a general belief that designers are seen as performers and not idea generators who can add value. Designers up to have now been only in the 'roll-up-your-sleeves-and-get-it-done part of humanity' (Clark & Smith 2010:56). Designers should therefore be seen not only as doers, but also as advisors and mentors (Clark & Smith 2010). I began to reflect on the great benefits that design thinking, and especially the designer as a design thinker, could contribute to problem solving. It was therefore this lack of understanding of what exactly designers do and the enormous benefits that design

thinking may hold for the entire economic sector, such as co-design and new participatory design methods which are seen as constructive tools for 'citizen engagement and supporting shared models for decision-making' (Bason 2014:37) that inspired me to engage in this research.

1.5. Context of study

Shifts in society and organisations because of social, technological and demographic changes demand a new way of problem solving. From preliminary readings it became clear that the tendency to use design and design thinking as a mindset is by no means a new idea. Modern-day realities call for new innovative ways of thinking by all stakeholders in an attempt to solve complex problems that are incomplete or contradictory (Beacham & Shambaugh 2011; Best 2010; Conklin, Basadur & VanPatter 2007; Buchanan 1992). These types of problems for which there are no straightforward methods of solution are known as wicked problems (Lexicon 2016b). The world is changing at a fast pace. New things are discovered and we invent new coping mechanisms to deal with constant change. Future success depends on our capability to manage and lead the profession of design in the context of these changes (Best 2010). For this to happen, people need to realise that they themselves are at the centre of the problem-solving process (Brown 2008).

The human-centred approach forms the broader context of this study. People should embrace the idea that collaboration and multidisciplinary teams may provide a wider range of skills (Scariot, Heemann & Padovani 2012). These multidisciplinary skills, coupled with suitable knowledge and collaboration, are what is called for in today's challenging world of work. To be agents of change, organisations of today need to 'combine their processes with the more emotional thought models associated with design, such as empathy, intuition, imagination and creativity' (Cerejo & Barbosa 2014:3). Furthermore, this study relates to brand leadership by identifying the notion of *design leaders* (Lockwood 2010; Clark & Smith 2010; Borja de Mozota 2010) as a way for organisations to develop a more design-minded culture. These design leaders act as catalysts in assisting other parts of an organisation to both adopt and use design thinking. Design leaders therefore not only create new approaches to innovation, but undertake an entire cultural transformation within organisations (Jenkins 2010).

The specific context of this study is the current South African design landscape with reference to multidisciplinary design studios in Johannesburg. Multidisciplinary design studios make use of various professional disciplines such as graphic designers, interior designers, photographers, architects, space planners, copywriters and even medical doctors to jointly and collaboratively find solutions to design challenges. It is evident from the literature that investments in the area of design are no longer only for aesthetic purposes, but for strategic decision-making (Cerejo & Barbosa 2014; Clark & Smith 2010; Van Zyl 2008; Anderson 2007; Buchanan 1992). It is here, within the four orders of design by Buchanan (2001, 1992), that the initial ideas for this study surrounding the role of the designer and the application of design thinking started to become clear. The four orders of design led the literature reading to the six pillars of design thinking (Cerejo & Barbosa 2014), which is used as both a theoretical framework and matrix for data collection and data analysis.

1.6. Research paradigm

A research paradigm is the 'identification of the underlying basis that is used to construct a scientific investigation' (Krauss 2005:759). The position of this investigation in terms of the nature of scientific truth is within the epistemological debate. The epistemological debate is argued from two viewpoints, namely the positivist paradigm and the naturalist or constructivist view. The positivist paradigm argues that the object of study is not connected to researchers and that knowledge is discovered and validated through direct observations. The alternative view from the naturalist or constructivist within the epistemological debate is that 'knowledge is established through the meanings attached to the phenomena studied' (Krauss 2005:759) whereby researchers interact directly with the subjects of study to acquire data (Krauss 2005; Cousins 2002; Burrell & Morgan 1979).

Its interpretivist stance is embodied in the epistemological assumption that people use certain common-sense behaviours. This study explains these according to the four orders of design and the six pillars of design thinking. This study may be categorised within the nature of society from within the theory of *order*. This theory forms part of the debate between the two theories of society, namely *order* and *conflict* (Burrell & Morgan 1979; Coser 1967; Dahrendorf 1959). According to the *order* view of society, emphasis is placed on stability, integration and functional co-ordination. The *order* theory states that society is generally seen as well-ordered and

display relatively stable patterns of behaviour. The opposing view of *conflict* emphasise change, conflict and disintegration in society. Conflict theory therefore maintains that conflict arise when resources, status and power are not evenly dispersed between groups in society (Burrell & Morgan 1979; Coser 1967; Dahrendorf 1959). From the first mentioned subjective-objective debate the study is positioned within the interpretive paradigm (Burrell & Morgan 1979).

1.7. Ethical process and limitations of the study

In order to capture empathic understanding and gain insight into the day-to-day working environment of the chosen participants, the information was recorded using audio recordings. This was done during semi-structured interviews that were guided by interview schedules. To ensure an ethical data collection process the participants were contacted telephonically to discuss their willingness to partake in the research, as well as their availability. A copy of the interview schedule was also sent to them to read before the interview. All the chosen participants agreed to partake in the study and signed participant consent forms (Annexure B). The study captures the data collection period of November 2015 although the participant consent forms were signed between April 2016 and May 2016. The difference therefore in the dates between the conducted interviews and the signing of the consent forms is due to the fact that participants agreed to partake in the research and were given the chance to sign the consent forms at their own convenience after the interviews were held.

Certain limitations were identified regarding sample group and size, prior research studies on the topic and data collection.

Sample group and size

The sample design of this study restricted the investigation to a group of five South African design industry experts. The restricted sample of five Johannesburg-based design agencies was selected due to time and financial constraints. The wider population of this study includes design studios in other parts of South Africa such as Cape Town and Durban. A group of five design experts were identified as a sample group based on their multidisciplinary ways of working. This research was limited to the South African visual communication design landscape in the form of brand identity and print design, and cannot be generalised across national and international

design landscapes. The conclusions and recommendations are concentrated on the design landscape in Johannesburg South Africa in November 2015.

Prior research studies on the topic

The currency and scope of this research topic is limited to the application of design thinking as a way to address certain visual design challenges among Johannesburg design agencies. Although the academic literature search produced prior research on the topic of design thinking such as the application of design thinking (Cerejo & Barbosa 2014; Zwart 2014; Rodgers & Winton 2010; Kimbell 2010, 2011), wicked problems and design in contemporary culture (Buchanan 1992, 1998; Roberts 2000; Khisty 2000), adding value through innovation (Simons & Gupta 2011; Lignon & Wong Kung Fong 2009; Beckman & Barry 2007) and design thinking collaboration (Manzini 2014; Lund 2014), very little research has been carried out on design thinking in the context of the South African visual design landscape. This limitation in prior research, however, proves that there is a gap in the topic of applying design thinking in South African design studios and points towards the need for further research.

Data collection

The use of open-ended questions in an interview schedule proved to be the best way to collect the data during semi-structured interviews (Cohen & Crabtree 2008; Bernard 1988). Other methods of collecting the data such as questionnaires, focus groups and participant observation were not considered. These methods tend not to develop empathy or confidence with the participants (Hannan 2008). Semi-structured interviews do not necessarily limit the study, but in retrospect involved large amounts of relatively unstructured text-based data that were transcribed by the researcher. Participants answered the questions on a personal level, which made transcribing and interpreting their opinions challenging. This study therefore cannot claim to have captured all the opinions and feelings of the participants, especially regarding tone of voice, facial expressions and body language.

1.8. Chapter exposition

Chapter 2 focuses more deeply on the design and methodology of the study.

It defines the research paradigm and discusses the key concepts and variables that formed part of the study. Two main concepts are identified, namely the role of the

designer and the principles of design thinking. This led to a discussion of the reasons for an interview schedule during semi-structured interviews. The sample design is explained, together with the specific sampling techniques that were used. Reasons for choosing a sample size of five participants are discussed. The procedures used in capturing and editing the data are explained. The chapter concludes with a discussion about the quality of data that were collected.

Chapter 3 presents a literature review of design thinking by exploring both the foundation and the principles of design thinking. Key authors Clark and Smith (2010), Lockwood (2010), Fraser (2010), Anderson (2007), Buchanan (2001, 1998, 1992), Harland (2011) and Golsby-Smith (1996) agree that sound design thinking supports problem solving and add value to human lives. The topic of design thinking is investigated by referring to the seminal work of Buchanan (2001, 1998, 1992). The ideas from several authors on the subject of design thinking, including those of Lugmayr and Stockleben (2013), Kimbell (2011, 2012), Dorst (2011) and Williams and Newton (2007), are also taken into account. For the purpose of this study certain clusters as discussed in Chapter 5, were identified from the literature to guide the rest of the research.

Chapter 4 discusses the data that were collected from the open-ended questions that were administered to the sample group through an interview schedule. The data were interpreted according to the two themes (the role of the designer; and characteristics of design thinking) to address the research questions. The data were interpreted and analysed according to themes by referring to them as clusters. A discussion of the main results concludes this chapter in the form of force field analysis.

The fifth chapter discusses the conclusions and recommendations that were obtained in this study. The main points are summarised and discussed according to the identified clusters under the two main themes in an effort to answer the research questions. The connection between the results and the literature review is simultaneously described. The larger relevance and value of the study are then discussed. The chapter concludes with recommendations for potential future research on the topic of design thinking.

CHAPTER 2: Methodology and data collection

This chapter documents the inquiry and methodology that were followed during the fieldwork stage of this study. It begins by defining the research paradigm as an interpretive paradigm that is based on grounded theory. The key concepts and variables that formed part of the study are unpacked. Two main concepts are identified and discussed, namely the role of the designer, and the principles of design thinking. The focus of the research is the application of design thinking as a way to undertake visual design challenges. The research design is then discussed and describes the reasons for choosing the data collection instruments. The decision to collect data about the key variables of design thinking and visual design challenges using an interview schedule during semi-structured interviews is supported.

The sample design is then explained, together with the sampling techniques that were used. The reasons for choosing a sample size of five participants are discussed. Particulars about the data collection process are described by referring to the way in which access was gained to the participants and the data collection techniques are explained. A description of the dates, times and settings of the interviews forms part of this section. The procedures used in capturing and editing the data are described with reference to post-coding procedures. The reasons for using the precise data analysis procedure of this study are substantiated.

2.1. Research paradigm

The position of this study in terms of the nature of scientific truth is located within the epistemological debate (Krauss 2005). The research collection method (open-ended questions) used in this study is a way to obtain the opinions and viewpoints of the industry professionals that were interviewed regarding certain topics. The epistemological assumption implies that the methodology of this study focuses on subjectivism within the four paradigms for the analysis of social theory (Burrell & Morgan 1979). This is apparent from the data samples, which consisted of five individuals who were asked how they, in context of professional practising designers, attempt to create, modify and interpret the world around them.

This study may be categorised within the nature of society from the perspective of the order-stability debate. From this subjective-objective debate the study is

consequently positioned within the interpretive paradigm (Krauss 2005; Burrell & Morgan 1979). This study attempts to understand the subjectively created world and continuing processes from the viewpoint of the individuals (industry professionals) concerned.

2.2. Conceptualisation and definitions

Although not confined to the creative industries in South Africa, creative problem solving presents a challenge for many designers and design agencies. Brown (2008) says that worldwide problems can be solved only through innovation. These problems include unaffordable healthcare, unsustainable energy usage, education systems that fail many students, and companies whose markets are being disrupted by new technologies and demographic shifts. Findings from the literature on the topic of design thinking revealed a better understanding of its characteristics and processes. The researcher's graphic design world of work experience is used as a thinking frame (Henning, Gravett & Van Rensburg 2012). The application of design thinking in addressing visual design challenges among Johannesburg design agencies using force field analysis is the object of this inquiry. A systematic inquiry to address this issue was conducted (Henning et al. 2012). This research was limited to the South African visual communication design landscape in the form of brand identity and print design, and cannot be generalised across national and international design landscapes.

The main argument of this study is based on the literature review from Chapter 3. For the purpose of this research, an exploratory literature review (Adams et al. 2007) was undertaken to see what exists in current academic literature. Two main themes are discussed, namely the role of the designer, and the principles of design thinking. The literature pointed the study towards issues that surround the main dilemma of creative problem solving. Issues such as the general state of design in South Africa and whether design thinking is being ignored are investigated. Furthermore, because several authors (Cerejo & Barbosa 2014; Kimbell 2011; Anderson 2007; Buchanan 2001; Golsby-Smith 1996) question the traditional role of the designer, the study investigates whether designers are indeed solely responsible for ideation and looks at where they are situated in the processes of design.

Before attempting to address these issues, it may be useful to define the two main themes of the literature review so that they are clearly understood in the context of this study. As mentioned before, the two main themes revolve around the role of the designer and the principles of design thinking. These two main themes were identified through the literature review to be able to tease out questions for the interview schedule. The literature review discusses design thinking, which is based on four conceptual categories (the four orders of design). This serves as a basis for the six characteristics or pillars of design thinking. These pillars are used as six conceptual categories.

2.3. Research procedure

The chosen research design for this study is categorised as observational design, whereby information was gathered only once during five individual interviews in November 2015. Differences were then traced back to the past, making this a retrospective design (Adams, Khan, Raeside & White 2007). The following procedure structure, as seen in Table 2.1., was conducted for the application of this method.

Stage	Phase	Objective
Pre-field work	1.1	Identify five multidisciplinary Johannesburg design agencies to interview
	1.2	Define a list of five participants within their respective agencies
	1.3	Define a meeting date, time and setting
Field work	2.1	Conduct interview with participant 1
	2.2	Conduct interview with participant 2
	2.3	Conduct interview with participant 3
	2.4	Conduct interview with participant 4
	2.5	Conduct interview with participant 5
Post-field work	3.1	Analyse data collected from interviews with participants
	3.2	Cluster and organise the data
	3.3	Interpretation of data

Table 2.1. Methodological procedure for the application of the proposed data collection method

The core of design thinking, from its intended perspective as a problem solving activity to promote design solutions, was investigated by asking two critical research questions namely, Is the designer the sole instigator of ideation and practitioner of design thinking?, and What can design thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving? The

literature review deals with both research questions with reference to theories by Cerejo and Barbosa (2014), Rodgers and Winton (2010), Buchanan (2001, 1998) and Brown (2009). As indicated in the literature review, several authors (Cerejo & Barbosa 2014; Bason 2014; Du Plessis et al. 2014; Kimbell 2011; Anderson 2007; Buchanan 2001) contribute to the first question by asking whether the designer is the sole instigator of ideation and practitioner of design thinking. This study aims to investigate where the designer might be situated in the design process of design thinking, be that somewhere between being the main agent and working in collaborative teams.

With regard to the second research question, empirical studies show that competent design thinking is required to be a creative practitioner in today's world of work. In addition, there is a need to bring creativity and innovative thinking back into the creative industries (Zwart 2014; Steinbeck 2011). The second research question of this study consequently intends to investigate the emerging importance of applying design thinking as an approach to visual design problem solving. As suggested by the literature, several authors (Cerejo & Barbosa 2014; Zwart 2014; Curedale 2013b; Johansson-Sköldberg et al. 2013; Kimbell 2011, 2012; Dorst 2011; Rodgers & Winton 2010; Brunner & Emery 2009; Brown 2008; Owen 2005, 2006; Buchanan 2001, 1998) state that design thinking can add value to organisations. Further constructs as revealed by the literature suggest using a human-centred approach for context-sensitive design, collaborating as an activity for knowledge sharing, understanding the design process holistically, making use of multidisciplinary design teams to capitalise on complexity, integrating ways of thinking to aid abductive reasoning, utilising collaboration towards creative solutions for wicked problems and incorporating the interactive and incremental stages in the process of thinking.

2.4 Key variables

The two key variables that form part of this exploratory study are design thinking and visual design challenges. Design thinking may be defined as combining empathy for the context of a problem, creativity in the generation of insights and solutions, and rationality in analysing and fitting various solutions to the problem content. The modern definition of the concept of design thinking sees it as an approach that 'combines domains of business, user-centred design and technology in a

collaborative fashion to produce particular, innovative and user-centred outcomes' (Lugmayr & Stockleben 2013:6).

The three concepts of visual, design and challenges make up the singular variable of visual design challenges. *Visual* is seen as visual information that is interpreted mentally and physically, and includes images from posters, advertisements, packaging, motion graphics, books, magazines, wayfinding, environmental graphics, branding, signage, logotypes type design, design for websites, mobile apps, and blogs (Cezzar 2016). *Design* is defined as the arrangement of these visual elements into a cohesive whole. The concept of *challenges* is seen as projects and briefs as they relate to practising design agencies.

2.5. Research design

The nature of the research setting allows for the collection of interview, written response and quantitative interpretation. The collected data were scored accurately and consistently, as is required by empirical research (Du Plooy 2009). The key variables of design thinking and visual design challenges were interrogated with an interview schedule during semi-structured exploratory interviews (Du Plooy 2009; Adams et al. 2007; Van Rensburg 2000; Bernard 1988). The aim was to engage in a general discussion with the stakeholders about the chosen variables to understand what is important to them (Adams et al. 2007). The semi-structured interviews were led by pre-set questions and allowed enough scope for open-ended answers (Hannan 2008). The main objective was to obtain insight and depth into the research topic and allow the participants to answer the questions in their own words.

The reason therefore for using open-ended questions to collect qualitative data in an interview scenario was because it elicits information about beliefs, attitudes, opinions, feelings, meanings and experiences. Interviews afford interviewees a chance to challenge the agenda set by a researcher in order to raise new issues and to elaborate on questions (Hannan 2008; Cohen & Crabtree 2008; Van Rensburg 2000). The use of semi-structured interviews was flexible enough for the study to allow for possible changes in the order of the questioning, the questions asked and the topics discussed. A semi-structured interview is also the most suitable way of collecting data, especially if there is only one chance to talk to a specific person (Bernard 1988).

Semi-structured interviews also allowed the researcher to prepare questions ahead of the time (Cohen & Crabtree 2008), which aided his effectivity during the interviews. Furthermore, because this study is interested in exploring the individual meanings, perspectives and understandings of certain issues from the participants, the researcher chose not to use other types of face-to-face data collection methods such as focus groups. Verbal responses from focus group members may be less honest and therefore less reliable (Woods 2006; Van Rensburg 2000). To ensure reliably stable and consistent understanding (Du Plooy 2009), the same interview schedule (see Appendix A) was used for all of the interviews. The interview schedule design was valid because it was able to collect the attitudes and opinions of the participants. The subjects being investigated might introduce an element of unreliability in the form of fatigue, emotional or health problems, memory fluctuations and environmental conditions (Du Plooy 2009). Although there was very little control over these types of errors, they were taken into consideration as possible sources of unreliability. The test-retest and split-half methods of assessing reliability were not necessary for this study since the questions posed to participants formed part of a semi-structured interview and served mainly as an interview schedule.

2.6. Sample design and sampling methods

The sample design restricted the investigation to a small group of participants, based on the two primary aims of this research. The first aim was to explain how the role of the designer has widened and consequently influenced other spheres. Second, the research is intended to explain how and why design thinking can assist with problem solving, adding value and promoting innovation. The target population for this study consisted of multidisciplinary studios in the South African design landscape.

Because of time, costs and geographic distance constraints, a total of five multidisciplinary design studios within the city of Johannesburg were investigated. Although there are many other multidisciplinary design studios in South Africa, only those within Johannesburg were chosen based on their experience in branding and design which is evident from several awarded accolades. Some of these awards include Agency of the Year runner up in 2011 for Black Africa Group (Black Africa Group 2015), Golden Clio Award, Pica Award and Loerie Award for CyberGraphics studio (CyberGraphics 2015) and Agency of the Year in 2014 for Joe Public (Adlip

2015). The rather focused number of elements in the sample size may be expected in a qualitative research design. The sample design was based on purposive sampling whereby the sample group was chosen based on the researcher's own knowledge of the population, his own judgement and the purpose of the study. This type of non-probability sampling is in accordance with the exploratory aims of this research study (Babbie & Mouton 2009). Another reason for using purposive sampling was to reduce the cost of the survey and complete the interview schedule within a set time frame of one month in November 2015.

The sample for this study consisted of a small population group of five design agencies in Johannesburg. The sample group do share some similarities, for example, all the chosen design agencies are based in Johannesburg and specialise in design, branding and strategic development. These agencies emphasise strong human relations, follow a holistic approach, and take the end-user into consideration when working on briefs. The participants utilise multidisciplinary teams and believe in collaboration with clients and other stakeholders. These similarities are reflected in the characteristics of design thinking, which is another reason that these five design agencies were chosen for this study.

This researcher concedes that other design studios such as Grid Worldwide, Yellowwood and InterBrand Africa are practising in Johannesburg, but focuses on the chosen agencies for specific reasons. The chosen studios are recognised internationally, but have a strong local impact. The studios have an understanding of local brands and design and actively aim to implement design thinking in their design processes. One studio in particular was chosen because of its long-standing relationship with local cultural content and because it acts as a catalyst for unorthodox design methodologies. The chosen agencies, however, do differ in size with regard to the number of staff employed. Also, some agencies have more than one office and are global, in contrast with other small to medium enterprise agencies. The positions, experience and responsibilities of the participants are also different. These differences are acknowledged, for example the fact that multidisciplinary collaboration is more achievable within larger agencies that can make use of architects and interior designers, than in smaller one-person agencies. The personal identities of the participants are revealed with their permission (Appendix B), although their individual opinions and ideas are depersonalised during the analysis and interpretation of the data in Chapter 4.

Data regarding the demographical and geographical aspects of the participants were not collected since this study is purely interested in their own individual professional opinions as expressed during the time of interview. Participants are therefore not categorised according to ethnicity, age or gender. The interviewees are all senior staff members, hold relevant qualifications and are professionals in the creative industry. This, together with the information that they have all won prestigious creative industry awards, establishes their credibility as suitable participants for this study. The five sample groups are described below.

2.6.1. Sample A: Black Africa Brand Consulting

Black Africa Brand Consulting is a specialist brand and design consultancy that creates and manages brands. They are a 100% African-owned agency, and have offices in Johannesburg, Lagos and Nairobi. Black Africa Brand Consulting was an Agency of the Year runner up in 2011 (Black Africa Group 2015). The person interviewed was Veejay Archary, who has a rich and extensive background in design and branding, and is the senior creative director of Black Africa Brand Consulting. He manages the output of the strategic and creative departments through direction, mentoring and creativity (Black Group Africa 2015).

2.6.2. Sample B: Brand Union

Brand Union is a global brand agency with 25 offices worldwide. They specialise in brand strategy, design, interaction and brand management. Brand Union believes that experiences 'form the basis of all kinds of human relationships, with other people and with the world around us' (Brand Union 2015: para. 2). They use a framework to assess brands holistically from a user perspective. This philosophy relates to the sentiments of Cerejo and Barbosa (2014), Woo (2007) and Brown (2008), who believe that a holistic approach adds value and innovation to products. Brand Union refers to their framework as an experience imprint, which is based on the fundamentals of 'Impression, Interaction, Responsiveness and Resilience' (Brand Union 2015: para. 4). The senior designer who represented Brand Union was Ronell Botes.

2.6.3. Sample C: CyberGraphics

CyberGraphics was established in 1991 as a multidisciplinary design studio and digital type foundry. The studio believes that effective design can be achieved only

through true collaboration with clients. It reflects one of the crucial elements of design thinking, which states that collaboration is a design thinking activity (Cerejo & Barbosa 2014; Scariot et al. 2012; Rodgers & Winton 2010; Brown 2009). CyberGraphics strive towards project solutions that are visually distinct and enduringly memorable (CyberGraphics 2015).

Jan Erasmus is the founder, owner and creative director of CyberGraphics, and was interviewed for the purpose of this study. He upholds his own principles of design by claiming that a 'powerful mind, guided by solid design principles, must be held in tension with intuition, play, contradiction and interruption' (Erasmus 2007:13). He has won many accolades during his career including a Golden Clio Award, Pica Award and Loerie Award (CyberGraphics 2015).

2.6.4. Sample D: Design Partnership

Design Partnership is an agency that focuses on strategy and design. They believe that design can add value to business and customers and enrich the customer experience (Design Partnership 2015). This reflects the view of several authors that a human-centred approach should engage customers and clients with the design process (Leinonen & Durall 2014; Mattelmäki et al. 2014; Brown 2008). Design Partnership has offices in Johannesburg and in Cape Town. The interview was conducted with the chief operating officer of Brand Partnership, Adrian Morris.

2.6.5. Sample E: Joe Public

Joe Public is a strategically driven creative agency that focuses on insightful and innovative communication solutions. The group includes six specialist companies that form Joe Public United, and has partnerships and affiliations with 14 African countries and Amsterdam (Adlip 2015). The notion of collaboration and growth is evident in the agency's ethos. 'The growth of our clients, the growth of our people and the growth of our partners are all positively interlinked' (Joe Public 2015: para. 1). Joe Public Johannesburg is the largest 100% independently owned communications agency in South Africa. They were appointed Agency of the Year in 2014 (Adlip 2015) and are a BBBEE Level 2 contributor (Joe Public 2015). The research interview was conducted with Pepe Marias, who is the chief creative director at Joe Public.

2.7. Data collection methods and fieldwork practice

Self-reporting was used to collect data through personal face-to-face interviews by using an interview schedule in the form of an interview schedule (Appendix A). The interview schedule contained open-ended questions to facilitate unrestricted discussion about the various topics. The purpose of this exploratory study was to collect qualitative data in an effort to understand the participant's perceptions about design thinking and the role of the designer. Face-to-face semi-structured interviews were consequently used to learn more about the views, opinions and beliefs of the research topic (Strydom & Bezuidenhout 2014; Woods 2006). The interview schedule was used to guide the interview and to prompt the participants to talk about the particular activities in their design processes, as well as the people involved. Stakeholders in the form of professional senior art directors and creative directors were interviewed, all of whom have at least ten years' experience in multidisciplinary design studios.

Sending the transcribed interview schedule back to the participants after the formal interviews ensured another level of validation. The purpose was to determine whether the data were properly and reliably interpreted. At that point, participants were given the chance to reflect and expand on their opinions. One participant utilised this opportunity and elaborated on the transcribed data by adding comments, further explanations and drawings. This was a value-added element during the data analysis stage. The interview schedule was not self-administered, but was completed by the researcher at a later stage after the interview. The interview schedule was used during interviews in a semi-controlled environment. Data were collected from a contemporary population. The interview roster in Table 2.2. shows the date, participant's name, his or her company, and the time and setting of the interviews.

	Date	Participant	Position	Company	Time	Setting
Interview 1	Wednesday 11 November 2015	Jan Erasmus	Creative director	CyberGraphics	10:00 – 12:30	CyberGraphics studio
Interview 2	Thursday 12 November 2015	Veejay Archary	Creative director	Black Africa Brand Consulting	09:00 – 10:15	Black Africa Brand Consulting boardroom
Interview 3	Friday 13 November 2015	Adrian Morris	Chief operating officer	Design Partnership	13:00 – 14:11	Design Partnership boardroom
Interview 4	Monday 16 November 2015	Ronell Botes	Senior art director	Brand Union	14:00 – 15:15	Brand Union boardroom
Interview 5	Friday 27 November 2015	Pepe Marais	Creative director	Joe Public	16:30 – 17:38	Joe Public boardroom

Table 2.2. Interview roster

2.8. Data capturing and data editing

This section discusses the procedures used in capturing and editing the data. The intention and purpose of the interview were explained to the participant at the beginning of each interview. The elements that make up the construction of the interview schedule (Appendix A) include the research title and a brief explanation of the purpose and main definitions used in the study. The rest of the interview schedule consists of the research clusters, each introduced with a working definition followed by the open-ended questions. A working definition of all concepts used in the interview schedule was therefore given to the participants to familiarise themselves with the contexts of each concept.

