Can contemporary art methods facilitate designers’ creativity?

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FACULTY OF SOCIAL SCIENCES AND HUMANITIES
DEPARTMENT OF DESIGN AND TECHNOLOGY

CAN CONTEMPORARY ART METHODS FACILITATE DESIGNERS' CREATIVITY?

By

Jonathan D Mason

A Doctoral Thesis

Submitted in partial fulfilment of the requirements for the award of

Doctor of Philosophy
of Loughborough University

21st March 2007

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Abstract

Art and industrial design share a long history, with some of the first industrial designers originating from the arts. Through the early part of the twentieth century many designers were educated and influenced by artists and on occasions they collaborated in the development of art/design movements. In recent decades this relationship has weakened with artists and industrial designers working towards different goals and paying less attention to how one another work. This research was undertaken to investigate whether contemporary artists were now using methods that may facilitate industrial design.

Since art is a broad discipline the first task was to narrow the scope and, through a research study, the discipline of sculpture was selected; for sculptors focused on achieving different goals to the industrial designers. Sculpture and industrial design were then explored in more depth in order to understand further how they work and to identify the methods they may use. While the focus of the research was largely on identifying the differences between the two disciplines, from data collected it became apparent that sculptors and industrial designers appear to achieve their goals in similar ways. Sculptors were found to have and use methods to progress their work and 42 were identified and, for the first time, documented. These methods were embodied in a card format and underwent preliminary testing by designers who were asked to provide feedback. While the designers recognised many of the methods some were found to have the potential to facilitate design creativity.

Recommendations for future work include an investigation into the use of the sculptors’ methods, by designers, over a long period of time in order to determine, in more detail, how they can be used and applied to industrial design projects. Furthermore, understanding how sculptors approach and explore a design problem can reveal alternative approaches and perspectives from which to work and, this too, is worthy of future research.

Keywords

Industrial Design | Sculpture | Methods | Working Processes | Exploration | Creativity | Knowledge Transfer
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- Kiefer Associates
- Metz Architects
- PIPS Technology
- Polar Creative
- RG+P Architects
- Seymour Powell
- Wysing Arts
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Chapter 1: Introduction

In this chapter the research and this thesis are introduced. The origins of the research stem from the author's own interests and background and these have been described in the first part of this chapter. The research question and the initial objectives required to initiate the research have also been included. The final sections of the chapter are dedicated to highlighting the scope of research and the structure of this thesis.
1.1 Origins of this Research

"We need to become hunter gathers of models, processes and ways of living. Putting old knowledge into new contexts" John Thackera (2005, p218)

This quote from John Thackera concerning how designers ought to change their ways of designing and search elsewhere for methods or processes is the essence of this research. It was thought that refreshingly alternative ways of working might be revealed through exploration of disciplines, other than design, and through understanding how different people work. Furthermore, it would be beneficial if these alternative methods also facilitated the designers’ drive for being original, perhaps by helping them think more creatively.

This research into art disciplines and their methods originated from a number sources. Firstly, the author held an interest in art and studied it prior to attending university. Here he experienced a variety of art disciplines and found the diversity of the people working within them, the collaborations with them and the ways they worked to be fascinating. Whilst studying industrial design at university it became clear that those artists worked differently from designers. Differences appeared to exist between the way the students were encouraged to work through projects, the focus of the work, the structure of the courses, and the freedom and constraints present. There was also a noticeable division between art and design with little interaction or collaboration. The design students appeared keen to work with ergonomists or engineers and apply their methods, but few ventured towards the faculty of art. These differences and division provided fuel for thought: were industrial designers missing out on methods and processes used by contemporary artists?

The second source and the spark that ignited the aforementioned fuel, discovered in the early stages of the Ph.D. study, was Colin Painter’s exhibition, titled At Home with Art (1999) where he recruited well known artists to design a mass produced product that would be sold in a national chain of home-improvement stores. These artists were essentially playing at industrial design and the artefacts produced were unusual and provoked the user to think about the product, perhaps in a new way. These artists, with apparently little industrial design experience, were able to produce artefacts that many design students spend years studying how to do.
They may have had assistance but the ideas still originated from their experience and art processes; what did they do and how? Therefore, this Ph.D. was an opportunity to explore the arts for methods and processes and introduce this knowledge into the context of industrial design. Perhaps these methods might also facilitate industrial design and designers' creativity and help them with their development of interesting and unusual products.

1.2 Aim and Objectives

The primary research question developed for this Ph.D., and the ultimate aim of the research, was to determine the degree to which contemporary art methods could facilitate designers' creativity.

Art and design are very broad subject areas and both had to be reviewed before any detailed research studies could be undertaken to answer the primary research question. Objectives were developed to guide this review, and these are as follows:

- To define industrial design
- To understand how industrial designers work: the design process
- To identify the methods used in industrial design
- To review creativity

- To define art
- To understand how artists work: the art process
- To identify the methods used in art

- To review the links between art and industrial design.

1.3 Scope of the Work

The motivation to research the arts for methods was based strongly on the author's personal desire to explore and understand this topic area further and to enhance his research skills. There was no intention to change the design domain radically but it was hoped that other curious designers or design educators would find this research interesting and perhaps useful.

Design is a broad discipline and for this research the focus was placed on industrial design, which is predominantly the design of mass produced products.
1.4 Structure of the Research

The overall research aim was to determine the potential for art methods to facilitate design creativity. To achieve this, the first requirement was to review the literature associated with industrial design and art in order to obtain a detailed insight into these subject areas. This review was divided into three sections: industrial design (chapter two), art (chapter three) and links between these two disciplines (chapter four). In light of the literature review the research objectives were revisited and, along with the overarching methodology for the research, are presented in chapter five. The layout of the research and thesis is shown in figure 1.1 on page 6.

Art is a broad discipline and it could not be explored in its entirety. The aim of the first study, therefore, (chapter six) was to reduce the scope of the research by identifying an art discipline that worked differently to industrial design. Such art disciplines may use methods that designers are not acquainted with and when applied in a design project they could facilitate creativity. From the questionnaires and audio diaries, the fine art sculptors were found to work towards a different type of goal to the industrial designers. The sculptors focused on more expressive and emotional aspects rather than the more practical foci preferred by the designers.

The next step (study two, chapter seven) was to understand further how contemporary sculptors and designers worked with the intention of identifying differences between them. However, as the in depth interviews and design exercise progressed it became very apparent that the sculptors' and designers' working processes were not so dissimilar to one another. This was unexpected considering they have different goals and work in different 'worlds'. For example, their clients played a different role in their projects or commissions; the amount of artistic freedom differed; the type of constraints differed; while the sculptors generally developed a one off piece, the designers often had to consider mass production.

The working processes were not absolutely identical, for the sculptors appeared to approach and explore their projects differently to the designers; they researched and selected sources of inspiration differently to the designers and they approached projects from a less utilitarian perspective. Most of the findings from study two confirmed the literature, nevertheless, they provided a direction to work in for the next research study.
Chapter 1: Introduction

How sculptors approached and explored their projects was investigated in greater detail, using in depth interviews, in the third study (chapter eight). The sculptors were found to use many methods when developing their artwork and for the first time these have been collected and documented. The methods (42 in total) were embodied in a card format and presented to designers in a preliminary test (study four, chapter nine). The designers were familiar with many of them and it was clear that the sculptors and designers used similar methods to progress their work; they appeared to achieve their different goals in similar ways. Despite this, when some of the methods were tested in a design exercise they demonstrated a potential for facilitating design creativity.

From the research studies it was concluded (chapter ten) that some art methods can facilitate a designer's creativity, however, the main contributions to knowledge were the realisation that sculptors do apply methods when producing artwork and that these methods are not so dissimilar to those used by industrial designers. This indicates that the key differences between these disciplines may not be found in their working processes and the focus of future research should be on other aspects of art and design, such as goals and intentions.
Chapter 1: Introduction

Chapters 2, 3 & 4

Chapter 5

Chapter 6

Chapter 7

Chapter 8

Chapter 9

Chapter 10

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Appendices

Figure 1.1 Structure of the research and thesis.
Chapter 2 : Literature Review Part 1 - Industrial Design

This chapter is the first of three dedicated to reviewing the literature associated with the topic area of this research. The focus of this chapter is industrial design. This begins with a description of industrial design prior to the review of key aspects of design, such as the design problem, the design specification, the design process and the methods used. A review of creativity has also been included within this chapter.
2.1 Definition of Industrial Design

Industrial design, sometimes referred to as product design, is the design of mass produced products, which may range from polymer widgets to medical equipment, from domestic appliances to motor vehicles (Bayley, 1985; Hauffe, 1998; Heskett, 1980; Archer, 1965). Originally, industrial designers were responsible for facilitating the increase in product sales through careful consideration of style and manufacturing techniques (Dormer, 2000; Conran, 1996).

The role of the Industrial designer within new product development has become more complex and diverse since its conception (Archer, 1965). In addition to the above, they must also consider aspects such as user needs, ergonomics, colour theory, semiotics, proportion, materials science, and quality standards (Hauffe, 1998). Lawson (1997) believes that there is no exhaustive list of the expertise needed by designers. This expertise is generally applied by the designer to solve a design problem by producing plans of the solution which are to be manufactured by those from other disciplines (Archer, 1965; Dorst, 2003).

2.2 The Design Problem

The design problem is the focal point for any designer and the nucleus of designing in general since it states the issues that are to be solved. Design problems can originate from many sources such as clients, users, legislators and designers themselves (Lawson, 1997). The development and exploration of the problem are an important part of a design process, since this is when major decisions are made that would affect the rest of the development, the success of the product and of the company (Baxter, 1995). This period of designing is often referred to as problem definition since with out clear knowledge of the problem there is no clear specification against which to judge proposed solutions (Pugh, 1991).

Defining the design problem requires creative thinking. This is because the essential characteristic of design problems are that they are not apparent but must be found. Design is as much a matter of finding the problem as it is of solving it (Lawson, 1997). Effort is needed to find the core of the problem and judge the boundaries of the project in relation to it.
In order to solve design problems a gradual approach of trial and error is required, with emphasis switching from precision and calculation to ambiguity and imagination. This is one factor that distinguishes designers from engineers (Dorst, 2003; Lawson, 1997). Furthermore, the design problem should be thoroughly explored since those who take time to define and understand the problem generally produce more creative results (Dorst and Cross, 2001; Getzels and Csikszentmihaly, 1976). There are numerous reasons for design problems requiring effort and creativity to solve, since:

- They cannot be comprehensively stated and are unique
- They require subjective interpretation
- The problem formulation include inconsistencies
- There are a limitless number of potential solutions
- There is no optimum solution
- The problem (or solution) is often a part of another problem
- There is no ultimate test of a solution.

(Lawson, 1997; Rittel and Webber, 1973; Dorst, 2003; Cross, 1994)

Methods exist to help designers with the process of analysing a design problem and many of these have been listed in table 2.1, overleaf. These methods have been divided into three categories with regard to how they facilitate the analysis. There are methods that facilitate the general understanding of the problem, those that distil the design problem into more simple elements and those that provide a more structured analytical approach, using matrices or graphs.
### Understanding the problem

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<td>VanGundy, 1988</td>
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### Problem Distillation

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<tr>
<td>Dominant and Crucial Factors</td>
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<td>Fractionation</td>
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<td>Functional innovation</td>
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<td>Parametric / dimensional analysis</td>
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<td>Problem abstraction / Decomposable matrices</td>
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</tr>
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</tr>
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<td>Product improvement checklist</td>
<td>VanGundy, 1988</td>
</tr>
<tr>
<td>System transformation</td>
<td>Baxter, 1995; Jones, 1992</td>
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<td>Problem identification game</td>
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### Structured Analysis

<table>
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<td>AIDA</td>
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<td>Lawson's design problem model</td>
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</tr>
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<td>Orthographic analysis</td>
<td>Baxter, 1995</td>
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<tr>
<td>SWOT analysis</td>
<td>Baxter, 1995</td>
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Table 2.1 Methods for exploring a design problem.
2.3 The Product Design Specification

The Product Design Specification (PDS) is the systematic and formal definition of a design problem. The PDS becomes the standard criteria that solutions are required to meet. Using a PDS can result in increased product quality and a greater chance of developing a more successful product (Pugh, 1991; Baxter, 1995). The PDS can also assist creativity since it helps to focus the product development and those who design to realistic criteria often produce more creative results (Weisberg, 1986). The greater the depth and breath of the investigations that contribute to the development of the PDS the better the overall quality and potential success of the final product.

2.4 The Design Process

The strategy used by designers to solve a design problem is often referred to as a design process. This has been defined and modelled many times and there appears to be no definitive design process. Lawson (1997), however provided an overarching list of characteristics, these are:

- There is no infallibly correct process
- It involves finding as well as solving
- It inevitably involves subjective value judgement
- It is a prescriptive activity
- Designers have a desire to change the environment
- It is endless.

These characteristics stem from the complexity associated with solving a design problem since there are many interrelating factors to consider, many of which are based in the future (Lawson, 1997). Furthermore, modern design problems are becoming increasingly more complex due to, among other things, advances in technology and changes in demographics and society (Jones, 1992). He highlights this in his observation of four levels of complexity that can affect design (figure 2.1, overleaf).
Despite the first characteristic of Lawson's definition he also concedes that design processes do have some generic phases which the designer will pass through whilst solving a problem; these are analysis, synthesis and evaluation. Analysis is the exploration and research of information surrounding a problem and synthesis is the resulting application of this knowledge through the production of ideas. Evaluation is the assessment of how well these ideas solve the problem. Jones (1992) also models the design process in three phases: divergence, transformation and convergence. These are similar in nature to the generic stages noted by Lawson, where the designer begins by undertaking a broad search for information followed by a period of ideation and concludes with more detailed and focused activity to provide a realistic solution. The first three phases of Cross' (1994) design process theory are also similar to the previous two (exploration, generation, evaluation), however, Cross concludes his process with a communication phase, where the designer informs others of the proposed solution(s). These design process models all use verbs to describe actions that the designer(s) undertakes when solving a design problem. Whilst these descriptions may be ambiguous and applicable to almost any creative activity, they do provide an insight into the cognitive aspects of designing. The designer would cycle through each phase iteratively with each cycle becoming ever more detailed (Jones, 1992; Dorst and Cross, 2001).

Other design process models have been constructed using the tasks and particular outcomes expected of designers when solving a design problem. For example, Pahl and Beitz's (1988) design process model consists of four main tasks: clarification of the task, conceptual design, embodiment design and detail design. Due to the ill-
defined nature of a design problem this type of design process model can become ever more detailed. The two examples of detailed design process models presented here are by Pugh (1991) (figure 2.2) and Baxter (1995) (figure 2.3, overleaf).

Figure 2.2 Pugh's model of a design process (1991, p11).
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These two processes were developed to clarify the development of new products and can be used to help demystify the solving of ill-defined problems for non-designers, such as managers, clients and other stakeholders. These models can also be used to guide a project in order to facilitate the reduction of risk associated with new product development as well as enabling, for example, feasibility, costs, time scales, resources and equipment to be predicted in advance (Baxter, 1995; Jones, 1992).

In contrast to the detailed design process models, Lawson (1997) opposes the notion of there being identifiable stages and an order. Instead, he favours the
theory that "design is a process in which the problem and solution emerge together" p47 (figure 2.4). This notion is also supported by Cross and Dorst (2001) who state that designers create ideas from co-evolution of the problem and solutions and this progresses following surprises that are framed and reframed continuously.

Figure 2.4 Lawson's design process model (1997, p47).

So far two theories of the design process have been described. There are those who prefer the theory that design is too complex and ambiguous to model precisely and refer to more cognitive actions undertaken by designers. And, there are those who believe that it is generally definable and list the tasks, stages and outcomes designers work through when developing new products.

Alternatively, the design process could be referred to as a selection of methods that are used by the designer to solve the design problem at hand (Jones, 1992; Birkhofer et al, 2002). The design processes undertaken at IDEO, an international design and human factors consultancy, are described by Kelley and Littman, (2001) as a "blend of methodologies, work practices, culture and infrastructure". The reason behind this description is designers at IDEO have no set routine and they define their process through the methods they use. The Chambers Dictionary (2003, p932) defined method as:

*The mode or rule used in carrying out a task or accomplishing an aim; orderly procedure; manner...*

A method can therefore, be implied as an aspect of design activity, such as drawing, a way of thinking, or the use of computer aided design (CAD). When all of the methods used by a designer are linked together the result is a design process.
Designers can therefore develop their design processes through their chosen combination of methods. Using this theory, the design process can be viewed from two perspectives:

1. As definable stages in the form of applied methods
2. As being indefinable in the sense that no two designers would combine or use the same selection of methods.

This theory also supports the development of and search for new methods for designers. As the number of methods available increases, choice and opportunity for the designer, to tailor his design process more precisely to solving the design problem in question, increases.

2.5 Design Methods

Originally products and artefacts evolved slowly in the hands of skilled craftsmen who passed on knowledge through the generations. Craftsmen worked by trial and error, developing their product and techniques over many years (Jones, 1992). However, the designer was a new kind of creator who employed a different way of working to produce products. An early dictionary definition, from 1662, for a designer was 'one who makes designs or patterns for the manufacturer or constructor' (Morrison and Twyford, 1994). The production of plans through drawing was possibly one of the first methods used by designers and furthermore, helped to define design. Since then many more methods have been developed in order to help designers solve design problems. One possible reason for this increase in methods is that few companies can survive by competing solely on price; customers are demanding more from their products and as a consequence designers need to find new ways of appealing to them (Baxter, 1995).

Many design methods are documented in this chapter and, whilst every effort was made to ensure that it is comprehensive, it is acknowledged that some may have been missed due to the large number of methods in this domain. Methods concerning the definition of a design problem were noted in the previous section and thus are not repeated here. In this section methods that facilitate research, externalisation and communication, and creativity are reviewed. One further section is included that consists of methods which do not neatly fit within the aforementioned categories.
2.5.1 Research

Research methods are used when designers require more information in order to proceed with the solving of a design problem. This category can be sub-divided further into primary and secondary research. Primary research is where the designer collects data first hand, whereas secondary research is the review of data that has been collected previously by another person.

Numerous methods for collecting primary research are available for use by designers and it seems that many of these have originated from disciplines other than design, such as ergonomics, social sciences, psychology and marketing. One possible reason for the influx of methods from these human centred disciplines is the recent trend towards a user centred design and usability philosophy. This is due to the increased competitiveness of the industry and the more thoroughly the users' needs are understood and catered for, the greater the chances of becoming noticeably better than the competition (Pugh, 1991). Seymour (1999) highlighted this design philosophy in his definition of design as "Making products better. For people".

Not all primary research methods are user orientated. Some are used to explore existing products or systems, for example surveying products by comparing them with the competition, flow analysis or testing products to experience them first hand. Table 2.2, is a list of the main primary research methods.

<table>
<thead>
<tr>
<th>Primary Methods</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children Samples</td>
<td>Bayley and Chapman, 1999</td>
</tr>
<tr>
<td>Co-Designing</td>
<td>Cain, 2005</td>
</tr>
<tr>
<td>Conjoint Techniques</td>
<td>Hofmeester and De Charon, 1999</td>
</tr>
<tr>
<td>Cultural Probes</td>
<td>Hofmeester and De Charon, 1999</td>
</tr>
<tr>
<td>Ethnography</td>
<td>Hammersley and Atkinson, 2003; Creswell, 2003; McNeill, 1995</td>
</tr>
<tr>
<td>Field Test</td>
<td>McNeill, 1995</td>
</tr>
<tr>
<td>Flow Analysis</td>
<td>IDEO, 2003</td>
</tr>
<tr>
<td>Focus Groups</td>
<td>Langford and McDonagh, 2003</td>
</tr>
<tr>
<td>Heuristic Evaluation</td>
<td>Nielsen and Mack, 1994</td>
</tr>
<tr>
<td>Interviews</td>
<td>McNeill, 1995; Creswell, 2003</td>
</tr>
<tr>
<td>Lead User</td>
<td>von Hippel, 2005</td>
</tr>
<tr>
<td>Longitudinal Studies</td>
<td>McNeill, 1995; Hofmeester and De Charon, 1999</td>
</tr>
<tr>
<td>Misuse / customisation</td>
<td>Weightman and McDonagh, 2003; Dunne, 1999</td>
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<thead>
<tr>
<th>Method</th>
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<tbody>
<tr>
<td>Mood boards</td>
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</tr>
<tr>
<td>Opinion Polls</td>
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</tr>
<tr>
<td>Personas</td>
<td>Cooper, 1999</td>
</tr>
<tr>
<td>Perspective Sorting</td>
<td>Forlizzi, Gemperle and DiSalvo, 2003</td>
</tr>
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<td>Photo Journals</td>
<td>Fulton Suri, 2003</td>
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<td>Photography</td>
<td>Ball and Smith, 1992; Kellehear, 1993</td>
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<td>Placebos</td>
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<tr>
<td>Postcards</td>
<td>Hofmeester and De Charon, 1999</td>
</tr>
<tr>
<td>Product survey / analysis</td>
<td>IDEO, 2003</td>
</tr>
<tr>
<td>Prototyping / Mock-up trials</td>
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</tr>
<tr>
<td>Questionnaires</td>
<td>Cross, 1994; Jones, 1992; Robson, 1995</td>
</tr>
<tr>
<td>Role Play</td>
<td>Chambers, 2002</td>
</tr>
<tr>
<td>Scenario Building</td>
<td>Suri and Marsh, 2000</td>
</tr>
<tr>
<td>Shadowing</td>
<td>Hofmeester and De Charon, 1999; IDEO, 2003</td>
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<tr>
<td>Task analysis</td>
<td>Shepherd, 2001; Hollnagel, 2003</td>
</tr>
<tr>
<td>Think Tanks</td>
<td>Chambers, 2002;</td>
</tr>
<tr>
<td>Time Audits</td>
<td>McNeill, 1995</td>
</tr>
<tr>
<td>User Diaries</td>
<td>Pedgley, 1999</td>
</tr>
<tr>
<td>User Trials</td>
<td>Green and Klein, 1999</td>
</tr>
</tbody>
</table>

Table 2.2 Research methods for designers.