General simple questions were asked first to put subjects at ease (Strydom & Bezuidenhout 2014; Adams et al. 2007). Issues regarding confidentiality were also discussed with the participants. Challenges were not anticipated regarding confidentiality of the individual or the data because this research study was undertaken in the public domain where the practice of design is transparent. Participants agreed to partake voluntarily in the study and signed a participant consent form (see Appendix B). After simple questions, the interview moved on to more in-depth questions, keeping any sensitive questions towards the end. Most interviews were kept inside the time limit of one hour. One interview lasted for two

and a half hours, however, from which valuable data were captured. The same interview schedule was used at all five interviews.

This study aimed to capture empathic understanding and gain insight into the professional circumstances of participants by recording the information. The primary format for storing this qualitative data were text based. This included transcribed interviews, drawings and audio recordings. Digital audio recordings were made with permission of the participants, allowing the researcher to concentrate on the interview and not to distract the participants by making notes of what they say. The participants were contacted telephonically before the interview to discuss their availability. After they had agreed to take part in the study, a follow up e-mail was sent, which stated the aim and purpose of the study.

A copy of the interview schedule was also sent to participants to read before the interview. It was explained to the participants that the interview would be kept to a maximum time allocation of one hour, to which the researcher strictly adhered with the exception of one case. The interviews were conducted in boardroom environments in an effort to minimise external distractions. To further minimise potential distractions and participant fatigue, interviews did not take place during lunchtime or at night. The interviews were recorded digitally and notes were not taken during conversations. This was done in an effort to maximise the participant's attention, build rapport and to make him or her comfortable enough to answer the questions. Field notes in the form of jotted notes, analytic notes and personal notes were made to record data during the research process. These notes were made before and after the interviews.

The next section describes the post-coding procedure. The nature of this exploratory study required the use of a qualitative methodology. Semi-structured interviews and open questions were therefore used to collect qualitative data. Defocusing was applied intentionally in an effort to prevent the researcher from creating unintended barriers by pursuing any predetermined personal issues. Information was collected by interacting with the participants and by forging friendly relationships in order to establish rapport.

2.9. Data analysis

An extensive amount of data were collected from the interviews. The data were developed into conceptual categories, which were consequently referred to as clusters. The content of the data set had to be established for the qualitative material to be used more effectively (Strydom & Bezuidenhout 2014; Hannan 2008). A thematic analysis was done to identify recurring themes and clusters within the dataset, as seen in Table 2.3.

Theme 1	The role of the designer
Cluster A	The four orders of design (strategic planning operations and systemic integration)
Theme 2	Characteristics of design thinking
Cluster B	Human-centred approach
Cluster C	Collaboration
Cluster D	Holistic approach
Cluster E	Multidisciplinary design teams
Cluster F	Abductive reasoning
Cluster G	Wicked problems
Cluster H	Stages in the process of thinking
Cluster I	South African design landscape

Table 2.3. Analysis of data according to themes and clusters

The items were grouped thematically by describing the main ideas in the messages and then tested against the obtained data. The items were subsequently grouped according to the following two broad themes of the role of the designer (Theme 1) and characteristics of design thinking (Theme 2). These themes were expanded upon, using clusters, as seen in Table 2.3.

The main findings were depicted through the use of force field analysis (Adams et al. 2016) and discussed in an effort to categorise positive and negative influences. Findings in the force field analysis link to the objectives of the study by highlighting constructive and adverse effects regarding the role of the designer as well as the application of design. Force field analysis is a suitable way of illustrating the qualitative data of this study, primarily because it shows the forces for and against a change (Mindtools 2016). By reviewing the results, it is then possible to describe positive forces and to look at solutions for negative forces.

2.10. Interpretation of data

The data were interpreted by reflecting on possible meanings and by exploring particular themes, concepts, ideas and processes. The collected qualitative data were interpreted to explain the opinions and inputs of the participants. This is done in an effort to identify their viewpoints of their world and how they came to that view. The data interpretation also discussed what the participants do in context of their professions and how they convey their view of their own situations (Taylor & Gibbs 2012). The descriptions used to describe the amount of participants are illustrated according to an interval scale as seen in Table 2.4.

Description	No	One	Some	Most	Common	Share	Similar	Overall	All
Number of participants	0/5	1/5	3/5	4/5	4/5	5/5	5/5	5/5	5/5

Table 2.4. Description of number of participants

The description used in the data analysis corresponds to the amount of opinions and views shared by participants. The description *most* would therefore imply that four or more of five participants share similar views. It is not the intention of this study to collect and analyse exact quantitative data, but rather to identify, describe and interpret recurring themes from the dataset. Table 2.4. therefore indicates purely the number of participants who share common thoughts to a certain degree.

2.11. Shortcomings and sources of error

The following section discusses the quality of the data and highlights possible shortcomings and limitations. The only internal threats – apart from history, maturation, testing and mortality – that might influence the study directly were instrumentation and selection. The instrument for collecting the data was used consistently in the form of an interview schedule.

CHAPTER 3: Literature review

This chapter presents a literature review of the neoteric¹ art of design thinking by looking at both the foundation and the principles of design thinking. The views and opinions of specific authors are purposely collated on the subject of design. The topic of design thinking is unpacked by referring to the seminal work of Buchanan (2001, 1998, 1992) and substantiated by ideas from Lugmayr and Stockleben (2013), Kimbell (2011, 2012), Dorst (2011) and Williams and Newton (2007). However, it is the extensive discussions on the application of design thinking from Cerejo and Barbosa (2012, 2014) and Brown (2008, 2009) that allows this study to pose two questions. First, is the designer indeed the only instigator of ideation? The emerging trend of designers as leaders is investigated within the context of fourth-order designers. The second question asks what design thinking could offer to the practice of design in its intended form as an approach to problem solving.

This chapter begins by contextualising innovative problem solving as a prerequisite for the modern world of work. A definition of design is unpacked, referring to several authors (Fiell & Fiell 2012; Harland 2011; Shaughnessy 2009; MacGarry 2008; Erasmus 2007; Heskett 2002; Buchanan 2001, 1998). The rather difficult task of defining and describing design thinking is then unpacked (Cerejo & Barbosa 2014; Zwart 2014; Curedale 2013b; Johansson-Sköldberg et al. 2013; Kimbell 2011, 2012; Dorst 2011; Rodgers & Winton 2010; Brunner & Emery 2009; Brown 2008; Owen 2005, 2006; Buchanan 2001, 1998). The fact that design thinking can have true value for organisations is also discussed (Dorst 2011; Kimbell 2011).

This leads the argument that design thinking is a required skill for designers and serves as an introduction to the principles of design thinking (Curedale 2013a). The section concludes with a discussion of Figure 3.1, namely the principles of design thinking, which is a revised illustration from Cerejo and Barbosa (2014). Figure 3.1 serves as the underlying structure for the rest of this chapter. The following sections discuss the importance of the four orders of design as the foundation of design thinking, based on Buchanan's (2001, 1998) matrix. The four orders of design then lead the literature review into the six pillars of design thinking.

¹ In Western culture, the term *neoteric* often relates to the development of new liberal arts. *Neoteric art* refers to arts of new learning needs and values of human beings (Bailey, Beverley, Macdonald & Shah 2014; Buchanan 1992).

3.1. Introduction to the literature

The modern world of work with all its challenges and economic uncertainty is an ever-changing landscape. New, innovative approaches and processes need to be applied so that organisations and individuals survive and are successful. Central to economic and social issues is the ability of organisations and individuals to solve problems. Worldwide challenges such as expensive healthcare, unsustainable energy usage, education systems that fail many students, and companies whose established markets are unsettled by new technologies can be solved only through innovation (Fraser 2010; Best 2010; Brown 2008). Furthermore, social values are shifting and consequently triggering higher expectations for corporate social and environmental responsibilities. These changes in technology and even political influence often work against design rather than enhance its reputation as a force for good (Harland 2011).

Design leadership can create a competitive advantage for an organisation by making use of design, which in turn influences the entire culture of an organisation (Lockwood 2010). Tim Brown from the design thinking firm IDEO² (2012) states that people are at the core of all these challenges and that these problems require a human-centred, creative and practical approach to finding the best ideas and solutions. The complexity and variety of solutions furthermore depends on the framing and interpretation of a design problem (Breuer, Caglio, Gottlieb, Groskovs, Hiltunen, Navarro Sanint & Schewe 2012). Design and design thinking is such an approach to visual challenges and therefore problem solving.

3.1.1. Design

The etymology or linguistics of design can be traced back to the Latin words *de + signare* (Krippendorff 1989a). This translates to making something or giving it significance. In other words, design is making sense of things (Krippendorff 1989a). Design is also seen as an integrated thinking and doing activity that involves 'idea generation, image creation, word interpretation, and media realization, for industry, commerce, culture, and society. Communication, with its theories, models, methods,

² IDEO is a global design company, based in the USA. IDEO strives to create impact through design, and is ranked as one of the top innovative companies in the world (IDEO 2016). At the core of the success of IDEO is the innovation method of design thinking, led by Tim Brown and David Kelley (Steinbeck 2011).

and practices, is also recognized as central to the process of making meaningful representations' (Harland 2011: 22). Design may further be defined as 'the human power of conceiving, planning, and making products that serve human beings in the accomplishment of their individual and collective purposes' (Buchanan 2001:9). Design therefore shapes our environment to comply with our needs and ultimately gives meaning to our lives (Heskett 2002). Design is the conception and planning of human-made artefacts and serves as a way to improve the quality of life (Fiell & Fiell 2012). No single definition of design, however, may adequately cover the wide variety of ideas and methods grouped under the label of design (Buchanan 1992).

In the South African context, Perez (Omar 2016) sees design as a process that develops new solutions and outcomes that might in turn serve society. Erasmus (2007) suggests that a 'powerful mind, guided by solid design principles, must be held in tension with intuition, play, contradiction and interruption' (Erasmus 2007:13). Design may also be seen as a subjective, personal and idiosyncratic process that is approached and realised by each designer in dissimilar ways (MacGarry 2008). Design then in its purest sense is a thorough examination of a subject, which then results in a graphic presentation of the findings (Shaughnessy 2009). As mentioned, design embraces a wide variety of disciplines, practices and their related institutions. It includes graphic communication and three-dimensional objects as well as 'integrated systems from information technology to urban environments' (Fiell & Fiell 2012:6). The roles of practice of design and the designer are in a constant state of flux, whereby the traditional roles – two-dimensional graphic design and three-dimensional industrial design – keep widening into areas other than these traditional spaces (Fiell & Fiell 2012; Anderson 2007; Golsby-Smith 1996).

3.1.2. Design thinking

Popular literature tends to place disparate, vaguely creative actions under the description of design thinking (Dorst 2011). More precisely, the design profession embodies very specific and intentional ways of reasoning (Dorst 2011). People tend to define design too narrowly and should consider a far wider view of the breadth and importance of design (Brunner & Emery 2009). Design practices connect with organisations on many levels that require the application of different kinds of design practice, each requiring specific design capabilities. These application levels tend to

be unclear and are partly to blame for the confusion about the nature and the value of design thinking (Dorst 2011).

Design thinking is seen by most authors as a people-centred way of solving difficult problems and follows collaborative and team-based cross-disciplinary processes. A leading practitioner of design thinking, Tim Brown (2008) believes that people are at the core when he views design thinking as a way of working that instils the full spectrum of innovation activities with a culture of human-centred design. This way of working uses a toolkit of methods and can be applied by anyone from the most seasoned corporate designers to schoolchildren. Richard Perez (Smith 2013), founding director of the Hasso Plattner School of Design Thinking, Cape Town University, believes that local knowledge should be included as a core attribute to design thinking.

Stanford University's d-school, a prominent leader in design thinking education and practice, believes that 'true innovation happens when strong multi-disciplinary groups come together, build a collaborative culture, and explore the intersection of their different points of view ... We believe having designers in the mix is key to success in multi-disciplined collaborations and critical to uncovering unexplored areas of innovation ... Design thinking is the glue that holds these kinds of communities together and makes them useful' (Brunner & Emery 2009:97). Design thinking differs from analytical thinking because it involves the process of augmenting ideas through widening the breadth of limitations (if any) during the ideation phase. Through this process of augmentation, participants' fear of failure is reduced while increasing their input and participation from a wide variety of sources during ideation (MedLibrary 2015a).

Design thinking should act as the keeper of all that is healthy in design practices (Kimbell 2011). Here it becomes important to point out that most design activities have been professionalised in the various branches of design in ways that could be valuable for other disciplines (Dorst 2011). The value lies in the application of these professional design practices. Design thinking can therefore have true value for organisations only when specific elements of the design practice are plainly articulated. Business and management communities have shown genuine interest in design thinking because of their need to use new problem-solving techniques to address complex and open-ended challenges in a modern world of work (Best 2010).

Organisations are interested in using designerly ways of working that involve decision-making processes that move back and forth between the general and the specific in an effort to deal with complex, open-ended problems (Dorst 2011; Cross 2001).

Design thinking may also be seen as a complement to science thinking that embodies a wide range of creative characteristics and other unique qualities (Owen 2006). In a way, design thinking becomes the opposite of scientific thinking. Where the scientist sifts through facts to discover patterns and insights, the designer invents new patterns and concepts to address facts and possibilities. In a world with growing problems, there is great need for ideas that can blend understanding and insight into creative new solutions (Owen 2006). Design thinking may be the answer precisely because it involves a mix of different kinds of thinking. Design thinking is a methods-based approach to problem solving and was even described as a trend (Buchanan 1992) as early as 1992. These methods have become a required skill for designers everywhere.

The counter-argument from Nussbaum (2011) states that 'design thinking originally offered the world of big business – which is defined by a culture of process efficiency – a whole new process that promised to deliver creativity. Companies were comfortable and welcoming to design thinking because it was packaged as a process' (Nussbaum 2011:para. 3). Within this statement lies the irony of the entire notion of design thinking, which in essence advocates freedom of thought without constraint and with no linear rigid processes. Through their efficiency culture, corporates turned it into a 'gated, by-the-book methodology that delivered, at best, incremental change and innovation' (Nussbaum 2011:para. 4).

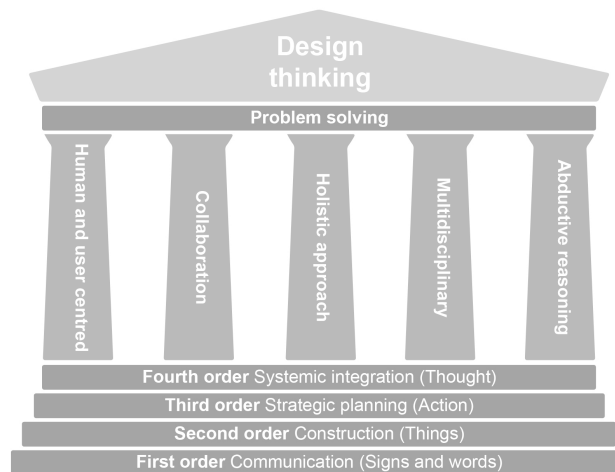


Figure 3.1. Principles of design thinking: a revised illustration from Cerejo and Barbosa (2014)

It is fitting that the principles of design thinking from Cerejo and Barbosa (2014) are illustrated by making use of an architectural masterpiece. Figure 3.1 is based on the Parthenon (448–432 B.C.) a Doric-order Greek temple that consists of three main elements: *stylobates* or foundations, *columns* or pillars, and an *entablature* or gabled roof (Fleming 1991; De la Croix, Tansy & Kirkpatrick 1991). Without the supporting elements the building cannot exist as a complete structure. The principles of design thinking are illustrated in a similar fashion. The foundation consists of the four orders of design. This supports the six pillars of design thinking upon which the concept of design thinking rests, thereby completing the structure.

3.2. The four orders of design

This section discusses the four orders of design as the foundation for the principles of design thinking. Buchanan's matrix (2001, 1998) is unpacked to illustrate the relevance of both the designer and the process of design. Design leadership is discussed in the context of the fourth order of design (Bason 2014; Lockwood 2010; Clark & Smith 2010; Borja de Mozota 2010; Jenkins 2010). Examples of each order of design are shown and their relevance to that specific order is discussed (Cerejo & Barbosa 2014; Meroni & Sangiorgi 2011; Van Zyl 2008; Anderson 2007; Golsby-Smith 1996). The section concludes by referring to the study of Cerejo and Barbosa (2014), who believe design thinking reveals a dynamic relationship with other knowledge-based disciplines. This indicates the beginning of the next section, which gives an overview of the six pillars of design thinking.

Designers have recently turned their attention away from symbols and physical objects, and started to focus on two quite different areas to produce new products and to reflect on the value of design (Buchanan 2001). Designers have consequently focused on action and environment. By doing this, designers ‘act as collaborative agents in determining public, corporate, and private plans for action’ (Buchanan 1998:12). To illustrate the emergence of this type of strategic planning as a discipline of design, Buchanan (2001, 1998) developed a matrix of human abilities and design disciplines as illustrated in Table 3.1.

		Design disciplines			
		First order Communication Signs and words	Second order Construction Things	Third order Strategic planning Action	Fourth order Systemic integration Thought
Human abilities	First order Inventing	Signs, symbols and images	→	→	→
	Second order Judging		Physical objects	→	→
	Third order Deciding			Activities, services and processes	→
	Fourth order Evaluating				Systems, environments, ideas and values

Table 3.1. Buchanan’s matrix – human abilities and design disciplines: a revised table from Buchanan (2001, 1998)

The theory for this matrix originated as an exploration of ‘pluralism, the changing world, and the changing role of design and the designer’ (Van Zyl 2008:4). Table 3.1 identifies four areas of design, known as *orders*, thereby creating a hierarchy of design activity (Cerejo & Barbosa 2012). This hierarchy consists of ‘*communication* (signs and words: graphic design), *construction* (things: industrial design), *strategic planning* (action: brand design) and *systemic integration* (thought: design thinking)’ (Cerejo & Barbosa 2014: 19). These orders intersect with the designer abilities of inventing, judging, deciding and evaluating (Van Zyl 2008).

The first order of design is formed by the traditional design discipline of graphic design, and can be seen as the most elementary design task, which is the design of the two-dimensional (Anderson 2007). The second order involves the design of objects or rather the three-dimensional, as practised primarily by industrial designers. It is important at this stage to note that the third and fourth orders are linked to the

preceding orders, although they do not associate directly to a literal or physical result (Anderson 2007). Much as a graphic designer would aim to improve the effectiveness of a piece of graphic communication, the third and fourth order designer strives to 'create a more efficient *process* and identifies a more appropriate *purpose*', each delivering a more desirable result (Anderson 2007:5). Figure 3.2 shows the widening spheres of the designer and the process of design.

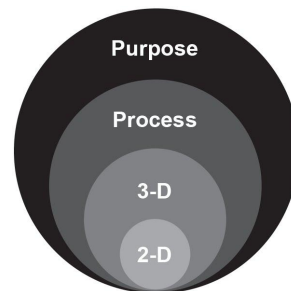


Figure 3.2. Widening domain of the designer and design process: a revised illustration from Golsby-Smith (1996)

Through the widening domain of the designer and design process, the third-order designer focuses on the process that will ultimately guide the problem. The fourth order designer moves even further away from process formulation and concentrates on the inherent purpose of the design effort. For this study, it is important that third order design is being offered more frequently by design studios in the form of a *design-specific service*. Fourth order design is gaining recognition as a legitimate design task (Bason 2014; Anderson 2007) that in turn increases the widening role of the designer and indeed the practice of design. The exact definition of the designer consequently expands. Buchanan's matrix (2001, 1998) reflects the profession and development of designers.

Designers are re-examining the nature of products in the context of action and are considering new approaches to communicative symbols, images and physical objects (Buchanan 1998). Each order may be further interpreted as a way to rethink the role of the designer (Cerejo & Barbosa 2012). By rethinking the role of the designer, design thinking is then applied to a widening circle of human problems that are no longer effectively dealt with by traditional methods (Bason 2014; Anderson 2007).

3.2.1. First and second orders of design: inventing and judging

The first and the second orders can both be placed historically in the industrialisation period between the 1750s and the 1950s. This was a crucial time for the development and establishment of the graphic and industrial design professions (Cerejo & Barbosa 2014). Several brands that originated during this period are currently among the top 100 global brands such as Heineken, founded in 1864, Coca-Cola from 1886, and BMW, which originated in 1916 (Brandz 2016; The Heineken Company 2016; World of Coca-Cola 2106; BMW Group 2016; Van Zyl 2008). Designers in both the first and second orders usually practised ‘in a modernist paradigm, with a focus on aesthetics and functionality’ (Van Zyl 2008:5). To add to this, designers rarely had any direct contact with strategic operations in an organisation and were restricted to problem solving for impromptu projects (Van Zyl 2008). Within these two orders, designers focus on form and function and disregard the broader concerns such as the human experience (Buchanan 2001).

Table 3.1 shows that the first order of graphic design, or the two-dimensional, is concerned primarily with visual symbols. Graphic design at the most fundamental level is defined as communication of information by using *words* and *images* to convey a formulated message (Anderson 2007). Graphic designers are therefore employed for their technical capability for selecting the best possible visual options to integrate all the client’s objectives (Anderson 2007). The term *graphic design* has evolved according to its focus, and has changed from visual communication-to-communication design (Buchanan 2001). Communication is central to this order. It is independent from the medium of the message because of the introduction of ‘new media and tools, such as photography, film, television, sound, motion, and digital expression’ (Buchanan 2001:10). The relationship between these two orders is illustrated in Figure 3.3.

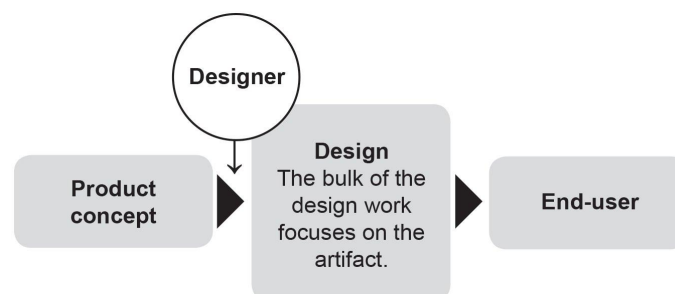


Figure 3.3. Communication scheme of the first and second orders of design: a revised illustration from Golsby-Smith (1996)

Figure 3.3 shows at which point the designer adds value to an artefact, thereby making it aesthetically more desirable (Cerejo & Barbosa 2014). The design effort in orders 1 and 2 is concerned with improving the way the product looks, be it graphic design or industrial design (Cerejo & Barbosa 2014). An example of a first-order two-dimensional product of graphic design can be seen in Figure 3.4 and shows the cover art of the Pink Floyd album *Dark side of the moon*.



Figure 3.4. *The dark side of the moon*, Pink Floyd, 1973, designed by Storm Thorgerson and George Hardie, UK (Pinkfloyd.wikia n.d.)

Storm Thorgerson designed the album cover for the *Dark side of the moon* album at the design studio Hipgnosis in 1972, while George Hardie from NTA Studios drew the actual artwork (Pinkfloyd.wikia n.d.). The cover shows a solid black background with a triangular prism reflecting light to form a colourful spectrum (signs and images). The typography (words) is placed inside a round holding shape and does not interfere with the primary light prism graphic. At his art exhibition in Los Angeles 'Taken by Storm', Thorgerson exclaimed: 'It's my job to reinterpret it [the design concept], really. So it doesn't really matter what I think, it matters what comes out the other end' (Hiatt 2011: para. 2). This statement coincides with Van Zyl's (2008) suggestion that designers were rarely part of the strategic operations in organisations and were merely there to solve problems for certain projects.

The second order in Table 3.1 refers to the object and involves industrial design, whereby things are crafted rather than working with words and images. Industrial design is the development of objects for mass production, typical three-dimensional,

physical objects (Brunner & Emery 2009). This order focuses on the usefulness, usability and desirability of a product and ‘grew out of a concern for tangible, physical artifacts [sic] – for material *things*’ (Buchanan 2001:10-11). As with the role of the graphic designer, an industrial designer is trained to work within constraints in shaping an object and applying his or her skill and interest to execute a design (Anderson 2007). Graphic designers and industrial designers know that the margins of their design efforts are constant and well defined, while the form is changeable and undefined (Golsby-Smith 1996). Figure 3.5 shows a three-dimensional object as an example of second-order industrial design.



Figure 3.5. Opinel knife, No. 8, 1890, designed and manufactured by Joseph Opinel (Opinel 2014)

The Opinel knife was developed in 1890 by French ironsmith Joseph Opinel as a workman’s knife. Opinel used clean cuts of beech wood and high-quality steel to produce an elegant foldout knife (physical object) that has become a symbol of French culture (Bespokepost 2014). In 1985 the Victoria and Albert Museum selected the Opinel knife as part of an exhibition celebrating the 100 most beautiful products in the world. Phaidon Design Classics chose the Opinel knife in 2006 as one of 999 classic designs, while New York’s Museum of Modern Art (MoMA) exhibited the knife as a design masterpiece (Opinel 2014: Momastore 2015). The aesthetic value, together with the functionality of the knife, reflects the notion of the second order in that product designs should be ‘useful, usable, and desirable’ (Buchanan 2001:13).

Modern-day culture has great understanding of these two narrow disciplines of two-dimensional and three-dimensional products. Designers with increased skill and experience start to partake more in the process of design, thereby offering their skills as third order services.

3.2.2. Third order of design: Deciding

The term *third order* is directly related to strategic planning and evolved as such at the end of the World War II. The word *strategy* can be traced back to management literature of the 1950s. During this period, external evaluation and action plans were given specific attention. Only later in the 1970s did capabilities and the development of internal potential become integral elements of business strategy (Van Zyl 2008). Designers started to rethink the nature of products in the context of action to give prominence to both the first and the second orders (Buchanan 1998).

This rethinking action is referred to as strategic planning or action-oriented design in the form of services, processes and activities (Buchanan 1998). The third order is therefore concerned with design undertakings and organised services (Cerejo & Barbosa 2014). The traditional management style of rational decision-making and logic forms part of this order. In this regard, some managers still 'feel safe in this rational and scientifically driven third-order environment' (Van Zyl 2008:6). For these types of managers, design is expressed in terms of return on investment and well-formulated design briefs. They believe that problem solving should mostly explore things that are already in existence (Van Zyl 2008). The work responsibilities of a designer, however, should naturally expand to place him or her in a position to move without obstruction between clients and users. Only then can the designer deliver valuable design input to the end-user (Anderson 2007).

The third-order designer is now more involved in finding appropriate design procedures to maximise the capacity of the work rather than merely making use of skill and experience as influence (Anderson 2007). Once involved, the designer is confident to explore other areas surrounding the management process such as crafting, products, typography and forms (Cerejo & Barbosa 2014). Designers become more aware of their widening role and as a result will add increased value across multiple areas.

These widening roles of designers are included in management processes (Bason 2014; Anderson 2007). Designers may then offer value to such processes in managing innovation and creativity and by managing people from different disciplines through the practical process of turning new ideas into workable solutions (Siodmok 2014). Designers have the ability to contribute 'an approach and set of tools that can

be used to maximize the potential for new ideas to emerge' (Siodmok 2014:191). The challenge, however, lies with project managers, such as brand managers, who are in charge of innovation projects. These managers need to start to see themselves as design thinkers (Bason 2010). Design thinking in the context of brand management is therefore not simply a fad, but an approach that adds value to innovation and aids problem solving. Kimbell (2010) points out that everyone might be a designer in popular culture, but suggests that everyone should rather be a design thinker in the context of management practices. The expanding interest of the designer in both the first and second orders of design is illustrated in Figure 3.6.

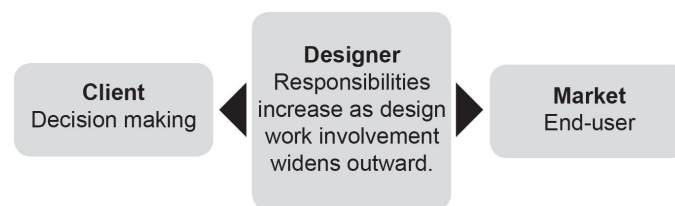


Figure 3.6. Initial communication scheme of the third order of design: a revised illustration from Golsby-Smith (1996)

The designer is now a centralised figure in the problem-solving process and has moved out of the first and second orders of design. At this level, the responsibilities of the designer expand as the design work involvement widens outwards between the client and the end-user. Designers influence the elements with which they work more directly and so influence the larger process by which they obtain such elements (Bason 2014; Anderson 2007). Within the third order, certain models of service have been identified by Golsby-Smith (1996).

Studio Propolis is an example of the way in which designers are part of the problem-solving process and have moved out of the first and second orders of design. Bethan Rayner and Naeem Biviji are the designers at Studio Propolis and were invited to speak at the annual Design Indaba³. They work across disciplines and scales, and combine their formal education as architects with informal training as furniture designers (Studio Propolis 2015). Studio Propolis produces handcrafted, designed-

³ The Design Indaba is an annual international design conference that has been held in Cape Town since 1995. The Design Indaba conferences focus on African and global creativity through the work and ideas of leading thinkers and industry experts (Design Indaba 2015a; Hudson 2015).

to-order products in Nairobi. Real-world needs are examined through extensive prototyping⁴ to provide them with a method of visualising, evaluating and learning how to improve the artefact before delivery to client. The designers at Studio Propolis directly influence the elements with which they work (strategic planning and action), thereby influencing the larger process by which the designer receives these elements (Anderson 2007). Their approach to design relies on their direct involvement in the process of making (Design Indaba 2015c). Figure 3.7 shows Kitimoto, a school bench and table for children. The plywood construction is simple, lightweight and economical.



Figure 3.7. Kitimoto, school bench and table for children, 2013, designed and manufactured by Bethan Rayner and Naeem Biviji, Kenya (Studio Propolis 2015)

Within the third order, the designer's value has increased across multiple areas. A more valuable service has been delivered to the client, who desires to achieve certain objectives (Anderson 2007). The designer's role has evolved into a more deliberate drive towards the 'properties, specifications and conceptual design of the artefact' (Cerejo & Barbosa 2014:25). In the practice of design this means that the designer now works more closely with the client, and becomes more familiar with the management process and decision-making process. As a result, the value of the designer has been moved outwards to both ends of the communication scheme as illustrated in Figure 3.8. Third-order design consequently reflects on the processes surrounding a task (Anderson 2007).

⁴ *Prototyping* refers to the use of simplified or incomplete models of a design to explore ideas, elaborate requirements, refine specifications, and test functionality. Concept prototyping is used to explore preliminary design ideas quickly and inexpensively (Lidwell, Holden & Butler 2010).

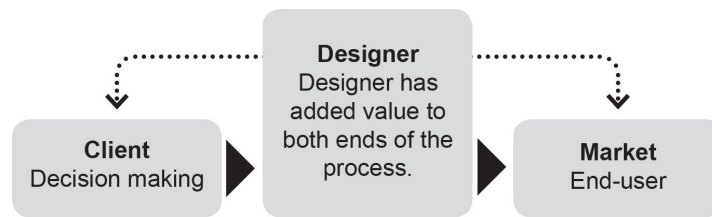


Figure 3.8. Final communication scheme of the third order of design: a revised illustration from Golsby-Smith (1996)

3.2.3. Fourth order of design: evaluating

While the third order of design deals primarily with the process that surrounds a task, the fourth order concentrates on the purposes driving such processes (Anderson 2007). The fourth order of design is aimed at environments and systems (Buchanan 2001). Through the continuous application of design thinking to problems, the designer's domain is widened to include the ideas of the client in an effort to establish a shared purpose (Bason 2014; Anderson 2007). This systemic integration embraces pluralism and systems thinking, which moves towards knowledge-based and learning organisations (Van Zyl 2008; Buchanan 2001). In practice, it is therefore critical to be able to learn in an organisation where 'problem-solving paradigms shift to focus on what might exist' (Van Zyl 2008:8).

The fourth order may further be unpacked as a way of designing complex systems and environments for living, working, playing and learning (Cerejo & Barbosa 2014). The designer in the fourth order has moved away from having only a consideration for the object and design processes and is closer to the 'psychological and cultural contexts that give meaning and value to design' (Van Zyl 2008:8). The design brief is seen as a flexible guideline in a continuous dialogue between the client and end-user (Cerejo & Barbosa 2014). Such a brief can be described as a learning or open one, which does not necessarily state the design challenge (Van Zyl 2008). During this transparent process, fourth-order designers and thinkers continuously rework ideas by considering different related and unrelated solutions (Van Zyl 2008).

The fourth order designer now advances into being in full control of team and project management processes. The client or end-user receives a value-added product because the designer has shared his or her expertise and knowledge. In this order, the designer should provide insight and knowledge and not only technical skill or

separated project management (Bason 2014; Van Zyl 2008). At this level, the designer's role often extends beyond design activities into more intellectual and emotive design thinking (Bason 2014; Van Zyl 2008). Organisations may at this point involve design that is more integrative and holistic by making it a core competency. The real value of design then manifests itself as a way of 'discovering and solving all manner of problems' (Lockwood 2010:82).

Of particular interest to this study is the concept in the fourth order that purposes to drive the processes of tasks. A critical question concerning the designer's involvement in the fourth order may then be asked, namely 'How is the designer capable of contributing to this evaluation?' (Anderson 2007:16). Buchanan's (1998) study of design in contemporary culture provides possible insights.

First, sound design thinking must be applied in the fourth order. Second, a clear description must be made of the people who are receiving these design efforts. Matters that require design thinking in the four orders of design are addressed through cultural integration. Culture therefore creates design and determines its significance (Anderson 2007). 'We need diversity and alternative perspectives to keep alive the ongoing inquiry into ordering, disordering, and reordering that is the central enterprise of human culture. We need the diversity of many personal visions to avoid entrapment in narrow thinking' (Buchanan 1998:7-8). The designer then becomes capable of contributing through the use of ordering, disordering and reordering words, images, objects and materials, together with processes and actions (Anderson 2007). The designer in the fourth order uses the same skillset to order, disorder, and reorder the values and beliefs of an organic culture (Anderson 2007). Such values and beliefs deliver insight into the appropriateness of the client's objective or alterations to the objective proposed by the designer. Design thinking as it is applied in the fourth order consequently takes into account a diverse array of cultural values and beliefs to determine how appropriate an objective might be (Anderson 2007).

The notion of a *design leader* (Lockwood 2010; Clark & Smith 2010; Borja de Mozota 2010; Jenkins 2010) corresponds with a designer in the fourth order and relates to brand leadership. Making use of design leaders is a way for an organisation to become more design-minded and involves developing personal leadership skills. These skills support an effective leader in planning, processing and building a culture

of design within any type of organisation. Design leadership also contributes to developing a competitive advantage for an organisation by making use of design. Design thinking contributes to successful companies that 'measure customer satisfaction, usability and brand value' (Lockwood 2010:94). An emerging trend exists toward design leadership. Design thinking and design leadership have the potential to analyse the challenges faced by managers such as sense building, complexity, user-oriented innovation and developing a socially responsible organisation (Borja de Mozota 2010).

Design professionals need to be catalysts in assisting other parts of an organisation to use and adopt design thinking (Clark & Smith 2010). However, it is challenging for design leaders to create an ecosystem in organisations that are not antagonistic to design, but rather in favour of it (Jenkins 2010). Attitudes and behaviours in traditional organisations prove to be major barriers and may 'squeeze the life out of design if they are continue unchecked' (Jenkins 2010:24). Design leaders therefore need to know that they are not only creating new approaches to innovation, but that they are undertaking an entire cultural transformation (Jenkins 2010).

Although the topic of leading through innovation is outside the scope of this research, Beckman and Barry (2007) do summarise their findings by describing what it means to lead through innovation as it pertains to design leaders and design thinking. First, it means that the process of innovation needs to be understood to be able to move between the abstract and concrete as well as between analysis and synthesis. Second, the correct team of people need to be assembled to execute this process. Lastly, a leader needs to be provided for such a team, who has classic leadership skills and the knowledge to seamlessly integrate diverse ways of thinking (Beckman & Barry 2007).

The work of Santiago Cirugeda serves as an example of the fourth order of design. Cirugeda is a leading figure in a responsive collective movement in Spanish architecture (Mitchell 2014). The architect develops self-built projects and proposals that aim to modify or transform neglected areas of the modern metropolis into more habitable cities. Cirugeda challenges traditional building processes in architecture, and questions the values (purpose) many architects and political powers place on urban development (Design Indaba 2015b). His studio *Recetas Urbanas*, translated as *Urban Prescriptions*, in Seville (*Recetas Urbanas* 2015), is built around the

premise of creating inclusive architecture that 'integrates all trades from design to realization, to take a palpable need and answer it with functional design' (Hudson 2015: para. 2).

Cirugeda's practice questions the notion of the architect as sole author-designer by using open-source architecture, conceived as a tool kit, which is then distributed freely on his website (Awan, Schneider & Till 2014). Cirugeda's holistic approach aligns with Buchanan's (1992) fourth-order description of complex systems and environments for living, working, playing and learning. The cultural aspect of Cirugeda's philosophy of including the community follows Buchanan's (2001) view that the fourth order of design should not focus only on environments and systems. The work of Cirugeda has indeed moved away from only having a consideration for the object and design processes and is closer to the 'psychological and cultural contexts that give meaning and value to design' (Van Zyl 2008:8). Figure 3.9 shows the EACC addition to the Castellón de la Plana as an exposition space in Spain (Sanguigni 2015). It was designed and built by Santiago Cirugeda, Spain (Sanguigni 2015).



Figure 3.9. EACC addition, Castellón de la Plana, exposition space, 2013

In terms of Buchanan's matrix (2001,1998), design thinking becomes a catalyst for the upstream and downstream flow of processes (Cerejo & Barbosa 2014). The upstream flow of processes affects related organisations, companies and projects that capture ideas and solutions. The upstream becomes a direct incentive for creativity and productivity (Cerejo & Barbosa 2014). On the other hand, the downstream process considers the fourth order of design, in which design thinking

provides the creation of dynamic environments. The result of the upstream and downstream flow of processes is that design demonstrates a dynamic relationship with other knowledge-based disciplines. This is truly the main advantage of what design thinking can provide. Designers are enabled in the fourth order to act as agents of change by working with other people to create more human-friendly design-minded organisations. These design leaders can then take advantage of design thinking to help business leaders to make their intentions real by clearly articulating goals, understanding customers and getting their teams to work together to add value (Clark & Smith 2010).

Each of the four orders of Buchanan's (2001, 1998) matrix builds on the skills and accountability of the previous order, while not neglecting the responsibilities of each order. By doing this, Buchanan (1998) identifies design thinking as an underlying skill in traditional design disciplines. The occurrence and relevance of this underlying skill is then mapped in activities that surpass traditional expectations of design (Anderson 2007). Design thinking therefore reveals a dynamic relationship with other knowledge-based disciplines, as mentioned before. The four orders should not be seen as areas of traditional disciplinary practice or specific outcomes, such as graphic design versus industrial design. Rather, the four orders link with the pillars of design thinking by acting as four broad areas of design thinking that are shared by all design professions and design applications. Furthermore, Buchanan's (2001, 1998) matrix not only functions as the history of design thinking principles, but reflects the career development of designers (Cerejo & Barbosa 2014). The next section deals with the six pillars of design thinking in which these dynamic interactions and characteristics of design thinking are discussed.

3.3. An overview of the pillars of design thinking

The sequence in which the six pillars of design thinking is illustrated is deliberately different from the original illustration from Cerejo and Barbosa (2014). This discussion organises the six pillars of design thinking in a different sequence by starting the argument with the importance of placing people at the centre of solving problems. The next pillar involves the value of collaboration as a way to build bridges between all stakeholders. This is followed by analysing the holistic nature of design and leads the argument into producing meaningful results in the form of multidisciplinary teams. The fifth pillar examines abductive reasoning and omniphaseic

reasoning as ways to combine mental processes to achieve different solutions. Central to the argument is the discussion on difficult or wicked problems. The relevance of encouraging a shared understanding of such problems is discussed. In an effort to discuss this section of the literature in a more comprehensible way, each pillar is discussed by starting with a clear definition after which certain positive aspects are unpacked. Possible problems regarding the design thinking principle are then discussed, followed by suggestions and specific solutions for the issues.

3.3.1 Placing people at the centre when solving problems

This heading looks at the first pillar of design thinking and starts by defining human-centred design as part of the problem-solving process. From this starting point, the discussion leads into the positive needs for a human-centred approach, which holds that people are at the centre of problem solving. Resolutions to address certain issues are then discussed.

Definition of human-centred design

According to the human-centred approach, the user is directly involved in the design process. All stakeholders are placed at the centre when solving problems, be it in different contexts. In the early 1980s, transgenerational design was used to promote the growth of human-centred design. The terms *universal design* and *human-centred design* are similar to integrative design, lifecycle design, inclusive design and user-centred design (Greenhouse 2010). Design is a human activity that all humans can be involved in. Ideas, and indeed design thinking, are therefore currently being used in the business world 'where design is touted as a mindset' (Beacham & Shambaugh 2011:1).

Positive needs for a human-centred approach

Design thinking involves human-centred design precisely because it supports the needs and motivations of people (Cerejo & Barbosa 2014). People are therefore at the centre of problem solving because of their creative human-centred discovery process (Fraser 2010; Brown 2008). The idea of integrating design and design thinking as a mindset across organisations is by no means a new trend. Historically, design has been seen only as an activity for professionals. The realities of the twenty-first century demand that everyone should strive to improve his or her world by generating solutions that are completely new to the world (Lockwood 2010;

Beacham & Shambaugh 2011). Human-centred design can then provide an 'orientation that fosters a deeper appreciation of user needs and what delivers value to customers' (Veryzer & De Mozota 2005:132). Design thinking can be utilised to uncover underlying user needs and issues to improve user experiences (Clark & Smith 2010).

Problems and resolutions concerning the human-centred approach

Certain obstacles still exist in the design of modern products, despite widespread acceptance of user-centred principles to product design (Miaskiewicz & Kozar 2011). For this reason, designers and the practice of design have advanced into actions and environments with reference to the third and even fourth orders. At this level, the designer interacts directly with the customer and focuses on the needs of the end-user (Cerejo & Barbosa 2014). This was the stepping-stone that design needed for it to become human centred and is a crucial element in the design thinking approach (Cerejo & Barbosa 2014). The process of user-centred design is often criticised for being expensive and time consuming. Even with substantial time spent understanding users, the problem in identifying and translating customer needs may still lead to solutions that do not meet certain aspects of the customer's experience (Shedroff 2009).

Leading designer practitioner Stefan Sagmeister believes in bringing the personal and human into design and to do something that is worthwhile (Sagmeister 2013). Similar human-centred sentiments are shared by IDEO's Tim Brown and David Kelley (Pethakoukis 2006). Brown insists that the core IDEO design principle is to create something tangible as a basis for further exploration and innovation. The IDEO organisation therefore consists of anthropologists, cognitive psychologists, and sociologists, who follow a very human-centred process. Design thinking assists designers to respond to human needs. Designers can achieve this only if all stakeholders in the design process have mutual understanding and use of design thinking (Beacham & Shambaugh 2011). Designers and other people who take part in the design consequently have to show responsibility and accountability (Leinonen & Durall 2014). In this way design, is driven by 'both the beginning and the end: the need of the user and the ultimate goal' (Brant 2012:13).

Human-centred design is a fragile encounter that entails certain inherent tensions. People try to move toward the *other* and toward *openness*, but instead they move

towards the *self* and toward *closure* (Steen 2012). Two techniques may be applied to show more awareness of these moves. A tendency to grasp the other may be overcome by engaging with a form of desire that is more open to the other. Steen (2012) also suggests a form of passivity that welcomes otherness, thereby opposing our eagerness to programme innovation. With this in mind, human-centred design practice can be meetings between people where they mutually learn and create from one another (Steen 2012). For Steen (2012), human-centred design is based on four principles. The first principle involves users understanding their practices, needs and preferences better. The second is the search for a suitable allocation of functions between people and technology. The third principle holds that project iterations should be organised in conducting research and generating solutions. The last principle of human-centred design requires that the tasks of multidisciplinary teams should be properly organised (Steen 2012).

Usability has also to be taken into account when looking at what sort of value has been delivered to customers. Nowadays the term *user experience* is preferred to usability. This shift in focus still recognises usability as an intrinsic element of design, but takes into account the holistic nature of design, whereby effective design requires the balancing of many aspects of the design process. A completed design artefact is therefore a gestalt in which ‘the whole is greater than the sum of the parts’ (Bias et al. 2012:276).

Human-centred design is also approached as an interpretive exercise. Talking to people and interacting with them forms the foundation for the larger movement towards context-sensitive design (Mattelmäki et al. 2014). Contextual understanding and personal engagement inspire design, although this notion has shifted recently from explorations of everyday life and moved more towards social questions and services (Mattelmäki et al. 2014). This shift noticeably reflects the third- and fourth-order characteristics of Buchanan’s (2001, 1998) matrix.

Empathic design forms part of the foundation of human-centred design and links directly to design thinking, because human knowledge should be leveraged to address a broader range of problems (Brown 2009). Traditional problem-solving methods and practices that seemed to work in the immediate past are no longer applicable to today’s problems. In the context of design thinking, this means designers need to link technical abilities with a new empathic sensibility of what

human beings need. Gasparini (2011) divides reflections around empathy into two main dimensions. The first dimension involves emotional empathy as an instinctive, shared and mirrored experience. This means as a person, one feels what other people experience. The other dimension is cognitive empathy, whereby one tries to understand how others may experience the world from their point of view (Gasparini 2011). Empathic design may also be considered from the viewpoint of the designer, whereby members of a design team 'adopt the role of people researchers and directly interact with users to ensure that the user perspective is included in the design' (Postma et al. 2011:31). Empathic design is therefore concerned with everyday life experiences and focuses on individual desires, moods, and emotions in human activities. The goal, however, is not to discover the fundamental truth about people and their environment, but to establish an understanding so that designers may propose possible new futures (Postma et al. 2011).

Earlier work on usability was too reliant on a rational agenda (Mattelmäki et 2014). More exploratory ways are used nowadays to study users' experiences in the form of role immersion. Role immersion is the idea of making sense of other people through oneself by experiencing things for ourselves in order to gain personal insights of experiences of other people (Mattelmäki et 2014). Through the process of empathic design all stakeholders can share experiences, while allowing openness for creative exploration.

3.3.2. Collaboration as a way to build bridges between stakeholders

The second pillar of design thinking is concerned with collaboration. The heading begins by defining collaboration followed by the positive needs for collaboration are consequently discussed. This is followed by a view of possible problems that may be problematic during the process of collaboration.

Specific resolutions to address these matters are then examined. These include Tom Kelley's personas, creating a culture that supports design thinking through training (Lund 2014), certain design objects and factors concerning the participants (Rahmawati et al. 2013) and exhibiting a wide variety of knowledge to develop solutions (Lund 2014). The section concludes with two more suggestions, which maintain that decision-making efficiency is vital to successful collaboration (Yin et al.

2011) and that teams can work more effectively together if provided with the necessary tools (Lund 2014).

Definition of collaboration

Collaboration may be described as a bridge that connects all the stakeholders with the problem-solving process (Lund 2014). All members work together as a team through collaborative efforts following a customer-centric process (Cerejo & Barbosa 2014). To be successful in today's marketplace, ideas need to integrate innovative thinking. This type of thinking is best achieved through collaborative interdisciplinary teams (Lignon & Wong Kung Fong 2009). Design thinking therefore acts as an approach to assist companies in collaboration. Design thinking uses certain steps from design to identify the problem in order to develop a solution. A step-by-step approach helps teams to stay on task and gives participants in the project specific goals and roles. The process then becomes iterative, so that the needs of all the users are taken into account (Lund 2014).

Collaborative design may also be seen as an activity that requires participation of individuals to share knowledge and to organise tasks and resources (Rahmawati et al. 2013). This is referred to as co-creation, which is described as any act of collective creativity (Vianna et al. 2012). A collaborative or broad co-design and co-production design process emerges when a project is developed with combined efforts from several people (Manzini 2014; Scariot et al. 2012). This collaborative process may involve many participants from various disciplines and requires team members with various aspects of knowledge and experience to work together (Yin et al. 2011). Such teams should foster multiple perspectives, produce rapidly and communicate fluidly (Brown 2009). Design experts may then funnel new ideas into the process and empower 'other participants' design capabilities' (Manzini 2014:106).

Positive needs for collaborative efforts

Collaboration is a vital element in the design process, especially since 'disciplines such as economics, law and health work in silos with thick walls that impede communication, thus creating a culture of increasing hyper-specialization (Bason 2014:227). There is a need to integrate processes of knowledge production and dissemination, partly as 'a reaction against the twentieth-century occurrence of narrow discipline focus and hyper-specialisation' (Du Plessis et al. 2014:18). More cooperation and mutual benefit are possible between those who apply design

thinking (Buchanan 1992). The approach of design thinking as a collaboration strategy involves many people in the design process to 'learn collectively from each other, make meaning of the situation at hand, and deal with complex and ill-defined problems' (Zahedi et al. 2012:5). This type of collective learning translates to group activities that are intended to stimulate creativity in order to develop innovative solutions (Vianna et al. 2012). Collaboration in design thinking encourages people to tell stories, make sketches, use mock-ups for testing, and observe user experiences (Zahedi et al. 2012). This co-construction fosters individual knowledge sharing and storytelling (Chessin & Garfin 2008).

The sharing of expert knowledge is a key element in the positive outcome of collaboration. More collaborative efforts are needed to achieve 'optimum design through shared solutions ... from experts' (Rahmawati et al. 2013:476). Negotiation and the decision-making process become vital to support a successful collaborative design process. A flattened hierarchy of participants further promotes decision-making (Coley 2008). Creating a shared understanding environment is equally important and can be achieved if participants sufficiently understand the flow of design, as well as the process itself (Rahmawati et al. 2013; Coley 2008). To this extent, non-designers may also partake in the collaborative design process (Scariot et al. 2012). Kassem, Iqbal, Kelly, Lockley and Dawood (2014) place emphasis on process through the adoption of protocols that create a shared vision of project delivery processes. By combining design thinking with collaboration, user experiences and design abilities push strategies to deliver more innovative solutions (Zahedi et al. 2012).

Problems and resolutions concerning collaboration

Certain difficulties may arise during collaborative efforts, as noted by several authors (Lund 2014; Rahmawati et al. 2013; Scariot et al. 2012; Zahedi et al. 2012; Yin et al. 2011). The following examples highlight some of these difficulties, followed by possible solutions and recommendations for more effective collaboration.

Building trust between varying personality types and varying personality skills may be problematic during the process of collaboration, mainly because of the diversity of people (Lund 2014; Scariot et al. 2012). Collaboration can be difficult, because employees have to 'change from a mindset of competition to collaboration' (Lund 2014:25). Therefore, trust needs to be established between team members for

successful collaboration. Designers may not be collaborative enough and there is little or no synthesis in organisations and studios (Kimbell 2011). Lund (2014) examines some consequences of collaboration and asks what future implications might exist for design thinking when looking at increased collaboration on employee skillsets and resources. The answer lies in the iterative nature and sequential step-by-step process of the design-thinking approach. Both the iterative nature and the sequential step-by-step process make for an effective approach for companies to collaborate to solve complex problems in office settings (Lund 2014).

It has become common practice to bring together a team of people to solve problems, be that in a virtual or face-to-face setting. Virtual collaboration, however, does experience more difficulties in the process (Vetterli et al. 2012). Research shows that virtual collaboration teams created the smallest amount of prototypes and experienced low satisfaction with process, team communication and the quality of teamwork (Vetterli et al. 2012). Even face-to-face settings have certain problems. Team members may have difficulty in understanding each other fully and share knowledge. 'They have their own knowledge, operating procedures, and ways in which they communicate about the design and make representations of their ideas' (Zahedi et al. 2012:4). Design practitioners often have to deal with conflicting positions of stakeholders in the design process. Conflict consequently arises when knowledge is shared among stakeholders who do not possess a common language of communication, or a related understanding of the needs and motivations of the user (Zahedi et al. 2012).

Certain solutions may be applied to address these problems. Tom Kelley from IDEO identifies personas, which include the anthropologist, the experimenter, the cross-pollinator, the hurdler, the collaborator, the director, the experience architect, the set designer, the caregiver and the storyteller. Each member of the team can play one or more of these roles. The collaboration is then more likely to find effective solutions if each role is represented (Lund 2014).

In addition, a culture that supports design thinking needs to be created through training. Successful projects need to be recognised to facilitate effective collaboration, and leadership needs to encourage and support the process by providing necessary time and resources. All goals need to be agreed upon before starting a project so that everyone in the group shares a united and clear purpose

(Lund 2014). A specific venue or space need to be created that has room for movement for the group. Visual materials should form part of this space to assist the team with brainstorming and prototyping. Team members should also be rotated frequently while adequate training and support is provided, as stated. It is important that all stakeholders should be involved in the collaboration process (Lund 2014; Raijmakers, Thompson & Van de Garde-Perik 2012).

Design objects and factors concerning the participants further ensure effective collaboration (Rahmawati et al. 2013). Design objects consist of knowledge that has been revealed by experts. This type of knowledge needs to be integrated in meeting all conditions of design (Rahmawati et al. 2013). Additional factors pertaining to the participants concern experts who should reveal best knowledge as an essential foundation of the design (Rahmawati et al. 2013). These disciplines aid the practical exploration of design and make it more intelligent and meaningful (Buchanan 1992). Only when data are integrated and knowledge is revealed by experts can collaboration be effective. Although complex problems can be solved by a group of collaborating people, participants must possess a wide variety of knowledge to develop solutions. Even though businesses have hundreds of employees and use multiple processes from different departments, they do not include input from each department when making decisions (Lund 2014). The solution lies in multiple inputs from departments that result in increased employee satisfaction and financial company growth. More importantly, involving input from each department would result in a culture of sharing in the companies (Lund 2014).

These solutions lead to the question of how to measure collaborative design performance and how the final design output might be improved during a design process. Five critical indicators for measuring and improving collaborative design performance have been identified, namely efficiency, effectiveness, collaboration, management skill and innovation (Yin et al. 2011). Of these indicators, design decision-making efficiency is the most important criteria for collaborative design efficiency (Yin et al. 2011). Influential factors include 'delivering to the brief with effectiveness, clear team goal/objectives for collaboration, decision-making ability for management skills, and competitive advantage for innovation' (Yin et al. 2011:174).