New research methods are continually being developed especially in areas that are of interest to designers and industry. One current area of interest is emotion and how designers can identify users' emotions towards products and consider them when designing. Engage, an Internet based knowledge sharing project funded by the European Union, hosts a library of methods tailored specifically for researching emotions. The organisers have, at the time of writing (2007) sourced 58 methods from industry and academia, demonstrating the importance of this area to design (www.engage-design.org). One example of a method used for designing for emotion is PrEmo™, a tool that can measure the fourteen emotions products often engender in users. Designers can assess the users' emotional responses towards the competition or their own concepts (Desmet, 2003).

Methods for secondary research involve the sourcing and reviewing of information. Traditionally these searches involved reading material from books, documents, magazines, journals and newspapers. Also the collecting of data unobtrusively over time can be a form of secondary research. Methods such as accretion, erosion or
graffiti can be used (Emmison and Smith, 2000; Webb et al, 1966; Robson, 2002). These are methods that focus on documenting the natural increase or decrease of material, for example the amount and type of litter people leave behind; the number of particular leaflets taken; circulation patterns of customers in a shop. Graffiti refers to the notes and messages users add to products which can indicate shortcomings in their design.

With the advances in technology more dynamic resources are now available, such as the Internet and digital media. For example, RealPeople is an interactive resource that provides designers with statistically valid information on real people and the pleasure they obtain from products. Designers can view video footage of users or complete searches of product or user type (Chhibber et al, 2004). Computer software packages are also available to help with the selection of materials, production process and anthropometrics. This ever growing number of methods can facilitate the collection of information and can be used to contribute to the design of a product.

2.5.2 Externalisation and Communication

Previously in this chapter the design problem and design process were noted as being complex and ill-defined. When embarking on solving a design problem designers often need to externalise their thinking and ideas to make the design process more manageable. Furthermore, externalisation allows the designer to communicate to others, such as other designers, users and stakeholders, who can analyse and make contributions towards solving the problem (Jones, 1992; Lawson, 1997). Some designers externalise their ideas more readily than others. Jones (1992) describes two types of designer: black box and glass box. A black box designer is one who can produce ideas almost magically with little externalisation. In contrast, a glass box designer externalises to a greater extent and this provides others with a more transparent indication of how they developed ideas and arrived at their solutions.

The methods used to externalise and communicate differ from those in the other categories in that they are more physical where as methods for defining a problem, researching or creating are generally focused on how designers think (Baxter, 1995). Drawing was one of the first methods used by designers and it enabled them to view the entire product prior to its construction. This allows for numerous ideas and potential solutions to be analysed, synthesised and evaluated much more
quickly. Lawson (1997) noted four types of drawing pertinent to design: design drawings, referential drawings (diagrams), presentational drawings and visionary drawings. Each of these types serves a different purpose throughout a design process and many designers feel happiest when they are holding a pencil and able to express themselves (Lawson, 1997).

Other methods of externalisation and communication include modelling and prototyping, which are three-dimensional representations but are subtly different. Models are normally representations of an idea, used to demonstrate the appearance and physical attributes such as size, mass and shape. Prototypes are generally more functional and demonstrate how things will work. These can be crude devices to, perhaps test a mechanism, through to high quality representations to test the final manufacturing processes (Baxter, 1995).

New technology has enabled the designer to use more advanced methods and media for externalisation. Computer aided design allows the designer to develop two and three-dimensional models in a virtual environment from which they can produce visualisations, animations, engineering drawings, and rapid prototypes. These modern methods of externalisation and communication are becoming vital to increasing the efficiency and competitiveness of companies (McHahan and Browne, 1998).

2.5.3 Creativity

Creativity is said to be at the very heart of design and this is regardless of the type of project, whether it may be a radical new development or the more mundane (Baxter, 1995). Fletcher (2001) produced a list of attributes of creativity which indicate how people can be more creative, this list consists of:

- Challenging assumptions
- Being responsive to new ideas
- Recognising similarities and differences
- Making unlikely connections
- Taking risks
- Building on ideas to make better ideas
- Looking at things in new ways
- Taking advantage of the unexpected
- Taking chances.
Being creative is not a simple process since many novel and original solutions require the creator to invest much time and effort (Csikszentmihalyi, 1988). Even those eureka moments are often the result of many hours of hard work. Creativity is a process of trial and error in searching for new solutions by combining known and discovered elements in many small tentative steps (Weisberg, 1986; Walberg 1988). To reduce the time and effort required many creativity methods have been developed. Brainstorming is a creativity method that has become highly popular with many designers. Brainstorming is a group session where ideas, no matter how outrageous, are freely expressed with out criticism and the aim is to obtain a plethora of new ideas that can be reviewed later in more detail (Cross, 1994; Baxter, 1995; Jones, 1992; Manktelow, 2003). IDEO, one of the world’s largest design consultancies, use brainstorming extensively throughout their design process and they consider it to be an important factor that facilitates their creativity (Kelley and Littman, 2001).

Examples of other creativity methods have been categorised and listed in table 2.3. This list, whilst very long, is not exhaustive and provides an indication of the sheer number of methods available. The categories are similar to those used in the literature and refer to the most suitable period during a design process when the method could be applied: when analysing problems, generating ideas, and evaluating ideas (VanGundy, 1988; Jones, 1992; Cross, 1994). One further category (holistic), refers to methods that can be applied at anytime during a design process. Some of the methods, such as brainstorming, are accompanied by the names of other creativity methods which are similar.

<table>
<thead>
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<td>Circumrelation</td>
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<td>Collective Notebook / Slip writing</td>
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<td>Concept fan</td>
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<td>Exaggerated objectives</td>
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<td>Force-fit game</td>
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<td>Heuristic Ideation technique</td>
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### Mental models / Pre-inventive

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</tr>
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<td>Quota</td>
<td>De Bono, 1990; Von Oech, 1983</td>
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<td>Reverse brainstorm</td>
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<td>SCAMPER</td>
<td>Baxter, 1995; Manktelow, 2003</td>
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<td>Sculptures</td>
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<tr>
<td>Six thinking hats</td>
<td>De Bono, 1986</td>
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<td>Word Diamond</td>
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### Evaluating ideas

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<td>VanGundy, 1988</td>
</tr>
<tr>
<td>Brainstorm - creative evaluation</td>
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<td>Castle technique</td>
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<td>Checklists</td>
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<td>Idea advocate</td>
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<td>Logic and Practicality</td>
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<td>Selecting criteria</td>
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### Holistic

<table>
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<td>&quot;I'm not creative&quot;</td>
<td>Von Oech, 1983</td>
</tr>
<tr>
<td>&quot;That's not my area&quot;</td>
<td>Von Oech, 1983</td>
</tr>
<tr>
<td>&quot;To err is wrong&quot;</td>
<td>Von Oech, 1983; De Bono, 1990</td>
</tr>
<tr>
<td>Abstraction</td>
<td>Ward, Finke and Smith, 1995</td>
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<td>Ambiguity</td>
<td>Von Oech, 1983</td>
</tr>
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<td>Analogies / Synectics</td>
<td>Ward, Finke and Smith 1995; Cross, 1994; Baxter, 1995; Jones, 1992; VanGundy, 1988</td>
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<td>Bisociation</td>
<td>Koestler, 1964; VanGundy, 1988</td>
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<td>Brain-sketching</td>
<td>VanGundy, 1988</td>
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<td>Brain-writing / Battelle-Bildmappen-Brain-writing (BBB) / Gallery method</td>
<td>Baxter, 1995; VanGundy, 1988</td>
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<td>Breaking Assumptions</td>
<td>De Bono, 1990</td>
</tr>
<tr>
<td>Clichés and proverbs</td>
<td>Baxter, 1995; VanGundy, 1988</td>
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</table>
Table 2.3 Creativity methods.

Creativity methods appear to have one main theme in common: they are aimed at altering the way people think. This seems to have been achieved in three ways:

1. **Providing a safe environment** – through rules a safe environment is obtained where members can offer wild ideas or express their thoughts without being criticised. Examples include brainstorming, games and brain-writing.

2. **New perspectives** – informing the user how else they could think. Examples include, bisociation, synectics, metaphors, analogies, why and clichés.

3. **Controlled thought** – through the use of frameworks, graphs or matrices aspects of the problem are systematically analysed. Examples include, orthographic analysis, SCAMPER, AIDA, product improvement checklist and Lawson’s design problem model.
Design could be considered one of the disciplines that would benefit most from these creativity methods, but many designers do not use them; they prefer to obtain knowledge of current practice through case studies (Roy, 1993). Furthermore, the application of a creativity method is also a contentious issue for it could be argued that following a method is the very essence of mediocrity and thus uncreative (Bohm, 1998). On the contrary, others believe that methods can be applied to enhance the chance of obtaining a creative product (Torrance, 1988; De Bono, 1990; von Oech, 1983). Dasgupta (1996) argued that creativity is knowledge driven and based on experiences applied in new ways. The aforementioned methods may facilitate finding alternative ways of thinking but this may only be of use if there is a knowledge base on which to draw.

### 2.5.4 Other Methods

The methods for designers in this section do not fit neatly into the previous sections and include methods for sustainable design, design for manufacture, and sound design. There are also design principles that designers can apply when developing ideas and concepts, however these are too numerous to describe here individually but a summary has been given.

Methods that support sustainable design are generally orientated towards comparing existing products or concepts with desirable principles of sustainability. There are five predominate methods available to designers and the most prominent is *Ecodesign Web* which can help designers to identify aspects of their existing product that are either commendable or in need of improvement (Lofthouse, 2006).

Design for manufacture (DFM) is a method of designing that can facilitate the development of a new product by ensuring its design is suited for manufacture. The use of such methods has been proven to reduce the time taken to get products to market (Miles and Swift, 1998). Whilst DFM has a number of underlying principles three more formal methods have been developed: Hitachi assemblability evaluation method, Boothroyd Dewhurst method and CSC design for assembly / manufacturing analysis (Burton, 2005).

*Sound design* is a new aspect of industrial design pioneered by researchers at Delft University. Tools and methods are being developed to enable designers to consider and test the sounds of their concepts. This has often been a forgotten aspect of product design (Özcan and van Egmond, 2006).
Design principles are also included in this design methods section since they too are essentially methods that can facilitate design. One comprehensive reference for these principles has been composed by Lidwell, Holden and Butler (2003) in their book *Universal Principles of Design* where they describe 100 of them. These principles were divided into five sections under which they can be applied, these are:

- How can I influence the way a design is perceived?
- How can I help people learn from design?
- How can I enhance the usability of a design?
- How can I increase the appeal of a design?
- How can I make better design decisions?

Baxter (1995) and Elam (2001) have also written of principles that can be applied to design and these focus on product aesthetics. The golden ratio/section is an example of a design principle where the ratio of height to width is 0.618 and has been found throughout nature, art, architecture and design. Rectangles and products that fit this ratio are often preferred over products with other proportions (Baxter, 1995). Principles such as these demonstrate that applying something as simple as a particular size of rectangle can facilitate the design of a product and thus can be viewed as a method applied by a designer in their design process. Furthermore, many of these principles, and the methods noted previously, originated from disciplines other than design such as Anthropometry, Computer Science, Economics, Engineering, Ergonomics, Marketing, Psychology, Sociology and Typography.

One further reference on this subject of design principles and methods is a book by Lauer and Pentak (2005) titled *Design Basics* which provides the reader with detailed information about design principles such as achieving unity, emphasis, balance, rhythm and using scale and proportion to their advantage. They also note elements of design that include aspects of the physical product: shape, volume, texture, space, motion and colour. However, a noticeable aspect of this book for designers is that the majority of examples used to demonstrate the principles and elements are sourced from the arts. This is one example of where art is already facilitating designers.
2.6 Summary

Industrial design has been defined as the design and development of mass produced products. The designer aims to solve a design brief or problem and its nature is generally ill-defined and highly complex with many possible solutions. The act of solving a design problem is the design process. This can be viewed as a selection of methods applied by a designer. Each process is unique and hard to define accurately due to the variety of methods available. Under this premise, new methods can always be developed to facilitate design by providing the designer with a greater selection of methods from which to choose. Many design methods and principles exist which originate from disciplines other than design which demonstrates a willingness by designers to accept new methods from other disciplines.

Knowledge of design theory has been well documented and many of the main sources have been reviewed in this chapter. However, due to the nature of literature and the time required to publish information it is uncertain how accurately these reflect current design practice. Also, many methods were identified but it is unclear how many are used regularly by designers.

2.7 Conclusions

From the review of this literature the following conclusions to the objectives stated in section 1.2 can be drawn:

- Industrial design is generally the design of mass produced products.

- Industrial designers tend to work on design problems that are highly complex and are often ill-defined.

- The design process can be viewed as a collation of methods applied by designers; the sourcing of new methods, from the arts or other disciplines, may provide alternative options and facilitate some designers.

- A large number of methods are available to the industrial designer and many of these appear to have originated from other disciplines and thus demonstrate the existence and acceptance of cross-disciplinary knowledge sharing.
- Creativity is a key part of design and is essentially the result of time and effort spent on solving a problem.

- One feature of creativity and the aim of many associated methods is the need to change the way a person thinks.

- Literature regarding design theory is abundant, however, up to date information on how designers actually work is less well documented.
Chapter 3 : Literature Review Part 2 - Art

The review of the literature continues in this chapter where the focus moves onto the art domain. Here a definition of art, and how it differs to design, has been attempted and the literature concerned with the art goal, process and art methods have been reviewed.
3.1 Definition of Art

When embarking on a process of defining a term a usual starting point is to note key characteristics that make it unique (Haufe, 1998). However, noting the key characteristics of the term art is rather difficult since they are forever changing (Carroll, 1999; Weintraub, 2003). As a consequence some definitions of art have therefore been quite vague, such as one offered by Collingwood (1964, p49):

*The special activity by which we apprehend beauty*

This definition could easily be applied to design for industrial designers are also charged with the task of developing beautiful products (Haufe, 1998). Furthermore, some contemporary artists have produced pieces that are intended to shock and are anything but beautiful when referred to in its traditional sense. Davies (1991) attempted to find a definition of art but despite reviewing many sources of literature was unable to provide a formal definition. However, he noted a few characteristics of art: pieces of art have a degree of status; art provides enjoyment; art has far reaching social benefits; an artist produces it. This last point, where art is produced by an artist, is not so simple to apply as it may appear, since the title of artist, and designer too, are self-administered and anyone can claim to be one, unlike an architect or accountant.

Neo-Wittgensteinianism's Open Concept is an art theory that provides a definition of art, or more accurately reasons why art is necessarily indefinable (Davies, 1991; Carroll, 1999). If art were defined it would have closed boundaries and would not be consistent with the permanent possibility of artistic creativity. Art is forever changing. A counter argument to the open concept theory is if art is inherently indefinable how is it possible to identify art as art when there is no definition to provide direction? This question was answered using the notion of family resemblance where a piece of art is identified through its similarity to previous artworks. However, the notion of family resemblance was dismissed by the Institutional theory where art is only considered to be art if it is an artefact (result of human labour) and is accepted as a piece for appreciation by a member of the art world (Carroll, 1999).

The defining of art appears to be an ongoing debate and it is beyond the scope of this research to provide one, therefore it will be assumed that art is essentially and
current indefinable. This conclusion however does not provide a satisfactory differentiation between art and design since, as art is indefinable it is possible that industrial design is also art and designers are artists. In support of this notion, examples of industrial design have appeared in gallery spaces and The Museum of Modern Art (2006) devoted a department to architecture and design in 1932, where buildings and products are celebrated for their contribution to art. This blurring of boundaries has not diminished, with art becoming more popular in the home and industrial design residing in the gallery (Moirarty and Whiteley, 2005).

Cuffaro and Ostrow (2005) distinguished art from design in two ways. Firstly, artists can design, for they too develop plans and consider functionality but they are also technically capable of manufacturing the pieces; a feat many designers cannot achieve. However, the work of Anthony Gormley (Gormley, 1998) and Anish Kapoor (De Salvo, 2002) show that some artists are producing pieces that are beyond their own capabilities. The second distinguishing factor from Cuffaro and Ostrow (2005), is that artists and designers develop pieces that are destined for different markets using dissimilar distribution methods. This too is not a clear distinction since pieces of art are now appearing in high street stores or outlets such as IKEA (an international furniture and home ware company).

Owen (1998) differentiated art from design using a four point map that positioned various practitioners on two axes between symbolic and real, analytic and synthetic. Art was considered to be more analytical and symbolic whereas design was synthetic and real. This concurs with the literature on design, for designers are often concerned with solving a problem which could be heavily constrained by factors such as clients, users and other stakeholders (Lawson, 1997; Hauffe, 1998; Potter, 2002). According to Getzels and Csikszentmihalyi (1976) artists also solve problems and they found that the artists who spend time finding and developing them are often more successful. However, these art 'problems' originate from the artist and are more expressive, and less precise, than design problems (Lawson, 1997; Gombrich, 1996).

Howe and Dillon (2001, p56) concluded that to design is to recognise a need to innovate whereas for art to be art it should be "capable of causing dissonance and [can] have a destabilising effect within its context". This viewpoint is shared by Cuffaro and Ostrow (2005) who believe that artists are more concerned with context, discourse and history in order to raise questions.
Owen (1998) noted the measures to which certain disciplines work (Table 2.1). Both the artists and designers work to the measure of beautiful / ugly but the other measures are different. The artists include thought provocation which is similar to Howe and Dillion's dissonance (2001) and, in contrast, the designers focused on more practical measures.

<table>
<thead>
<tr>
<th>Domain</th>
<th>Discipline</th>
<th>Measures</th>
<th>Sources of Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art</td>
<td>Painting</td>
<td>Beautiful / ugly</td>
<td>Culture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skilful / unskilful</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thought provoking / banal</td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>Product Design</td>
<td>Beautiful / ugly</td>
<td>Culture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Better / worse</td>
<td>Artificial world</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fits / doesn't fit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Works / doesn't work</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.1 Differences between art and design. Table adapted from Owen, 1998, p16.

Therefore, from this perspective art and industrial design can be differentiated by focusing on the goal / problem of the person in question. An artist's goal, it seems, is geared towards expression, causing dissonance and provoking thought, whereas a designer is perhaps more problem focused and concerned with the practical issues surrounding a product's development.

The word *art* and art as a discipline can include numerous sub-disciplines, for example, fine art (sculpture, painting, printmaking, installation, virtual), jewellery, textiles (printed, woven, multimedia), graphics, ceramics (clay, glass, slip), photography, digital and virtual. In fact, the axis organisation, a charity that operates a website for British artists, lists 37 types of art (Axisweb Ltd, 2007) differentiated by the type of material the artist works with, which is a typical mode of taxonomy for this discipline (Whiteley, 2005). Furthermore, as mentioned earlier in this chapter, design disciplines can also be reviewed as offering artistic pieces to the world such as industrial design, furniture and also web design and architecture. Therefore, art is an extremely broad discipline that includes many sub-disciplines.

### 3.2 The Art Goal

The art goal is similar to the design problem described in section 2.2, in the sense that it is the main focal point for an artist when developing their artwork. The art
goal is often chosen by the artist. He may have been affected by an event, his emotions, a reverie or illumination which can provide the catalyst for his work (Sapp, 1995). The artist's goal may also be continuous and can last their lifetime. The artist works on developing the goal and solution simultaneously, where each piece of art produced forms only one part of the overall solution and furthers the goal (Ecker, 1963; Getzels and Csikszentmihalyi, 1976). This goal will always be a part of the artist and his work, even if it were a commissioned piece.

Different artists will approach their goal differently. Galenson (2001) identified two types of artist: experimental and conceptual. The experimental artist focuses on one very specific goal and will endeavour to solve that, which can take many years. For example, they may wish to develop a particular technique or style (figure 3.1). The conceptual artist may have an underlying style or theme but wishes to apply it to different types of work and try new things (figure 3.2). Conceptual artists appear to be more suited to participation in research such as this. This is due to their more varied artwork, for the production of different art pieces may require the use of different methods. These artists may therefore have a greater variety, and number, of methods to disclose.

Figure 3.1 Example of an experimental artist; each piece is similar.

Figure 3.2 Example of a conceptual artist; each piece is different.
Galenson’s description of a conceptual artist should not be confused with the artists associated with the *conceptual art movement* (1960s to 1980s). The essence of this movement was that the art was in the idea and not the physical piece; language became the key material with which to work (Lucie-Smith, 1984).

### 3.3 The Art Process

In section two the design process was described as being a number of methods applied by a designer and thus the art process could be considered likewise. However, unlike design, little has been researched or documented on the arts, art process and how artists work (Leclerc and Gosselin, 2004; Owen, 1998). Nevertheless, there appear to be three viewpoints from which the art process could be determined.

The first is similar to Lawson’s (1997) view of the design process where the process of producing art is indefinable, too changeable and artists work to so many or so few rules or methods that a generic process is seemingly impossible to determine (Canaday, 1964). Weintraub (2003) describes artists as society’s “free radicals” who are free from methods, rules and requirements and thus under this premise how can there be an art process?

The second view contradicts the first and to an extent demystifies the artist. This is the notion that an art process is inherently a creative one and can be described using theory associated with the creative process. Studies by psychologists into the creative process have revealed that the underlying principles of creativity are the prepared mind and that creative solutions are the result of a knowledge based process (Finke, Ward and Smith, 1995; Dasgupta, 1996). Generic creative processes have also been developed to explain further the phenomenon. One of the original processes includes five steps which are: first insight, preparation, incubation, illumination and verification (Ghiselin, 1963; Baxter, 1995). Finke, Ward and Smith (1992) developed another creativity process called the *Geneplore process*. This incorporated both generative and explorative cognitive processes. Both of these cognitive processes are generic in nature and, as such, art creativity is similar to scientific creativity (Weisberg, 1986; Ward, Finke and Smith, 1995).

Psychologists Mace and Ward (2002) have also investigated art creativity by tracking the work of many artists and periodically interviewing them. From their data they proposed a creative and art making process (figure 3.3, overleaf). This
Chapter 3: Art

consists of three phases: conception, idea development and making. These are similar to the stages proposed in chapter two to describe the design process.

Figure 3.3 Creative art making process, Mace and Ward (2002).
Sapp (1995) also attempted to reveal the art process and like Mace and Ward, he too identified the three stages noted previously. He also highlighted the artistic process as being one of many iterations of divergence to convergence to divergence and so on, that progressively becomes more focused towards a particular solution (figure 3.4).

Figure 3.4 Sapp’s model for idea inception and image development (1995, p177).
However, general opinions and conclusions of the nature of the art process is that it is more chaotic and does not follow particular stages (Cawelti, Rappaport and Wood, 1992; Sapp, 1995; Ecker, 1963; Getzels and Csikszentmihalyi, 1976). Instead, it is considered more accurate to describe the art process as a continual clarification and emergence of the problem and solution: constant experimentation.

The third view is an extension of the second. Since design is considered to be a hybrid activity between art, science and mathematics (Jones, 1992), the process of producing art could be the same as that for design, especially since the processes noted above could easily be applied to numerous disciplines. This view is shared by some authors of design literature who have speculated as to how artists and designers must work in a similar manner and that an art process would have much in common with the design process since many similar talents are needed for both (Dorst, 2003; Lawson, 1997). In addition to this Bloemink (2004) noted that many contemporary artists produce plans and models of their ideas so that others can manufacture them. This is similar to the actions of a designer.

These three viewpoints provide an indication of what the art process may be like. The theories that stem from creativity literature are too generic and could be applied to almost all disciplines from science to art. The literature from psychology and design show that it may be similar to a design process.

One further area of art literature that may have provided an insight in to this are the numerous autobiographies, biographies and interviews with artists. From these sources it is sometimes possible to gain an insight into how an artist works; this is through their use of (or implied use of) methods to obtain an idea of their art process. For example, De Salvo (2002) interviewed Anish Kapoor about his art installation at the Tate Modern in London. From this interview Anish’s sources of inspiration, influences, research and methods can be noted. However, this method of identifying art processes using secondary data is fraught with issues. Information regarding the data collection is often hidden, such as the aims and objectives of the interviewer, the degree of rigour used when applying the research methods and the extent of editing or censorship. Furthermore, some of the texts are another person’s interpretation of the artist, their process and work and so may be biased.
3.4 Art Methods

Art (and design) methods can be divided into two categories. One category is for the methods that inform the artist how they can achieve particular results, for example, how to paint with oils or watercolours, or how to use perspectives and light. Leonardo DA Vinci’s notebooks were full of methods detailing how to draw the human figure (Richter, 1998). These methods are perhaps early versions of the modern day CAD tutorials or marker rendering methods (e.g. Powell, 1985) used by designers. The second types of method are those concerned with developing the mind or altering how one thinks; these would include creativity methods such as brainstorming or mental models. However, the methods or processes used by artists to do this have not been well documented.

The methods noted in this section have been sourced from the documentation available on the subject, which has included some autobiographies, biographies and interviews, since it is easier to identify accurately a method than a process. For example, a text may describe the use of drawings or show images of the artist’s own drawings; which clearly indicates the use of this method. How or when the artist produced those drawings is less certain making the process more difficult to determine. Searching for methods using this source is a long and tedious process as well as being rather haphazard with regard to which artist’s book is chosen for review.

3.4.1 Externalisation and Communication

The artist, like the designer, externalises and communicates his ideas and he does so using the same methods as designers: drawing, modelling and to a lesser degree, using computer software. Of the few biographies studied for this research all of the artists produced drawings and many produced models (or maquettes) of their ideas (Gormley, 1998; Goldsworthy, 2000; De Salvo, 2003; Illuminations, 2002). Computer software packages were also used to model the artists work, however, the artist is not always responsible for producing these. New technology and the use of computers are providing artists with new possibilities and some artists, such as Julian Opie, have used them to produce their final pieces (Edmonds and Candy, 2002; Illuminations, 2002).

Artists also externalise and communicate in a similar manner to designers by using drawings, models, and engineering drawings to allow others to manufacture their pieces. This, for the first time, allows them to develop pieces that go beyond their
own personal manufacturing ability. Antony Gormley would not have been able to produce the Angel of the North without communicating it to the commissioning committee and those who would fabricate it (Gormley, 1998).

3.4.2 Exploration and Creativity

Edmonds and Candy (2002) undertook a study with artists in order to understand further artistic creativity and the artists' use of digital technology. From this research they discovered that a key aspect of the art process is exploration which corresponds with Getzels' and Csikszentmihalyi's (1976) work. In addition to this they found four parts to this exploration: breaking with convention, immersion in their work, holistic view of the problem and parallel channels where they work on a number of ideas at once. These might be similar to some of the design methods noted in section 2.5. For example, breaking conventions has similarities to the creativity method of breaking assumptions suggested by De Bono (1990). The artists' holistic view of the problem is a less formal approach to some of the frameworks and matrices used in design, such as orthographics or Lawson's model of the design problem. Similarly the maintenance of parallel channels is akin to the design process applied by Adidas when developing new training shoes, for it allows them to develop safe and risky concepts (Lucas, 2004).

Getzels' and Csikszentmihalyi's (1976) study into the how artists develop and solve problems revealed three types of problem exploration: manipulation, unusualness and experimentation. Manipulation is where the artist wishes to find new problems or uncover the core of the problem rather than settle for ones presented to them. Unusualness describes their drive to source unusual perspectives from which to work; often the riskier options are more innovative. Experimentation is where the artist, through play or experimentation with the problem, ideas or media, can identify new perspectives that may have gone unnoticed. Artists were also found to use metaphors as a strategy for explaining their ideas to others (Mamykina, Candy and Edmonds, 2002; Cupchik, 2003).

3.4.3 Research

The research undertaken by artists in some of the biographies was of a primary nature where the artist visited locations and/or met with experts in order to understand how their work could be produced (Gormley, 1998; De Salvo, 2002). There is also evidence that some artists use historical information from secondary sources to guide and inspire their work (Weintraub, 2003).
Artists are also capable of using the interview method in order to obtain inspiration for a piece. As part of the At home with art project organised by Colin Painter (1999), nine sculptors searched for inspiration by interviewing home owners. The interview was a requirement of the project and it is unclear whether these artists would use this particular method when developing their own artwork.

3.5 Summary

Art is a seemingly indefinable discipline and for art to be art it is necessary that this should be the case, so that it can continue to be creative and break boundaries. However, for this research, art will be defined via its most obvious difference to design: the type of problem/goal that is solved or focused on. Design problems are generally more constrained, having precise constraints applied by clients and numerous other stakeholders. In contrast, artists appear to work towards goals that may have originated from personal experiences or ideas and numerous art pieces can be produced over a lifetime (perhaps) towards attaining this goal. Also the artist's goals are often more expressive than a design problem and are noted for causing a degree of dissonance.

Little information exists regarding art processes and the methods used but some authors state that the art process is likely to be similar to the design process. In which case art methods should be easily transferable to design. However, few documented methods exist, offering the potential for research in this area. The literature also revealed how broad a discipline art is, consisting of many sub-disciplines which could be a source of methods for design.

Two types of artist were identified by Galenson (2001): experimental and conceptual. Conceptual artists appear to be the most suitable for participation in this research.
3.6 Conclusions

From the art literature reviewed in this section the following conclusions have been drawn:

- Currently, no universal definition of art exists.

- Artists and designers appear to work towards different goals/problems.

- Expression and dissonance is a common feature of artistic practice.

- Art is a broad discipline consisting of many sub-disciplines.

- Conceptual artists, as defined by Galenson, appear to be the most suitable type for participation in this research.

- The art process appears to be similar to the design process in that they work through similar stages and therefore it is likely that artistic methods could be integrated into design processes.

- The methods used by artists have been less well documented in the literature.
Chapter 4 : Literature Review Part 3 - 
Industrial Design and Art

Industrial design and art have been reviewed independently in the previous two chapters; the focus of this chapter is a review of their relationship. These relations are first viewed from a historical perspective prior to noting examples of collaboration between them or other disciplines. Within this section some architects have also been reviewed since many have worked as industrial designers or collaborated with artists. This chapter concludes with a review of the current thinking behind art facilitating design.
4.1 Historical Relationship

John Flaxman and George Stubbs were some of the first industrial designers (although they were not referred to as such) and started work during the industrial revolution of the 18th century. They were employed by the industrialist and ceramist Josiah Wedgwood and were responsible for developing new pieces that would enter mass production. Originally these gentlemen were practising artists (a sculptor and a painter) and this demonstrates one of the origins of industrial design (Bayley, 1985; Morrison and Twyford, 1994).

During the 1920s, America was experiencing an economic boom and this was when industrial design began to flourish as a profession. Industrial design became a key factor in a company’s strategy to produce more desirable products and thus become more competitive. The need to produce more competitive products was heightened by the Wall Street crash in 1929 when companies were fighting to stay afloat. Unlike the industrial designers of the Industrial Revolution, this new wave of industrial designers originated from more commercial backgrounds such as advertising and shop window display or decorative disciplines like stage design (Heskett, 1980). However, unlike the designers of the 18th century, these were not just concerned with aesthetics but also with how the products were used and in developing innovations. They also brought new philosophies and processes to new product development such as working from the inside out and working with the engineers. A definition of industrial design in 1936 highlights the fact that the industrial designer at that point in time was a mixture of artist, engineer and marketeer (Sparke, 1986).

The design culture in Italy differed from those in America and other western countries since it held onto a closer link with art and viewed design as a form of art. This could have been due to their method of teaching designers; they were initially taught architecture and were encouraged to explore and be influenced by avant-garde movements, politics, art, sociology, architecture, film and music (Dormer, 2000). Italian designers were noted for paying attention to radical design movements, such as Memphis, which were a mixture of art, philosophy and manufacture (Dormer, ibid). In contrast, the American designers worked with more design orientated styles such as streamlining or towards creating corporate identities (Heskett, 1980). During the 20th century artists and designers became more disassociated with each other’s movements and trends, and, as a
consequence the apparent relevance of art to designers diminished (Aldersey-Williams, 1993).

In the current climate the role of the industrial designer has not changed from when the profession first began but the needs they must address have with the advent of more user orientated design practices (ergonomics) and heightened awareness of issues such as, sustainable design. However, the designer can still play at art since there are always people willing to receive such pieces and in some cases have them produced for particular market niches (Dormer, 2000). Many designers are influenced by art; for example, Dick Powell looks to art when experiencing a problem with selecting colours, however, the influence is rarely appreciated in the designed outcome. Aldersey-Williams (1993) also noted how the two disciplines appear to admire each other yet do not communicate and surmised that if they were to, both disciplines would be enriched.

4.1.1 Industrial Design Education

Early design education was founded during the 19th century when manufacturers required specialists who could combine artistic flare with technical skill. The education of such individuals was via the academic art institutions of the time or through apprenticeships. The first design schools in the UK, encouraged by the government, were tailored towards applying art principles to design practice. The success of these schools was limited since the students did not obtain the necessary knowledge or technical skills required for manufacturing (Sparke, 1986).

The first institution to obtain lasting success at combining art with industrial practice was the German school of design, the Bauhaus, in 1919 since they focused on a more practical approach to teaching design (Bayley, 1985). The Bauhaus taught art (drawing and abstract thought) and the ways of the craft worker, prior to the students learning about and using industrial techniques. It was this method of teaching design that was to inspire modern design education (Sparke, 1986).

In Italy, designers were encouraged to assert themselves as individual designer-artists (Sparke, 1986; Branzi, 1984). Design schools, such as the Domus Academy, did not segregate different disciplines, with architects, interior and product designers working together. Design education of this nature could date back to the New Italian Design movement that begun after the second world war. Its aim was to develop the relationship between people and their domestic habitat,
thus pulling architecture, product design and art together. In the 1950s the Royal College of Art (RCA) in Britain, proposed new courses that included more vocational education. However, general design education was still one of a craft-based approach (Sparke, 1986). British design schools are not devoid of relationships between architecture and product design education. The current head of the design products department at the RCA in London is Ron Arad, an architect and product designer.

Schools of design had to find a balance between the arts and engineering. However, due to an economic slump in 1970s and 1980s, and with the advent of new technologies, less emphasis was given to art. These changes in education were the beginning of a gradual separation of arts and crafts education from industrial design (Dormer, 2000).

4.2 Cross Disciplinary Activity

There are numerous examples of professionals working in disciplines that are outside their initial area of training and some important inventions originated from such people. For example, the ballpoint pen was invented by a sculptor and the hovercraft by a radio engineer. Those coming into a discipline as outsiders can bring their own points of view and skills which are applied in a seemingly creative way (Lawson, 1997). Some designers are also hard to classify, such as Phillippe Starck or Marc Newson, in the sense that they work on a variety of projects that span many disciplines from architecture, products to motor vehicles (Starck, 2006; Rawsthorn, 1999).

A few key projects have been undertaken where artists, and architects too, have solved product orientated design briefs. Colin Painter’s (1999) study titled At Home with Art was first mentioned in the introduction (section 1.1) as being a great source of inspiration for this research. He organised a project where nine professional sculptors each designed a mass produced product. Prior to designing the product they gained inspiration from interviews with people in their home. The outcomes were all marketable and sold for a limited period in a national chain of home improvement superstores; figure 4.1 shows three of the designs.
A further example of collaboration between art and industry was a project undertaken by Plummer (2005). She organised artist-in-residence positions at twelve factories producing mass produced products. This new environment for the artists and the chance to use many of the machines, processes and the expertise of the factory's employees enabled them to develop not just pieces of art (installations and sculpture) but also ideas for new products. This demonstrated how art and industry could work together.

In Bloemink’s and Cunningham’s (2004) book Design ≠ Art they highlighted a number of artists who have also designed numerous products, mostly furniture, and yet they are only referred to as artists. Donald Judd, for example, has designed a number of workstations, chairs and tables, a sink and even a swimming pool.

Many architects have also produced designs for products and the most famous examples originate from Alessi: the Italian design factory. Alessi, who manufacture household products, has a long history of employing architects to work as industrial designers and develop new products for them. They have also challenged architects to participate in design research exercises; the first was in 1983 and the most recent in 2002. Each time the topic of the design brief was to design a tea and coffee set and since 1983, 33 architects have participated. The purpose was to explore possibilities for the Alessi company and to survey the future of designer objects (Mendini, 2003). Figure 4.2 shows the kettle designed by Michael Graves for the first tea and coffee exercise in 1983 and this became one of Alessi’s best selling products. Figure 4.3 shows one of the tea and coffee sets designed by Wiel Arets for the 2002 exercise. Many other architects such as Ettore Sottsass, Henry
Van de Velde, Richard Rogers, Ali Tayar, Stephen Roberts, Arthur Casas, Martin Brudnizki and Aldo Rossi, to name just a few, have successfully transferred their skills to other design disciplines. The education system in Italy, noted in section 4.2, could be responsible for the high number of Italian architects who also practise product design.

Figure 4.2 Kettle by the architect Michael Graves (Alessi, 1998 p64).

Figure 4.3 Weil Arets, tea and coffee towers 2002, (Mendini, 2003).

The aforementioned projects where artists or architects have been requested to produce pieces of industrial design appear to have focused on the solutions. Little can be gleaned from the texts as to how the artists or architects worked to solve the briefs. There are a few insights into their sources of inspiration or some of the methods they used, but there is not enough information to identify a working process. These projects highlight the fact that one does not have to be educated
specifically in design in order to be able to develop new products. Furthermore, as Lawson (1997) and Mendini (2003) noted, observing those from other disciplines attempting projects in an area with which they are less familiar can provide new insights or opportunities.

**4.3 Collaboration**

So far, the projects and examples provided are of individual artists or architects applying their skills to solve a design brief. In this section examples of where they have worked together are discussed. The advantage of collaboration is the bringing together of differing experiences, backgrounds and skills which can effectively solve a problem collectively. Collaborators generally assume a role that suits their area of expertise and there are two ways in which collaboration can occur. The first is similar to that of a consultant where someone is bought into the project for a short period where they impart their thoughts and knowledge and then depart. The second is where they are employed on a project for its duration and this is reported to be the more beneficial of the two (Mamykina, Candy and Edmonds, 2002).

The designers at Habitat, a retail store specialising in contemporary products for the home, have a relationship with artists in that they commission them to produce artwork. They also employ artists, or those who have studied fine art, as members of the design team in order to bring new perspectives to projects (Kefford, 2006).

*Proboscis* is an art studio based consultancy that employs artists who undertake large artworks that involve in-depth research and public participation. To complete these projects the artists collaborate with people from other disciplines, such as writers, curators, critics, designers, scientists and theorists. Collaborations with others has become a key aspect in the working process at Proboscis (http://proboscis.org.uk).

Collaboration has also been reported between architects and industrial designers. One such project was the design of the new bed-seats for *Virgin Atlantic* aeroplanes. The designers were charged with developing the seating while the architects worked on the environment and creating the desired atmosphere in the cabin (Anon, 2003). Their expertise was allocated to the areas that best suited them.
Artists and architects have also collaborated; Williams (1997) describes two projects where they both worked together to develop large scale art and architectural pieces that required inputs from each profession. Williams noted that artists and architects often share similar considerations: the human condition; use of light; composition; culture; ideas and the relationship to the physical world. Fernie (2006) edited a book titled *Two Minds* which consisted of case studies of collaborations between artists and architects. From these Fernie noted how practitioners from these two disciplines think differently and identified a number of differences between them; some of the pertinent differences are noted below (Fernie, 2006, p14):

- Artists are more interested in developing an idea rather than completing a project
- Architects can move from one scale or form of representation easily where as the artist focuses on particular aspects and looks for intimate qualities in space and material
- Architects are interested in form whereas artists work towards creating an experience
- Architects work with large numbers of people; artists rarely do this.

Studies have been undertaken into the collaboration between industrial designers and those who produce craft products who could also be considered as commercial artists. Kalvialainen (2000) found that craft products arouse more personal emotions in the users than the more anonymous aesthetics associated with mass produced products. However, despite this benefit collaboration is uncommon due to the differences in cultural and working practice causing complications (Yair, Tomes and Press, 1999). For collaboration to work it is dependent on the designers and craft workers' willingness to accept the new processes. The designer, who participated in their study, also had a background in craft working and this is said to have helped overcome many of the problems associated with collaboration.

One further issue that can render collaboration more difficult is the language difference between different disciplines; clear communication is required for collaborative creativity. Mamykina, Candy and Edmonds (2002) found that this could be overcome through the use of metaphors since they provide a more uniform understanding of a goal or situation. Fernie (2006) found that for collaborations to work between artists and architects trust, respect and interest are also necessary.
4.4 Current Thoughts on Art Facilitating Design

From the literature it seems that art can offer other disciplines new ways of seeing things and can apply meaning and apparent depth to solutions. Art can also test the taste and opinions of the public long before design or architecture arrive at that similar position (Coates, 2003).