Collaboration is especially helpful when teams are provided with the necessary tools and resources to work together effectively, particularly during the ideation phase

(Lund 2014). Clients should be involved at all stages of the process, because the real knowledge exists in the client (Conklin et al. 2007). Firms who nurture cultures of innovation usually reward risk taking, encourage designers to engage with the company, and support play and new ideas. Such firms do not demonise failure; nor do they overemphasise regulations or efficiency (Brown 2009). Collaborative design has thus been used extensively during problem solving. The holistic approach to problem solving, however, has gone a step further than collaborative design.

3.3.3. Holistic way of working

A holistic approach to solving complex problems serves as the third pillar of design thinking. This heading is introduced by defining the holistic approach from the perspectives of both design thinking and whole system design. Challenges regarding issues of environmental sustainability are discussed, referring to the use of much-needed optimised and innovative solutions. The difficulty of learning from other disciplines is then discussed as the primary problem of the holistic approach and leads the discussion to suggestions of ways in which to overcome this problem. The section concludes by examining eight overall themes that determine the success of whole system design.

Definition of the holistic design approach

Holism, from the Greek word *holos*, refers to the idea that natural systems and their own properties should be viewed as a whole, and not be seen as separate collections of parts (Anthrobase 2016:para. 1). The term *holism* was coined in 1926 by South African statesman Jan Smuts, who intended it to mean the tendency in nature to form wholes that are greater than the sum of the parts through the use of creative evolution (Smuts 1986). Design thinking has a strong foundation in a solid holistic perspective precisely because it supports a comprehensive analysis and universal understanding of design phenomena (Cerejo & Barbosa 2014). Woo (2007) argues that the organic whole of design phenomena does indeed constitute holistic design. A holistic design approach or a holistic experience in the context of design thinking may also add value and innovation to products (Brown 2008).

The solid holistic perspective is also referred to as whole system design, and is defined as an 'integrated approach to the design of more sustainable and innovative solutions which encourages those involved to look at a problem as a whole, take

multiple factors into account and utilise relationships between different parts of the problem as opposed to addressing one aspect at a time' (Coley 2008:227). Whole system design offers systemic solutions to complex problems (Brown 2008).

Positive aspects of holistic thinking

The world today mostly calls for a wider approach to complex problem solving because of an increase in public awareness of issues of environmental sustainability (Blizzard & Klotz 2012; Charnley et al. 2010; Fraser 2010; Coley 2008). The complexity of our world demands that we develop habits of mind in order to make use of system principles to not only try to understand the complexity of everyday situations, but also to design for desired futures (Sweeney n.d.). To add to this, the 'challenges we face as a society, and therefore as designers, are significant' (Blizzard & Klotz 2012:456). Environmental challenges include shortages of energy, natural resources, water and food. Social issues such as political instability, rising levels of poverty, homelessness and the questionable quality of education and infrastructure are all complex problems that add to the picture.

Worldwide challenges such as these can be met only with more innovative and sustainable products, services and systems (Charnley et al. 2010). Solving these, designers and design thinking can transform organisations and inspire innovation (Lockwood 2010; Borja de Mozota 2010; Brown 2009). Designers of today not only act as a craft person but also as that of a 'historian, theorist, critic, researcher, and educator' (Harland 2011:32). By using imagination, designers can see a fuller picture and keep the big idea in mind (Clark & Smith 2010). Whole system design serves as a way of reaching more optimised and innovative solutions, although it does not necessarily always guarantee a more sustainable outcome (Blizzard & Klotz 2012; Coley 2008). The development of partnerships across disciplines, thinking systemically and the involvement of stakeholders in the design process, however, are increasingly being recognised as necessary components of more sustainable design (Coley 2008).

Problems and resolutions concerning holistic thinking

People generally have been taught and trained to develop very specific disciplinary expertise, making us view the world from within that discipline (Charnley et al. 2010; Coley 2008; Buchanan 1992). It is therefore understandably difficult and even counter-intuitive for experts to begin to learn from, interact and integrate with other

disciplines (Charnley et al. 2010; Coley 2008). Disciplines such as engineering, science and management try to solve complex problems 'by becoming increasingly specialised and reducing problems to their constituent part' and focus their attention only on each part (Charnley et al. 2010:4). Consequently, the need to think holistically and to develop transdisciplinary skills and understanding has to be recognised and promoted.

A model for a holistic design approach was developed in an effort to address the need for holistic thinking. In this model, experiential design is seen as a 'transformational process between concept and experience, with a holistic view of design phenomena' (Woo 2007:1). In the context of this phenomenon, design is described as a creative and an experience-oriented process, seeing the designer as a creator of possible user experiences through the holistic design approach (Woo 2007). Two main components form the basis of ideation from a holistic point of view. When designers start with new projects, they typically recall their own memories and imagine ideas gathered from their own experience and knowledge. This is the first component of ideation, which is followed by the second component when designers attempt to find solutions or new experiences through adaptation or synthesis (Woo 2007).

An existing holistic design approach applies experiential design knowledge to three stages of design innovation. These consist of the research stage, the design stage and the innovation stage (Woo 2007). During the research stage, tasks are clarified and design knowledge is extended by asking questions. The design stage identifies essential problems and looks for solution principles. The innovation stage introduces new or substantially improved goods or services. It is argued, however, that this holistic design approach does not offer a practical or specific design process, but acts merely as framework for research and practice in design (Woo 2007).

Another approach to problem solving in the context of holism is systems thinking. Systems thinking is an approach that concentrates on the connections among parts by focusing on how the elements of a system feed back to one another. This may produce extraordinary patterns of growth and provide methods to control the system (Lexicon 2016a). The Rocky Mountain Institute states that whole system design 'considers an entire system as a whole from multiple perspectives to understand how its parts can work together as a system to create synergies and solve multiple

problems simultaneously' (Blizzard & Klotz 2012:458). Whole system design therefore becomes an interdisciplinary, collaborative and iterative process.

A similar description of whole system design states that it should encourage people to regard problems as a whole system and not to concentrate only on one particular component of that system (Charnley et al. 2010; Krippendorff 1989b; Weick 1976). Consequently, systems thinking attempts to solve problems by looking at them as part of an overall system rather than reacting to specific parts, outcomes or events. The component parts of a system may then be better understood in the context of relationships with each other and with other systems. The whole systems approach can help create more sustainable designs. Proponents of this approach believe that silos need to be broken down and that people need to start working across disciplines (Blizzard & Klotz 2012). The various elements of whole system design are shown as being unified resulting in a framework for sustainable whole system design, as illustrated in Figure 3.10.

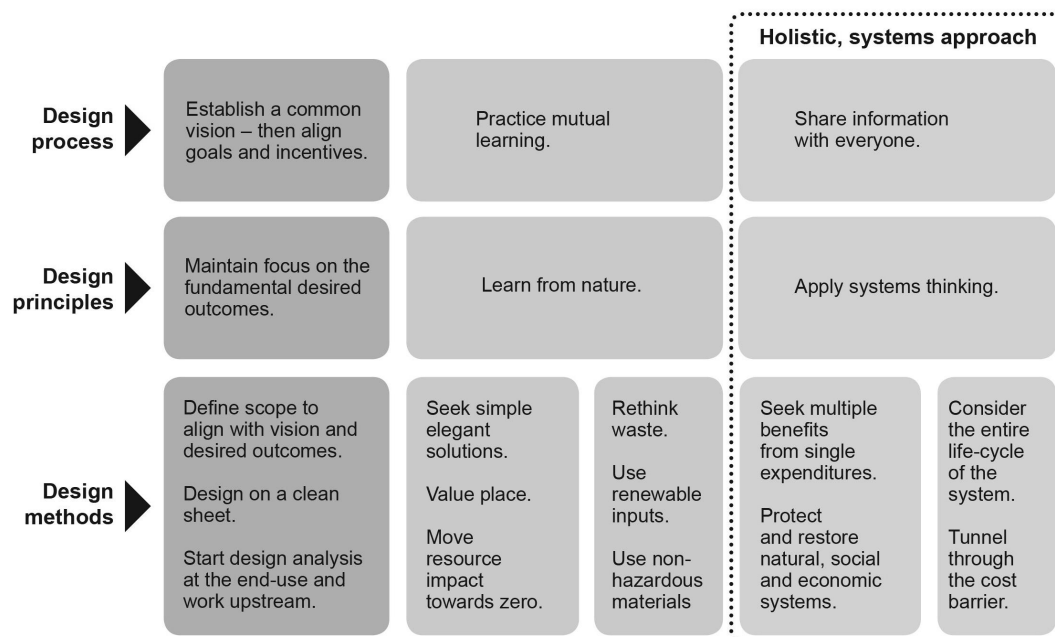


Figure 3.10. Whole systems design framework: a revised illustration from Blizzard and Klotz (2012)

The whole system design framework in Figure 3.10 is organised into three overarching categories, namely design process, design principles and design methods. These processes, principles and methods are believed to be broad enough

to be applied to a variety of design disciplines. The intention of this framework is to develop consensus among the design disciplines and to show that whole system design may possibly be a design approach for sustainable solutions (Blizzard & Klotz 2012). The third column, which is linked by a holistic systems approach, is of specific interest to this study. In this column, all stakeholders should be part of the design process 'which is how the process of *shares all information with everyone* links to systems thinking' (Blizzard & Klotz 2012:475).

Finally, systems must be regarded as a whole. Certain mechanics for doing so were developed by Charnley et al. (2010), who believe that systems are conceptual devices that should be bound with a purpose so that they become real. Only when they are real, can we explore the way they interact with the environment. This connectedness gives systems emergent properties that cannot be subdivided into separate components (Charnley et al. 2010).

According to Charnley et al. (2010), the success of whole system design depends on the influence of eight overall themes, as discussed here. First, partnerships need to be formed and consequently sustained. Multiple perspectives within these partnerships should be combined with corresponding expertise, experience, ability and competence. Second, the influence of human and non-human communication must be considered. Whole system design requires regular communication between all parts of the system. Individual characteristics of all stakeholders should also demonstrate a balance of discipline specific expertise and transdisciplinary skills. A shared understanding of purpose and process must be developed. The whole systems approach must be adopted to achieve this. Interests must be aligned between individual motivations and project motivations. The project and intended customers should therefore align with one another. Sense-making activities are needed to gain a shared understanding of the system and the multiple perspectives associated with it. The role of the facilitator encourages all stakeholders to take ownership, and have a shared democracy and a flattened hierarchy. Lastly, all stakeholders, disciplines and sub-systems must be integrated to develop an optimised and holistic solution (Charnley et al. 2010).

3.3.4. Integration of disciplines: multidisciplinary teams

The fourth pillar of design thinking is concerned with multidisciplinary teams as an intrinsic element of design thinking. This heading starts with a definition of multidisciplinary practice and is followed by a discussion about the positive aspects of multidisciplinary teams. Problems and resolutions concerning multidisciplinary teams are then discussed. The two main insights of under-design and role-playing are highlighted in context of the role of the designer in multidisciplinary teams. This leads the discussion to certain guidelines that support shared understanding. This section concludes by looking at the categories of working together, intentional learning and strategic leadership as more ways of experiencing cross-disciplinary practice.

Definition of multidisciplinary teams

It may seem obvious that multidisciplinary teams mean members of different professions all working together. Yet it becomes evident from the literature that the concept is far from clear. The terms *multidisciplinary*, *interdisciplinary* and *transdisciplinary* are often used interchangeably. The topical term of transdisciplinary also accurately describes ways of working across and beyond several disciplines. Transdisciplinarity allows for the awareness of phenomena from a multitude of perspectives by involving relevant specialists, non-specialists, stakeholders and other participants (Du Plessis et al. 2014). This topic, however, is reasonably 'new among academia' (Du Plessis et al. 2014:24). For the purpose of this study, the term *multidisciplinary* is used to describe these and other ways of working together, as mentioned by the majority of authors. Multidisciplinary teams is a strong element of design thinking, precisely because design thinking uses a wide range of methods and tools from various disciplines to explore and understand the behaviour and perceptions of stakeholders (Cerejo & Barbosa 2014). Multidisciplinary teams are therefore important because they provide the skill range to meet the increasingly complex needs of users.

Several studies have made an effort to understand design as an integrative discipline. This is evident in the different ways that authors describe their studies on multidisciplinary approaches, for instance interaction design research (Stolterman

2008), accommodating interconnections (Björkland 2013), collective intelligence (Conklin 2005), shared understanding (Conklin 2009), systems thinking (Darzentas & Darzentas 2014) and integrative thinking (Mascarenhas 2009). These research titles point to the central debate surrounding multidisciplinary thinking, which states that multidisciplinary efforts are a way to build bridges between all stakeholders in the problem-solving process.

Positive aspects of multidisciplinary teams

The need to develop frameworks for joint problem solving that involves diverse stakeholders is undisputable in the complex challenges of today's world. Multidisciplinary effort is a way to address these challenges, but unfolds its positive impact only over periods that may take several months to develop (Von Thienen et al. 2010). Overall, multidisciplinary teams may have a significant positive effect, although not always in all contexts. Creative arts professionals in the context of creative industries such as advertising, animation, video and film production, performing arts and entertainment have long structured their workplace relationships around a variety of team-based models. For instance, in advertising, the core of the creative team consists of the designer and the copywriter.

The creation of stage-gate processes and their execution by cross-disciplinary teams, consisting of both scientists and designers, has become a modern-day problem-solving technique (Beckman & Barry 2007). This enables team members to use their discipline-specific expertise to achieve a desired shared outcome (Fleischmann & Hutchison 2012). As the creative concept takes form, 'others are solicited to the team, each adding to, shaping, and advancing the project' (Fleischmann & Hutchison 2012:24). Creativity and consequently innovation increasingly occur in teams, particularly multidisciplinary teams (Paletz et al. 2012).

It is evident from the literature that design thinking practitioners in particular use their visual artefacts and prototypes to assist multidisciplinary teams to work together (Curedale 2013a; Curedale 2013b; Clark & Smith 2010; Kimbell 2011; Brown 2009; Brown 2008; Cross 2001). Design thinking tools therefore have a strong visual character to assist interdisciplinary teams in understanding one another and creating together (Tschimmel 2012). Other more traditionally creative pursuits such as design and photography are increasingly beginning to identify other disciplines in a

search for new alignments and connections that would facilitate new technologies and online opportunities (Fleischmann & Hutchison 2012).

New alignments and technologies are consequently extending projects beyond media and design to make use of a 'diverse range of expertise such as information architecture, software engineering, research and theory, business strategy and content production – as well as digital photography, illustration, 3D model making, musical composition, performance and other allied creative disciplines' (Fleischmann & Hutchison 2012:25). Furthermore, design thinking and the many disciplines that are engaged in some way in design must become more explicit (Beckman & Barry 2007).

Problems and resolutions concerning multidisciplinary teams

Working in multidisciplinary teams is not a natural skill. Therefore people need to be trained and equipped for the interdisciplinary and multidisciplinary world they live in. Communication across disciplines is difficult, and often requires additional negotiation between members of a group (Oehlberg et al. 2012). Design teams create design information both individually and collaboratively, and therefore 'often struggle to synthesize heterogeneous information and form a shared understanding of the design problem or their solution strategy' (Oehlberg et al. 2012:669). This communication gap happens partly because innovation strategies of design firms are different from traditional models of academic and scientific scholarship (Cerejo & Barbosa 2014; Jenkins 2010).

One of many solutions would be to depend on radical collaboration by teams, sharing knowledge and getting into the habit of gaining early insights through tangible expressions of ideas (Simons & Gupta 2011; Fraser 2010). The broader the domains of strategies used by experts, the broader the domain of results may be from multidisciplinary teams. Multidisciplinary teams therefore produce more unusual results than monodisciplinary teams, and also enhance innovation (Von Thienen et al. 2010). However, more time should be spent in practising ways of working in multidisciplinary design teams. This implies that designers in particular need to break down the boundaries between sub-design disciplines to develop successful multidisciplinary teams (Raijmakers et al. 2012). Designers must also 'diversify communication tools and output in academic knowledge production and dissemination to reach beyond academic audiences, to business, creative industries,

society and education' (Raijmakers et al. 2012:10). Designers and non-designers must be aware of their own strengths and weaknesses. The team as a whole should be involved in decision-making and constant discussion to create more robust ideas and fewer design flaws (Simons & Gupta 2011).

Multidisciplinary teams are more likely to be successful in applying design thinking when they can be guided to combine design methods (Seidel & Fixson 2012). Design methods such as needfinding⁵, brainstorming and prototyping are valuable, not only for concept generation, but also in concept selection (Seidel & Fixson 2012). The way in which multidisciplinary teams use these design methods is an area of increasing importance precisely because organisations are being urged to embrace design thinking in areas where people may not have previous experience with these methods (Seidel & Fixson 2012). Multidisciplinary teams are increasingly the norm in creative arts practice, especially when these teams are driven by technological innovation (Fleischmann & Hutchison (2012).

The emphasis of the role of designers in the context of multidisciplinary teams is of great importance to this study. Tom Kelley (Lund 2014) believes that designers can play the role of collaborator and facilitator in multidisciplinary teams in an effort to explore ways of working with other people. Designers can therefore play a key role in multidisciplinary teams by being flexible with the roles they play (Raijmakers et al. 2012). Most designers know that they cannot understand all the design issues by reflective study alone. To cope with human complexity, designers realise intrinsically that they must explore ideas quickly through prototyping (Simons & Gupta 2011).

Teams should define and explore the role of the designer regularly throughout any project. Multidisciplinary or cross-functional teams do not include people only from within an organisation. Instead, multidisciplinary teams consist of people who truly want to listen and value to the viewpoints of the others (Simons & Gupta 2011). People working across different disciplines are in a sense prevented from growing stale, therefore ensuring value-added design (Blair 2011).

⁵ Needfinding involves a set of activities for determining the requirements for a new concept by employing a user-focused framework (Patnaik & Robert 1999). Needfinding is undertaken as part of concept generation by utilising existing technologies and design capabilities (Seidel & Fixson 2012).

Two main insights are highlighted when reflecting on the role of the designer in multidisciplinary teams. First, designers must under-design the formal aspects of concepts. To under-design implies that ‘multi-stakeholder collaborations require relinquishing (some) control of the creative process’ for ‘the designer to take up a more strategic, central position in the design of the service as a whole’ (Raijmakers et al. 2012:6). Communication is therefore extremely important when presenting early stage ideas to non-designers. The objective is to facilitate further discussion and co-creation (Raijmakers et al. 2012). The importance of ‘preliminary, unfinished thoughts and visuals as tools for co-creation’ is a highlight of this objective (Raijmakers et al. 2012:6).

The second insight uses role-play as a tool for co-creation and empathy. Role-play may be used as a co-creation tool to look at different viewpoints and possible roles for multiple stakeholders (Raijmakers et al. 2012). When individuals from different disciplines discuss their shared domain, they are in effect approaching it from vastly different perspectives (Paletz et al. 2012). This approach reaches beyond user-centred design, whereby only the end-user is placed in the centre.

Designers are often seen as generalists and not as specialists in the way that they shift roles and undertake problems (Raijmakers et al. 2012; Owen 2006). With reference to the four orders of design, the traditional sub-genres of design (graphic design, industrial design) reflect skill-based knowledge. In today’s creative industry these skills and disciplinary boundaries have and should become more blurred and redistributed (Lockwood 2010). These disciplines alone are no longer enough to reflect the present-day design needs of the economy and society. Designers should therefore learn how to analyse and define their own roles based on their own experiences by embedding design within the requirements of the economy and society (Raijmakers et al. 2012). This approach creates T-shaped people who combine deep expertise, such as design, with broad knowledge of other disciplines.

Design teams are encouraged to use certain design guidelines to support shared understanding (Oehlberg et al. 2012). The guidelines propose that teams need to support varying clients and media, and to enable individuals to selectively present design information to the team. Teams must support the sharing of meta-analysis of information and record shared decisions alongside individual contributions. Teams must also offer an accessible and visible team archive (Oehlberg et al. 2012). An

information tool in the form of a sharing cycle connects information in multidisciplinary design teams (Oehlberg et al. 2012). Through the sharing cycle, designers capture, reflect and share, first individually and then as a team during each phase of the design process. The aim is to empower 'designers to share rich information with their collaborators, and to help teams record shared frames and apply shared knowledge towards intermediate design decisions and goals' (Oehlberg et al. 2012:670). These frameworks allow individuals to contribute to group work while keeping boundaries between personal and private spaces.

Four obstacles need to be overcome in order to build a successful multidisciplinary design team. To be more successful, the multidisciplinary design thinking team should overcome stereotypes that assume that designers can illustrate, that all artists are creative, and that engineers are good at calculations (Lugmayr & Stockleben (2013). The following suggestions are proposed by Lugmayr and Stockleben (2013) for successful multidisciplinary engagement.

First, people have to accept the ideas of their fellow team members, even in areas where they deem themselves experts. Short presentations of each team member's discipline could ensure mutual respect and professional trust. Second, team members should get into the habit of giving positive feedback and have conversations to reach a shared understanding of the ideas drawn by the team members. There should be enough room for reflection to discuss the technical terminologies the team members are using. Third, members of the team should be encouraged not to withhold ideas. Any suggestion might be the exact idea that is needed to inspire a better idea. The final outcomes of the design thinking process are always the work of the entire team (Lugmayr & Stockleben (2013). People enjoy bouncing ideas around with other people, being exposed to multiple perspectives, and sharing the workload during multidisciplinary teamwork (Fleischmann & Hutchison 2012). Lastly, Lugmayr and Stockleben (2013) refer to the basic traits of character as suggested by Brown (2008), which include empathy, integrative thinking, optimism and experimentalism. Design thinkers should have significant experience in more than one discipline to enable true interdisciplinary collaboration (Brown 2008).

Various other ways of experiencing cross-disciplinary practice may be described in terms of thinking, acting and being (Adams et al. 2011). Certain categories are

identified within these descriptions, but only the categories of working together, intentional learning and strategic leadership are discussed here in the context of this study. The first category serves as the cross-disciplinary practice of working together with people who have different training to effectively find a better solution. This is a foundational category on which the other categories build. Different ways of thinking involve awareness of differences in disciplinary training. Different perspectives from team members are therefore seen as a value-added information source (Adams et al. 2011).

The second category holds that cross-disciplinary practice is an intentional learning process in which everyone gains. Descriptions include *me*, *my team* and *my stakeholders* (Adams et al. 2011). This category represents a process of improving the conditions for working together with people who have different training to address complex problems. New opportunities arise to address these complex problems 'through intentional learning experiences that involve immersion in other disciplinary ways, seeing failure through an opportunistic mindset, and having a passion for discovering alternative ways of seeing the world' (Adams et al. 2011:600).

The experiences that represent the third category are concerned with applying prior learning to actively enable cross-disciplinary work and outcomes. Cross-disciplinary practice involves strategic leadership to enable successful cross-disciplinary outcomes. Leadership is therefore 'central in that it involves being the 'interface', 'connector', or 'communication specialist' to cross disciplines, organizational structures, and cultures to proactively create an environment for innovation' (Adams et al. 2011:600). This type of workplace stimulates creativity and supports collaboration (Jenkins 2010).

3.3.5. Combination of mental processes: abductive reasoning

To add to the complexity of the future of design practice, the concept of integrated, whole-mind thinking serves as the fifth pillar of design thinking. This heading looks at definitions of abduction as a different method of reasoning. Omniphasic literacy adds to abductive reasoning and is consequently discussed. The primary problem with abductive reasoning is discussed and is followed by an investigation of the rationality of design.

Definition of abductive reasoning

Abduction serves as a type of explanatory inference, and forms part of deduction and induction, which are terms used in the method of reasoning (Khisty 2000). Abduction may be understood as the argument to the best explanation, and is a logical way of seeing inferences or best-guess leaps. Abductive logic also allows for the creation of new knowledge and insights (Kolko 2010). The seminal writings of Peirce (1965), an American philosopher who contributed towards the areas of logic and semiotics, noted that abductive reasoning might explain how original ideas often seem to come from nowhere. Deduction proves that something *is* in existence, while induction demonstrates that something *is operative*. Abduction therefore merely suggests that something *may be* (Arrighi & Ferrario 2008).

In contrast with traditional deductive and inductive reasoning, abductive reasoning 'jumps from a Result to a possible Rule that would... make a Case reasonable' (Ross 2010:145). By again referring to the seminal writings of Peirce (1965), abduction is seen as a form of 'self-controlled reasoning', which enables a transaction among 'facts, ideas, and an inquirer' (Anderson 2005:9). Abductive reasoning may therefore be interpreted as a landscape of possibility and plausibility (Smorti 2008). This definition of abductive reasoning allows us to look at such processes as following a hunch, making an educated guess, or trusting one's intuitions (Ross 2010).

Positive needs for abductive reasoning

Designers do not merely solve problems, but instead work through the problems by using an abductive process (Cerejo & Barbosa 2014). Modern society is well skilled in this abductive rational process of thinking, mostly because of educational systems that favour logical and rational ways of interpreting and interacting with the world around us (Williams & Newton 2007). It is therefore wrong to replace the intuitive judgments of design practitioners with rule following or to arrange knowledge into abstract systems of symbols that then stand in for established knowledge (Crawford 2009). Abductive reasoning is needed because we 'possess great knowledge, but the knowledge is fragmented into so great an array of specializations that we cannot find connections and integrations that serve human beings either in their desire to know and understand the world or in their ability to act knowledgeably and responsibly in practical life' (Buchanan 2001:6).

Design thinking can be used as an open-out method of innovation. This method stands in contrast with more traditional funnel-down methods of applying design as styling towards the end of a process (Lockwood 2010). Because design thinking is driven by intelligence, which supports innovation, it helps an organisation to explore several ways to solve problems. This type of thinking is referred to as innovation intelligence, and includes emotional intelligence, integral intelligence and experiential intelligence (Clark & Smith 2010). Emotional intelligence refers to the ability to understand and support the context of culture. Integral intelligence assists in uniting diverse customer needs to deliver value. Experiential intelligence is a way of understanding and activating all of the human senses to 'make innovation tangible, known, and vibrant' (Clark & Smith 2010; 49). A good abductive reasoner must not only be receptive to ideas, but be able to recognise their fitting and plausibility to be able to engage with a problem (Anderson 2005). It is necessary to think beyond what is immediately observable and to embrace what could be possible instead. This way of thinking leads to new solutions to unmet needs by using imagination (Fraser 2010).

Omniphasic literacy adds to abductive reasoning, especially since the practice of design is a goal-directed problem-solving activity. Omniphasic visual literacy⁶ encapsulates the 'ability to perceive, interpret, and create visual messages through the use of rational intelligences ... as integrative processes of the mind' (Williams & Newton 2007:147). This means that rational approaches are acknowledged as part of the omniphase approach, but that specific attention is placed on the intuitive and visual aspects of music, writing, art, photography, acting, meditation and even daydreaming (Williams & Newton 2007). An integrated mindset may then be achieved by combining intuitive responses with practised technique. Ultimately designers need to combine knowledge from other specialisations into valuable results for both individual and social life (Buchanan 2001).