Yair, Tomes and Press (1999) have researched into the collaboration of craft workers into a more industrial setting and noted how they can be beneficial to the design process by offering original thought, new insights and expertise to a project. However, this was not a single sided relationship since the designers were able to offer extended vision with regard to how things could be. In a similar sense, one of the reasons for the Alessi company employing architects and undertaking design exercises with architects was the chance to see what they could create and bring to design (Mendini, 2003). Schmiedeknecht (2003) noted that art could be a useful intellectual resource for architects in the sense that artists see the world in alternative and abstract ways.

Sustainability is one of the great challenges facing designers today and Chapman (2005, p20) noted in his book Emotional Durability how art could potentially help design with this. Works of art have the ability to hold people’s attention and maintain interest since, according to Chapman, they “do not surrender all their meaning at a single glance”. It has been known for many years that art can evoke feelings, emotions or initiate the desire to ask questions but design has only recently begun to tap into this (De Botton, 2006). For example, the first conference dedicated to the topic of design and emotion was held in 1999 in the Department of Industrial Design at Delft University. On the last day of the conference the organisers revealed their plans for a Design and Emotion Society to promote and stimulate more research in this area. If designers were able to influence consumers’ emotions through their designs, this may result in more appealing, and more emotionally durable, products; such products may have less impact on the environment because they would not be replaced so quickly.

Artists have also been described as being the antennae of society since artists are often the first to notice shifts and changes which can go unnoticed by the general public for many years (Coates, 2003). They have been described as an alarm system for design and architecture (Schmiedeknecht, 2003). This ability to notice subtle change before others could prove vitally useful to designers and companies.
in this hyper competitive age. Art has also been described as a means to explore different styles and aesthetics which could feed into design, perhaps through more vanguard artists who may also mass produce their pieces (Cuffaro and Ostrow, 2005).

Cupchik (1983) undertook a scientific (psychological) study of artistic creativity and found that artists have a number of skills which might be characteristic of their profession and shed some light on their abilities mentioned in the previous paragraph. According to Cupchik (ibid) artists can: access more primitive feelings and memories; are able to break down conventions which are normally habitual for everyone else; can switch effortlessly between viewing the gestalt to the formative aspects. As a consequence the artist is said to be able to view the world from alternative perspectives as well as reproduce this in objective pieces.

On occasions technology from one discipline can benefit those working in another. For example, CAD software used by industrial designers has been introduced to, and used by, architects (Mays, 1999; Holt, 1990). Artists have also benefited from technology used by designers. This has included the use of more advanced externalisation methods, such as CAD, used to communicate their ideas to others; this allows them to undertake more grandiose projects (Bloemink and Cunningham, 2004).

4.5 Summary

In this section the historical relationship between art and design has proven to be a close one with many original industrial designers and the educational design institutions working from an artistic perspective. However, with a general divide forming between art and design through the 20th century, art has steadily been dropped from formal industrial design education. Greater emphasis has thus been placed on manufacturing, current design needs and new technologies over the more traditional art principles.

Artists and architects are capable of designing products, as demonstrated by the numerous examples of cross-disciplinary activity. Working in other disciplines has been considered a good thing and promotes the flow of ideas and technology. Unfortunately, few seem to take the time to do so and collaborations between those from different disciplines, whilst proving to be a positive activity, are also a rarity.
It is important not to confuse this research into art and design methodology with the collaboration projects. The former aims to understand how artists work and whether the methods they use can be adopted by product designers. The latter focuses on the integration of an artist into the design process.

Despite the seemingly weaker relationship and low number of collaborations, it appears that art and artists can provide new perspectives from which to view projects or happenings in society. The way they can add meaning to their work and evoke emotional reactions over long periods of time is proving to be a source of interest to those in design.

4.6 Conclusions

The following conclusions have been drawn from the literature reviewed in this section:

- Art and industrial design have a long/shared history in terms of industrial practice and education but in more recent times a divide has been observed between them. This may be a good time to explore the contemporary arts for methods that could be introduced (or reintroduced) to design.

- Artists are said to have the ability to view the world from different perspectives; can designers learn from this?

- The flow of knowledge from one discipline to another has been shown to offer new insights and ideas for those concerned, however, this practice appears to be an infrequent occurrence.

- Those who have studied and theorised the benefits of art on design have noted how art can potentially offer new perspectives, help to imbue meaning into products and to provide insights into future trends. These projections of application of art in design have little reference to how designers could achieve such results. Perhaps the methods used by artists could facilitate this aspect?
Chapter 5: Research Methodology

This chapter consists of the new research objectives developed in response to the literature review. The underlying strategy for conducting this research is also included, which covers the general type of research method and data that will be applied and collected. Other strategies for conducting the research have also been noted: the use of naturalistic inquiry, grounded theory, the procedures for establishing trustworthiness and factors concerning potential sample groups.
Chapter 5: Research Methodology

5.1 Research Objectives

From the literature, aspects of industrial design, art and their relationship were reviewed and the conclusions from this contributed towards the development of more detailed research objectives that would ultimately enable the research question to be answered. The development of these new objectives stemmed from aspects of the literature that required further investigation. Such aspects included:

- Art is a broad discipline consisting of many sub-disciplines
- Art methods and processes have not been well documented and are surrounded by speculation
- Art has been noted for its potential to facilitate design but there appears to be a void in the knowledge regarding how this can be achieved
- A large amount of literature exists concerning industrial design theory, however, it is unclear how many of the methods noted are applied by practising designers.
- Architects have also been found to undertake industrial design projects. Can anything be learned from their working processes?

With these factors in mind the objectives for this research into whether art methods could facilitate design creativity were developed and are as follows:

1. To reduce the scope of the research by selecting, through research, an art discipline that appears to hold potential for having methods that may facilitate designers' creativity.
2. To understand further the working processes of those in the selected art discipline, architecture and design.
3. To record the differences between these working processes and identify aspects that differ the most from the designers' processes.
4. To focus more closely on these aspects and identify the methods and ways of working associated with them.
5. To test the findings from objective four with industrial designers to determine the degree to which art methods could facilitate design creativity.
Chapter 5: Research Methodology

5.2 Research Strategy

The selection of the overarching methodology for this research was influenced by the aim, the objectives and the subject area. This was essentially, to explore and understand further how people from different disciplines worked. This required studying and understanding how individual people interpreted and reacted to the world in which they work. Research that is focused on behaviour, such as this, is inherently subjective (Cohen, Manion and Morrison, 2000) and this determined the strategy for this research.

Robson (2002) describes two types of research: fixed and flexible. A characteristic of fixed research design is the identification and measurement of variables. Researchers undertaking a fixed design study tend to focus on aggregates, group properties and general tendencies from larger samples. Data collected are often numeric and quantifiable. The researchers also tend to remain at a distance from the participants. In contrast, flexible research design refers to the collection of data regarding individual preferences and idiosyncrasies. The measurement of variables are less apparent and the researchers will often work closely with participants to collect empirical material (Denzin and Lincoln, 2005, p3). Data from this type of research are often word orientated (Miles and Huberman, 1994; Silverman, 2000).

Another key difference between these two types of research strategy is the degree of objectivity. Data from fixed research are considered to be more objective. This is due, in part to the researcher working at a distance from the participants, reducing emotional affect and potential for bias. Since flexible research design requires the researcher to have a closer relationship with the participants the emotional effect is potentially greater and data are subsequently likely to be more subjective. The use of flexible research strategies that collect qualitative data have the ability to reveal how things work in particular contexts (Mason, 2002, p1) and this is what is required to answer the aforementioned research aim and objectives. However, subjectivity in research can affect the trustworthiness (validity and reliability) of the findings (Robson, 2002). Through the application of the following strategies the potential trustworthiness of this research was maximised.
5.3 Naturalistic Inquiry

One of the risks associated with research design is ensuring the validity of the data collected (Robson, 2002). Naturalistic inquiry is a strategy that can potentially increase the validity of flexible research and of the qualitative data obtained. This is achieved via the researcher endeavouring not to manipulate the participants and allowing the phenomena and subsequent findings to reveal themselves naturally (Cohen, Manion and Morrison, 2000). Studies take place in the participants' natural setting and techniques such as open-ended questioning or freedom to complete tasks in their own way and in their own time are applied. Theories are formed once the data has been collected.

Where possible and when applicable, principles of naturalistic inquiry have been applied to the design of the studies in this research. For example, the participants of an audio diary exercise in study one were permitted to work undisturbed by the researcher and record data at their discretion. All interviews with professional practitioners (studies two, three and four) were held at their place of work and the design exercise in study two was completed in their own time and environment.

5.4 Grounded Theory

Grounded theory is a strategy for developing theory continuously during research activity and once data have been collected (Strauss and Corbin, 1994). This strategy is suited for use with flexible research design (Robson, 2002). New theories are generated by and are said to be grounded-in data collected and issues that are relevant to the area of study emerge (Strauss and Corbin, 1990). Seale (1999, p.88) simply describes grounded theory as "supporting claims with credible evidence" and it is this factor that facilities the trustworthiness of a piece of research.

Due to the small amount of literature concerning art methodologies it was unclear from the outset how art might facilitate creativity in the design process. The development of hypotheses based on this small amount of knowledge would have been presumptuous. Therefore, the principles of grounded theory were applied and subsequent studies were designed using the knowledge and experience gained from the previously completed studies.
5.5 Trustworthiness

The validity and reliability of fixed research studies are generally rated through their ability to be replicated. However, qualitative data from flexible research studies can be interpreted in many ways, making replication difficult (Cohen, Manion and Morrison, 2000; Seale, 1999).

Robson (2002) describes three main areas of risk that can affect validity and reliability; these are description, interpretation and theory. Description refers to the risk associated with the collection of data: its accuracy and completeness. Reducing the risk surrounding the interpretation of data is achieved through the use of evidence to justify and demonstrate how inferences were made. The third risk relates to the theory developed and how not considering alternative explanations to the recorded phenomena can reduce its validity and reliability.

Ensuring the reliability and validity of qualitative research relies on the researcher's ability to be comprehensive and honest throughout (Cohen, Manion and Morrison, 2000). Comprehensive practice can be obtained through applying methodical processes, such as standardising aspects of the research (Mason, 2002) perhaps through the use of protocols to guide data collection. Such actions can ensure that accuracy and completeness are maintained.

The collection of data is only one aspect of the process; the interpretation of data and its analysis is also a complex procedure (Robson, 2002). He also states how there is "no clear or accepted single set of conventions for qualitative data analysis". Miles and Huberman (1994) in their book Qualitative Data Analysis do provide a strategy for facilitating the analysis of qualitative data. Three aspects of data analysis are noted; data reduction, data display and conclusions drawing, which are undertaken concurrently. Data reduction is the processing of data to make it more manageable and includes the removal of unnecessary content. Miles and Huberman (ibid) suggest that word orientated qualitative data can be managed using coding which is essentially the segmentation of data into categories (the codes). Coding enables data to be managed more efficiently and places pressure on the researcher to make judgements and identify trends or themes from the data (Ryan and Bernard, 2000). Computer software has been developed to assist researchers with this task and the Nvivo qualitative data analysis software was used in studies two and three where data were coded. Seale (1999) states that the premature coding and application of meaning to data can potentially block a
researcher from seeing it from other perspectives; however, the use of the NVivo software enabled data to be coded or un-coded easily, providing a flexible approach towards the generation of hypotheses.

Data display is where data is transformed into another format, such as charts or diagrams. This action can turn previously complex and wordy data into a more compact form ensuring it is immediately accessible to the researcher (Miles and Huberman, 1994) and can facilitate its communication to others (Ryan and Bernard, 2000). This strategy was applied in studies one and two where identification of working processes were necessary.

Conclusion drawing is the act of noting potential conclusions from data. This involves the identification of, for example, regularities, patterns, explanations and configurations that can assist with answering the research question. Conclusions are drawn throughout the analysis process and, using data, are dismissed or substantiated using the principles of grounded theory noted in section 5.4.

The potential trustworthiness and rigour of research can be increased further using a strategy of triangulation; this is when a number of different sources are used (Robson, 2002; Cohen, Manion and Morrison, 2000). This strategy can result in a variety of data types that can enrich and enhance the findings (Seale, 1999). For this research, data triangulation was used predominantly, which is the use of multiple data collection methods. The selection of methods was not random since it is important they work together to collect relevant data from the various perspectives the researcher requires (Mason, 2002). For example, in study one a questionnaire was used to collect basic information on working processes from a large sample, whilst an audio diary exercise collected more personal data from only a few participants. This multi-source strategy is especially suited to subjective topics, such as human behaviour, since it provides at least two viewpoints for analysis and comparison, allowing for discrepancies or similarities to be identified.

5.6 Sampling

The sample of participants in the research studies varied depending on the aim and objectives of the study and a few underlying strategies were applied to the recruitment process. The first was purposive sampling, which is the careful selection of participants by the researcher where the most suitable or representative participants were targeted for participation to ensure relevant data
are collected (Ritche, Lewis and Elam, 2003). For example, the location of the participants’ studios was a key consideration since travel time and its associated costs were prohibiting factors. Furthermore, the artists who were contacted were selected following a review of their portfolios. Conceptual artists were more desirable since they work on a variety of project types and would perhaps have a broader experience base and applied more methods (Galenson, 2001).

The second strategy was controlling the sample size and this depended on the nature of the study and the type of data required. For example, when searching for detailed data regarding working processes and the methods used (studies two and three), fewer participants were recruited because of the extra time required for each participant. When a more general opinion was required a larger sample was recruited (studies one and four). However, in conjunction with the triangulation strategy, and when applicable, these studies also included a second source of data.

5.7 Conclusions
The research strategy used is summarised below:

- The research objectives were deduced from a review of the literature in the areas of industrial design, art and from their collaborations.
- The research strategy was selected to suit the aim, objectives and the subject area.
- A flexible research design was required to collect data from individuals regarding their working processes.
- Research of a flexible design tends to reveal subjective data due to the close relationship with the participants.
- The objectivity of the subjective research (trustworthiness) is potentially increased using the research strategies of naturalistic inquiry and grounded theory as well as through the careful application of methods for data collection, triangulation and for data analysis.
- Small sample sizes were used for the exploratory studies so as to obtain detailed data.
Larger sample sizes were used when reviewing the findings in order to ascertain a more general opinion.

The samples were purposely selected to suit the scope of the research and following guidance from the literature. Artists who were recruited for participation in the studies would conform to the criteria defining a conceptual artist.
Chapter 6: Study 1 - Narrowing the Scope

In this chapter the first research study is described. The purpose of the study was to narrow the scope of the research so that a particular sub-discipline of art could be focused on in more detail. A rationale has been provided as an introduction which includes the aim and objectives developed to guide the study. The applied method is described in detail prior to a discussion of the data collected from which conclusions have been drawn.
6.1 Rationale

In the literature review, art has been noted for its broad nature and the numerous sub-disciplines that fall within its remit. Due to the time available to complete the research stated in section 1.3 it would have been impractical to attempt detailed research into each of these sub-disciplines. Therefore, the first requirement was to narrow the scope of the research by selecting an art discipline that would become the focus of subsequent studies. This would allow greater time and effort to be allocated to understanding and exploring further this one particular discipline, allowing more detailed research to be completed.

The most suitable art discipline would be one in which the practitioners appear to work in a manner least like those of an industrial designer. Logically this contrast would ensure a greater potential for those in that art discipline to use methods that were unfamiliar to an industrial designer. Methods that were new or unfamiliar would enable a designer to try an alternative way of working which, according to the literature, might facilitate their creativity.

6.1.1 Aim

To identify an art discipline whose practitioners appear to work in ways unlike those of an industrial designer.

6.1.2 Objectives

The individual objectives of this study were:

- To compare and identify differences between the working processes of those in art disciplines and industrial design
- To compare the personalities of those working in art disciplines with industrial designers
- To gain an insight into ways of accessing and collecting data from art practitioners.

6.2 Method

The design of this study was tailored towards achieving the aim and objectives stated above. This required art practitioners from numerous art disciplines to be
accessed as well as those from industrial design. Additionally, a large number of participants had to be accessed in order to obtain a more general overview of how those practitioners work within their chosen discipline. This was to prevent the findings from being skewed by an individual who may not be truly representative of his or her peers. However, this approach, using a large sample, was balanced with the need for obtaining data on working processes which is inherently qualitative. This translated into a balance between the quality and quantity of data and the time and effort required for collecting data from each participant.

This study consisted of two parts. In the first part, a questionnaire was used to collect data on the general working processes of those from different art disciplines and industrial design. A number of pertinent differences would indicate a discipline worthy of further research. A personality test was also distributed with the questionnaire; data from this would help to identify whether those with similar personalities chose to work in the same discipline.

Part two of this study provided confirmation of the findings from part one. This was achieved through the use of audio diaries to obtain detailed data on the participants' working processes which enabled a more comprehensive comparison to be undertaken. Following the details of the sample used for this study, the data collection methods used have been described in more detail.

### 6.2.1 The Sample

This study required the sample to include numerous art disciplines and industrial design. Professional practitioners are dispersed throughout the country in private art studios and consultancies where access would have been on an individual basis. This option would have required considerable time, effort and money to achieve if a large sample size were attempted. A more suitable option was to use university undergraduates who are concentrated in a single location. Whilst they may not be truly representative of professional practitioners the experience and working practices they have learnt during their degree are intended for use within their chosen discipline. Therefore, this was regarded as being satisfactory for identifying differences between them.

Undergraduates representing the art disciplines were sourced from the Loughborough University School of Art and Design (LUSAD). All of the departments were targeted: fine art (sculpture, print), textiles, jewellery and silversmithing,
Chapter 6: Study 1 – Narrowing the Scope

graphics, ceramics, and furniture. The industrial design undergraduates were sourced from the Department of Design and Technology, also at Loughborough University.

In chapter four, section 4.1, art and design were noted for having a close historical relationship, with design emerging from the art and advertising disciplines. Whilst engineering is a creative discipline, in the sense that they too design and produce artefacts, it appears to have fewer associations with art. For this reason, an engineering discipline (automotive) was included in this study. Data obtained from this source may act as a reference point to determine whether the findings extend beyond just art and design.

6.2.2 Data Collection Methods

Many research and data collection methods exist and many were noted in section 2.7. However, not all were suitable for the first part of this study for reasons such as the time or effort required to conduct them, or equipment or financial requirements. The interview and the questionnaire were selected as potential methods for collecting data on working processes, in the context of this study.

Both the interview and the questionnaire method can be tailored to collect qualitative data through the use of open and closed questions and are suited for investigating behaviour and working processes. The advantage of interviewing participants is the ability to ask further, additional questions in order to enquire further into the responses given. This can also be used to clarify the answers with the participant. Interviews can reveal intimate data such as thoughts, attitudes, feelings, reasons behind actions, how and why things are undertaken. Additionally, information that was previously tacit and implicit can be uncovered during an interview (Arksey and Knight 1999, Weiss, 1994). Interviews are therefore, very effective at obtaining detailed information (Cohen, Manion and Morrison, 2000). Questionnaires provide less flexibility and the data collected can be more limited. However, interviews are time consuming to conduct, especially when larger sample sizes are attempted. In contrast, questionnaires can be easily distributed and completed by many participants simultaneously. Also, the use of a standard set of questions facilitates data analysis for the responses are more predictable. Therefore, due to its efficiency, the questionnaire method was chosen.
Chapter 6: Study 1 – Narrowing the Scope

A personality test was distributed to each of the participants, along with the questionnaire. The purpose of this test was to help determine whether a particular discipline attracts people with certain personality traits.

The second part of this study was to confirm the findings from the questionnaire in part one. These findings took the form of an art discipline whose members appeared to work differently from those in industrial design. This discipline would be examined more closely to ensure that it showed potential for future research. The interview method has already been noted for its suitability for studies of this nature and it is even more suited to this part of the study since fewer participants were recruited. Nevertheless, this was an opportunity to experiment with alternative data collection methods that could be used to gather data from art disciplines. One such method was the diary.

The diary method had been used by Pedgely (1999) to identify how and when designers considered materials when designing a new product. Using this method he successfully obtained thoughts and issues the participants had during their projects. This method seemed suitable for identifying how a participant worked through their project. Diaries are a self-disclosure method where the participant is responsible for providing the data without being prompted to do so by a researcher. Data can be collected over long periods of time and the progress of a participant and their projects can be traced. The participant can also add to the data set whenever they feel they have reached or undertaken an important moment or task, at any time of day or location (Sayre, 2001); other methods are not this flexible. Additionally, the participants can provide data in privacy and confidentiality. Pedgely (1999) provided logbooks for his participants but for this study the participants were provided with dictaphones, transforming this into an audio diary study. Through the use of the dictaphone the participants did not have to rationalise their thoughts into written word, which is less spontaneous. The success of an audio diary study depends on the participants adding to the diary and therefore, the quality and quantity of data may vary between participants (Pedgely, 1999).

6.2.3 Part 1: The Questionnaire

The design of the questionnaire was tailored to the identification of how the participants work through their projects. As such the questions were focused on the activities associated with the art and design processes noted in the literature.
Open questions, that were non-leading, were used since it was unknown how the participants worked and it was important that they provided the information from which the findings and hypotheses could be established. Open questions take longer to complete than closed for they required more cognitive effort when forming a response (Cohen, Manion and Morrison, 2000) and to ensure a higher quality of response only five questions were presented, these were:

1. Tell me about one of your past projects.
   This was to identify the type of work they choose to undertake and could determine their areas of interest and concern.

2. How do you like to start a project?
   This was to encourage the participant to begin thinking about their working process.

3. Do you research? If so, how and what sort of things do you search for?
   This can identify areas of interest important to the participants and areas of knowledge required to further their projects.

The remaining two questions were unfinished sentences that the participants were asked to complete. This change in question style was intended to maintain participant interest.

4. When working I find inspiration from...
   Whilst similar to question 3, inspiration can be more abstract and thus may provide additional insight into what was important to the participants.

5. To help me generate ideas I like to...
   The responses for this question were intended to identify some of the methods used by the participants when progressing their projects.

The questionnaire was tested on three postgraduate design students at Loughborough University. Two held Bachelor degrees in engineering and the other a degree in glass blowing, ensuring an appropriate spread of disciplines. None of the testers found difficulty in understanding or completing the questionnaire and from their responses differences could be noted.
Chapter 6: Study 1 – Narrowing the Scope

6.2.4 The Personality Test

The personality test used was the big five locator test, developed by Warren Norman who worked on the trait approach to personality (Glietman, et al 2000). A psychologist, at Loughborough University, recommended the test for its ease of completion by participants without the need for a researcher to be present (Olphert, 2004). The name big five refers to five personality traits: openness, conscientiousness, extroversion, agreeableness and negative emotionality; all other traits are said to fall within these five (Glietman, et al 2000). Since the big five locator test uses only five traits to characterise personality, the findings are not precise but they do provide an indication of what a person is like (Glietman, et al 2000).

The big five locator test consists of 25 questions; each question required the participant to locate themselves between two descriptive words on a 1-5 rating scale. To reduce anxiety the participants were not asked to give their name, only the name of the degree they were studying. For meaningful data to be obtained, the responses on each test paper required processing; this followed a particular procedure, which can be found in appendix 1.1. The output from the processing is five numbers between five and 25, for each participant. Each number corresponds to one of the five personality traits and where they are positioned between the extremes, such as extrovert or introvert. Table 6.1 shows the five traits and how the numbers correspond. The numerical data from this test can be analysed using statistical analysis which makes it suitable for use with larger samples.

<table>
<thead>
<tr>
<th>Low Openness</th>
<th>High Openness</th>
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<tr>
<td>Preserver</td>
<td>Explorer</td>
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<td>Flexible</td>
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<td>Introvert</td>
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<td>Challenger</td>
<td>Negotiator</td>
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<tr>
<td>Radiant</td>
<td>Reactive</td>
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Table 6.1 The five personality traits.
6.2.5 Part 2: Audio Diary

The audio diary part of this study commenced following the analysis of the data from the questionnaire and personality test. This was so the findings could be tested further as a safeguard to ensure the suitability of the selected art discipline. The sample size was kept to four, since only four dictaphones were available; two were given to industrial design undergraduates and the remaining two to participants from the other selected discipline. Each of the participants was provided with a pack containing the dictaphone and its instruction manual, spare batteries, two tapes, an information sheet for the study (appendix 1.2) and a camera (figure 6.1). The camera was provided so they could accompany their diary entries with an image that may facilitate their verbalisation.

Prior to the study each participant was briefed as to the purpose of the research, instructed in the operation of the dictaphones and were asked to consider the following when adding to their diaries:

- What are you doing now?
- Why are you doing that?
- How are you going to progress?
- What inspired or made you do that?
- Is your work progressing as planned?
- If not, do you have any idea why?
- Any thoughts regarding your project...

Figure 6.1 The pack given to the audio diary participants.
Weekly meetings were arranged with the participants to enable them to voice any problems and to ensure they were willing to continue. The duration of the study was flexible; the participants could either fill the two tapes (~ three hours) or continue until the end of the semester (~ five weeks). The limit of three hours tape time was imposed to ensure data analysis remained manageable.

6.3 Results and Discussion

The findings from the questionnaire, personality test and audio diary study have been reported individually prior to a more general summary of the findings and subsequent conclusions. An appraisal of the research methods used has also been included.

6.3.1 Part 1: The Questionnaire

The questionnaire was distributed and completed by participants from six disciplines, these were:

- Industrial design (N=92)
- Fine art sculpture (N=23)
- Multi-media textiles (N=18)
- Jewellery and silversmithing (N=14)
- Graphics (N=8)
- Automotive engineering (N=14)

The five questions presented to the participants were open-ended resulting in qualitative responses. The analysis began by reading through the responses which were gradually categorised as and when suitable and potential categories revealed themselves. Table 5.2, overleaf, shows the categories used to organise the responses. The participants' responses to each question were registered only once. These were tested by a colleague to confirm that they were meaningful. This test involved the sorting of randomly selected responses into the categories; comparisons were made between the researcher and the colleague's groupings and differences were discussed and resolved.
Table 6.2 Categories used to sort the questionnaire responses.

The responses from the first question revealed the different type of project the participants undertake as part of their degree programme. Figure 6.2, graphically shows this and the fine artists are notable since they prefer projects with a focus on intangible aspects and those that are more expressive. This is unlike the majority of the other participants who focus on more tangible aspects in their projects.
This notion of intangible and tangible deserves further explanation. Essentially all of the participants produce a physical piece, such as a piece of sculpture, a new product, a length of textile or an item of jewellery, however what they focus on (problem/goal) when developing that piece appears to differ. The fine artists seem to focus on the meaning, semantics and expression to a greater extent than the participants from the other disciplines. For example, the basis for some fine art projects were happiness, the shadow as a metaphor, illusionary worlds and relationships (these are aspects that cannot be physically touched). This concurred with the findings of Fernie (2006) who also discovered that artists prefer to focus on experiences. In contrast, the participants from industrial design were focusing their attention on physical and tangible aspects (that could be touched) products (razors, product packaging etc), manufacturing, the users and the competition. This finding corresponds with the literature review regarding the differentiation between the goals of artists and designers (section 3.1).

The textile participants demonstrated a balance between the intangible and tangible foci. When developing a textile some focused on intangible aspects such as ballet, sci-art (integration of science in art), time and sound, which would influence their work. Others would use more tangible artefacts such as flowers, nature, tribal imagery and geometry.
The responses to question two were mixed and less conclusive than question one. From an initial view of the graph, figure 6.3, it appears that the fine art, textile and the graphics participants like to undertake some form of research when starting their project work. The remaining disciplines were quite similar to each other in their range of responses with lower scores across the three categories.

Figure 6.3 Question 2: how they like to start a project.

Participants from all the disciplines did like to reflect on their work and undertake brainstorming activity to help them identify a direction to work in and, with the exception of textiles and graphics, a few like to begin with the production of drawings or models. Many of the participants responded to this question by noting aspects of all three areas in their answer; however, the majority of the bars represent less than 30% of the discipline's sample and other than the desire to expand personal knowledge, there is little to suggest an absolute preference for ways of starting a project.

From the responses to question three it was clear that the majority of the participants undertook some form of research when working through their projects (figure 6.4). The exception was the participants who studied graphics, since half of the sample stated that they only research if necessary.
The research undertaken by the participants was divided into the categories of primary and secondary, as discussed in the literature (section 2.5.1). Unfortunately, approximately 35% of the sample did not specify how they research or respond to the question and this places a degree of uncertainty on subsequent findings (figure 6.5). However, the participants from all disciplines appear to favour secondary research. This type of research is generally easier to undertake for it requires less time and effort, which is a possible reason for its popularity. Primary research, was undertaken by a small percentage of the sample from industrial design, textiles and jewellery.
The responses from question 3 also revealed some of the areas that the participants researched into and the type of information they searched for (figure 6.6). The most popular type of information searched for, by those in all the disciplines and especially fine art, related to prior art. This is information concerning other practitioners and artefacts. The use of such information is a key source of inspiration for the generation of new ideas and can aid its communication to others, perhaps by providing context (Eckert and Stacey, 2000).

![Figure 6.6 Question 3.3: the type of information researched.](image)

One other commonality, with the exception of the graphics participants, was the sourcing of technical information. These degree programmes require the participants to develop a physical piece for assessment requiring knowledge of technical specifications and processes that are applicable to their project.

Turning our attention to some of the differences, the artistic disciplines and industrial design all searched for cultural and social information, for which the engineers did not. This was the second most popular research topic for the fine artists and graphics participants suggesting it is important for their project work. The textile participants also stood out from the other disciplines in choosing to collect items as a form of research. Industrial design, fine art and jewellery participants did this too, but not to the same extent.
The participants looked to numerous sources for their inspiration and a common response, with the exception of the engineers, was that inspiration was sourced from everywhere (figure 6.7). These participants were therefore placed in the total immersion category. This is a genuine response, provided the participant becomes immersed in their work to the degree that their subconscious is always pondering the issues of their work (Cross and Cross, 1996). Alternatively, it may have been seen as the quick and simple response to a very open question. Those who wrote of particular areas have enabled a few similarities and differences to be noted.

![Bar chart showing sources of inspiration in different disciplines](image)

**Figure 6.7 Question 4: sources of inspiration.**

Prior art was an area that many participants from industrial design, textiles, graphics and engineering found to be inspiring. Fewer fine artists and jewellery designers shared this view despite previously stating they researched into this area; they, along with the engineers, found their inspiration from research activity that expanded their knowledge.

The engineering participants invested their time personally reflecting on their projects more than those from other disciplines. Engineers generally undertake projects by applying known principles and this reflection may assist with this process. Tovey (1986) discussed the work of four industrial design transportation students, one of which referred to the usefulness of this reflective time to consider current and future issues. The same also seems to apply to these engineering students.
Chapter 6: Study 1 - Narrowing the Scope

The final question asked the participants how they generate ideas for their projects (figure 6.8) which revealed a mixed response, suggesting that an ideation process is more personal preference than general rule. Looking at industrial design first, the highest two bars (<30%) were personal reflection and initial project work. Many of the participants noted the use of brainstorming and the writing of lists to help generate ideas as well as sketching and modelling.

![Graph showing ideation process preferences]

Figure 6.8 Question 5: how ideas are generated.

The fine artists also generate ideas from personal reflection but in contrast to the industrial designers, spend their time further expanding their knowledge through research. Perhaps they iteratively research and reflect on a topic area when starting a project, where as the industrial designers would reflect on their sketch work. This account is not dissimilar to the processes in the literature. Baxter's (1995) process implies that designers begin with concept design and Lawson's (1997) process also concurs with these findings. The early stages of the art processes by Mace and Ward (2002) and Sapp (1995) include exploration and the search for ideas through research. This corresponds with these findings from fine art, but also appears applicable to the textile and jewellery participants.

As with sourcing inspiration, the engineering participants were, like the fine artists, keen on personal reflection to generate ideas. For them, this personal reflection was frequently described as finding a quiet place and noting thoughts and experiences. To a lesser degree they used initial project work and expansion of
knowledge for ideation, which included sketching ideas and talking to experienced people.

### 6.3.2 The Personality Test

Data from the test papers were processed and the resultant data sets consisted of five numbers, where each number corresponded with one of the five personality traits. These were compared using statistical analysis. To obtain useful findings from questions with rating scales (such as Likert), the Gorsuch rule states that a question to participant ratio of 1:5 ought to be obtained (Gorsuch, 1983). This personality test had 25 scaled questions and, under this ruling, required a minimum of 125 participants; this was attained and exceeded with 169 completed test papers.

The statistical test used was the Kruskal-Wallis non-parametric test. This test determines whether the differences among the samples are a result of a genuine population difference or are chance occurrences (Siegel, 1956). The results showed that there was no significant difference between the data sets for each discipline. There was no statistical relationship between the participants' personalities and the discipline which they were studying (Table 6.3).

<table>
<thead>
<tr>
<th></th>
<th>Openness</th>
<th>Concientiousness</th>
<th>Extroversion</th>
<th>Agreeableness</th>
<th>Negative Emotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>6.459</td>
<td>3.208</td>
<td>3.192</td>
<td>7.753</td>
<td>2.996</td>
</tr>
<tr>
<td>Df (disciplines)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>.264</td>
<td>.668</td>
<td>.670</td>
<td>.170</td>
<td>.701</td>
</tr>
</tbody>
</table>

a Kruskal Wallis Test
b Grouping Variable: Discipline studied

Table 6.3 Results from the Kruskal-Wallis test.

To reaffirm the findings from the Kruskal-Wallis test a hierarchical cluster analysis was also produced using the data. The cluster analysis grouped those with similar test scores, and thus similar personalities, and then similar groups were grouped together and so forth; this produced a dendogram, shown overleaf (figure 6.9). Within the first 22 participants on the dendogram all of the disciplines had been represented. Had personality been a factor behind the participants selecting to study in a particular discipline, those from the same discipline would have been grouped together. Some participants from the same discipline were grouped
together (two or more participants). The most common were from industrial design with 28 groups, however, this was to be expected since the industrial design participants constituted 51% of the sample and clusters forming between them were more probable. There were two groups of fine art participants and two for textiles. All of these groups were distributed throughout the dendogram, reducing their importance to the overall findings.

Figure 6.9 Hierarchical Cluster Analysis; the first 42 participants.
To ensure that the number of industrial design participants had not skewed the results one further hierarchical cluster analysis was run, this time with fewer industrial design participants. The number of industrial design participants was reduced from 92 to 16 by repeatedly removing every other participant until 16 remained; this number was more inline with those from the other disciplines. The dendogram produced had fewer groupings of industrial design participants and the participants from all the disciplines were mixed.

The reason for these findings is perhaps due to the nature of personality itself. Personality is the combined result of many factors: social influences, peers, personal incidents, parental treatment and reciprocal interaction (relationship with genetic make-up and the environment) are a few examples (Glietman et al, 2000). The above factors influence how people seek environments and situations that are suitable for them, such as choosing a university degree course. When making such decisions people use a loss aversion process that weighs up the positive and negative aspects of decisions which are also guided by personality. There are numerous reasons or influences as to why a person may choose to study a particular course. As a consequence, those with very different personalities can be attracted to a particular discipline and there appears to be no statistical link between the participants’ personalities and the discipline they selected to study.

6.3.3 Summary of Part 1

Many of the differences noted between these participants were slight. Some of the questions failed to show clear differences, such as those concerned with research, inspiration and ideation; findings from the sample were spread over all the categories. This indicates a more mixed process that appears to be based on personal preferences rather than being directed by a type of practice perhaps associated with a discipline. This may even demonstrate how similar many of these participants are with so few obvious differences being noticeable from the graphs. However, there was one clear difference that appeared to be more related to the nature of the discipline than personal preferences. The responses from question one, the type of project the participants undertake, clearly showed that the fine art sculptors worked on projects and developed pieces of art with a focus on intangible and expressive aspects, whereas the majority of the other participants focused on developing the tangible and functional. The fine artists appeared to work towards a different goal to the designers. Due to this the fine artists appear to be the most
different of the art disciplines and industrial design, and are perhaps suited for future research.

Findings from the personality test indicated that there is no statistical relationship between the participants personality and the discipline they study.

6.3.4 Part 2: The Audio Diary Study

The audio diary study commenced following the analysis of the questionnaire and the personality test, since the choice of participant for this study depended on this. Two industrial design undergraduates, in their second year of study, had been recruited in advance and were to be compared to the other participants. Third year undergraduates would have been more desirable for their extra experience but due to the time of year, they had already completed much of their project work. The second year undergraduates however, had begun working on a new project to design an injection moulded artefact that they could report on for this study.

The analysis of the questionnaire and personality test provided an initial comparison of various art disciplines with industrial design and it appeared that fine art sculpture was the most suitable for further study. This was due to the different type of project they choose to undertake and the areas they focus their attention on. In light of this, two third year fine art sculpture undergraduates were recruited for participation.

The duration of the study was five weeks and the audio time recorded ranged from 35 to 67 minutes. The audio recordings were transcribed (example in appendix 1.3) and comparisons made between the participants were based on what they focused on, their concerns and how they progressed their projects. Three of the four participants described their process in sufficient detail for a working process diagram to be constructed. Such diagrams, as used in the literature, can facilitate comparison. Participants student 1 and student 2 were the fine artists and students 3 and 4 were the designers.

Figure 6.10, overleaf, shows the process described by student 1 when working through her project. Her project focused on understanding your place in the world and never being truly comfortable with in it, and the feeling of awkwardness we have at times being in our own body. Her project conforms to the questionnaire findings of focusing on intangible topics. From this starting point she researched
into other artists who have also looked at these issues and reflected personally on the issues further. This relates to the findings from the questionnaire and to the work by Eckert and Stacey (2000) into sources of inspiration. From this point she noted the use of her sketchbook and playing around with ideas whilst reflecting on them.

Figure 6.10 Student 1's working process

She focused on emotional and experiential aspects and wanted the viewer to become a part of the work itself by interacting with it.

*Each piece is irrelevant until it is performed by a viewer. The viewer sits in the space and becomes the work itself (Student 1)*

*How would I create a piece of art that would engage the audience and make them feel vulnerable, make them feel excited, make them feel all those things that you feel when you are young? (Student 1)*

Despite this desire for audience participation and to make them feel particular emotions, she did not undertake any research into these areas. Her ideas were based on personal reflection, her experience and her own emotions and feelings. Ideas were developed in her sketchbook and when she found gaps in her
knowledge she undertook more research, for example, she had to find more details on materials, processing and the cost of producing her ideas. She developed her idea and once it was finalised she then proceeded to research into realising it. Due to the high cost associated with producing her idea she reluctantly had to rethink part of her project.

_This is the problem with all this, you can have great ideas but it is the making them, the realising them that is such a problem (Student 1)_

When developing her ideas she produced a number of maquettes (realistic miniature representations) to test her ideas. She decided to produce a large scale version and proceeded to determine how this could be achieved. She sought advice from experts at this stage. To summarise student 1’s process, she began by reflecting and researching into an area of interest prior to developing ideas. Only then, did she consider how to realise her intentions and produce an idea to which she was already committed.

Student 2 followed a similar process to student 1, whose process appeared quite linear. In contrast, student 2’s process seemed to be more iterative; she often reviewed her work and revisited her research before progressing her ideas further (figure 6.11).

![Figure 6.11 Student 2’s working process.](image-url)
Student 2's work focused on personal relationships and how the past can affect them, once again an intangible topic area. She researched into this through reading and described how this helped her to develop theories that could be included in her work. This research, as with student 1, was used to inspire her sketch work, but she also referred back to her reading and she continued to read during this stage. There was a point when she felt that her sketching was not helping her progress and decided to produce maquettes of her ideas. She constructed a selection of her ideas so she could review the direction in which her work was going. Following a break, which she later describes as incubation, she returned to sketching, reading and to writing down her ideas. She undertook her writing in her studio space where she was surrounded by her work: images, sketches, notes, books (etc) and she noted this as being a useful place to be when considering her thoughts (figure 6.12).

![Student 2's studio space.](image)

Her aim at this stage was to understand the meaning of her work which involved rationalising why she used particular forms and materials, how she felt about them now and how she should progress them to satisfy her intentions and goals.

"I have kind of got a form now I think, in a little bird cage and a swing, I just haven’t quite got the meanings together why it is important and what I need to do specifically and the specific meaning for each bit of it" (Student 2)
At this point she took another break (incubation) to compose her thoughts prior to making and realising her ideas fully. This is similar to a designer being immersed in a project and then experiencing that creative leap when they hit on a new way forward after a period of incubation (Dorst and Cross, 2001; Jones, 1992).

I feel I have to give myself two days off or three days, whatever, just to allow everything to filter through (Student 2)

From these two processes it appears that much of the fine artists’ time is spent on developing and researching their idea and their artistic intentions. Sketching and modelling facilitates their understanding and development of this idea. Attention is directed to the production of their final piece once they are satisfied with the idea and wish to realise it fully.

How do the two designers compare to the two fine artists? As with the two fine artists the type of project the designers worked on was noted as well as the general process they worked through. Unfortunately, only one of the participants (student 3) provided enough data to produce a process diagram. Student 4’s data had not been ruled out since she too provided some insightful comments.