Problems and approaches to abductive reasoning

According to Buchanan (1992), there is a communication problem between the scientific community and designers. This communication gap is partly to blame for the differences between rational and intuitive ways of thinking. As mentioned earlier,

⁶ To be visually literate, a person needs to be proficient in using a communication system. To do this, the symbols of such a communication system must be understood (Williams & Newton 2007).

modern society is skilled in rational thinking because of logical, linear and rational educational systems. To add to this, many scientists share in the new liberal art of design thinking, while practising as masters of their specialised subject matters (Borja de Mozota 2010; Buchanan 1992). These include the many scientific methodologies in physics, chemistry, biology, mathematics and the social sciences, all of which are based on rational ways of thinking (Buchanan 1992).

This rational way of thinking pushes against today's world of work, which calls for different ways of thinking. While abduction may even be seen as a weak argument (Peirce 1965), it is necessary for sound reasoning because it narrows down to a feasible number 'the infinite set of hypotheses that we could possibly entertain in any given situation' (Khisty 2000:108). Most people are intuitively illiterate. According to this argument, people may respond to such stimuli as the Nike swoosh without being aware of its influence, which constitutes intuitive meaning. Authors believe that the 'one-sided approach to knowing that most of us have learned for most of our lives has prepared us for a singularly rational world – which doesn't exist' (Williams & Newton 2007:134). Integrative thinking blends analytic and lateral thinking, and may even support uncertainty more (Lugmayr & Stockleben 2013). On the other hand, analytical thinking has a tendency to blend out contradictions within complex problems to have a consistent idea of the problem at hand (Lugmayr & Stockleben 2013).

There are two approaches to problem solving, based on two fundamentally different epistemologies. The first approach follows a rational, analytic or intellectual way of thinking, while the second offers a more 'interpretive, emergent, and explicitly embodied' way of solving problems (Rylander 2009:1). The first intellectual or knowledge work approach is characterised by knowledge-intensive firms, which are organisations that are dependent on highly qualified people to solve complex problems in a creative way (Rylander 2009). Factors that affect so-called brainwork include knowledge, experience, mental agility and the ability to think up and formulate new ideas (Kroemer & Grandjean 1997). Knowledge work and design thinking are therefore embedded in the various constructions of knowledge (Rylander 2009). A definite shift exists in the developed world economies that are moving away from industrial manufacturing to knowledge work (Brown 2008). The alternative to the intellectual approach is an interpretive approach that is represented by design

thinking and design firms. Rational and Intuitive thinking stem from rational and interpretive approaches.

Rational thinking embodies all that is scientific. This scientific way of thinking is also referred to as convergent thinking, and is based on reason and logic (Hegeman 2008). Only one correct answer can be arrived at deductively, and convergent thinkers tend to approach a problem by asking the question *What is?* (Hegeman 2008; Rylander 2009). Knowing-in-action forms part of a rational way of thinking and involves the skilful act of doing without practice (Hegeman 2008). Designers therefore rarely approach a problem as a given and continuously ask questions that explore a range of contexts (Cerejo & Barbosa 2014).

In contrast with convergent thinkers, divergent thinkers use intuition and imagination and typically solve problems by asking the question *What might be?* (Hegeman 2008). Similarly, the question *What if?* is asked by divergent thinkers in an attempt to try to imagine possible future scenarios, as opposed to accepting the status quo (Kimbell 2011). David Kelley from IDEO approaches problems from the perspective that the answer is 'out there, hidden in plain sight' (Pethakoukis 2006: para. 2). Abductive reasoning is therefore well suited to facing problems that are 'vague, or even unimagined' (Ross 2010:145).

Rational and intuitive ways of thinking may be referred to as convergent and divergent ways of thinking (Curedale 2013b; Rylander 2009; Hegeman 2008; Williams & Newton 2007). Convergent thinking is seen as a tool for problem solving, whereby the brain applies a mechanised system or formula and where the solution is only a number of steps away from the problem (Curedale 2013b). Divergent thinking is what we do when we cannot produce an answer or when we do not know what the next step should be (Curedale 2013b). However, the problems that designers have to address can seldom be neatly categorised into rational thinking and intuitive thinking. This in part accounts for the breakdown of communication between rational scientists and the more intuitively minded designers, as mentioned earlier (Buchanan 1992).

Design thinking calls for both convergent and divergent thinking to be operationalised and applied during problem solving. Designers constantly have to make rational and intuitive decisions and use both convergent and divergent thinking when engaging with a problem. All problems call for designing a solution, and therefore all projects

are essentially 'designing something' (Rylander 2009:12). For example, when designing a logo, the designer has to take the client's brief with its specified constraints into account. In this scenario, there is only one correct answer because of real-world limitations such as budget constraints, specified colour usage and even time management and delivery. By using convergent and divergent ways of thinking, designers are engaging with design rationality (Stolterman 2008).

It is quite possible to talk about a rationality of design practice to build a deeper understanding of what defines the disciplined behaviour of a designer. The rational designer's behaviour would be to work on two or more designs in parallel and in an iterative way (Stolterman 2008). This means that the rational, disciplined, designerly way of working involves a decision-making process that goes back and forth between the general and the specific. For the most part creative divergent thinking dominates the designer's thinking during this process. The designer makes use of imagination to create an original solution to the problem by asking *What might be?* This question has no right or wrong answer (Stolterman 2008). Both convergent and divergent thinking is necessary to solve a problem although convergent thinking dominates throughout the design thinking process.

3.3.6. Wicked problems: building a shared understanding

Problem solving forms one of the crucial characteristics of design thinking, and acts as the sixth pillar of design thinking. The following heading looks at the various ways of describing wicked problems, especially in the context of design thinking. This leads the discussion into the need for a shared understanding of wicked problems. Two ways of dealing with wicked problems are then discussed. The section concludes by relating wicked problems directly to designers in industry.

Definition of wicked problems

The term *wicked problem* refers to a complex problem for which there is no straightforward method of solution (Lexicon 2016b). Wicked problems can therefore be defined as problems that are difficult or even impossible to solve, mostly because they may be incomplete, contradictory or have changing needs that are often difficult to recognise (Conklin et al. 2007; Buchanan 1992). Rittel and Webber (1973) were the first authors to formally describe the concept of wicked problems by contrasting wicked problems with comparatively tame problems. Wicked problems therefore refer

to messy, circular and aggressive problems that stand in contrast with tame problems such as mathematics, chess or solving a puzzle. While attempting to solve a wicked problem, the solution of one of the problem's aspects might reveal or produce another even more complex problem. Because so many people have to adjust or change their mindsets and behaviours, other areas have been identified as showing signs of wickedness. These areas include aspects of design decision-making and knowledge management (MedLibrary 2015b).

Several studies have made a clear connection between wicked problems and design thinking (Darzentas & Darzentas 2014; Cerejo & Barbosa 2014; Pasisi, Gibb & Matthews 2014; Game et al. 2014; Conklin 2009; Stolterman 2008; Conklin et al. 2007; Conklin 2005; Buchanan 1992). Design thinking links with problem solving because it aims to solve problems where the variables are complex, the data incomplete and the outcome uncertain (Cerejo & Barbosa 2014). Even the systems we work in are defined as being 'complex and plagued with wicked problems' (Game et al. 2014:275).

Positive needs for a shared understanding of wicked problems

The seminal study of Rittel and Webber (1973) grounded wicked problems in public planning and policy. The context of public planning may be widened to problems surrounding global climate change, natural hazards, healthcare, the AIDS epidemic, pandemic influenza, international drug trafficking, nuclear weapons and social injustice. The complexity of these solutions add to the positive need to both study the characteristics of wicked problems and to develop a shared understanding of wicked problems (Lockwood 2010).

A fundamental issue that lay behind both the practice of design and design thinking is the relationship between determinacy and indeterminacy (Buchanan 1992). Determinate problems have definite conditions and are derived from the linear model of design thinking. In practice, this means that a designer first has to identify the exact conditions before calculating a solution. As a result, the wickedness has been removed, and the problem is in a sense tamed (Roberts 2000). People tend to simplify a problem in various ways in an attempt to make it more manageable and 'taming a wicked problem is a very natural and common way of coping with it'

(Conklin 2009:20). In contrast, the term *indeterminacy* (and not undetermined) means that there are no definitive conditions or limits to design problems (Buchanan 1992).

The relationship between determinacy and indeterminacy leads us to the question *Why are design problems indeterminate and therefore wicked?* The answer lies in the peculiar nature of the subject matter of design, which has never been critically considered, according to Buchanan (1992). 'Design problems are *indeterminate* and *wicked* because design has no special subject matter of its own apart from what a designer conceives it to be' (Buchanan 1992:16).

The ten characteristics of Rittel and Weber (1973) have been generalised to other spheres outside social policy planning. The following characteristics identified by Conklin (2009) aim to build a shared understanding of wicked problems. Wicked problems are consequently unending, do not have a right or wrong outcome, unique, costly and diverse. The first characteristic holds that the problem cannot be understood until a solution has been developed. The problem exposes new aspects every time a solution is put forward, so that further adjustments need to be made to the potential solutions. Problems like these are ill structured and contain an ever 'evolving set of interlocking issues and constraints' (Conklin 2009).

Second is the notion that wicked problems display no stopping rule. No statement can clearly define the problem, and therefore the solution cannot be clearly defined either. The process of solving the problem does not end with the emergence of an ideal solution, but when resources such as time, money or energy are depleted. Solutions to wicked problems may never be definitely right or wrong. The quality of a solution can therefore not be ascertained from following a formula and can only be described at best as 'better/worse' or 'good enough/not good enough' (Conklin 2009:19).

Each wicked problem is intrinsically novel and special, and solutions to these problems have to be custom designed. Long-term insight may lead to better wisdom and experience about the approach to wicked problems, although the particulars of a new wicked problem will always render another bigger problem. Every solution is a one-shot operation and each attempt at finding a solution to the problem will have certain repercussions. In other words one has to try different solutions to learn about

the problem. Every solution is costly and has long-term effects that may lead to new wicked problems. The last characteristic demonstrates that solutions to wicked problems cannot be substituted, which means that for every solution that is devised, a number of other solutions are never even imagined. This is where creativity can be used to find potential solutions (Conklin 2009).

Problems and resolutions concerning wicked problems

Design thinking, with its processes of empathic understanding, divergent and convergent thinking, rapid prototyping, co-creation, testing and iterative processes provides new ways of problem solving (Pasisi et al. 2014). Design problems tend to be typically wicked because they are sometimes interpreted incorrectly, involve multiple stakeholders, all of whom share wildly different viewpoints, and have no correct or optimal solution (Conklin 2005). Using standard problem-solving methods would therefore not necessarily solve wicked problems. Many companies find that models that were successful in the past do not apply to modern-day challenges and opportunities (Lockwood 2010). Instead, wicked problems require creative solutions. Creativity, insight and innovation would then emerge naturally as the by-products of shared understanding and shared commitment (Conklin et al. 2007).

Wicked problems are typically found in issues surrounding the economy, environment and politics. In situations such as these, a problem becomes wicked when a great number of people have to change their mindsets and behaviour to be able to solve it. Solutions to wicked problems depend on how the problem is framed and vice versa. Consequently, the definition of the problem depends on the solution. However, stakeholders have radically different worldviews and different frames for understanding a problem. The constraints surrounding the problem and the resources needed to solve it keep changing over time and therefore the problem might never be solved definitively (MedLibrary 2015b).

However, there are certain resolutions or coping strategies to help deal with wicked problems. As mentioned before, wicked problems cannot be approached by means of traditional rational problem-solving methods alone, such as clear problem definition, analysis and sequential step-by-step formulas (Conklin et al. 2007). While traditional problem solving is able to define the problem clearly before any strategies to solve it are devised, wicked problems are more difficult, if not impossible to describe. The following three coping strategies in the form of authoritative,

competitive and collaborative strategies serve as possible ways to handle wicked problems (Roberts 2000).

Authoritative strategies are referred to as taming strategies and aim to lessen levels of conflict by empowering only a few stakeholders to solve the problem. Stakeholders such as these must have the authority to define a problem and produce some solutions for it. This reduction in the amount of people (stakeholders) simplifies problem complexity because various viewpoints are eliminated at the start. Solving problems can consequently be quicker and with fewer people involved. 'Reliance on experts also can make problem solving more "professional" and "objective"' (Roberts 2000:4). Authoritative strategies may consequently be applied in design studio environments, assuming that designers and the key decision makers are seen as professionals. The disadvantage of authoritative strategies is that authorities and experts can be wrong about the problem and the solution (Roberts 2000). Such experts or authorities may not have an appreciation for all the perspectives needed to cope with the problem either.

Competitive strategies are not new, and have typically been applied in times of conflict and politics in the marketplace as a way to find solutions. Stakeholders who follow competitive strategies have a zero-sum game attitude (Roberts 2000). Someone must therefore win or lose. According to this strategy, holders of different viewpoints are forced to oppose one another and have to produce their own preferred solutions (Roberts 2000). These solutions can then be compared and the most preferred one chosen. The issue of power is central to the pursuit of competitive strategies. Stakeholders, who create the strongest power base using whatever tactics their ethics and morality allow, increase their chances of winning the right to define and solve the problem their own way. The struggle for power usually leads to conflict and contributes to one of the disadvantages of competitive strategies. Without knowledge sharing, stakeholders no longer have the incentive to produce the best possible solutions, which consequently gives rise to conflict (Roberts 2000).

A great deal of interest has been prompted in the literature around collaborative strategies that reflects two of the main pillars of design thinking, namely collaborative design teams and multidisciplinary studios. The French verb *collaborer*, translated as working together, means that collaboration is based 'on the principle that by joining

forces parties can accomplish more as a collective than they can achieve by acting as independent agents' (Roberts 2000:6). Examples of these types of collaboration strategies are evident in government, business and international relations in the form of alliances, partnerships and joint ventures. Apart from numerous advantages, several disadvantages of collaboration occur when too many stakeholders are involved in the problem-solving effort and add to the transaction costs (Roberts 2000). These transaction costs may be seen as scheduling more meetings and having to take into account more people with whom to communicate. Achieving a shared understanding to solve wicked problems is also a time-consuming process (Game et al. 2014; Conklin 2009; Rittel & Webber 1973). Consequently, synergy becomes difficult to achieve, mostly because collaboration is a learned skill and needs to be practised regularly (Roberts 2000). One must also be conscious that other members of the team might act in ways that are surprising, unconventional, and even subversive (Heller & Vienne 2009).

Another possible strategy in solving wicked problems involves a network approach (Conklin 2009; Roberts 2000). According to this approach, wicked problems are socially defined. Nobody owns the problem; nor do they possess a clear idea of how to construct possible answers. It is because of this social complexity that solving wicked problems is essentially a social process (Conklin 2009). As a solution, all stakeholders should therefore be involved to generate conversation not only with one another but also with the problem at hand (Conklin 2009). Communication must be managed and nurtured so that the social network can function as a cohesive entity. Potential problem solvers, stakeholders and designers alike need to reflect on the social nature of wicked problems before any attempt at solving them.

In conclusion, wicked problems relate directly to designers in industry for the simple reason that designers deal daily with incomplete and contradictory problems. Wicked problems consequently require a creative solution, which is a skill that is practised by designers. From an intuitive viewpoint, designers interact with these messy, circular and aggressive problems that stand in contrast with more rational tame problems. Specific areas of interest relating to wicked problems for practising designers include design decision-making and knowledge management. Wicked problems link directly to designers, mainly for the reason that design thinking is part of problem solving precisely because it aims to solve problems where the variables are complex, the data incomplete and the outcome uncertain (Cerejo & Barbosa 2014). Furthermore,

the complexity of today's problems faced by designers adds to the need to develop a shared understanding of what wicked problems entail.

A determinate problem, which consists of definite conditions, is another direct link between wicked problems and designers. In practice, designers therefore first have to identify the exact conditions of a problem before attempting a solution. Certain resolutions and coping strategies exist in dealing with wicked problems and for the designer the strategy of collaboration is certainly the most ideal. By joining forces, people can accomplish more together than they can achieve by working alone (Roberts 2000). Another suitable strategy for designers in solving wicked problems is in the form of networking, which relates closely to collaboration. The network approach therefore allows the designer to generate conversation with other people about the problem at hand.

3.4. Design thinking processes

This section looks at various views of design as a process for thinking and identifies two approaches to this process. A detailed analysis of the actual step-by-step process of design thinking falls outside the scope of this study. The intention here is to gain insight into different ways of thinking, based on the principles of design thinking (Figure 3.1). Existing design processes, however, do need to be acknowledged to be able to contextualise possible new ways of thinking with specific reference to creative problem solutions. The role of design is now recognised as a 'process as much as it is an artifact, communication or environment' (Lockwood 2010:82). The two design processes described in this heading that resonate most with this research are the *seven-stage approach* and the *five-stage approach* from the Stanford d.school (2011).

Definition of the design process as a process for thinking

The design process itself is emergent and keeps changing between definition and solutions by using imagination, prototyping and taking the user into account (Fraser 2010; Rylander 2009). Designers therefore transfer 'among various tasks, subproblems [sic], and design processes in a flexible and highly opportunistic manner' (Razzouk & Shute 2012:337). A non-linear (Hegeman 2008) analysis of the design thinking process is proposed by Brown (2008). Brown's (2008) practical applications at the design firm IDEO involve seeing the design process as a system

of spaces, rather than a predefined sequence of logical steps. Design projects at IDEO have to undergo three spaces, which they label 'inspiration, for the circumstances (be they a problem, an opportunity, or both) that motivate the search for solutions; ideation, for the process of generating, developing, and testing ideas that may lead to solutions; and implementation, for the charting of a path to market' (Brown 2008:4). The actual sequence of design thinking and decision-making is not a simple linear process and 'problems addressed by designers do not, in actual practice, yield to any linear analysis and synthesis yet proposed' (Buchanan 1992:15).

3.4.1. Seven-stage approach

An early version of the design thinking process is based on the work of Herbert Simon (1969), and includes the seven distinct stages of defining, research, ideating, prototyping, choosing, implementing and learning (Serrat 2010). These seven steps may be used as containers in which problems may be framed. Within these steps, appropriate questions can be asked, ideas can be created, and the best possible answers can then be chosen (Serrat 2010). The decision-making process should go back and forth continuously between the whole and the details (Stolterman 2008). The process is therefore repetitive and 'partly cyclical and partly directional, through which it continually gains depth' (Leupen, Grafe, Körnig, Lampe & De Zeeuw 1997:16).

During the first stage of defining, a decision must be made in order to find out exactly what issues need to be resolved. A target audience must be agreed upon, as well as the urgency of the project. Criteria for success may be listed, together with a glossary of terms. In the research stage, a specific issue must be reviewed, whilst being mindful of existing obstacles. Examples of previous attempts to solve the problem should be taken into consideration. The project's supporters, critics and investors must be noted. Thought leaders' opinions must also be taken into account. Talking to the end-users might deliver the most fruitful ideas for design at a later stage. During the ideation stage, the needs and motivations of these end-users should be identified in order to generate multiple ideas. Brainstorming sessions should consist of orderly open-ended discussion with no judgment or negative criticism of ideas. Ideas may then be combined, expanded and refined during the prototyping stage. Feedback from a diverse group of people, including the end-users,

should be taken into consideration before presenting a selection of ideas to the client.

At this stage, it is important to reserve judgement and maintain neutrality. Actual working prototypes should be presented. After the prototyping stage, the objective must be to constantly review the possible solution, while remembering to put emotion and ownership of ideas aside. Consensus thinking must be avoided. The most practical solution is not always the best, and only powerful ideas should be selected. During the implementation stage, tasks should be planned and descriptions drawn up for each task. Resources should be determined before assigning tasks for execution. Only then may the implemented ideas be presented to client. Consumer feedback may then be gathered to determine whether the solution met its original goal during the learning stage. A discussion on possible improvements could measure the success of the idea implementation. All relevant data must be collected and documented for future reference.

3.4.2. Five-stage approach

The Stanford d.school outlines each of the modes of a human-centred design process in Figure 3.11 as empathise, define, ideate, prototype and test. They believe that these process modes, together with certain mindsets and methods, are vital approaches for design thinkers (Stanford d.school 2011).

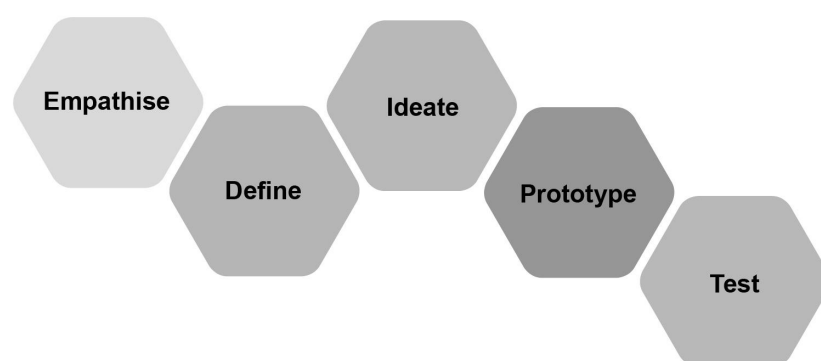


Figure 3.11. Modes of a human-centred design process: a revised illustration from Stanford d.school Bootleg Bootcamp (Stanford d.school 2011)

The empathy mode forms the foundation of a human-centred design process, and consists of observing users in the context of their lives, engaging with users and

immersing oneself in their experiences. This is followed by the define mode, which unpacks the empathy findings into persuasive needs and insights. By doing this, a deeper understanding of the user and the design space is developed, thereby creating a problem statement in the form of one's point of view. This individual point of view becomes the unique design vision. The ideate mode focuses on idea generation by exploring a wide variety of possible solutions. A large amount of ideas and a wide variety of ideas are all explored. Ideas and possible solutions are then transformed into any type of physical form during the prototype mode, such as post-it notes, role-playing activities and storyboards. Early explorations should be quick and rough to be able to learn rapidly and try various possibilities. During the testing mode, ideas and possible resolutions are refined and placed in the appropriate context of the user's life (Stanford d.school 2011).

3.5. Conclusion

In conclusion, this section highlighted the important aspects of the four orders of design and the characteristics of design thinking as they relate to the research questions. With reference to the first research question, the four orders of design aim to identify to what extent the designer instigates ideation and identifies a link between design thinking and the role of designers. The intended research is based on Buchanan's (2001, 1998) four orders of design as the foundation of the principles of design thinking. The idea that designers are widening their spheres of influence (Bason 2014; Siodmok 2014; Bason 2010; Kimbell 2010; Anderson 2007) and the emergence of design leaders (Lockwood 2010; Clark & Smith 2010; Borja de Mozota 2010; Jenkins 2010) serve as insights derived from the literature and were included in the participant interview schedule (Appendix A) as a way to research these perceptions.

The second research question of this study intends to investigate the emerging importance of applying design thinking as an approach to visual design problem solving. Results of research carried out by several authors (Cerejo & Barbosa 2014; Zwart 2014; Curedale 2013b; Johansson-Sköldberg et al. 2013; Kimbell 2011, 2012; Dorst 2011; Rodgers & Winton 2010; Brunner & Emery 2009; Brown 2008; Owen 2005, 2006; Buchanan 2001, 1998) state that design thinking can add value to organisations. Important aspects regarding the characteristics of design thinking also

form part of the interview schedule. The interview schedule serves as a way to research current views and perceptions of South African designers.

The four orders of design

Buchanan (2001, 1998) identifies four orders of design as the foundation to the principles of design thinking. Each order discusses the relevance of the designer in the process of design (Cerejo & Barbosa 2014; Meroni & Sangiorgi 2011; Van Zyl 2008; Anderson 2007; Golsby-Smith 1996). Design thinking can be applied to a widening circle of human problems that are no longer dealt with sufficiently by traditional methods (Bason 2010; Siodmok 2010; Anderson 2007). The notion of a *design leader* as described by Lockwood (2010), Clark and Smith (2010), Borja de Mozota (2010) and Jenkins (2010) corresponds with a designer in the fourth order.

Characteristics of design thinking

Following a human-centred approach for context-sensitive design

Several authors (Leinonen & Durall 2014; Mattelmäki et al. 2014; Curedale 2013b; Steen 2012; Beacham & Shambaugh 2011; Tschimmel 2012; Greenhouse 2010; Brown 2008) have shown that a human-centred approach engages customers and clients with the design process. Talking to people and interacting with them forms the larger movement towards context-sensitive design (Mattelmäki et al. 2014). It is clear from the literature that people should strive to understand the relevant contexts of problem solving and should personally engage in it to inspire design.

Collaboration as an activity for knowledge sharing

The roles of the designer, researcher and user have changed with the progression from user-centred design to collaborative design (Scariot et al. 2012). Several authors see collaboration in the context of design thinking as an activity of sharing expert knowledge (Cerejo & Barbosa 2014; Lund 2014; Lignon & Wong Kung Fong 2009; Kimbell 2011).

Understanding the design process holistically

According to Cerejo and Barbosa (2014), design thinking supports a comprehensive analysis and general understanding of the design phenomena. From the literature it is apparent that a holistic approach is needed to look at today's complex problems (Blizzard & Klotz 2012; Harland 2011; Charnley et al. 2010; Brown 2009; Coley 2008;

Fullerton 1997). The need to think holistically and to develop transdisciplinary skills and understanding has to be recognised and promoted (Charnley et al. 2010; Coley 2008).

Integrating various disciplines: multidisciplinary teams

Design thinking uses multidisciplinary design teams to capitalise on complexity.

The literature shows the importance and relevance of multidisciplinary teams as part of design thinking in that true innovation depends on radical collaboration by teams, knowledge sharing and wide-reaching cross-pollination (Cerejo & Barbosa 2014; Fleischmann & Hutchison 2012; Simons & Gupta 2011). Multidisciplinary teams are of great importance because they provide the skill range to meet the increasingly complex needs of users and utilise their specific discipline expertise (Fleischmann & Hutchison 2012).

Integrating ways of thinking to aid abductive reasoning

Integrated, whole-mind thinking serves as a possible means to solve problems in context of design thinking (Cerejo & Barbosa 2014; Crawford 2009; Williams & Newton 2007; Buchanan 2001). It is then no coincidence that the literature points towards a communication and comprehension gap between the rational scientific community and the more intuitively inclined design community (Lugmayr & Stockleben 2013; Williams & Newton 2007; Buchanan 1992).

Utilising collaboration towards creative solutions for wicked problems

From the literature it is clear that there is a strong link between wicked problems and design thinking (Darzentas & Darzentas 2014; Cerejo & Barbosa 2014; Game et al. 2014; Conklin 2009; Stolterman 2008; Conklin et al. 2007; Conklin 2005; Buchanan 1992). The literature also states that areas such as design decision-making and knowledge management show signs of wickedness (Conklin 2009; Buchanan 1992) and seems to be an underlying tendency throughout the literature on wicked problems.

Interactive and incremental stages in the process of thinking

Design projects at IDEO have to undergo three spaces, namely inspiration, ideation and implementation (Brown 2008). An early version of the design thinking process (seven-stage approach) includes define, research, ideate, prototype, choose, implement and learn (Serrat 2010). The five-stage approach of the Stanford d.school

outlines each of the modes of a human-centred design process and includes empathise, define, ideate, prototype and test (Stanford d.school 2011).

As a conclusion, the literature study focuses on main aspects surrounding the four orders of design and the characteristics of design thinking. These main aspects inform the primary research of this study, which includes following a human-centred approach for context-sensitive design, collaborating as an activity for knowledge sharing, understanding the design process holistically, using multidisciplinary design teams to capitalise on complexity, integrating ways of thinking to aid abductive reasoning, utilising collaboration towards creative solutions for wicked problems and integrating interactive and incremental stages in the process of thinking.