Students 3 and 4 were working on identical projects that were set as part of their modules for their degree. This provided the first initial difference; the fine artists select their work and the topic of their work whereas the designers are provided with project briefs. The second difference arose when the type of project was compared; the designers knew from the beginning that they were to design a widget, a product for the beach and to redesign cosmetic packaging for a sustainable design module. The fine artists’ work, as found from the questionnaire and the audio diaries, was more focused on intangible aspects of life and emotional experiences. It is worth clarifying, that these second year undergraduate designers are given the opportunity in their third year of study to develop a new product of their choice. This would be more similar to the situation of the fine artists in this study; however, the questionnaire respondents, who were in their third year, also focused their attention on tangible aspects and products.

Student 3’s process is similar to those of the fine artists in that she too begins with personal reflection of the topic area and research activity (figure 6.13). Her research however was more orientated towards discussions with users or family to help identify potential directions for her project. Students 3 and 4 did use the
Internet and library for their research but this took place later in their projects to support and inspire them when sketching.

*Often I will ask other housemates and family what problems they have, to try and get an idea for a project. This is usually really helpful. One of my housemates, she does graphic design so she is quite good for bouncing ideas off and we usually help each other with ideas* (Student 3)

![Diagram](image)

**Figure 6.13 Student 3’s working process.**

While the fine artists were focusing inwardly on the meaning and intention of their artwork, student 3 was focusing on the user and the issues they have with products. The artists seemed to base their work on assumptions and personal feelings or emotions whereas the designer noted and attended to the needs of others. However, the designer (student 3) was not devoid of emotion and its affect on her designing. For a sleeping and waking project she begin to identify issues that relate to emotional needs such as comfort and security.

*I have pictures of my housemates when they were younger, when they were asleep and noted the things they had to have with them like teddies or security items* (Student 3)

Of the two designers, only student 3 mentioned the use of modelling to further her idea generation. These models were quite rough and ready (card and Plasticine®) when compared to the fine artists’ maquettes, constructed from wax and intricate metal fabrication. Despite this difference in fidelity, her models still furthered her idea development.
The card models definitely helped me to come up with the idea. I found that the initial ones, I had going over the thumb rest, didn’t actually work when I tried it (Student 3)

Nevertheless, the impression is that modelling is a more important activity to these fine artists than the designers due to the amount of time and effort spent on them. When the designers wanted to realise and test their ideas further they produced three dimensional CAD models, removing the need to model it physically. Neither of the fine artists referred to this method.

Students 4 and 1 are two very different people. The fine artist (student 1) developed her ideas and then searched for ways to realise them, and was concerned that she had to compromise her idea due to its excessive cost. But she found alternative ways of producing what she wanted. In contrast, the designer (student 4) was willing to compromise her ideas and tried to keep the design simple to ensure that it was easier for her to produce. This phenomenon also occurs with craft people; Levien (1999) found that a good crafts person avoids compromise whereas a designer practices the art of compromise.

Overall, the participants seemed to work in a similar way by following a process of research, sketch work and modelling prior to the final realisation of their idea. The main differences essentially stemmed from what they chose to focus their attention on. The fine artists worked to develop artwork that expressed intangibles such as feelings and emotions and were developed from personal reflection and secondary research. The fine artists gave the impression of being more philosophical. Whereas the designers were more focused on the needs of the user and tangible issues such as manufacturing.

The fine artists appeared to spend much of their time developing their ideas, intentions and the meaning behind their work. They would then work out how to realise it. In contrast, the designers were aware of manufacturing and were willing to compromise their designs to increase its ease of production. The fine artists were less willing to do this.

From these findings it appears that the fine artists may not work dramatically differently from the designers, but they do seem to think differently. They focus their attention on different aspects and issues. Despite the small scale of this study
these differences were quite apparent and therefore, could be an indication that fine art sculpture may have more to reveal.

6.4 Appraisal of the Methodology

The most undesirable issue affecting this study was the low number of art disciplines that participated. In section 3.1 37 art disciplines were noted, of which only four participated in this study. This was despite efforts to include as many as possible but many undergraduates were not willing to participate, stating that they had no time. This is one aspect of research that is out of the researcher's control but the four participating disciplines were quite diverse. Sculpture represented the broad field of fine art. Multi-media textiles represented a broad fabric orientated discipline with many producing craft products. Jewellery and silversmithing produce small scale pieces and graphics is predominantly two-dimensional. This variety was deemed sufficient to continue.

With regard to the five questions, the most useful was the first that asked the participants to describe one of their projects; the responses provided a clear difference between the disciplines. The four remaining questions provided interesting data, but less convincing differences were found.

The data collected from the audio diary study supported the findings from the questionnaire and provided additional insight into how undergraduates worked. Of the four participants, three recorded a sufficient amount of useful data to determine a basic process diagram to show how they worked. The fourth participant was unable to provide such detail and the majority of her diary time was given to rationalising why she had rushed or not done her work. This highlights the risks associated with this self-disclosure method noted by Pedgely (1999).

While data collected from this study confirms the work of others in the literature this study was good practice and an insight for collecting and analysing data from artists and designers. The lessons learnt from this study were applied and developed in future studies; such as, how to recruit participants, interview techniques, use of alternative data collection methods (audio diaries) and data analysing data.
Chapter 6: Study 1 - Narrowing the Scope

6.5 Overall Summary

With regard to the three objectives of this study, the first, to compare the working practices of art and design disciplines, was achieved through the use of the questionnaire and audio diary study. The responses to question one provided the most useful finding by clearly highlighting the different type of project the fine art participants undertake when compared to those of the other disciplines. This finding concurred with those from the audio diary study. The fine artists appeared to focus their attention on less tangible aspects, such as experiences which confirms literature regarding artists goals stated in section 3.1. Those from other disciplines did not do this to the same extent for they focused on more tangible aspects, such as materials, users, or functionality.

The second objective, which was to compare the personalities of the participants from different disciplines revealed no significant differences between the participants of different disciplines. From this it can be implied that the presence or absence of particular personality traits are not indicative of the degree course a person chooses to study.

The third objective was to gain an insight into other data collection methods and the use of audio diaries. Three of the four participants provided useful data that shed some light onto how they progressed their project work and the concerns that they had. Data were collected over a prolonged period of time and with little intervention from the researcher, this adhered to the principles of naturalistic enquiry. Diaries may prove to be a useful research method for future projects.

6.6 Conclusions

The aim for this study was to identify an art discipline that appeared to work in ways unlike industrial designers. Data from this study confirms that of the literature especially with regard to artists working towards different goals and on different types of project to designers. The fine art sculptors' goals were different to those of the other art participants and to those of the designers, therefore they were the most suitable for inclusion in future research.

With regard to achieving the primary aim of the research this conclusion enabled the scope of the research to be narrowed, allowing detailed studies to be undertaken to identify the methods that may or may not facilitate design creativity.
Chapter 7 : Study 2 - Current Working Processes

The second study of this research is described in this chapter. Having reduced the scope of the research the next step was to collect detailed data on the working processes of artists and designers. This chapter begins with a rationale for conducting the study and the aim and objectives used to guide it. The applied method and the strategy for analysing data collected are explained prior to a discussion of the results from which conclusions are made.
Chapter 7: Study 2 – Current Working Processes

7.1 Rationale

The main finding from study one was that the projects undertaken by the undergraduate sculptors at Loughborough University appeared to have a more intangible subject than the projects undertaken by the students of Industrial Design. The sculptors seemed to pay more attention to how they expressed themselves through their work and what aspects of the work meant. They had a different type of goal to the design participants. Sculpture was therefore a discipline that appeared worthy of researching further. The focus of this study was to research into contemporary sculpture and to understand further how professional sculptors work.

The overarching rationale for undertaking this research was to determine whether methods from art disciplines could facilitate industrial design creativity. However, to do this a clear understanding of contemporary industrial design practice was required against which the sculptors' processes could be compared. From this study, the places in the sculptors' processes that differed to those of the designers processes may indicate a potential source of methods that can be investigated in subsequent studies.

This study was also an opportunity to include another discipline: architecture. Architects may design on a greater scale but they produce not only functional buildings but architecture that reflects the needs of society and human desires (Ballantyne, 2002). Architecture seems to incorporate the practical nature of design with the intangible aspects of sculpture. Furthermore, many architects have designed buildings that have been appraised as pieces of sculpture (Bruderlin, 2004). There are also numerous examples where architects have designed mass produced products as industrial designers do (Alessi, 1998; Branzi, 1984; Mendini, 2004). Therefore, architects were included in the sample of this study to determine if their working processes could offer a further insight.

7.1.1 Aim

The aim for this study was to gain a greater understanding of how professional contemporary sculptors, architects and industrial designers work, in order to identify the key differences between their working processes, and determine areas suitable for future research.
7.1.2 Objectives

There were five main objectives:

- To identify the participants' working processes
- To identify similarities and differences between the participants
- To identify differences in the participants' attitude
- To affirm the selection of sculpture as a suitable discipline for future studies
- To identify aspects of the participants' processes that could be studied more closely in future research.

7.2 Method

The identification of similarities and differences between the architects', designers' and sculptors' working processes required a general understanding of how they work. Lawson (2004) investigated how designers work for his book *What Designers Know*; he used five methods to further his understanding of this topic area. These were:

1. Sitting and thinking about design
2. Observing the designer under controlled conditions
3. Observing them in their natural setting
4. Interviewing designers
5. Simulating the design process.

Lawson (ibid) described the advantages and disadvantages of each of the above methods, however, when used collectively they provide data that can reveal how designers' work and what they know. Therefore, to understand architects, designers and sculptors, this study consisted of two parts and each were designed using the above methods as a guide. The first part involved interviewing the sample. Data collected from these interviews were analysed for similarities and differences between the participants' working processes. This provided a greater understanding of how these participants worked but due to the different type of project they undertake it was not ideal for making any direct comparisons. Therefore, to support the interview data, a second part to this study was devised in order to collect data that would enable a direct comparison to be made between the working processes. This was achieved by replacing the project type variable with a
standard design brief that the participants from each discipline could solve. The sample targeted and the two parts of this study are detailed below.

7.2.1 The Sample

The sample were selected using the strategy described in the methodology chapter (section 5.6). Sixteen participants were recruited for the interview part of this study. There were six architects (numbers 1 to 6), six sculptors (numbers 1 to 6) and four designers (numbers 1 to 4). Each of these interviewees were asked to further their participation in the research by undertaking the design exercise. Five of whom agreed to participate (one architect, two sculptors and two designers) and an additional architect and designer were recruited, bringing the total number of participants for the design exercise to seven.

7.2.2 Part 1: The Interviews

The nature of the study reported in the chapter six was the collection of data from a large sample, using the questionnaire method, to obtain a general insight into how different disciplines work. In contrast, for this study more detailed data were required to understand precisely how the participants work, and the interview method is more suitable for collecting qualitative data of this nature (Cohen, Manion and Morrison, 2000). As a consequence of time taken to collect this detailed data a smaller number of participants were recruited.

Six architects, six sculptors and five designers participated in these interviews; all were practicing professionally and there was a broad spectrum of experience, from those newly graduated to company directors. The interviews were held at the interviewees’ places of work to reduce the inconvenience. Prior to starting the interview, the study was introduced, consent forms were read and signed and the interviewee was asked to provide some contextual information: their name, age, position in the company, past employment and educational history. All of the architects who participated were educated as architects, and had only worked within the discipline of architecture. Four of the designers were educated in industrial design and the fifth had studied automotive design. Finally, all but two of the sculptors were educated in fine art. One sculptor held a degree in industrial design; this was potentially a controversial overlap and was specifically examined at the results stage. The other had no formal art education.
Chapter 7: Study 2 - Current Working Processes

The interviews were informal; the study was introduced to the participants and they were encouraged to describe and converse freely on their working processes. This was preferable to the interviewer asking presumptuous questions. The protocol used to guide the interviews included the main topic areas to be covered and some key questions. These topic areas were obtained from literature regarding design processes and how designers' work (Pugh, 1991; Baxter, 1995; Lawson, 1997) and were: inspiration; problem exploration; research; idea generation.

Details regarding the type of work the participants undertook was also included since the disciplines of architecture, design and sculpture consist of many variants and specialisms. Creativity also obtained a place in the protocol since this was an area of interest in this research. These questions targeted the interviewees' thoughts towards creativity and its associated methods.

The protocol was redesigned following the first interview with a sculptor in order to increase its appropriateness. On this occasion the interviewer was unaware that many sculptors do not use any form of brief to guide their work and the original protocol needed amending. This resulted in two subtly different protocols, one for the sculptors and another for the architects and designers (appendix 2.1). Each interview was audio recorded and transcribed verbatim prior to analysis.

The interviewees were also requested to draw a process diagram of the way they worked. Process diagrams are used extensively in literature to explain design process theory; Pugh (1991), Baxter (1995) and Lawson (1997) all used diagrams in their texts. They were included in this study as an additional way for the interviewee to communicate their working process. The participants had no support or input from the interviewer when drawing their diagram to ensure that they were not influenced.

7.2.3 Part 2: The Design Exercise

The design exercise was tested in a pilot study (appendix 2.2)[1]. This included the test of a design brief and specification, as well as three different potential data collection methods. Two versions of protocol analysis and a longitudinal diary method were tested on third year Industrial Design undergraduates. Data from the

[1] Appendix 2.2 consists of the full pilot study report that provides details of the methods tested and the conclusions drawn.
pilot study indicated that the longitudinal diary method was the most effective for collecting data on the working process the participant used to solve the brief.

The longitudinal aspect of the diary method enabled the participants to solve the brief over a longer period of time compared to those participating in the protocol analysis tests. The extra time meant the participants could undertake the exercise in a manner that was potentially more reflective of their own working process and was not condensed unrealistically into a few hours.

The design exercise was therefore a longitudinal study where the participants solved the design brief on their own and in their spare time. To collect data over this period of time the participants were requested to record their thoughts, any issues and their actions in a diary as they solved the brief. This provided a running record of how they solved the brief. The second data collection method was the interview and this was held at the end of the project once the participant had completed the exercise. These interviews provided the researcher with the opportunity to hear how the participants had worked through the project and ask questions. The interview was also a precaution against the participants not completing the dairy, which is one of the risks associated with this method (Pedgley, 1999). All project work completed as part of the exercise were a third source of data and was viewed during the interview to ensure the researcher understood what were present.

The design brief tested in the pilot study remained unchanged since no problems were raised against it. The brief was as follows:

To design a nutcracker. You are encouraged to consider and design peripheral items such as bowls or trays as well as offering a positive user experience. This is an opportunity to design a wonderful creative product that will be admired by all who see it.

Nutcrackers are an established product with which the participants were likely to be familiar. They can also vary in their complexity ensuring their suitability for designing by participants from different disciplines and backgrounds.

Accompanying the design brief was a short specification, consisting of three criteria, to ensure the participants provided a response to the brief that could be analysed. The first specific was to design a nutcracker that would, at least in theory, work and
crack nuts. This was to ground the project in reality and ensure that each participant produced a potentially workable solution. The second specifically requested the participants to present their final idea in some form and the third was to remind them that whilst this was a research project, they were encouraged to have fun.

7.3 Data Analysis

In this section, the strategy for analysing data collected from the two studies is noted. Data collected from part 1 included audio recordings of the interviews and hand drawn process diagrams. Data from part 2 also included audio recordings from the concluding interviews, as well as handwritten notes from the diaries and the sketch work produced.

The interview transcripts from parts 1 and 2 were also searched for attitudes, which are a positive or negative evaluation of a subject. The participants’ attitudes towards aspects of designing can be used to identify similarities or differences between them. More details of the data analysis strategy are provided in the following three sections.

7.3.1 Part 1: Interview Data

The audio recordings were transcribed verbatim in preparation for their analysis. To ease the analysis process the Nvivo qualitative data analysis computer software was used. Using Nvivo a number of initial coding groups were formed using the headings from the interview protocol. Each transcript was then read a number of times and relevant pieces of text were coded accordingly. As the researcher became more familiar with the data the codes evolved and searches for particular themes were conducted. The codes and themes were also displayed in model trees which are a useful tool when identifying links as well as similarities and differences between the participants. Robson (2003) identified three disadvantages for using computer data analysis software such as Nvivo. These were: proficiency in use takes time and effort; difficulty changing established categories; some programs impose specific approaches. This study was the first occasion that the researcher had used Nvivo and whilst proficiency did take time and effort, this and the other two disadvantages did not appear to affect the data analysis, since Nvivo enabled categories and codes to be altered easily and did not impose a particular approach.
Chapter 7: Study 2 - Current Working Processes

The hand drawn process diagrams were analysed in two ways. The words from each diagram were input into Nvivo, coded and similarities and differences were searched for. Secondly, the layout of each process diagram was reviewed to provide a potential insight into how the interviewee perceived their own working process, e.g. linear or iterative.

7.3.2 Part 2: Design Exercise Data

Three formats of data were collected from the design exercise. The audio files from the interviews were transcribed verbatim and analysed using Nvivo in the same way as the interview data from part 1. The hand written notes from the diaries were input into a computer as digital text that could also be analysed using the Nvivo software.

The sketch work submitted ranged from sketches on scraps of paper to a large oil pastel rendering. The final design outcomes were presented in an equally diverse way, including sketches, computer generated models, engineering drawings and working prototypes. Criteria were established against which the sketch work could be reviewed (an example of this can be found in appendix 2.3). This included recording:

- The type of media used
- Areas of interest
- Methods used
- How they presented their final solution.

7.3.3 Analysis of Attitude

Attitude has been defined as a positive or negative evaluation of a subject (Petty and Cacioppo, 1996; Eagly and Chaiken, 1993; Triandis, 1971). Whether attitudes can reliably predict behaviour has been a constant source of debate among psychologists. Many of the early studies revealed low correlations; however, as knowledge of the topic increased attitudes and behaviours were refined into smaller, more precise components, for example, behaviours consist of an action, a context and a period of time. Subsequent research, focusing on these components, produced higher correlations between attitude and behaviour (Petty and Cacioppo, 1996). Furthermore, it was found that attitudes based on past experiences were a more accurate source of data for anticipating future behaviour. Therefore, the reliability of the attitudes, revealed by the interviews in these studies, relating to
behaviour, should be high since the interviewees were reporting retrospectively on their working processes. Some of the attitudes revealed were inferred from a belief. Beliefs are similar to attitudes but refer to the information a person may have on the subject as well; for example, when a designer was asked for his opinion on creativity methods his response began with an attitude (in bold) and was accompanied with a belief to add weight to this attitude (italics).

I think that they are good but you need someone who is a bit of an extrovert to pull people through it

7.4 Results and Discussion

In this section the findings from parts 1 and 2 of this study are discussed. This begins with a review of the interview data and followed by a review of the design exercise data. In both parts the attitudes identified from the participants are noted.

7.4.1 Part 1: The Interviews

From the findings similarities and differences between the participants' working processes are discussed. This discussion has been divided up into the sections used in the interview protocol: the project and approach; inspiration, exploration and research; idea generation; creativity.

The Project Work and Approach

The origins of the architects' and designers' projects were similar with respect to them originating from a client and a brief. Projects can also originate from competitions which can give them something more unusual to work on and, provided they win, can help to promote their company. The design briefs used by architects and designers can vary in complexity from open and explorative to highly detailed. These briefs often evolve through the course of the project as they, the client and often users, enter discussions or, following a period of research activity, find out what is really required; a designer called this a phase of clarification.

When the sculptors agreed to undertake a commissioned project, they too would work for a client and have a brief. These briefs tended to be open, but included practical requirements the piece must adhere too, such as legislation, the budget and location. The sculptors would not use a brief for their personal work. Instead they follow their intuition and are guided by themes, ideas and past work; this was
often described as their journey. Also, the sculptors’ approach focused on making artistic statements and ensured that their piece portrayed the desired feelings and expressions. The architects and designers approached their projects from a more functional perspective noting the functional attributes of the building or product. The following quotes demonstrate this:

Other projects, for example start with research with the client saying these are the problems and we want to get X number of people on this site (Architect 1).

It is about producing a building that is fit for its use more than anything else (Architect 2).

The best way to start is to kind of find what is around the product. So you start looking at what the competitors have already done and then what not to do. What current products might be useful for their technology or their look or the types of material they use and then obviously the main thing is what the product does (Designer 1).

If it is my own work it is very personal and I have my own set of rules (Sculptor 1).

When I am in the studio I do pieces that function purely on ideas and what I think to be conceptual and what is very much a statement (Sculpture 2).

The participants had a different relationship with their clients. An architect’s or designer’s client plays an important role in a project since they work together to produce the desired outcome. In contrast, when commissioning a piece of sculpture, the client may not know clearly what they want other than a piece of art. The selection of a sculptor is based on their portfolio or the project may go out to tender. Once selected the sculptor will generally work alone, with the client providing minimal input. This difference may be due the nature of the output. The functional attributes and the styling of architecture or products are, perhaps, easier to comprehend than a piece of artwork based on intangible feelings, expressions or experiences. Furthermore, these feelings etcetera, are often those of the sculptor who is interpreting the brief. Sculptors do have to attend meetings with clients to obtain feedback but they still campaign for their own perspectives.
I have done commissions but I will / would always rather do my own project; I do not mind being told what people would like but I will still do it my way; it is my work (Sculptor 3).