CHAPTER 4: Data analysis and findings

This chapter unpacks the data that were collected from the open-ended questions that were administered to the sample group. These data were interpreted according to the two themes (the role of the designer; and characteristics of design thinking) in an effort to address the research questions. The opinions, viewpoints and suggestions of the participants were interpreted according to the existing clusters. This chapter follows the same order as the themes identified in the literature review. It begins by presenting the results obtained from the fieldwork and discusses the trends that were identified. The core results of the collected data conclude this chapter.

4.1. Analysis of data

The relatively unstructured data were organised according to conceptual categories, which are referred to as clusters. Recurring themes and clusters in the dataset are identified in Table 2.3. whereby data were analysed according to the two main themes, namely the role of the designer; and characteristics of design thinking, each containing its own clusters. In the following analyses of the data, the specific words, phrases and statements used by the participants are set in italic typeface to illustrate the emergence of positive and negative themes under each section. The main results of the data are concludes this chapter.

4.2. Theme 1 The role of the designer

4.2.1. Fourth order of design: Evaluating

Cluster A *The four orders of design (strategic planning operations and systemic integration)*

Contributors to strategic planning operations

Each participant interpreted the involvement of the designer in strategic operations differently, depending on his or her own position and experience in his or her own agencies. Most responses weighed more towards the views of the designers themselves, while the remaining responses placed more emphasis on strategic decision-making from the viewpoint of management. Participants chose to divide the answer into two sections, namely *who partakes* in the strategic operations and *how*

they do it. It was clear from the data that designers should form part of the planning process, but that only more mature and experienced designers are allowed to do so. Only executive and senior team members, who have enough client-facing experience, are part of the brief-taking process. These people are included in an *umbrella crew consisting of the creative director, executive creative director and the account director*, who is not only familiar with the client, but also knows the problem.

Designers as part of strategic planning operations

Responses differ on *how* designers are part of strategic operations. Most believe that senior stakeholders are client facing and that it is the task of the senior designers to actually solve the problem. Some agencies consistently ask whether the brand is still on strategy and have designers who work in tandem with the strategists. Time is allocated for them to solve the problem so that the designers do not have to worry about the way in which they represent their company. Designers should be able to see the details and should actively participate in the process. As mentioned before, some responses leaned more towards a managerial way of doing, which including interrogating the brief and asking whether it was indeed correct. These strategists work apart from designers and keep asking *why* and want to know exactly *what* the problem is. They want to know *what to design for*.

Barriers of role description and insubstantial design methodology

One participant believes that once young designers become permanently part of the strategic thinking it might reduce their creative thinking because of negative influence from non-designers. Opinions from non-designers might sway their thinking because design is such an *intuitive way of working*. Designers are seen as being naturally strategic but this skill applies to their craft only later in their career. Designers in a sense grow into it. Another response was that designers are pushed into the background as technicians in that creative directors give their input, which is then merely filtered down to the designer. Through this filtering process, parameters become too unwieldy, or design matters are not considered at all. Input is then filtered out to such an extent that design briefs *start to design themselves*, so to speak. When this happens there is a lack of applied design methodology. The unorthodox work of Stefan Sagmeister and The Designers Republic serves as examples of sound applied design methodology.

Force field analysis of Cluster A The four orders of design (strategic planning operations and systemic integration)

With regard to Cluster A: The four orders of design (Figure 4.1.) the data show that all designers should form part of the planning process. Furthermore, all participants expressed a desire for designers to be included in decision-making processes. In reality, only more mature and *experienced designers* are currently allowed to be part of the process. A negative response was that designers are pushed into the background as *technicians*. This happens when input from creative directors is merely filtered down to the designer in a managerial way of doing.

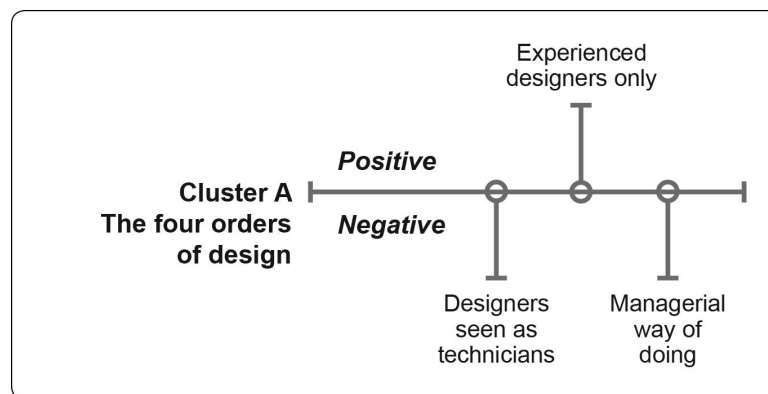


Figure 4.1. Force field analysis of Cluster A

4.3. Theme 2 Characteristics of design thinking

4.3.1. Placing people at the centre when solving problems

Cluster B *Human-centred approach*

Involving clients and customers in the problem solving process

The overall view of the participants relates to the idea that people are at the centre of problem solving because of people's nature to use a discovery process. The processes followed in agencies do reflect international practices and are applicable to global design. Also, everyone needs to partake in this process of discovery to *improve our world*. The data shows that the agencies should take both client and customers into consideration during their problem-solving processes. Clients should therefore be part of the process early on to facilitate efficient decision-making. Clients are made to understand the creative problem solving process in an effort to produce *something unique and ownable* for them. It is also *essential to get early buy-in* from the client, otherwise projects are more likely to be rejected.

Possible solutions to unconstructive client involvement

Participants did comment on some negative aspects, however, when involving clients in the design process and talked about challenges surrounding the application of design thinking. One participant said that South African designers do not make enough use of design thinking. For these types of designers, only the visual is important. This viewpoint of engaging the client with the design process is then escalated to macro level, whereby the end-user is overlooked. The participant who believes that we try to solve problems in South Africa on a first world level gave the example of water scarcity. The solution to this scenario would be to look at the *grass roots level of a problem*. This notion is reflected in the literature, which states that human-centred design can provide deeper appreciation of user needs. Most participants believe that empathy for the end-user must exist in order to look at the situation from their perspective. This should be done from the ground up and not by top-down management of the end-user.

Human-centred solutions add value and meaning

The participants were definitive on the issue of bringing the personal (or human) into design. One participant was adamant that designers need to have a solid background and must be well read. Common thoughts included adding meaning and value to the lives of people. One participant who believed in having a greater mutual purpose between clients and agencies echoed this sentiment. A brand's higher meaning should also align with the higher meaning of the customer. In conclusion to this cluster it was noted that the physical elements of design speak to the human aspect of the user, for example packaging that has form and enhances the senses. Even digital design should therefore be *made human*.

Force field analysis of Cluster B Human-centred approach

Responses on Cluster B: Human-centred approach (Figure 4.2.) include views on client participation and empathy. Clients are part of the creative problem-solving process in an effort to produce something unique and ownable. However, South African designers do not make enough use of design thinking. We try to solve problems in South Africa on a first world Western context. The solution to this scenario is to look at the grass-roots level of a problem. In this regard, most respondents agree that there must be empathy for the end-user in order to look at

the situation from the end-user's perspective. Designers also need to have a solid background.

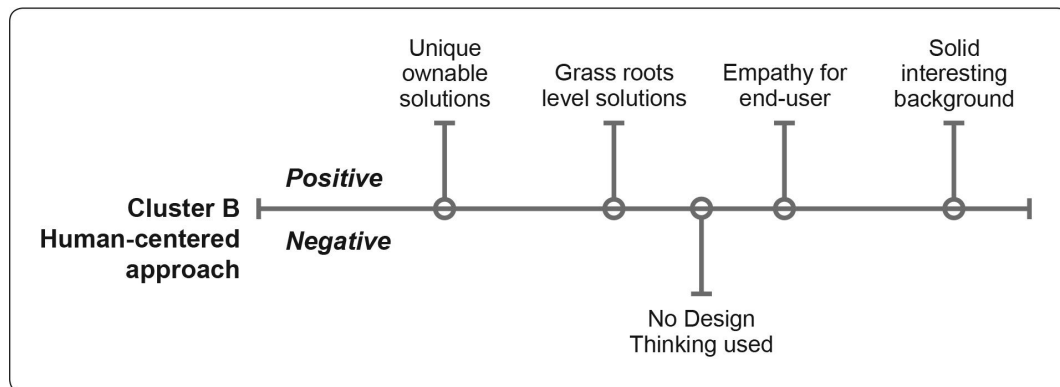


Figure 4.2. Force field analysis of Cluster B

4.3.2. Collaboration as a way to build bridges between stakeholders

Cluster C *Collaboration*

Positive attitudes toward collaboration

Most participants agree that expert knowledge should be shared in the form of collaborative efforts, which is a vital element in the design process. The participants agree that people in the design process learn collectively from one another to try to make meaning of the problem. Collaboration is perceived as a *good way of working* and participants feel positive about it. People feel the need to bring their own personalities to the design table.

Mutual learning in collaboration

When collaborating with experts with different backgrounds, unexpected creativity happens. This type of mutual learning gives rise to a product that can be differentiated because a unique element is brought into it. The product or creative solution may then be perceived as *new and exciting*. All the industry experts are proud to be true South African designers, and believe that South Africa is in itself unique. There are many unique opportunities for collaboration among all the people of South Africa precisely because it is such a *culturally diverse society*. To solve South African problems, we need to work with the people who are engaging with the problems and who may help to create real solutions. This is a recurring idea, as mentioned before, regarding the human-centred approach to design as was evident from a drawing by one participant.

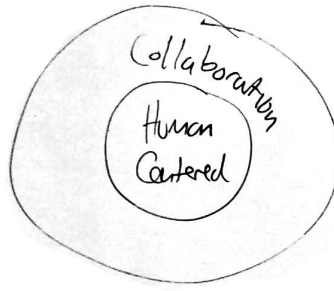


Figure 4.3. Collaboration diagram

Design should therefore be practised for the people. An example was given, whereby Nando's collaborated with various South African artists to help create unique region-specific stores for their restaurants. South Africa has unique challenges, which further necessitate collaboration. It was pointed out that there is great potential for collaboration in all sectors of the economy, mainly because of the influx of international brands. These brands need to adapt to our local market, which is well *informed and aspirational*.

More than one participant elaborated on negative aspects surrounding collaboration and spoke about barriers of ego and *self-centredness, insecurity and individuality*.

Barriers of ego and self-centredness

It was suggested that people should overcome the barriers of ego and self-centredness, especially since that professional practising designers are *commercial artists*.

Insecurity

Creative people are sometimes insecure, primarily because most other people believe that they can judge creative work. People work in *silos* and do not collaborate properly. It is also difficult to physically bring people together and unfortunately no project lasts long enough for permanent collaborative efforts.

Individuality

In closing it was mentioned that graphic design is not a group effort, but an individual endeavour. If these individuals are weak, they tend to *lean on one another for solutions* and ideas. Top-end designers work alone and their work is seen as their own unique *design voice*. Designers such as Stefan Sagmeister, Rudi van der Lans,

Elliot Earls, Paul Rand, David Carson and Neville Brody do not delegate their work as art.

Client involvement

Comments were mostly similar regarding the involvement of clients during the phases of a project as a way of collaboration. Clients are involved right from the outset or *immersion phase* in an effort to understand the business of the client. It is believed that clients are the people who best understand the context of their brands. Clients are consequently part of the creative process. Several creative directions are considered before *final buy-in* is obtained from a client. For the most part, this creative collaboration happens only for big projects. Clients are also involved in the *implementation phase* of the project. Some agencies have workshops that brief clients on the creative process. By doing this, clients feel part of the problem-solving process. When they are involved, clients tend to feel proud of the work that is produced and share a deeper understanding of the true meaning behind it. Contrary to these views is the notion that clients should not interfere with the designer's way of working. Involving clients in the design process tends to allow them to take over, chasing up the costs and prolonging the job unnecessarily. Do designers really need approval at every stage? According to one participant, this merely shows insecurity and a lack of confidence from the side of the designer.

Force field analysis of Cluster C Collaboration

With regard to Cluster C: Collaboration (Figure 4.4.), participants perceived collaboration as a *good thing* and feel positive about it. People feel the need to bring their own personalities to the design table. A negative response was that people first have to overcome the barriers of ego and self-centredness before they can truly collaborate. People still work in *silos* and do not collaborate properly.

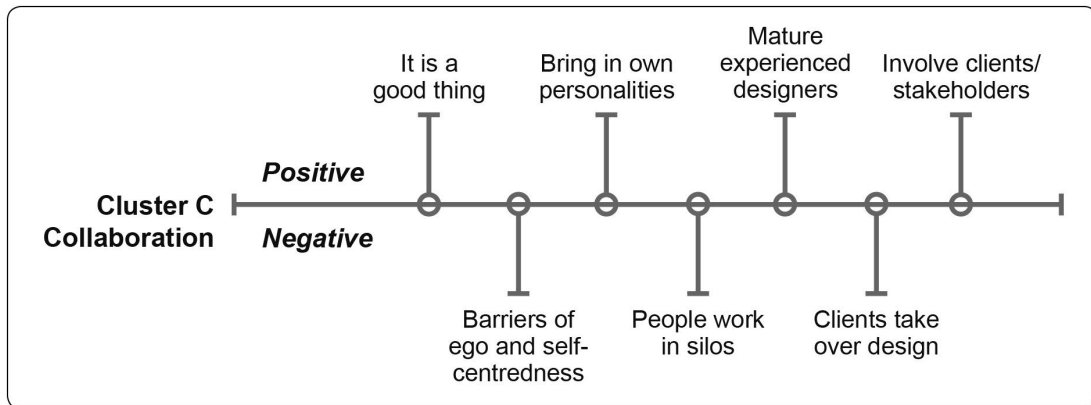


Figure 4.4. Force field analysis of Cluster C

4.3.3. Holistic way of working

Cluster D *Holistic approach*

The collected data contains both positive and negative views on a holistic approach to design thinking. This pillar of design thinking is discussed under two main concepts. The first concept probes the participants' views on the potential increase in public awareness on issues of environmental sustainability as suggested by the literature (Blizzard & Klotz 2012; Charnley et al. 2010; Coley 2008). The second looks at certain ways in which creatives recall their own memories and frames of reference during the ideation process, which may also be referred to as whole system design (Charnley et al. 2010).

On environmental sustainability

Most participants felt that big South African corporations are indeed spending time and money to give something back to the community. The question posed to these corporates involved asking them about their *green strategy*. Once corporates buy into a holistic approach to problem solving and environmental sustainability, other departments inevitably become part of this way of thinking. Environmental sustainability initiatives of organisations may come through in different ways. Even an advertising campaign can drive these initiatives, such as the Donate R2 campaign from Kentucky Fried Chicken (KFC). This serves as an example of how a corporate responsibility initiative can be driven by something as simple as a logo. Other positive examples included Nedbank, which has a 2030 plan that is concerned with green architecture and solutions to sustainability.

Reluctance to change

One participant adds a fourth level to the existing triple bottom line of clients. This is called their *7+ concept*. The agency asks what more they can add to the creative work to make it more socially relevant. By doing this, value is again added to the end product, but within the much wider context of responsible citizenship and social responsibility. Some participants, however, reported negative aspects surrounding the issue of corporate engagement with environmental sustainability. They have not experienced a shift in their clients to become more environmentally aware, which may be attributed to the current economic recession. Furthermore, clients are perceived as being more and more self-sustainable. This inward view means that clients do not see the big picture and seldom partake in a holistic approach to problem solving. Another opinion focused on digital technology. The participant did not feel that clients have evolved the past 30 years, but have managed only to *digitise everything they had in analogue format*, thereby strengthening a pyramidal management structure. The solution to this is a flat structure such as the Internet with no art directors or marketing managers.

Processes of holistic thinking

Participants reacted on a personal level to the ways in which they bring their own experience and knowledge into the ideation process as a form of holistic thinking. Most agreed that they draw their ideas from feelings and self-experience and by immersing themselves in the brief. Different cultural traditions and behaviours have to be taken into account when ideating possible solutions. Only after this initial immersion and individual ways of engaging with the brief do participants use the Internet. Some participants feel that the Internet is not a natural form of ideation and even referred to it as an emulation mode. Thorough information and visual research, together with frequent trade visits, immersing oneself in unfamiliar environments and insisting on constant feedback ties the ideation loop back together.

Another viewpoint is that there are very few examples of *true creativity* (innovation) and that someone else has already solved the problem. These solutions can then be *pro-created* to solve existing problems, even if the solution lies in a different category all together. This view is criticised by referring back to the emulation mode, whereby already painfully thought of solutions on the Internet are made to fit the brief. By

doing this, ideas seem to materialise out of thin air with little or no original thinking behind them.

Force field analysis of Cluster D Holistic approach

Data concerning Cluster D: Holistic approach (Figure 4.5.) revealed that when corporates buy into a holistic approach to problem solving, other departments become part of this way of thinking. Environmental sustainability initiatives of organisations may come through in different ways. Negative responses believe that clients are not environmentally aware. This may be attributed to the current economic recession. The data show that most participants draw their ideas from feelings and self-experience and by *immersing* themselves in the brief. The use of existing solutions on the Internet to fit a brief was criticised. Solutions that are *pro-created* are neither truly creative nor innovative.

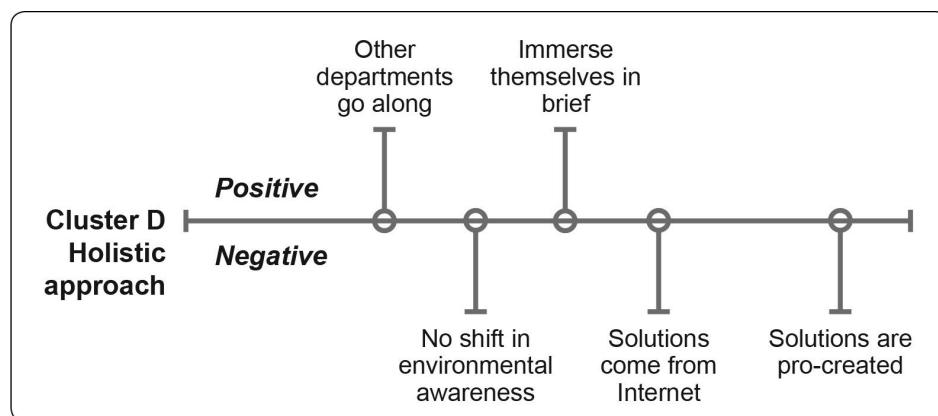


Figure 4.5. Force field analysis of Cluster D

4.3.4. Integration of various disciplines: multidisciplinary teams

Cluster E *Multidisciplinary design teams*

Multi-skilled characteristics of designers

Participants agreed that multidisciplinary teams form a solid element of design thinking. Most had a positive view of multidisciplinary teams and were quick to offer examples of their own day-to-day methodology. All the participants used the phrase Jack-of-all-trades in the context of practising as a multidisciplinary designer. The rhetoric behind this statement is that designers should be multi-skilled. Studios should consist of a range of multi-skilled masters, who form part of a tight-knit team of knowledgeable people. Similar views were expressed by claiming that designers should have some interest in almost everything around them, and should be able to

mix perspectives from many people. All these perspectives from designers and clients in the studio make for a more value-added final product.

Keeping abreast of new technologies

Another shared view of participants surrounds the use of new technology, social online platforms, and being able to work with technicians. The branding, designing and advertising space has been changing fast over the last five years. There are now many more platforms other than the medium of print. Design finds itself in the role of having a two-way conversation on these new online platforms. Consequently, multidisciplinary information designers are scarce in South Africa. These types of designers have to be able to work and design for different platforms such as web and print design, which serve as different message delivery systems. They must be competent enough to translate static two-dimensional information into interactive multimedia interpretations.

Integrating different spheres of knowledge

Designers should be able to *work with technicians*, who would not be capable of briefing them if they do not possess the knowledge of the technicians themselves. This lack in knowledge then has a negative impact, causing lengthy discussions with technicians to understand what is possible. This makes the design process more cumbersome and expensive. Multidisciplinary teams demonstrate a broader knowledge base and can consequently produce more, and be more cost-effective in doing so. It is therefore important to add and acquire new skills. In conclusion, some participants criticised the South African design landscape by saying that designers and clients are practising in *silos*. As a consequence, silo teams do not interrogate the brief enough, which leads to weak solutions with no added value.

Force field analysis of Cluster E Multidisciplinary design teams

Concerning Cluster E: Multidisciplinary design teams (Figure 4.6.) all the participants used the phrase *Jack-of-all-trades* to show that designers should be multiskilled. Designers should be interested in everything around them and be able to mix perspectives from many people. These perspectives produce a value added end product. Designers should also be able to work with *technicians*.

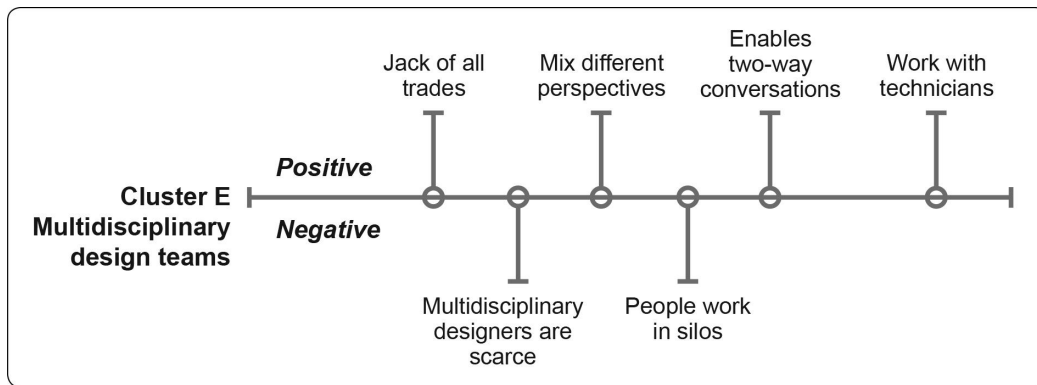


Figure 4.6. Force field analysis of Cluster E

4.3.5. Combination of mental processes: abductive reasoning

Cluster F *Abductive reasoning*

Extending concepts into solutions

Opinions on abductive reasoning were analysed according to two themes: the use of visual aspects during the problem-solving process, and applying the integration of knowledge from many specialisations. With regard to the first theme, participants had similar views of being a multidisciplinary designer. It was believed that designers should take what they have learned from something and apply it to something else. One participant talked about *best practice mash-up*, whereby the functional and experiential aspects have to be understood first before looking at visuals and graphics. This technique is similar to the one mentioned earlier, whereby previous solutions are regarded as potential solutions. Best practice mash-up involves looking at what other people have done before. An existing concept is then used as a solution. This is done by curating all possible solutions and using the most appropriate one, depending on how the brand in question is positioned. This way of abductive reasoning stands in contrast to try and find an existing solution on the Internet.

On being aware of the world around us

All participants seemed passionate about using visual elements during their ideation process. One participant exclaimed that you have to live design to make design. Designers should be visually aware of the world around them. An example shared by one participant showed that while working on something as diverse as retail interior design, the participant still had to be on trend. Designers should therefore be aware of current developments in the design landscape, both locally and internationally. An

unbalanced work-life approach is seen as a key threat and designers should ideally aim to use their social lives in design and design in their personal lives. The risk of burning out may be overcome by not over-thinking it. Having said that, the participant stated that designers do usually not have time for hobbies.

Drawing inspiration from individual interests

This statement stands in contrast to the opinions from other participants, who believed that experiences and hobbies are key when looking for inspiration and ways to solve problems. Some agencies encourage their designers not only to pursue their own personal hobbies and interests, but also to showcase them in the form of a rooftop exhibition. For example, designers in a studio who are interested in selling their own line of fashion are encouraged to do so at this type of exhibition. According to the participant, this has a positive effect because the designers have to engage with concepts regarding marketing and online presence. Through this engagement, the designers' skills are upgraded or added to in the form of accounting, marketing, branding, online commerce and consumer behaviour.

The integration of knowledge

Regarding the integration of knowledge, all participants agreed that designers should use as many forms of knowledge as possible. For them, this means integrating knowledge from fields as diverse as home renovation to visiting disadvantaged schools. By having a natural interest in the world around them, designers gain new insight and appreciation for other disciplines. Designers should know their own *strengths and weaknesses with regard to their knowledge and skill level*. Proper knowledge also enables one to know who the right people are to get on board for project collaborations.

An example was given where designers (intuitive thinkers) work with plastic product engineers (rational scientific way of thinking). By combining their knowledge and asking the *What if?* question, they managed to produce a more exciting and innovative end-product by manipulating and mixing the plastics. In conclusion, one participant explained that designers should not react to a brief, and believed that better results may be achieved without a prescriptive brief. In this scenario, reacting is then transformed to creating, as seen in the participant's illustration below.



Figure 4.7. Rea[c]ting illustration

Force field analysis of Cluster F Abductive reasoning

Responses regarding Cluster F: Abductive reasoning (Figure 4.8.) believe that designers should take what they have learned from something and then apply it in something else. Designers should be aware of their own *strengths and weaknesses* regarding their knowledge and skill level. Non-descriptive briefs are preferred to prescriptive briefs. Designers should be aware of current developments in the design landscape, both locally and internationally. The notion of *best practice mash-up* is seen as discouraging in the sense that designers *lean on one another* for ideation and creative solutions. An *unbalanced work-life* approach is seen as a key threat.

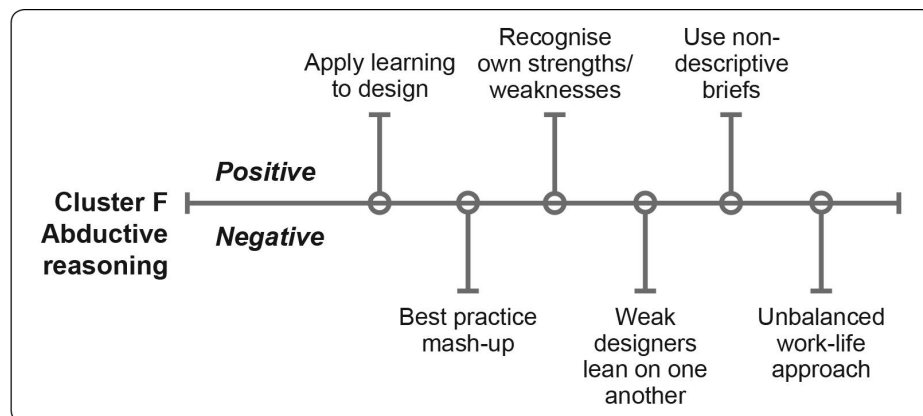


Figure 4.8. Force field analysis of Cluster F

4.3.6. Wicked problems: building a shared understanding

Cluster G *Wicked problems*

Asking the right questions to facilitate mutual understanding

The issue of wicked problems was discussed by unpacking problems during design decision-making and by asking participants what their definition of a creative solution is. A sentiment shared by most participants surrounding design decision-making entails asking certain questions in an effort to try to imagine possible future scenarios. Typical questions such as *What might be?* and *What if?* were suggested by more than one participant. These types of questions should also be asked right at

the beginning of any design decision-making process in an effort to try to understand what the client wants to achieve. The intentions of a client must therefore be summarised in a sentence or paragraph to aid shared understanding. One participant explained that these questions are not always posed at the onset of the design decision-making process, merely because of modern daytime constraints. In this respect so-called *orange meetings* take the best ideas of all the thinkers in the studio to try to find the best possible way into a project.