It is nice to get positive comments and it can be interesting to get critical comments as well but I cannot work with that in mind. It is very difficult to keep what I want to do for myself as an artist. (Sculptor 2).

Inspiration, Exploration and Research
Inspiration has been described as a "supposed force or influence that stimulates creative activity" (Oxford, 2003). The interviewees were asked what inspired their work since this is known to be an important aspect of creativity (Eckert and Stacey, 1998). The sources of inspiration and exploration mentioned in the interviews are listed in table 7.1.

<table>
<thead>
<tr>
<th>Architects</th>
<th>Designers</th>
<th>Sculptors</th>
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<tbody>
<tr>
<td>Students</td>
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<tr>
<td>Critiques</td>
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<td>Relationships</td>
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<td>Products</td>
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<td>Other designers</td>
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<td>Play</td>
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<tr>
<td>Brief</td>
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<td>Flow charts</td>
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<td>Fashion/trends</td>
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<td>Periodicals</td>
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<td>Image/mood boards</td>
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<td>History</td>
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<tr>
<td>Site</td>
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<td>Cost</td>
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<tr>
<td>Buildings</td>
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<td>Feelings/experience</td>
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<td>Previous work</td>
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<tr>
<td>Scrap/sketch book</td>
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<tr>
<td>Technology/material</td>
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<td>Users/public</td>
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<tr>
<td>Constraints</td>
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</tbody>
</table>

Table 7.1 Sources of inspiration and exploration.

Generally all the participants, but the architects and designers especially, will search for inspiration from anywhere and a number of them stated that inspiration does come from everywhere. Collectively the architects listed the most sources,
with the designers second and sculptors third. There was some overlap between the disciplines; however, it seems unlikely that any individual would interpret the source in an identical fashion to another.

One key difference was that whilst the architects and designers used many sources of inspiration the sculptors made a point of avoiding certain sources and did not wish to be influenced by them. They wanted to avoid sources that were used often or were clichés, fads or fashions. Thus they did not refer to periodicals, fashion and trends or use mood and image boards. For example, one sculptor was commissioned to produce a piece for Chesterfield and he purposely avoided using the church with its crooked spire since it had been used many times before to represent the city. Another sculptor stated:

*I find it almost distracting if you see what other people are doing. It keeps it more pure without too much looking around. Well that is my way of looking at things* (Sculptor 1)

The sculptors also mentioned that their work was part of a personal journey into themselves or the meaning of things and thus contemporary fashions were not applicable. The statement below from one of the sculptors highlights this and what they focus on when developing their work:

*It is very much about a journey and what I have been already talking about, trying to pare something down to simplicity, to a clarity that just makes you reflect and respect for a little while and think and enjoy something that is beautiful.* (Sculptor 4).

Some of the sources of inspiration were tools, such as flow charts, mood and image boards, critiques or the search for relationships. These were used mostly by the architects and designers. The sculptors favoured less methodological sources; in particular, playing with material and processes to explore what happens.

All of the interviewees undertook some form of research to help further their projects. The focus of an interviewee's research depended on what was important to him or required to further the project at that point in time. For example, a key factor for architects and sculptors is the location of the building or sculpture. Site research included reading maps, taking photographs, observing the people who currently use it, looking for natural features, the surrounding area and its history. Research topics of this nature did not apply to the industrial designers in this study.
who generally focus on non-site specific projects. Participants from each discipline researched into technical aspects of materials and technology as well as previous examples of work.

The architects and designers also stated that they are inspired by feelings and experiences, however they do not apply these to their projects as keenly as the sculptors. The sculptors, would base entire projects and artworks on feelings or experiences as noted in the previous section. Nevertheless, the architects and designers do take an interest in this area.

Many of the interviewees, including four sculptors, agreed on the importance of researching the requirements of the user; this information was considered essential to the success of many projects. Architects and designers wanted to gain a greater understanding of users’ interactions with buildings or products as well as discussing ideas and concepts with them. To facilitate the generation of ideas some of the sculptors held workshops with members of the community, asking them to draw, sculpt and provide stories or poems. They also spoke to those who would be living, working and socialising near the site. However, user research was only undertaken when working on a commissioned piece; it would not be used for a personal piece. The sculptors also presented their ideas and listened to feedback from the commissioning committee and interested parties from the community.

The majority of the research methods mentioned were used by each of the disciplines (table 7.2, overleaf). These included methods such as visiting locations, referring to books, browsing the Internet, taking photographs, interviewing, holding workshops or more detailed observations. Towards the top of table 7.2 are methods that were mentioned by interviewees from only one of the disciplines. These, as expected, are more specialist such as the use of props for sculptors or the designers completing product evaluation tests.
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<table>
<thead>
<tr>
<th>Method</th>
<th>Architects</th>
<th>Designers</th>
<th>Sculptors</th>
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</thead>
<tbody>
<tr>
<td>Props (life models)</td>
<td></td>
<td></td>
<td>✓</td>
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<tr>
<td>Aunt Sally [2]</td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>Product evaluation/tests</td>
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<td>✓</td>
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<tr>
<td>Focus groups</td>
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<tr>
<td>Questionnaires</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td>Observation</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Interviews/informal chats</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Photographs</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Books/internet</td>
<td>✓</td>
<td></td>
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<tr>
<td>Workshops</td>
<td>✓</td>
<td></td>
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<tr>
<td>Visits</td>
<td>✓</td>
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</table>

Table 7.2 Research methods used.

The research activity described appeared to be undertaken with little scientific rigour. The participants generally described their research as being informal and data collected was mostly in the form of notes, sketches and photographs. Chhibber, Porter, Porter and Healey (2004) described this research as being “quick and dirty”, when their research with industrial designers revealed similar findings. The architects and designers, however were more rigorous with their research than the sculptors and they used methods that could enable them to obtain more precise data such as focus groups and product evaluations. Furthermore, when the architects or designers undertook interviews or workshops they had clear objectives as to what they needed to find out, such as the precise function of certain rooms, or problems with an existing product. The sculptors seemed to use this type of research to gain a general experience rather than definite data.

*Initially you just sit down and you can complete room data sheets. That tends to work more as the design progresses. Each room has a number and you go and sit with the people who are going to be in that room asking them for requirements and mark that down on the sheet and that forms the basis for the internal fit out of the building. (Architect 2).*

[2] *Aunt Sally* is a method used by some architects when aiming to find out what users or clients want from the building; it is simply an idea presented to users to encourage discussion.
During a rail project we would just go out and take pictures on trains so we can understand the circumstances and how people use the trains and have a go ourselves. (Designer 1)

Yes, I do quite a lot of research, mainly relating to history of the spot where it is going, people around it. Quite often it is fun. If you get chatting to people at these places and they have all got these little stories which you just do not get from reading books so it is really good fun to pick up on some of those. (Sculptor 5)

None of the interviewees mentioned the use of methods that precisely facilitated the understanding of the users' emotions. Architects and designers would interpret emotions from mood boards or image boards constructed by them, the user or client. One of the architects stated that he was inspired by the users' emotions when designing an extension linking an airport to a train station. He did not research into emotion on this occasion since he implied that people would be excited about their holiday or arriving at their destination; all that was required was to enhance the emotion that existed and not to worry about evoking a new one.

You do not need to talk to anyone to know it, you know that feeling yourself, you have experienced it... going on holiday, I am nearly there, I am getting on the plane, rock on, not long now, here is the railway station, I am almost there... so it is just building on it before they even get there. Make the excitement even bigger. Architecture can do that. Major architecture can do that, it just makes people go wow. (Architect 3).

The sculptors were similar in that they too liked to play on the viewers' emotions, but like the architect, they too did not use any research methods and there was no scientific rigour involved when considering emotion; they merely hoped that their piece would have the desired affect.

Despite the apparent similarities of the research methods used and the areas investigated, each of the participants would use the information they collected for their own purpose. This is dictated by their project and what they choose to focus their attention on (goal). However, the architects and designers appeared to focus on researching facts whereas the sculptors focused on experiences.
Idea Generation

All of the interviewees used very similar tools and methods when generating ideas; the most popular was sketching and this was commonly used to start a project. There was a general consensus on the high importance of 'doodling' and loose initial sketches used to capture an idea on the 'back of an envelope'. Despite all the advances in technology and capability of computer visualisation systems, drawing is still noted as being one of the most important tools a designer has (Heskett, 2005).

The generation of ideas and their development appears to be a communal affair for the architects and designers, who would often consult, work and brainstorm with colleagues, users and clients.

Once I have an idea of what I am looking for then I would sit down with another member of staff, other architects, and make a fresh approach and decide on probably the best idea... that is the way I would do it...bounce ideas off each other (Architect 4)

At the early stages of a project a few of us get together and brainstorm sometimes just come up with, you know, what if it is this, what if it is that and go off on tangents all over the place and that has tended to be the way I have worked with other companies as well (Architect 2)

We would then sit down and brainstorm it to come up with an initial idea (Architect 5).

I am the only architect here but I am not the only one who is creative but quite a lot of the design leadership comes from me. I will consult with the others and we will work out things (Architect 6)

No idea is thrown out no matter how crazy it is. As a group we undertake a filtering process based on some of the constraints: practicality, cost, aesthetic reasons (Designer 2)

About 20 people; people from the project, people from marketing, communications, particularly people from the supply chain, kind of where they produce the thing, and from the research team, and three or four designers who will sketch to embody the concept. Basically it is a brainstorming process (Designer 3)
Examples of collaborating with users:

You draw something that can give them an idea and say how’s that? (Architect 3)

We try to share the creative process with them [users], and it generally works very very productively (Designer 3)

Example of working with clients:

Someone comes to us with an idea and we will do a load of concept sketches and ideas and we will present, you know five or six ideas and that kind of chooses our action (Designer 4)

The first thing is to get the client’s initial reaction to this, because much of this information will help their company and we can see where they want to direct it (Designer 3)

When undertaking a commission or personal piece the sculptors would generally work on their own and would not seek others to help them with their generation of ideas. The sculptors did search and accept guidance regarding technical aspects in order to complete their piece; the architects and designers also did this.

Some of the sculptors would begin developing a piece directly by playing with the materials. Such action is perhaps not suitable when developing a building or product but this seems to be an established route for sculptors. Below are three sculptors who described this process:

For my own work I will just get a chisel quite often and I will just get stuck in... usually after a little while of playing and idea comes to you (Sculptor 5)

The other way is to start carving even though I may have no idea at all what I am going to do... I get the stone, get the hammer, chisel and literally just start and usually after a little while of playing and idea comes to you in your head and you know what you are going to do with it. (Sculptor 6)

...then I thought let’s try lighting an edge and see what happens and I had no idea anyone had done that before or that it would do that. I got
really excited and interested and had this child like enthusiasm and just started playing and had this fantastic time. (Sculptor 4)

Another mode of generating ideas is via the use of CAD software. The architects spoke of software called sketchup™ that enabled them to sketch 'into' the computer and produce three dimensional images. One of the designers mentioned that some of his colleagues used CAD software since it enabled them to play with elements of a design, such as using it to position internal components into different configurations. CAD was used in the later stages of an architectural and design project to visualise ideas and facilitate detail design and the production of engineering drawings. For most of the architects and designers interviewed this is where their working process may end; once they had completed the detail design in CAD, the files would be sent to the production or construction teams who would then take over the project. Two sculptors also used computer software to visualise how their piece would look in the proposed location. These visualisations served two purposes, to demonstrate ideas to commissioners and to test an idea prior to making a maquette.

Some of the designers used prototypes in the later stages of a project to test their designs but only one of the architects used this method. The remaining architects did not use physical modelling, preferring computer generated visuals instead. It seems that architects use CAD to save time, with two of them stating that modelling is too slow and inefficient (figure 7.1).

Figure 7.1 Use of computer or physical models by the participants
One architect stated another reason why he favoured computer visualisations to physical models:

*If you give them [client] a computer visual it is my version, I want you to look at this... you are telling them what you want them to see, but with a model there are no hiding places.* (Architect 3)

Sculptors use physical modelling extensively in their working process for the very reason that there are no hiding places and that they can see their ideas in physical form in front of them.

*But then at some point I need to start visualising it in 3D because the way things fit together, even if I am fairly well versed in thinking in three dimensions, you know the actual sketching in three dimensions it is not the same as working in three dimensions* (Sculptor 2)

According to the sculptors, maquettes enable them to understand further their idea and consider technical aspects, as well as being a mode of communication to any clients. Designers use prototypes for similar reasons (Pugh, 1991). However it seems from these interviews that sculptors will sometimes model their ideas instantly, without any design sheets, unlike the designers in this study.

Two of the architects used predetermined formulae when generating ideas. This would include the use of known building layout styles, such as linear where all the rooms exit onto a straight corridor, or radial that uses a central atrium. Sometimes pre-designed rooms or apartments act as building blocks to ease the development of a larger project. The designers and architects also used charts to plot ideas, features, constraints and issues to help generate ideas.

**Creativity**

The interviewees were asked for their opinions and thoughts on creativity and of the methods that may facilitate creative thinking which they may or may not use. From earlier questions it was clear that the most commonly used creativity method, used mostly by the architects and designers, was the construction of mind maps or group brainstorm sessions. The interviewees did not seem to view brainstorming sessions as a creativity method; to them creativity methods, such as those developed by De-Bono (1986 and 1990), were used by managers in businesses other than design, who were not taught to think creatively. Roy (1993) also
reported on this attitude towards creativity methods. The participants' comments of creativity methods were generally negative such as:

- *They are too structured* (Architect 1)
- *You cannot follow a procedure to be creative* (Architect 6)
- *We have tried them in the past, but if you have a big group of people and talk and listen to each other you probably do a lot of that without realising* (referring to De-Bono's six hats) (Designer 1)

There was a consensus among the participants that creativity is a natural phenomenon that cannot be induced using a method. Creativity is about "looking at things differently" (Architect 1) and "using your feelings and not implementing a process" (Designer 2).

### 7.4.2 Attitudes from the Interview Data

A number of attitudes have already been revealed. The positive view towards users by architects, designers and three sculptors is one of them. The sculptors held a negative attitude towards using fashion and trends as sources of inspiration. The architects, unlike the sculptors and some designers, had a negative attitude towards physical models. All participants were positive towards the use of sketching as a medium for generating ideas, but were generally negative towards creativity methods.

Six of the seven participants held the attitude that constraints were often unavoidable and some felt they were a positive aspect of a project since they could inspire and promote creative thinking.

- *I try not to think if them as constraints... anything that has an impact on or forces you to rethink something about the design ultimately has a positive benefit on the design... it is for a reason* (Architect 2)
- *I mean it [constraints] can make me move towards a different point that I may not have normally considered so it is quite good. I suppose it is like a poet having to keep to a certain rhythm structure; it is a restraint in one way but in another way it precedes assumptions* (Sculptor 2)

The most common constraints mentioned were time and money. Clients were also seen as constraining, being described as being indecisive and as having poor vision.
Material, technical, planning and legal constraints were also mentioned (table 7.3). The sculptors also noted a constraint regarding the construction of their artwork. Many of the artists interviewed produced their artwork themselves in their own workshops and thus had to consider their own capabilities when developing their art. Only two of the sculptors used contractors to fabricate their artwork and this was usually in conjunction with a large commissioned piece. Such construction issues do not hinder architects or designers who tend not to make their own designs; this occurrence was discussed in the literature review (section 2.1). Nevertheless, construction and production factors would be a concern of architects and designers for they must produce plans that can be made.

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<thead>
<tr>
<th></th>
<th>Financial</th>
<th>Clients / user groups</th>
<th>Legal / Planning</th>
<th>Material</th>
<th>Technical</th>
<th>Personal construction of art/design/building</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Sculpture (Commissioned)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Sculpture (Personal Work)</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

Table 7.3 List of constraints and whom they affect

One of the sculptors did not like constraints, especially those that accompany a commission, such as health and safety legislation. She felt demoralised when her work was altered to adhere to legislation and consequently she avoids commissions and concentrates on her own personal work. Five of the six sculptors held a very negative attitude towards compromising their intent and self-expression (figure 7.2).
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Figure 7.2 Participants' willingness to compromise

The sculptors preferred to maintain control over the final piece and do not wish to be dictated to, for they see the piece as their personal interpretation of a brief, site, issue or topic. They remained true to this attitude even if they were undertaking a commissioned piece with a client. The exceptions were those who were stone carvers; they would carve pieces for clients to their exact requirements, such as, headstones, nameplates, crests and replacement gargoyles. However, this is a service they offer in addition to their sculptural work where they were less likely to compromise.

One sculptor placed his artistic integrity higher than earning money since he would turn commissions down if they did not suit him or if they would be too tightly controlled. This attitude towards compromise is perhaps fuelled by the sculptors' desire to embark on their journey of discovery discussed earlier. Below are some quotes highlighting this attitude towards compromise:

*In a sense there are two clients; there is whoever is commissioning the work and then there is myself. You know it has got to be relevant to my body of work. If it is something that I have been thinking or trying new material or trying a slightly different approach or just something I am trying to do artistically that has as much relevance as how much money I get. (Sculptor 2)*

*I have done various commissions for art galleries but I am not a fan of commissions... my compromise is that what I like to do is go and find money, by doing lots of framing, running this gallery and I am a part time visual arts director for the country at the moment... I would rather*
go and get the money like that than not be able to do the work that I totally believe in. (Sculptor 4)

*It is difficult to avoid the sort of um... design by committee situation. I will a) sometimes not go for commissions just because of that and b) I haven't got commissions because of that also; there is no point in me trying to compromise what I am trying to do as an artist. I do not think it works, it patronises the public and produces something that doesn't work artistically and it then becomes well a nothing.* (Sculptor 2)

*I am not a sculptor of animals or pets or whatever, and I am not a sculptor who would recreate other things, if that is what you want you go and find your stone carver, I could do it, I know how to do it, it would drive me insane to do a copy, I would start it and I would never finish it. I am a fairly awkward customer really. I have my principles.* (Sculptor 6)

Context is defined in the Oxford English Dictionary (2003) as the circumstances relevant to something and things can be in or out of context. The circumstances under which somebody normally works would constitute their context. The context in which the sculptors worked differed greatly from that of the architecture and design interviewees (table 7.4); this difference may enable the sculptors to act on this attitude of no-compromise.

All of the sculptors were self-employed and did not have the responsibilities associated with an organisation, such as the livelihoods of employees or the being told which projects to work on. Thus they were working in a different context. They could govern their own actions more easily and work towards what they believe in. This is despite some of the sculptors working with clients like the architects and designers.

<table>
<thead>
<tr>
<th>Context</th>
<th>Architects /6</th>
<th>Designers /4</th>
<th>Sculptors /6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worked for a company</td>
<td>6</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Self employed</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Directors of a company</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Worked with clients</td>
<td>6</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 7.4 Contextual information
One of the designers also aspired to such principles by wanting to develop his own style similar to the design houses in Europe, rather than designing a number of disjointed products. However, he was unique among the design participants and was the only one who was self employed (freelance) like the sculptors. To try and keep good ideas in the project, and limit his need to compromise, he would hold ideas back from clients:

Clients have poor vision and I do not like to run the risk of showing ideas to them in case they throw them out too soon. (Designer 2)

Many of the architects and designers who participated were willing to compromise and let the client guide the project; however, they would intervene if they felt the client was making a mistake or missing out on an opportunity. Nevertheless, ultimately it would always be the client’s decision.

7.4.3 Process Diagrams

From the analysis of the participants’ hand drawn process diagrams it was clear that the participants had not been able to include all of the elements that they described in their interviews. This may have been due to the large number of elements included in a design process or that they were unable to recall the relevant information at the time of drawing. Figure 7.3 shows two examples of the process diagrams.

Figure 7.3 Two process diagrams: architect 4 (left) and designer 1 (right)
A comparison was made between the number of elements disclosed in the interview and those included in the diagrams to determine the extent of the difference. Three elements, considered important in the interviews, were searched for in the process diagrams. These were, the user, reference to the site (building or sculpture) and mind mapping. Figures 7.4, 7.5 and 7.6 show the number of participants who referred to these elements in their process diagrams and, or in their interview. The diagrams show clearly a discrepancy between what was stated in the interviews and written in the process diagrams. This indicates that this method, on its own, may be unsuitable for eliciting complex working processes. However, the elements written in the process diagrams may be the most frequently used and of greater importance to the participant since they were able to recall them. Equally, the participants may not have been able to recall them, for example some of their art/design actions may be tacit.

Figure 7.4 Reference to users by the participants.

Figure 7.5 Reference to the site by the participants.
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Figure 7.6 Reference to mind mapping by participants.