Mediation as a way for everyone to participate

The fact that many businesses are structured in silos was again mentioned. Marketing departments and other departments all have their own budgets, which leads to conflict and ineffective decision-making. A suggested solution from one participant was for the designer to *act as a mediator in order to get everyone involved in the decision-making process*. A financial institution was given as an example because they use incentives as a way to get people on board. The financial institution wanted to know how they could retain high-performance people within the context of the high cost of office space. The solution was to introduce meeting areas, scaling down desking, and giving employees an entertainment allowance to spend at the adjacent stores. These incentives helped in retaining high-performance employees. Aligning solutions so that there is an incentive may solve problems during design decision-making.

Measuring creative solutions

The answers from participants showed that they were well aware of the complexity of the term *creative solution*. All participants agreed that a creative solution must be *different* in one way or another. Some believed that a creative solution must always be relevant in the context of society, culture and economics, while other participants believed that designers are supposed to act as *the servers to solve a problem*. A typical creative solution in the advertising industry would constitute a successful campaign with increased sales. This definition becomes a bit more complex when it comes to branding. Clients still do not understand why they need branding or a branding agency. A creative solution may be measured as being successful by the mere fact that people are talking about it, such as the Coke Open Happiness campaign. Specific metrics need to be put in place for this type of creative measurement. It was noted that the South African design industry must still find a balance between strategy and design. Creative solutions are therefore measured

differently in different departments and in different contexts. These variables include the campaign itself, the logo on its own, return on investment and creative awards.

Force field analysis of Cluster G Wicked problems

With regard to Cluster G: Wicked problems (Figure 4.9.), the question of *What if?* was suggested by more than one participant. Questions should be asked right at the beginning of any design decision-making process to try to understand what the client wants to achieve. A lot of businesses, however, are still structured in *silos*. It is believed that a creative solution must be different in the context of society, culture and economics. A creative solution should therefore be *significantly different*. The South African design industry must yet find a balance between strategy and design.

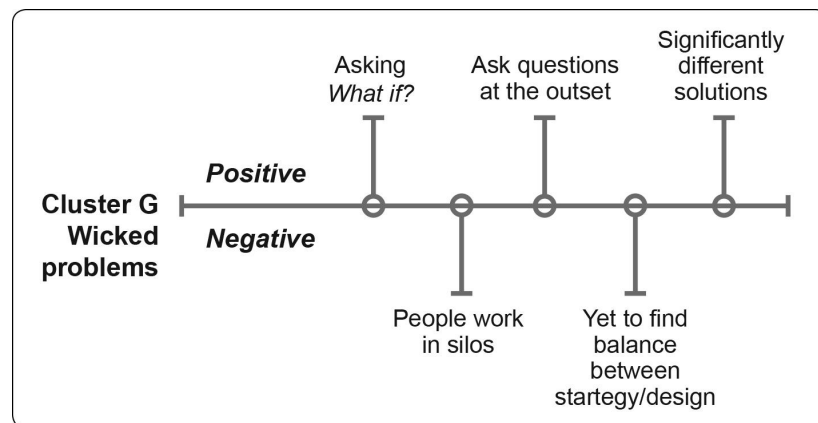


Figure 4.9. Force field analysis of Cluster G

4.3.7. Design thinking processes

Cluster H Stages in the process of thinking

Conventional design agency processes

Most participants reported that they followed a typical design agency process and that the thinking was done during the strategy section. Teams consisting of creative directors, project managers and creatives carried out these processes. One model maintained that both the strategy department and the creative department start a project by interrogating the brief. Sometimes a strategy from a previous project that was not used or rejected could be adapted to fit the new brief. Creative concepts and ideas were then presented to client, whose views were taken into account. Ideas were then refined, executed and presented as final art. Another version of the process of thinking was based on the belief that inspiration has become a loaded word and is open to interpretation.

Strategy that leads to prototyping

Another studio endeavours to do things differently through exploration, discovery and ideation. Exploration is used to try to understand the context first. The environment, customers and end-users are examined. No solutions are considered yet; only the context of the brief. The discovery process overlay the client's requirements in this context and followed a broader and higher strategic level. The process was concluded through rapid prototyping. Yet another process followed a similar linear model by making use of ideation, implementation and production. This model allowed the agency to find the most truthful way in, as is seen in the illustration below.

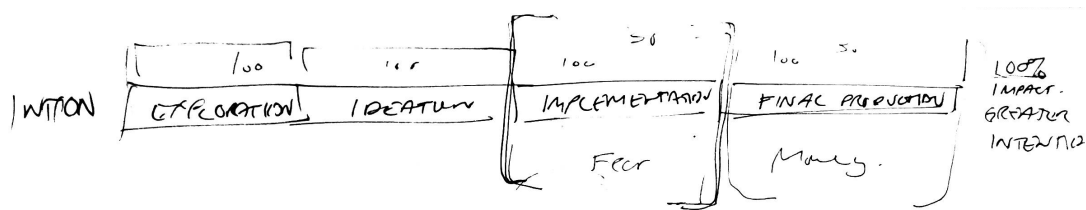


Figure 4.10. Process of ideation, implementation and production

The close-ended process

One participant criticised these types of processes as being *closed ended*. In the opinion of the participant, the incorrect way of ideation started with several scamps, all of which were then eliminated except one, as chosen by the creative director. By adding detail, the chosen scamp or singular idea was then enlarged into a final solution. This closed-ended process has no alternatives, except for one final solution, as seen in the illustration below.

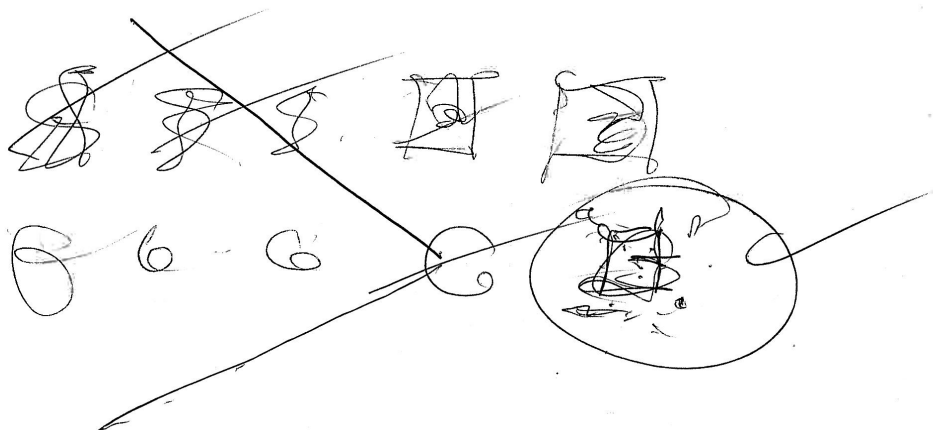


Figure 4.11. Closed-ended process

The open-ended play process

As an alternative to this close-ended process, Erasmus (2015) suggests using a four-phase process. This process is already in existence and is applied in the participant's own studio. The suggested four-phase process includes a play process that is the opposite of scamping. It is an *open-ended* process where *visual problem solving is the goal*. The open-ended process starts by writing about the project. Word associations with opposites are then drawn up. This forms the play or filter process. Each word then gets an icon in order to accumulate a *visual vocabulary* for the specific project as seen in the illustration below.

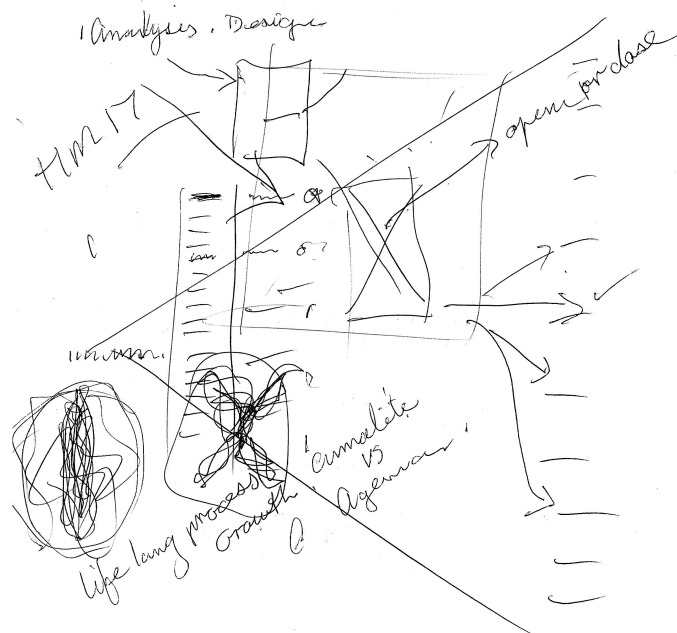


Figure 4.12. Open-ended play process

The four-phase process closely resembles the five-stage approach from the Stanford d.school (2011) based on human-centred design. As described by Erasmus, it is based on defining the work, architecture, design and implementation (J. Erasmus, personal communication, 11 November 2015). These four phases correspond with the principles of design as suggested by the participant, which include mental rigour, intuition, play, contradiction and interruption (Erasmus 2007).

Outcomes of discussed design processes

The positive outcomes of these processes include aspects of human-centredness, empathy and commercial success. From the customer's perspective, it should deliver

a great experience while receiving a buy-in from all stakeholders. This buy-in creates a shared feeling of ownership among all stakeholders. One participant believes that they may be able to control exploration and ideation to a certain extent, but that they cannot control the implementation such as costs, production and people's bonuses. *Fear and money* then becomes the main drivers of this type of outcome.

Force field analysis of Cluster H Stages in the process of thinking

Most of the participants use linear processes with regard to Cluster H Stages in the process of thinking (Figure 4.13.). These linear processes showed similar stages, which include exploration, discovery and ideation. Processes such as these have been criticised as being *closed ended* and merely a series of systematic steps. A four-phase process was suggested as an *open-ended* alternative to the closed-ended way of thinking and was based on defining the work, architecture, design and implementation.

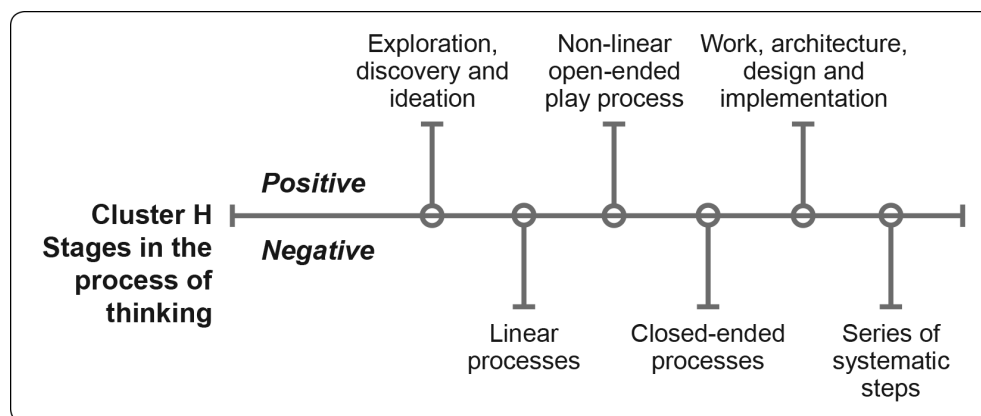


Figure 4.13. Force field analysis of Cluster H

4.3.8. South African design landscape

Cluster I *South African design landscape*

Participants were given the chance to talk about their views on matters such as the current state of affairs in the South African design landscape and whether designers are treated as professionals in South Africa. These talking points were considered in the context of the study's research questions.

Output of designers

It is believed that *designers make stuff* and solve problems through design solutions. One participant was adamant that designers in a sense do everything, again referring

to the Jack-of-all-trades metaphor. Designers use all their relevant skills when working with other people. These multidisciplinary types of designers do more than the average art director at an agency, who is quick to use existing artwork in design publications such as *Communications Annual*. The designer is then instructed to reproduce a similar look and feel, according to the taste of the art director. The participant asked whether this way of working does not in fact constitute plagiarism.

The perception of designers

All participants reacted both positively and negatively to the issue of whether designers are treated as professionals in South Africa. Designers are perceived to be strange and alien by other non-designers, and it is difficult to take them serious. Some designers do not know how to sell themselves and do not exude enough self-confidence. It is also thought that professions such as architects and doctors get *special treatment*. The data showed that non-designers (usually the leaders of an organisation) do not understand that designers have created their brands for them to exist. According to the opinions of the participants, designers in general are not treated as professionals. Opinions also showed that designers should at the very least be *acknowledged*, over and above being regarded as professionals. A question asked by one participant revealed the sentiment of whether designers in South Africa *regard themselves as professionals*. Positive opinions, however, did state that high levels of design professionalism exist in South Africa. Designers are becoming more and more valued as professionals, especially in the commercial sector where they add value.

Cultivating a unique South African design language

Most participants feel positive about the current state of design affairs in South Africa regarding the quality of design solutions. Participants claim that creative solutions might not always be the best, but are certainly not the worst, and believe that *good design* is hidden and not shared enough. It is also perceived that South Africa is still struggling to find its own *graphic language as African designers*. It was noted that Afrikaner designers are an upcoming new ground-breaking type of designers. These designers include not only the free-borns, but also an older generation. It is felt that they have little or no *baggage*, which gives them an open mind and more self-confidence.

Educational design policy in South Africa

One view regarding the current state of design affairs in South Africa focused on design education in South Africa. Most universities and colleges have to adhere to the government's prescribed method of broader education. This broad educational policy dissolved into 'a very bureaucratic and vocational system with a big emphasis on software skills' (J. Erasmus, personal communication, 11 November 2015). These tertiary institutions offer numerous specialised fields within short timeframes. Another problematic situation is that people with *fine art degrees teach most graphic design courses*. Although this is a worrying situation, a possible solution to this current state of design educations was proposed. The ideal design curriculum should consist of typography 60%, photography 25% and anthropology with history of graphic design 15%. A lot of emphasis should be placed on typography since it is the dominant information design element.

Force field analysis of Cluster I South African design landscape

Participants reacted both positively and negatively regarding Cluster I: South African design landscape (Figure 4.14.). Designers are perceived to be peculiar and eccentric by non-designers and it is difficult to take them seriously. Designers are regarded more as professionals, especially in the commercial sector, where they add value. Positive viewpoints were expressed about the current state of design affairs in South Africa. Our creative solutions might not always be the best, but are certainly not the worst. Designers are displaying more *risk-taking behaviour* to design solutions. Good design is hidden, however, and not shared enough. South Africa is still struggling to find its own graphic language as African designers.

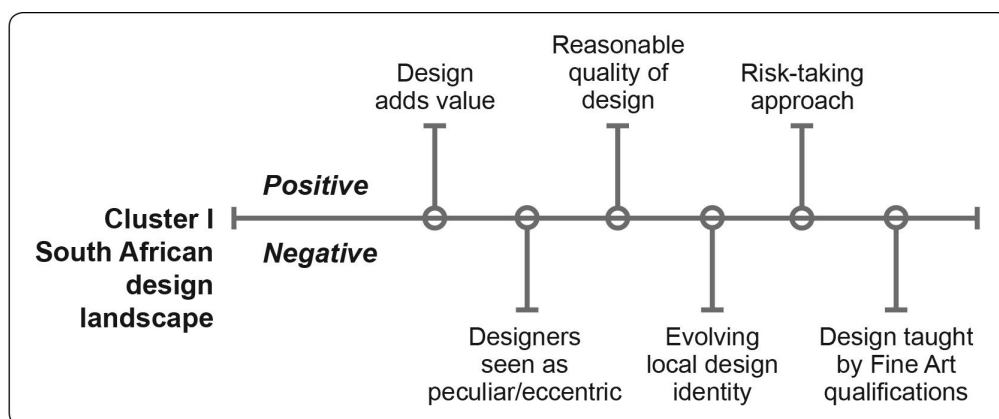


Figure 4.14. Force field analysis of Cluster I

4.4. Key findings

The main results of the data, regarding Theme 1 and Theme 2, are consequently shown on a force field analysis which points out the positive and negative inputs from participants. Figure 4.15. distils the data from Theme 1 The role of the designer into two main positive and negative aspects. According to participants a positive impact regarding the role of the designer involves the fact that mature and experienced designers are part of the decision-making process. The negative issue that emerged from the data shows that most designers are unfortunately still being perceived as technicians who are pushed to the background.

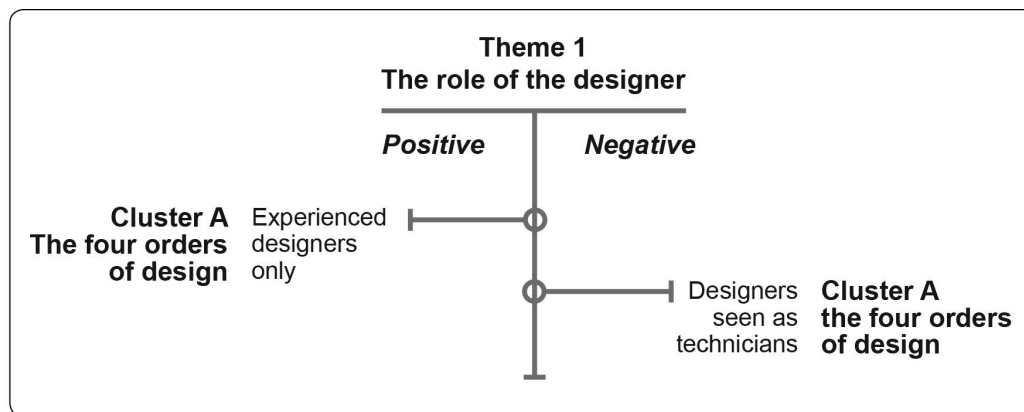


Figure 4.15. Force field analysis of Theme 1

The key findings from Theme 2: Characteristics of design thinking are further condensed, as seen in Figure 4.16. The main positive aspects include developing empathy for end-users, involving clients and stakeholders during collaboration, inviting all departments to be part of the problem-solving process and that most designers are multiskilled (*Jack-of-all-trades* phrase). Furthermore, designers apply learning to design and create significantly different types of solutions to problems. Non-linear open-ended play processes further facilitates this way of solving problems. The fact that designers make use of a risk-taking approach to problem solving is also seen as a positive aspect. Certain negative issues were identified of which the following are the key aspects. Some participants believe that no design thinking is being used in South Africa and that most people still operate in silos. Certain solutions are pro-created without considering broader options for solutions. Furthermore, weak designers tend to lean on one another and make use of closed-

ended processes to generate ideas and solutions. Finally the negative aspect of people with Fine Art degrees teaching into design is seen as a negative aspect.

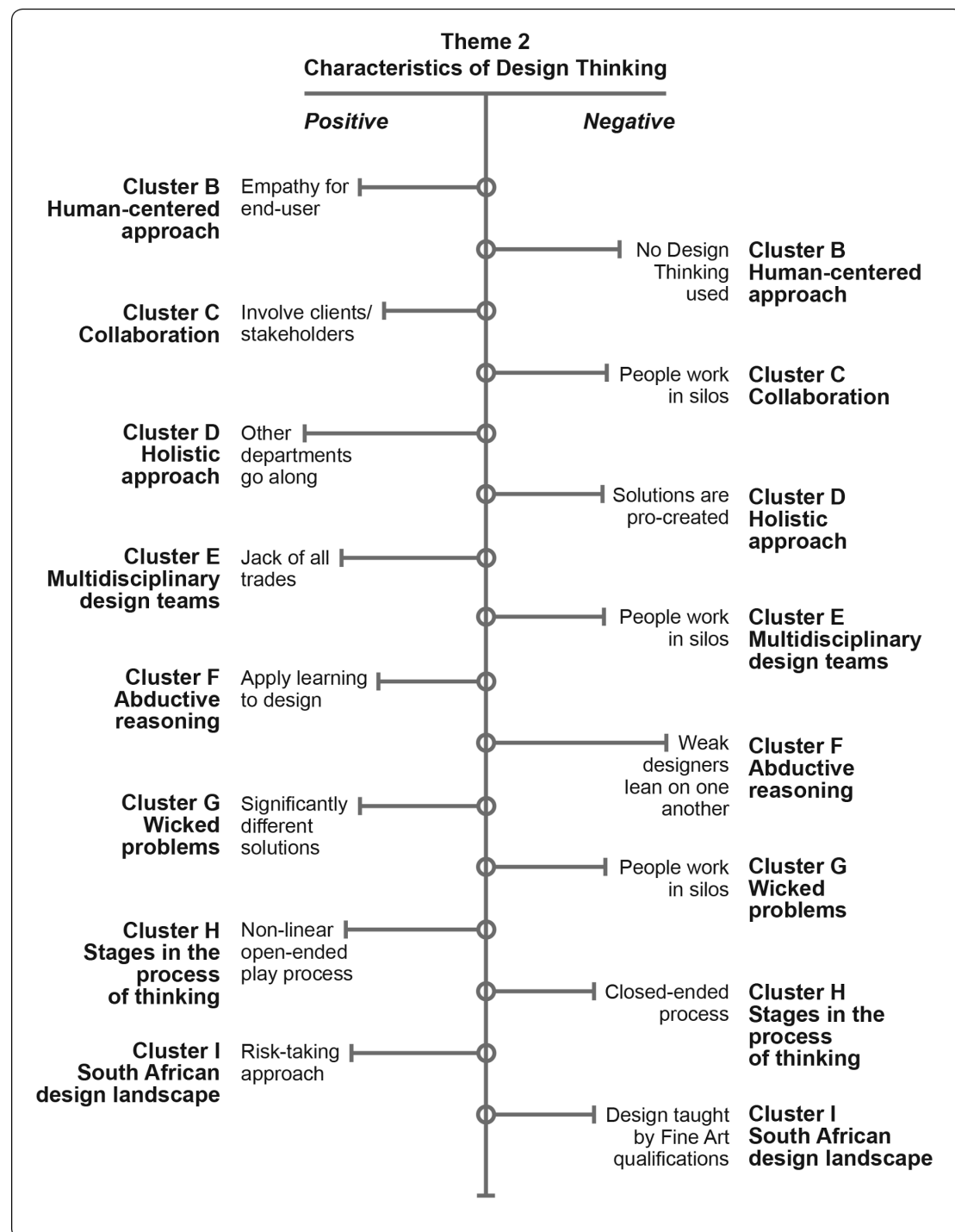


Figure 4.16. Force field analysis of Theme 2

CHAPTER 5: Conclusions and recommendations

This chapter discusses the main findings of this research by summarising and discussing main points under the two main themes in an effort to answer the research questions. This is followed by an interpretation of the results in terms of the literature review from Chapter 3. The connection between the results and the literature review is simultaneously described. The larger relevance and value of the study are then discussed. The chapter concludes with recommendations concerning potential future research on the topic of design thinking.

This dissertation responded to two main research questions:

1. To what extent is the designer the sole instigator of ideation and practitioner of design thinking?
2. What can design thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving?

The answers to these questions enable the researcher to make possible recommendations for the application of design thinking in addressing visual design challenges. These questions were addressed through the observational research design of this study. This was done to develop clusters by sorting information from the literature review and by administering open-ended questions to five participants using an interview schedule. These clusters were applied throughout the research and involved the following:

Cluster A The four orders of design

Cluster B Human-centred approach

Cluster C Collaboration

Cluster D Holistic approach

Cluster E Multidisciplinary design teams

Cluster F Abductive reasoning

Cluster G Wicked problems

Cluster H Stages in the process of design thinking

Cluster I South African design landscape

5.1. Summary of main points

The first aim of this study was to explain how the role of the designer has widened and consequently influenced other spheres (Theme 1). Second, the research aimed to explain how and why design thinking can assist with problem solving, adding value and promoting innovation (Theme 2). The overall aim was to investigate the core of design thinking from its original perspective as a problem solving activity to promote design solutions. From these perspectives, the outcome of the study was to suggest ways to bridge the gap between rational scientific thinkers and more intuitive design thinkers. Chapter 4 showed the main points that apply positively and negatively to the two research themes, as seen in the force field analysis.

5.2. Interpretation of results in terms of the literature review

Research question 1: To what extent is the designer the sole instigator of ideation and practitioner of design thinking?

Theme 1: *The role of the designer*

Cluster A *The four orders of design (strategic planning operations and systemic integration)*

It was suggested by the literature and supported by collected data that designers are moving their design efforts away from images and physical objects only and have started to place them in the context of strategic planning (Van Zyl 2008; Buchanan 1992). The opinions of participants also reflected the notion that designers are trying to become part of the strategic planning process by placing their design efforts in an earlier moment in the design process at the point that vital decisions are taken (Buchanan 1998). This opinion is reflected in the literature regarding the four orders of design, which states that there is a 'much greater impetus for the involvement of a designer or sound design thinking; there is a cultural need for design, beyond its problem-solving capabilities' (Anderson 2007:21-22). It is clear from the data that designers should form part of the planning process (Simons & Gupta 2011; Anderson 2007), but only more mature and experienced designers are currently allowed to do so. The data corresponded with the view of Anderson (2007) that design thinking as it is applied in the fourth order takes into account a diverse array of cultural values

and beliefs to determine how appropriate an objective might be (Anderson 2007). Bierut (2007) views designers as more than mere stylists. Ultimately designers should be involved earlier in the strategic process (Bierut 2007).

Designers are often pushed into the background as mere technicians when design input from creative directors is just filtered down to the designer. Authors Charnley et al. (2010) and Coley (2008) disagree with this top-down structure by saying that a flattened hierarchy promotes decision-making in design teams. The collected data of this study suggests that designers are increasingly being regarded as professionals in the South African context. This sentiment corresponds with the fourth order of design whereby the designer moves even further away from process formulation and starts to focus more on the design effort itself. By rethinking the role of the designer, design thinking is then applied to a widening circle of human problems that are no longer effectively dealt with by traditional methods (Anderson 2007).

The conclusion is that designers are agents of change and work with other people to create more human-friendly design-minded organisations. These so-called design leaders (Clark & Smith 2010) are not responsible solely for ideation, but work together with all stakeholders in addressing visual design challenges. The role of the designer widens to other decision-making areas outside ideation. Designers therefore practise design thinking in order to partake in the decision-making process and to assist in creating design-minded cultures in organisations.

Research question 2: What can design thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving?

Theme 2: Characteristics of design thinking

Cluster B *Human-centred approach*

Participants commented positively on the idea that people should be at the centre of problem solving, similar to the views of Brown (2008), who advocates a human-centred process of discovery. Everyone needs to partake in this process of discovery to improve our world (Beacham & Shambaugh 2011). The data showed that a human-centred approach adds meaning and value to the lives of people (Brown 2008). Some participants in this study mentioned that we try to solve problems in South Africa on a first world level. The solution to this scenario reflects the literature, which claims that human-centred design can provide a deeper appreciation of user

needs (Cerejo & Barbosa 2014; Veryzer & De Mozota 2005). This opinion opens the discussion to empathy, whereby members of a design team interact directly with users to ensure that the user perspective is included in the design (Postma et al. 2011).

Cluster C Collaboration

Participants of the current study corroborate that expert knowledge should be shared in the form of collaborative efforts. This sharing of knowledge is a vital element in the design process. The term *co-creation* was mentioned, which is described in the literature as any act of collective creativity (Vianna et al. 2012). The data showed that clients are the people who best understand the context of their brands and should be part of the design process. This sentiment is shared by Conklin et al. (2007), who thinks that clients should be involved during all stages of the process, because the real knowledge resides within them. Co-design is therefore a valuable tool 'for fostering citizen engagement and supporting shared models for decision making' (Bason & Schneider 2014:37).

The participants' views coincide with those of Zahedi et al. (2012), who believe that people in the design process learn collectively from one another to try to make meaning of the problem. It was added that true collaboration happens only when people overcome the barriers of ego and self-centredness. Kimbell (2011) feels that designers are not collaborative enough, and that little synthesis exists in studios. From the data it was evident that people should feel safe in their direct environment to be able to collaborate effectively. This sentiment was echoed in the literature in that special venues with visual materials need to be created that have room for movement to assist brainstorming and prototyping (Lund 2014; Raijmakers et al. 2012). Participants concede that people are still operating in silos, which has a negative effect on collaboration and indeed design thinking. In this regard, Blizzard and Klotz (2012) also believe that silos need to be broken down and that people need to start working across disciplines. The conclusion is that collaboration is an essential part of design thinking that involves the sharing of expert knowledge, client participation and the enabling of mutual learning. People should be discouraged from working in silos.

Cluster D *Holistic approach*

Participants reported on a personal level on ways in which they bring their own experience and knowledge into the ideation process as a form of holistic thinking (Woo 2007). It appears that participants draw ideas from feelings, self-experience and by immersing themselves in the brief. This holistic design approach adds value and innovation. The data correspond with the literature, which states that an integrated approach to design and innovative solutions would encourage those involved to look at the problem as a whole (Coley 2008).

Cluster E *Multidisciplinary design teams*

Participants shared the idea that multidisciplinary teams are a solid element of design thinking as advocated by Cerejo and Barbosa (2014). The data collected for this study suggest that design teams should consist of a range of multi-skilled masters that form part of a team. This is a sentiment shared by Beckman and Barry (2007), who believe that there is a need to embrace the many disciplines that are engaged in design. It was mentioned that different perspectives from designers and clients in the studio make for a more value-added product. This is consistent with the views of Fleischmann and Hutchison (2012) and Paletz et al. (2012), who believe that each contribution by a team member advances a project, and therefore adds to creativity and innovation. The literature refers to a sharing cycle (Oehlberg et al. 2012), which is a similar information tool, as was suggested by one participant, who believes in reflecting and sharing during each phase of the design process.

In conclusion, participants emphasised that technology and social online platforms have changed very rapidly over the last five years. This is reflected in the literature, which states that new alignments in technologies are extending projects beyond media and design to use a wide range of expertise (Fleischmann & Hutchison 2012). It was noted that designers should also be able to work with technicians. The literature supports this view. Raijmakers et al. (2012) and Simons and Gupta (2011) believe in a mutual learning process between designers and non-designers (technicians) to create more robust ideas and fewer design flaws.

Cluster F *Abductive reasoning*

The data suggest that a designer should transfer previous knowledge, applying it to a new scenario. This aligns with Anderson's (2007) view that a good abductive reasoner must be receptive to new ideas. Designers are visually aware of the world

around them. This reflects the idea from Williams and Newton (2007) that designers give special attention to their visual surroundings. It was also mentioned that designers and non-designers must be aware of their own strengths and weaknesses, which is a sentiment that is shared by Simons and Gupta (2011).

Most participants suggested asking the *What if?* question (Kimbell 2011) as a way to generate different solutions. This corresponds with Cerejo and Barbosa (2014), who believe that designers rarely approach a problem as a given, and continuously ask questions to explore a variety of contexts. In conclusion, one participant explained that better results might be achieved without a prescriptive brief. The literature reflects the idea of using non-descriptive briefs and refers to it as open briefs (Van Zyl 2008) or flexible guidelines (Cerejo & Barbosa 2014) that barely state the design challenge.

Cluster G *Wicked problems*

The issue of wicked problems was investigated from the perspective that design decision-making is showing signs of wicked problems (Conklin 2009; Buchanan 1992). A sentiment expressed by most participants surrounding design decision-making entails asking certain questions to try to imagine possible future scenarios. This notion is in line with the ideas of Kimbell (2011). A typical question asked was *What might be?* which relates to Hegeman's (2008) thinking. The question of *What if?* (Kimbell 2011), as mentioned before, was suggested by more than one participant. One participant did say that these questions are not always posed at the beginning of the design decision-making process because of modern-day time constraints. The participant uses so-called orange meetings to overcome limited time. It seems the idea behind these orange meetings is similar to collaborative strategies aimed at dealing with wicked problems as advocated by Roberts (2000).

Cluster H *Stages in the process of thinking*

The processes of thinking described by the participants seem to reflect the seven-stage approach from Simon (1969) and the five-stage approach from the Stanford d.school (2011). Most processes of thinking, as suggested by the participants, appear to be linear in nature, for example using ideation, implementation and production. These linear models stand in contrast to the views of Hegeman (2008), who believes that designers prefer to use non-linear models. These processes f

furthermore contrast Brown's (2008) idea that the design process should be seen as a system of spaces rather than a predefined series of systematic steps.

However, the four-phase process suggested by one participant is an open-ended process in which visual problem solving is the goal. This process ensures that more than one answer is generated, not merely one answer. This way of thinking is supported by the literature. Both Hegeman (2008) and Rylander (2009) believe that convergent thinkers approach a problem by considering more than one solution, which does not mean that there is only one correct answer (Hegeman 2008; Rylander 2009). It can therefore be concluded that some design processes in the South African context seem to be too rigid and strict to allow for visual problem solving.

Cluster I South African design landscape

The data indicate that designers use their skills to be able to work with a diverse range of people. This correlates with Buchanan's (1998) notion that designers act as collaborative agents. Several opinions regarded the designer as a Jack-of-all-trades, which is a positive viewpoint. It was further noted that certain types of designers and indeed design agencies in the South African context are setting new ground breaking trends. These designers are open-minded and self-confident. It can be concluded that this behaviour results in more risk taking design actions. This sentiment is shared by Brown (2009), who speaks about design firms that support risk taking in an effort to encourage cultures of innovation.

Research question 2 is answered by arguing for the emerging importance of applying design thinking as an approach to problem solving and that competent design thinkers are required to be successful future creative practitioners.

5.3. Broader meaning of results

The roles of design and designer have changed in the past decade, mostly because of advancements in communication and technology such as smart mobile phones. This positive shift is recognised as a key business asset that adds value. It is evident from the data that South Africa in particular possesses unique design flair because it is such a diverse society. For this reason, there are several opportunities for collaboration between the people of South Africa, especially with regard to the

problems South Africa is facing. To address these challenges, we need to take our cues from the South African environment itself not only to find creative solutions, but also to use design as an educational device. Modern problems cannot be solved with yesterday's solutions. This way of working may then produce real solutions, which are socially, culturally and financially relevant. The current economic recession, however, hinders this way of working. Organisations show high levels of self-sustainability and are not pushing for a holistic approach to problem solving. This produces a risk-averse attitude towards design in general. Concerning multidisciplinary design, it is evident that much has changed in the past five years. Design has become a two-way conversation because of new online platforms.

In terms of designers themselves, the data show that designers should be able to see the details and actively participate in the problem-solving process. Designers need to realise that their lives are cumulative processes, whereby experience and skills are constantly being gathered, in both local and international contexts. The more skills designers have, such as empathy, the more interesting and relevant their work will be.

Being part of the problem-solving process means that designers need to have self-confidence, and should not function in silos. This would assist them to develop design-minded organisations and, more importantly, to act as design leaders. The change in the roles of creativity and design in business is vital for organisations to develop design-minded ways of working. Design leaders (Lockwood 2010; Clark & Smith 2010; Borja de Mozota 2010) have consequently become the link between design thinking and brand leadership as a way to develop more design-minded cultures in organisations. These design leaders promote the adoption and use of design thinking in all parts of an organisation. The data show that South African designers are aware of design thinking, but are not consciously practising the six pillars of design thinking.

5.4. Conclusion

The use of design thinking as a way to add value and assist in solving difficult problems in South African organisations has yet to be utilised to its full potential. The results from this study partially confirm the original expectation that the role of the designer has changed in recent times. Opinions from the participants reveal a desire

for designers to be part of strategic planning operations. These types of designers want to place their design efforts at an earlier moment in the design process where important decisions are taken (Simons & Gupta 2011; Van Zyl 2008; Anderson 2007; Buchanan 1992). Designers in South Africa show willingness to be agents of change and to act as design leaders to create more human-friendly design-minded organisations (Clark & Smith 2010). Indeed, future success depends on their capability to manage and lead the profession of design (Best 2010).

In addition, the participants who were interviewed for this study showed notable enthusiasm for design thinking. The interviews were conducted in the participants' working environments, which made them comfortable enough to expand beyond the questions in the interview schedule. In the context of this study the participants showed remarkable credibility. With regard to their professions as practising designers, it may be concluded that they are a typical breed of creative people. They are visually literate and are inspired by the world around them. The data pointed out that although design thinking exists as a theory, in reality people do not apply the unique and integrative characteristics of design thinking. South Africa therefore presents sufficient opportunities for designers to recognise and engage with design thinking.

By reflecting on the analysed data, this exploratory study proposes to apply the six pillars of design thinking in an effort to solve creative problems by following a human-centred approach (Cerejo & Barbosa 2014; Beacham & Shambaugh 2011; Postma et al. 2011; Brown 2008), sharing expert knowledge through collaboration (Lund 2014; Raijmakers et al. 2012; Vianna et al. 2012; Zahedi et 2012; Blizzard & Klotz 2012; Conklin et 2007), thinking holistically (Coley 2008; Woo 2007), operating in multidisciplinary design teams (Cerejo & Barbosa 2014; Fleischmann & Hutchison 2012; Paletz et al. 2012; Oehlberg et al. 2012; Raijmakers et al. 2012; Simons & Gupta 2011; Beckman & Barry 2007), using abductive reasoning as a way of thinking (Cerejo & Barbosa 2014; Kimbell 2011; Anderson 2007; Williams & Newton 2007) and being aware of wicked problems (Conklin 2009; Hegeman 2008; Buchanan 1992; Roberts 2000).

5.5. Limitations and implications for future research

In conclusion, limitations in the methodology and the researcher are acknowledged. As mentioned before, the limited sample size of five design agencies might be seen as a limitation for this study. However, exploratory studies often utilise a small sample size (Du Plooy 2009; Babbie & Mouton 2009). The issue of self-reported data may also be seen as a possible limitation, which may contain potential sources of bias. Longitudinal effects are also taken into account as a possible limitation of this study. Data were collected over one month in November 2015. The conclusions and recommendations from the data should therefore be viewed within this time frame. Future research should consequently be undertaken to explore the benefits of applying design thinking to solve real world problems, specifically in the South African context. It is also suggested that future research must be undertaken to highlight the importance of design leaders in the brand management environment.

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Appendix A: Interview schedule

Design thinking in South Africa: An exploratory study among Johannesburg design agencies using force field analysis

November 2015

Purpose of study

The purpose of this exploratory study is to look at the application of design thinking as a means to tackle visual design challenges among Johannesburg design agencies using force field analysis. The study aims to investigate the core of design thinking from its original perspective as a problem solving activity to promote design solutions. Two critical questions are formulated in the research dissertation:

Is the designer the sole instigator of ideation and practitioner of design thinking?

What can design thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving?

Working definitions

Design thinking

For the purpose of this interview, the working definition of design thinking is seen as combining *empathy* for the context of a problem, *creativity* in the generation of insights and solutions, and *rationality* in analysing and fitting various solutions to the problem content. Curedale (2013b) and Buchanan (2001) both agree that design thinking is a people-centred way of solving difficult problems, and therefore follows a collaborative, team-based, cross-disciplinary process. This interview schedule is structured under the following headings, called clusters: the four orders of design, human-centred approach, collaborative approach, holistic approach, multidisciplinary design teams, abductive reasoning, wicked problems and stages in the process of design. Each of these clusters will be defined in the context of this study during the interview.

Visual design challenges

Design briefs from clients in the creative industry.

Interview schedule

Cluster A: The four orders of design

Working definition

To illustrate the emergence of strategic planning as a discipline of design, Buchanan (2001, 1998) developed a matrix of four design disciplines or four orders, as illustrated below.

		Design disciplines			
		First order Communication Signs and words	Second order Construction Things	Third order Strategic planning Action	Fourth order Systemic integration Thought
Human abilities	First order Inventing	Signs, symbols and images	→	→	→
	Second order Judging		Physical objects	→	→
	Third order Deciding			Activities, services and processes	→
	Fourth order Evaluating				Systems, environments, ideas and values

Table 3.1. Buchanan's matrix: human abilities and design disciplines, revised table from Buchanan (2001, 1998)

Much as a graphic designer would aim to improve the effectiveness of a piece of graphic communication, third- and fourth-order designers strive to create a more efficient *process* and identify a more appropriate *purpose*, each delivering a more desirable end result (Anderson 2007).

In which ways do you think designers can be part of strategic planning operations?

Cluster B: Human-centred approach

Working definition

According to Beacham and Shambaugh (2011), design is a human activity that all humans can be part of. In a human-centred approach the user is involved directly in the design process and all stakeholders (customers and clients) are placed at the centre when solving problems.

In which way is the idea of engaging customers and clients with the design process applicable to the South African design environment?

How do you bring the personal and human into design?

Cluster C: Collaboration

Working definition

For the purpose of this study, collaboration may be described as a mutual learning activity that stimulates creativity (Zahedi, Poldma, Baha & Haats 2012; Vianna, Vianna, Adler, Lucena & Russo 2012). Several authors agree that collaboration in context of design thinking is an activity of sharing expert knowledge (Cerejo & Barbosa 2014; Lund 2014; Lignon & Wong Kung Fong 2009; Kimbell 2011). It would be of great value for this study to see how expert knowledge is being shared in our creative industry. My personal observation at the annual Design Indaba is that collaboration has always been a key concern at the conference and that most speakers believe that design is a joint effort.

In which way do you think collaboration relates to the South African design industry?

In which ways are your clients involved during the phases of projects in your design agency?

Cluster D: Holistic approach

Working definition

Design thinking has a strong foundation in a solid holistic perspective, exactly because it supports a comprehensive analysis and general understanding of design phenomena (Cerejo & Barbosa 2014). Brown (2008) believes that a holistic experience in the context of design thinking adds value and innovation to products. Several authors (Blizzard & Klotz 2012; Charnley, Lemon & Evans, 2010; Coley 2008) insist that a wider approach to complex problem solving is called for in the world today, mostly because of an increase in public awareness regarding issues of environmental sustainability.

In this regard, how do you experience this increase in public awareness in your clients? Please share an example of such a project.

In what ways do you recall your own memories and frames of reference (experience and knowledge) during ideation?

Cluster E: Multidisciplinary design teams

Working definition

Multidisciplinary teams are important because they provide the skill range to meet the increasingly complex needs of users and make use of their discipline-specific skills (Fleischmann & Hutchison 2012). The creation of cross-disciplinary teams, consisting of both scientists and designers, has become a modern problem-solving technique (Beckman & Barry 2007).

Please tell me about your own discipline-specific expertise, both as it applies to yourself as well as to your design agency.

Cluster F: Abductive reasoning

Working definition

For the purpose of this study, abductive reasoning is seen as integrated, whole-mind thinking, and serves as a possible means to solve problems in context of design thinking (Cerejo & Barbosa 2014; Crawford 2009; Williams & Newton 2007; Buchanan 2001). Designers therefore need to integrate knowledge from many specialisations into productive results for both individual and social life (Buchanan 2001).

Which visual aspects do you make use of during problem solving, for example your own hobbies and interests?

How do you practise the integration of knowledge from many specialisations?

Cluster G: Wicked problems

Working definition

For the purpose of this study, a wicked problem is defined as a problem that is difficult or at the most impossible to solve. This may be because the problem is incomplete, contradictory or has changing needs that are often difficult to recognise (Buchanan 1992; Rittel & Webber 1973). Taking into consideration that designers practise in complex systems, it would be of great benefit to this study if you can tell me about your own experience regarding complex problem solving. The literature claims that areas such as design decision-making also show signs of wicked problems (Conklin 2009; Buchanan 1992).

In what way have you come across problems during design decision-making?

Please share with me your opinion on what constitutes a creative solution?

Cluster H: Stages in the process of thinking

Working definition

Design projects at the American agency IDEO, one of the foremost design thinking studios, undergo three spaces. These spaces are labelled by Brown (2008) as *inspiration*, for the circumstances that motivate the search for solutions; *ideation*, for the process of generating, developing, and testing ideas that may lead to solutions; and *implementation*, for charting a path to market. This process is non-linear (Hegeman 2008).

Please tell me about the design process in your studio?

What would be the positive outcomes of your design process?

Cluster I: South African design landscape: General questions

How is design thinking still relevant in today's world of work?

What exactly do designers do, in your opinion?

Please share with me your own intellectual culture of design.

Are designers in South Africa treated as professionals?

What do you think of the current state of design affairs in South Africa regarding the quality of design/creative solutions?

Some believe design to be a Western concept. What are your views on the current South African design language/style? In what ways is it unique/different from the rest of the world?

Sagmeister (2014) protests against the fact that designers are storytellers. Please share with me your thoughts on this statement.

The creative industry in South Africa actively participates in the annual Design Indaba. Do you think their engagement is genuine?

Appendix B: Participant Consent forms



PARTICIPANT CONSENT FORM

To: Jan Erasmus, CyberGraphics, 072 395 1259, jan@cybergraphics.bz

Date of interview: Wednesday, 11 November 2015, 10:00 – 12:30

Date of this participant consent form sent to participant: Tuesday, 19 April 2016

From: Emile le Roux, Senior lecturer in Visual Communication, Vega School of Brand Leadership (Bordeaux Campus, Johannesburg), 083 754 9980, emile@vegaschool.com

Promoter: Dr Franci Cronjé, Vega National Teaching and Learning lecturer, Vega (Cape Town Campus, 130 Strand Street, De Waterkant, Cape Town), 082 557 3647, franci@vegaschool.com

As part of my study for the Master of Arts (MA) in Creative Brand Leadership, I conducted personal interviews with specialists in the South African Design industry. Thank you for agreeing to participate in this study. If you have any questions that you feel that were not addressed or explained fully, please ask me for more information.

Research title

The application of Design Thinking in addressing Visual Design challenges.

Purpose of the Project

The purpose of my research is to study the application of Design Thinking as a means to tackle visual design challenges. As part of the study I am investigating the core of Design Thinking from its original perspective of design.

Why you were asked to participate

Your opinion and thoughts will contribute greatly to my study, especially referring to your principles of design which holds that a "powerful mind, guided by solid design principles, must be held in tension with intuition, play, contradiction and interruption" (Erasmus 2007).

Erasmus, J., 2007, *Intrigue: the Graphic Designer's code*, Ex Libris Press, Johannesburg.

Personal interview conducted on 11 November 2015

The personal interview questionnaire was designed to collect information on my two primary research questions: *Is the designer the sole instigator of ideation and practitioner of Design Thinking?* and *What can Design Thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving?* Your participation in my research project is for the purpose of collecting your professional opinion on the subject. Your opinions and responses during our discussion formed part of the data analysis for my Chapter 4 (Discussion of results). I am sending the transcribed data that I have made since our interview back to you via email (please see

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Page 1 of 2

Erasmus_feedback.docx). At this stage you are welcome to make any changes and additions.

Withdrawal clause

Your inclusion in this study is purely voluntary. Even though you agreed to participate in this study, you may withdraw at any time without having to provide an explanation for your decision.

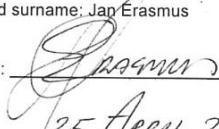
Confidentiality

All information gathered in this study will be held in strict confidence and only the researcher will have access to the original data. Results will only be retained for as long as required for the research purpose.

Consent to participate in this study as required by Vega School of Brand Leadership: I have read the information presented to me in a language that I understand and I understand the implications of participating in this study. The content and meaning of this information have been explained to me. I have been given the opportunity to ask questions and am satisfied that they have been adequately addressed. I understand that my participation in this study is purely voluntary and that I can withdraw from this study at any stage without having to provide an explanation for my withdrawal. I volunteered to take part in this study.

Respondent

Name and surname: Jan Erasmus

Signature: 

Date: 25 April 2016

PARTICIPANT CONSENT FORM

To: Veejay Archary, Executive Creative Director, Black Africa Brand Consulting, 082 375 5179, veejay@blackafricagroup.com

Date of interview: Thursday, 12 November 2015, 09:00 – 10:15

Date of this participant consent form sent to participant: Tuesday, 19 April 2016

From: Emile le Roux, Senior lecturer in Visual Communication, Vega School of Brand Leadership (Bordeaux Campus, Johannesburg), 083 754 9980, emile@vegaschool.com

Promoter: Dr Franci Cronjé, Vega National Teaching and Learning lecturer, Vega (Cape Town Campus, 130 Strand Street, De Waterkant, Cape Town), 082 557 3647, franci@vegaschool.com

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Research title

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Purpose of the Project

The purpose of my research is to study the application of Design Thinking as a means to tackle visual design challenges. As part of the study I am investigating the core of Design Thinking from its original perspective of design.

Why you were asked to participate

Your opinion and thoughts will contribute greatly to my study because of your rich and extensive background in design and branding (Black Group Africa 2015).

Black Africa Group, 2015, viewed 19 August 2015, from <http://www.blackafricagroup.co.za/about/profile/>.

Personal interview conducted on 12 November 2015

The personal interview questionnaire was designed to collect information on my two primary research questions: *Is the designer the sole instigator of ideation and practitioner of Design Thinking?* and *What can Design Thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving?* Your participation in my research project is for the purpose of collecting your professional opinion on the subject. Your opinions and responses during our discussion formed part of the data analysis for my Chapter 4 (Discussion of results). I am sending the transcribed data that I have made since our interview back to you via email (please see

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Page 1 of 2

Archary_feedback.docx). At this stage you are welcome to make any changes and additions.

Withdrawal clause

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Respondent

Name and surname: Veejay Archary

Signature:  com.apple.idms.appleid.prd.577132
30754b35366c572f41466844676772
464f56413d3d

Date: _____

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Page 2 of 2

PARTICIPANT CONSENT FORM

To: Adrian Morris, COO, Design Partnership, 082 887 7183, adrian@designpartnership.co.za

Date of interview: Friday, 13 November 2015, 13:00 – 14:11

Date of this participant consent form sent to participant: Tuesday, 19 April 2016

From: Emile le Roux, Senior lecturer in Visual Communication, Vega School of Brand Leadership (Bordeaux Campus, Johannesburg), 083 754 9980, emile@vegaschool.com

Promoter: Dr Franci Cronjé, Vega National Teaching and Learning lecturer, Vega (Cape Town Campus, 130 Strand Street, De Waterkant, Cape Town), 082 557 3647, franci@vegaschool.com

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Purpose of the Project

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Why you were asked to participate

Your opinion and thoughts will contribute greatly to my study exactly because Design Partnership is an agency focusing on strategy and design. You believe that “design can add tremendous value to business and customers alike” and also “enhance customer experience” (Design Partnership 2015). This reflects the view of the core issue in my study in that a human-centered approach should engage customers and clients with the design process.

Design Partnership, 2015, viewed 21 August 2015, from <http://www.designpartnership.co.za/#WHO%20WE%20ARE>.

Personal interview conducted on 13 November 2015

The personal interview questionnaire was designed to collect information on my two primary research questions: *Is the designer the sole instigator of ideation and practitioner of Design Thinking?* and *What can Design Thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving?* Your participation in my research project is for the purpose of collecting your professional opinion on the subject. Your opinions and responses during our

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Page 1 of 2



discussion formed part of the data analysis for my Chapter 4 (Discussion of results). I am sending the transcribed data that I have made since our interview back to you via email (please see Morris_feedback.docx). At this stage you are welcome to make any changes and additions.

Withdrawal clause

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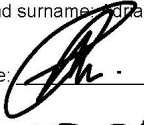
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Respondent

Name and surname: Orlan Morris

Signature: 

Date: 23.04.16.

PARTICIPANT CONSENT FORM

To: Ronell Botes, Brand Union, 083 694 0170, ronell.botes@yahoo.com

Date of interview: Monday, 16 November 2015, 14:00 – 15:15

Date of this participant consent form sent to participant: Tuesday, 19 April 2016

From: Emile le Roux, Senior lecturer in Visual Communication, Vega School of Brand Leadership (Bordeaux Campus, Johannesburg), 083 754 9980, emile@vegaschool.com

Promoter: Dr Franci Cronjé, Vega National Teaching and Learning lecturer, Vega (Cape Town Campus, 130 Strand Street, De Waterkant, Cape Town), 082 557 3647, franci@vegaschool.com

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Purpose of the Project

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Why you were asked to participate

Your opinion and thoughts will contribute greatly to my study because Brand Union believes that experiences "form the basis of all kinds of human relationships, with other people and with the world around us" (Brand Union 2015). This statement reflects two of the key issues in my study, namely human-centered design and a holistic approach to problem solving.

Brand Union, 2015, viewed 19 August 2015, from <http://www.brandunion.com/who-we-are>.

Personal interview conducted on 16 November 2015

The personal interview questionnaire was designed to collect information on my two primary research questions: *Is the designer the sole instigator of ideation and practitioner of Design Thinking?* and *What can Design Thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving?* Your participation in my research project is for the purpose of collecting your professional opinion on the subject. Your opinions and responses during our discussion formed part of the data analysis for my Chapter 4 (Discussion of results). I am sending the

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Page 1 of 2

transcribed data that I have made since our interview back to you via email (please see Botes_feedback.docx). At this stage you are welcome to make any changes and additions.

Withdrawal clause

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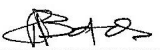
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Respondent

Name and surname: Ronell Botes

Signature:  _____

Date: 20.06.16.

PARTICIPANT CONSENT FORM

To: Pepe Marais, Chief Creative Officer, Joe Public, pepe@joepublic.co.za

Date of interview: Friday, 27 November 2015, 16:30 – 17:38

Date of this participant consent form sent to participant: Tuesday, 19 April 2016

From: Emile le Roux, Senior lecturer in Visual Communication, Vega School of Brand Leadership (Bordeaux Campus, Johannesburg), 083 754 9980, emile@vegaschool.com

Promoter: Dr Franci Cronjé, Vega National Teaching and Learning lecturer, Vega (Cape Town Campus, 130 Strand Street, De Waterkant, Cape Town), 082 557 3647, franci@vegaschool.com

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Purpose of the Project

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Why you were asked to participate

Your opinion and thoughts will contribute greatly to my study exactly because the notion of collaboration and growth is evident in your agency's ethos. "The growth of our clients, the growth of our people and the growth of our partners, are all positively interlinked" (Joe Public 2015). This statement reflects one of my key issues regarding collaboration as a form of problem solving.

Joe Public, 2015, viewed 21 August 2015, from <http://joepublic.co.za/offering>.

Personal interview conducted on 27 November 2015

The personal interview questionnaire was designed to collect information on my two primary research questions: *Is the designer the sole instigator of ideation and practitioner of Design Thinking?* and *What can Design Thinking bring to the practice of design/visual communication in its intended form as an approach to design problem solving?* Your participation in my research project is for the purpose of collecting your professional opinion on the subject. Your opinions and responses during our discussion formed part of the data analysis for my Chapter 4 (Discussion of results). I am sending the

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Page 1 of 2



transcribed data that I have made since our interview back to you via email (please see Marais_feedback.docx). At this stage you are welcome to make any changes and additions.

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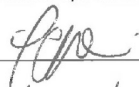
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Respondent

Name and surname: Pepe Marais

Signature:  _____

Date: 5 / 10 / 2016 _____

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Page 2 of 2