According to the process diagrams, the architects and designers approach their projects in a similar manner. As elicited from the interviews, they began with a client or a brief and this was followed with research into the client, the users and their needs, the site, functions and existing products. The sculptors' processes contrasted with this. Only two of the six included a brief or client and their processes began with finding a theme or conceptual context in which to work. When searching for a theme the sculptors thought introspectively and brainstormed ideas as well as to talking to experts or interviewing people. Two sculptors also noted the careful selection of material to work with and another took a period of gestation to allow ideas to form. Essentially, the approaches taken by the sculptors were more varied and individual.

The designers and sculptors included the use of prototypes and maquettes to facilitate the development of their ideas (or concepts or designs). However, the sculptors included modelling earlier in their processes than the designers. This supports the notion that the act of modelling to a sculptor facilitates their generation of ideas and is not just for detailed development.

The designers were the only participants to note CAD as a part of their process diagram. From the interviews it is known that sculptors and architects also use computer software and have stated how important it is, but they did not indicate it in their diagrams. The designers used CAD and its virtual modelling capabilities to facilitate their generation of ideas. In a similar way, the sculptors highlighted their use of physical modelling (maquettes) for the same purpose. The designers also noted the use of physical modelling (prototypes or models) during the detailed
design and development stage of their process. None of the architects indicated the use of virtual or physical modelling on their process diagrams.

The process diagrams were an arrangement of words that could provide an insight into how they might view their own working process. For example, referring back to figure 7.3, it is clear that the architect's diagram illustrates a mostly linear process that consists of a number of set stages. The designer's diagram consists of three cycles, one for each of the main stages of his working process and all three are iterative. From this it could be inferred that the designer has a more flexible process that can be iterated many times. The architect's process appeared more rigid; another architect stated on her diagram when parts of the project would have been 'signed off' signifying that she also worked through more rigid stages. Of the fifteen participants [3], eleven of them drew linear and quite rigid processes inferring that they see a clear start and finish to their projects. This applies to some of the sculptors despite their previously stating how their work was a continuous journey; perhaps some overarching aspect of each individual piece contributes to this journey in some way. The type of process a person uses is likely to be influenced by his or her own working style, context and education. The context has already been discussed but the one participant who had had no formal higher education found drawing the process diagrams difficult and drew a chaotic and unstructured process diagram. She would work on numerous projects, stop and begin new ideas, halt projects if they were not going well, or return to previously halted projects or old ideas and resurrect them. Her process of working on them, revealed from her interview, included the use of sketching, painting, researching, modelling and sculpting in no particular order. Perhaps education instils particular processes for working through projects and because she was never exposed to them she had to develop her own style.

On a similar strand, sculptor 1 stated that he had undertaken a degree in industrial design, which was considered a controversial overlap at the beginning of this study. The reason for this concern was that it may have been more difficult to identify differences between sculpture and design when one of the participants was a hybrid sculptor/designer. During the interview he referred to the benefits of having a degree in industrial design, such as having more confidence to research and interact with other professions. However, there was no cause for concern, since he described a working process that reflected those of the other sculptors.

[3] Of the seventeen participants, one architect and one designer did not complete a process diagram.
7.4.4 Summary of Part 1

From these interviews a number of similarities and differences were found between the participants from architecture, design and sculpture. The following similarities and differences are those that are perhaps predictable but were not apparent from the literature.

**Similarities:**
- None of the interviewees used tools or methods to facilitate their interest in emotional aspects of their work.
- The participants did not view brainstorming as a creativity method.
- The interviewees held the attitude that constraints are a positive aspect of a project and facilitate creativity.

**Differences:**
- The sculptors made a point of avoiding certain types or sources of inspiration whereas the architects and designers were keen on sourcing inspiration from anywhere.
- The architects and designers undertook more rigorous research that had more precise aims than the sculptors.
- The sculptors appeared to search for and research experiences to a greater degree than technical / facts and figures which the architects and designers favoured. Most technical research undertaken by sculptors was focused on material properties / processing.

The other similarities and differences found in this study, noted below, confirm with the literature and demonstrate how the study undertaken is potentially reflective of current art/design practice. These findings may not offer any additional contributions to knowledge but they were useful for identifying directions for future research.

**Similarities:**
- Architects, designers and sculptors all undertake projects originating from clients and commissioners that have some form of brief. The sculptors however will not use a brief for their personal work.
- All of the interviewees undertake some form of research to further their work, but what they focus on differs.
Interviewees from each discipline researched into the users and considered them an important source of information. The same research methods were used by participants from each discipline but how they were used and the focus of the interviewees varied. All of the interviewees sketched when generating ideas. Creativity was considered by the interviewees to be a natural phenomenon that cannot be induced through the application of a method.

Differences:
- The sculptors focused on making an artistic statements and working on intangible aspects such as feelings and expressions. The architects and designers focused on more functional attributes.
- The clients for an architectural or design project work more closely with the architects and designers than clients commissioning a piece of sculpture.
- The architects and designers used more inspiration tools to help them find an idea or direction, e.g. flow charts, image/mood boards.
- The generation of ideas is a more communal affair for the architects and designers.
- The sculptors would model at anytime during a project, even at the very beginning to start a project. The designers would model/prototype later in a project once ideas have been developed. The architects rarely modelled in three dimensions.
- The architects and designers used computer visualisation more often than the sculptors.
- The sculptors were less willing to compromise than the architects and designers, even when undertaking a commissioned piece.

One of the attitudes that the participants shared regarded constraints; most considered them to be unavoidable yet inspiring and their attitude was generally a positive one. Another attitude that became apparent was the sculptors unwillingness to compromise their artistic intent or self-expression. They wanted to maintain control over their work. The architects and designers would only take such action if they felt strongly about the situation, however, often their context and need to please the client prevented such behaviour on a regular basis.

How useful process diagrams are for eliciting working processes is still unclear. A more negative perspective is that the data obtained is not as detailed as that from the interviews, however, it could represent the important aspects of a process that
are applied frequently. Furthermore, the shape of the drawn process could also represent how the participant perceives their working process, whether they work towards fixed stages or iteratively cycle from task to task. However, how a working process is drawn may be influenced by the participant’s education. The one participant with no formal higher education in art or design found the task difficult and drew a unique and chaotic diagram.

7.4.5 Part 2: The Design Exercise

Data collected from the design exercise participants (2x architects, 3x designers, 2x sculptors) provided sufficient information to map the working processes they applied to solve the design brief. The sources of data were the diaries, interviews and the participants’ development work.

The process diagrams developed from the audio diary data in chapter six were awkward to follow since they included many arrows indicating iterations. Therefore, process diagrams developed from this design exercise were constructed differently. Data were divided into episodes of activity. Lawson (2004, p18), who used episodes to facilitate his description of the design process, regards them as “reasonably self-contained events that are focused on a particular theme which contribute toward solving the overall problem”. Placing these episodes in chronological order provided an indication of the participants’ working process from which similarities and differences could be identified.

Overview of the Working Processes

The design exercise began with a problem (to design a nutcracker) for the participants to solve and ended when they presented their solution; this provided the main axis of the process diagrams. Located on this axis are the episodes in apparent chronological order (black boxes). Three main episodes were identified from the data; these were exploration, development and generation of ideas, and detail development. The exploration episode consisted of activities that related to understanding the brief further, such as thinking around the problem, research or partaking in discussions on the topic. All of the participants solved the brief by first undertaking some form of exploration. The development and generation of ideas episode was when the participants demonstrated actions that are often associated with ideation, such as sketching or prototyping ideas (Schon, 1983; Lawson, 2004). The third main episode was detail development where all of the participants focused on a particular idea that they would develop further to solve the brief. Actions
associated with this episode included increased attention on one particular idea, moving from general ideas to detailed aspects, production of engineering drawings or CAD visualisations just prior to revealing a final solution. The process diagrams show the episodes contained in distinct boxes, however, there is likely to be some overlap between them. For example, during an episode of exploration, a participant may have thought of many ideas but did not externalise or develop them until later. Four of the seven participants worked through these three episodes in this order (figure 7.7).

The three remaining participants answered the brief by progressing through a slightly different process. Architect 5 was the only participant not to include all three episodes in his process. He answered the brief during his episode of exploration and his detail development episode consisted of the production of the presentation material. Designer 2 undertook a second episode of exploration since he became dissatisfied with his ideas. He re-evaluated the problem and developed a new idea. Sculptor 2 introduced another episode titled gestation. This was a period where little activity took place; the sculptor was waiting for an idea to come to him. Another sculptor who participated in the interviews also noted a period of gestation in his working process diagram where ideas were left to develop naturally. This seems similar to the incubation aspect of creativity theory where ideas develop naturally in the mind (Baxter, 1995). It was during the gestation episode when Sculptor 2 found his inspiration following an incident with some

Figure 7.7 The four participants who applied the same process.
automatic doors (he almost trapped his head between them and likened his head to a nut and how it would have been crushed; he moved on to research torture devices for suitable nut cracking mechanisms). Once this idea was developed he began to explore issues that related to it before further developing and detailing his solution. In contrast, the other participants were more proactive when searching for ideas during their episodes of exploration and idea development. Figure 7.8 shows these three processes.

![Diagram of working processes]

Six of the seven participants solved the design brief following a process of exploration, development and generation of ideas, and detail development. Despite the low fidelity of these processes there is an indication that these architects, designers and sculptors applied a similar working processes when solving this design brief. This demonstrates that these people, who are perceived to be creative, generate their ideas from a process of research and development over a period of time.

**Detailed View of the Working Processes**

The process diagrams in the previous section did not show the true level of detail of the participants’ working processes. The episodes could be broken down further to reveal specific actions and thoughts. This is illustrated in figure 7.9. Each episode consisted of at least one action or activity (orange boxes) and these in turn consisted of the disclosed thoughts the participants had (blue boxes). Two of the participants noted actions that they would have liked to have undertaken but were unable to do so; these are presented in the green boxes.
Most of the differences occurred within the episodes. The precise actions and thoughts of the participants indicated the different ways they approached and progressed through the solving of the design brief. To demonstrate this, the four participants who had worked through the same episodes in an identical order are now shown in figure 7.9 with their episodes expanded to show how they proceeded to answer the design brief. It is clear that each of them had their own personal goal.

**Architect 7**

**Problem**

**Development**

- Exploration
- Generation of ideas
- Development / generation of ideas
- Detail development
- Solution

**Architect 7**

**Architect 7**

- Exploration
- Generation of ideas
- Development / generation of ideas
- Detail development
- Solution

**Designer 1**

**Problem**

**Development**

- Exploration
- Generation of ideas
- Development / generation of ideas
- Detail development
- Solution

**Designer 5**

**Problem**

**Development**

- Exploration
- Generation of ideas
- Development / generation of ideas
- Detail development
- Solution

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Figure 7.9 The four participants with the same episodes but different goals.

This phenomenon also occurred with three other participants who had worked through the episodes slightly differently from the participants mentioned previously. Their process diagrams are shown in figure 7.10.
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Sculptor 2

Problem

Exploration

Gestation

Development /
generation of ideas

Exploration

Development /
generation of ideas

Detail development

Solution

How to solve

Act of not thinking

Design report

Sketching

Research

Gathering

Prototyping

Construction

distraction

Abnormal fatigue

Victims

Existing machinery

Fun / feel good

Mechanisms

Machines

Figure 7.10 The three participants with different episodes and agendas.

In the next part of this chapter the participants working processes are compared. This comparison is divided into three sections, one for each of the episodes: exploration (and gestation), development/generating ideas and detail development. Figure 7.11 shows the link between these episodes and the sections used in the interview protocol for the first part of this study (section 7.2). The episodes were used since they were inferred from actual data collected and not from the literature.

Figure 7.11 Links between the terminologies used in the interview and design exercise studies

Exploration (and Gestation)
The two architects explored the design brief through discussions with colleagues. Architect 5 stated that this was an important aspect of his architectural practice and this was when they would question the brief. The designers and sculptors not discussing the exercise with others seems improbable, however, the architects were the only participants who noted it. From these discussions architect 5 concluded that the brief did not need solving and other than presenting this solution he had
completed the exercise. None of the other participants came to this conclusion; instead they focused on aspects of nut cracking that interested them.

Sculptor 5 approached the design exercise differently from the other participants. His first decision was to produce his nutcracker in stone due to his expertise as a stone carver and this was a logical starting point for him. This corresponds with the thoughts of Cuffaro and Ostrow (2005) who noted artists as being capable of constructing the final article, unlike many designers. Sculptor 5 chose to focus on the incongruous balance between elegance and the brutal act of nut cracking. Sculptor 2 also considered his perspective for approaching the exercise. He chose to follow a sculptural route since he favoured the idea of celebrating the act of nut cracking rather than treating the exercise as a design project and considering users and ergonomics. The sculptors appeared to approach this design exercise from a sculptural perspective and treat it as if it were a commissioned piece of art. The project brief may not have been natural to them but they applied their art experience to solve it.

*I was not necessarily going to go down the line of producing a very ergonomic article that... I sort of got interested in it in the other way round in a sense where by you, the notion of celebrating the idea of cracking a nut.* (Sculptor 2).

When interviewed, the sculptors discussed their approach perspectives within the first few minutes. The architects’ and designers’ perspectives were formed from the results of other activities such as research or discussions and this was the reason why they were disclosed later in the interview. This could be due to the architects and designers’ specifications including more precise areas of interest, such as the user, potential markets and commercial aspects, rather than the intangible and more philosophical aspects the sculptors focus on. Additionally, the sculptors considered their designs to be a one-off or a piece of functional sculpture and not something considered for mass production, as the other participants’ designs seemed to be.

Three of the seven participants (architect 7, designer 1 and sculptor 2) undertook research to gather information. The architect looked for existing nutcrackers and other similar products in the shops. The designer and sculptor browsed the Internet for images, which they used in different ways. The designer produced an image taxon showing types of nutcracker as well as a mind map of potential market
niches and types of user, which contributed towards the development of a design specification and his approach to solving the brief. Such commercial issues are typical considerations for industrial designers (Pugh, 1991; Baxter, 1995). He stated that he would have liked to have undertaken more research with users and watched how they used existing nutcrackers; however, not having time to do this he relied on his gut feelings. He stated that he did not normally work in that way but it was an interesting change. The sculptor used images to facilitate the generation of ideas for aesthetics and mechanisms. Furthermore, the focus of the images in the sculptor’s research was less utilitarian. While the architect and designer concentrated on existing nutcrackers and mechanisms the sculptor searched for old nutcrackers, Victorian kitchenware and medieval torture devices. Those who did not undertake actual research explored the brief by writing or sketching their own thoughts and perspectives towards the brief.

**Generation and Development of Ideas**
All of the participants used sketching to generate and develop ideas for solving the brief. The majority of the sketches were small and appear to have been drawn quickly. Sketches such as these are typical of how many architects and designers begin generating ideas through visualisation of existing ideas and how the act of sketching can facilitate the formation of new ideas (Goldschmidt, 1994; Schon, 1983). This, it seems, is also true for sculptors. During the exploration and idea generation episodes sketching enabled them to understand their research, their thoughts and to visualise how things may be or work, such as mechanisms.

For three of the participants (architect 7, designers 5 and 2) it was during this episode, following a period of sketching, that they decided on their design specifications. However, designer 2 and sculptor 2 required more information and entered into a second episode of exploration. When sculptor 2 continued with the development of his idea he did so by playing with materials in his studio; he appeared to be the only participant to develop his ideas in this way.

**Detail Development**
The detail development episode was when the participants developed their favoured idea into a solution that would satisfy the design brief. How the participants detailed their ideas varied. The two architects drew their solutions. Architect 7 produced engineering drawings to ensure the components would fit together. She stated that these drawings were developmental and a means to present her solution. Two of the designers (1 and 3) produced CAD visualisations and the
remaining designer produced sketches. The two designers who used CAD seem to have developed their idea as they constructed their final models/visualisations. This is inferred from the apparent 'jump' from a small rough sketch to the precise CAD visual. Due to this these two designers could be categorised as black box designers (Jones, 1992). The sculptors were the only participants to construct and present their solutions as fully working pieces.

During the detail development episode, architect 7 stated that during the production of the engineering drawings she appraised her solution and thought of additional ideas. For example, she proposed two versions of her nutcracker, a small individual one and one twice the size for use by a group of people. Also during this episode she thought of the materials and manufacturing methods. Designer 1 also considered his choice of material at this stage. This was the reverse order to sculptor 5 who had chosen his material at the beginning of the exercise.

With the exception of sculptor 2, the participants quite naturally considered the exercise to be over once they had solved the brief and submitted their work. However, when sculptor 2 submitted his solution he stated that it was only a prototype and that he wanted more time to develop the idea which was important to him. To enable him to do this he requested his prototype be returned to him on completion of this research. This could be an indication of a difference noted in the interview study where some sculptors are on a personal journey of discovery implying a degree of project perpetuity. Sculptor 5, the stone carver, did not view his project in this way but this could be due to the fact that his commissioned work has more specific deadlines, similar to the architects and designers. Figure 7.12 shows the participants' solutions to the design brief.
Chapter 7: Study 2 – Current Working Processes

Architect 5

This nut's already been cracked!

Architect 7

Designer 5
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Designer 2

Designer 1

Sculptor 5
7.4.6 Attitudes from the Design Exercise Data

The three designers and architect solved the design brief by focusing on aspects of nut cracking that were either important to them or perceived to be important to other users. These were practical requirements of a nutcracker, such as its ability to crack the shell and how safe it was to use. They also noted the importance of not making a mess and this was a key consideration for them. Three of the five solutions they produced were designed to catch the shell and the mechanism was hidden away or required minimal input to operate. However, the sculptors held an opposing attitude; they both focused on the act of nut cracking. Sculptor 5 explored the contradiction between the brutal act of bashing a nut and the elegance of the piece. Sculptor 2 wished to celebrate the act and action of cracking a nut. They did not mention the needs of the user or highlight problems with existing nutcrackers and neither were concerned with mess. On the contrary mess was considered, especially by sculptor 2, to be an important and fun part of cracking a nut.

Whether or not mess is a good thing is not a point for discussion in this thesis; however, the key finding is that the two sculptors saw something positive in what the designers and architect clearly assumed to be negative. This suggests that the sculptors, who may not be familiar with the rules of usability or user centred design, thought of other aspects to consider when developing their nutcrackers.
Lawson (1994) described this phenomenon and inferred that people will approach a project from their own perspectives. Due to the small sample size, this distinction between the disciplines could be a coincidence, nevertheless, it may point towards and support the notion that sculptors do approach projects from a different perspective to designers or architects.

7.4.7 Summary of Part 2

As with the findings from part one, many of the similarities and differences noted from this part concur with the literature. However, a few differences, that were less predictable became apparent:

- The sculptors approached the project by noting their material and/or a particular theme they would focus on, which was of an intangible nature. The architects and designers noted aspects of their specification later in the project following research.
- Sculptor 2 searched for unusual and less utilitarian sources of inspiration. The architects and designers focused on existing nutcrackers, market niches and users.
- The sculptors held a different attitude towards aspects of nut cracking. Aspects the architects and designers deemed to be negative were considered to be positive by the sculptors.

Other similarities and differences noted, that concur with the literature, are as follows:

Similarities:
- The majority of the participants worked through the design exercise by applying a similar working process: exploration, ideation and detail development. The main differences occurred within the episodes.
- All of the participants sketched when generating ideas.

Differences:
- The architects and designers worked on ideas that could be mass-produced, whereas the sculptors considered theirs to be a one off piece.
- Sculptor 2 appeared to be the only participant to generate and develop ideas through playing with material in his studio.
The architect, designers and sculptors presented their final ideas differently. The sculptors were the only participants to model physically their designs. The designers used CAD and the architect produced engineering drawings.

The main difference in attitude concerned the identification of positive or negative aspects of nut cracking. The designers and architect considered the act of cracking and the mess to be a negative aspect whereas the sculptors regarded it to be positive and worthy of celebration - they approached the project from different perspectives.

### 7.5 General Discussion

The findings from this study correspond with those from study one. The questionnaire study revealed the sculptors' preference for more intangible and expressive topic areas which were also noted for the sculptors in this study. Also, like the students in the audio diary study, the professional sculptors did not like to compromise. The working processes also appeared to be similar in both studies with a general consensus of exploration, ideation and development. The key difference appears to be what the participants focused their attention on and what they perceived to be important.

The above observation was also noted in a studio session organised concurrently with study two (appendix 2.4) [4]. The studio session was an organised event where design students were given a sculptural brief to solve by a professional sculptor. The aim for the session was to observe differences between the sculptor and design students. The brief developed by the sculptor required the students to design a new playground using garment patterns as their sole source of inspiration; this concurs with the findings from study two where the sculptors were more selective of their sources. The design students considered the use of a single and unusual source of inspiration to be an interesting way of working. One further similarity between the studio session and study two was the differences in opinion the participants had regarding sketching and modelling. The sculptors in both studies favoured modelling and doing so early in a project, sometimes as a starting point. The designers were less willing to model their playground ideas, preferring to sketch them instead. The professional designers who spoke of modelling or prototyping their ideas would do this later in a project. From the studio session and

[4] Appendix 2.4 consists of the full report of the studio session.
this study it is clear that sculptors and designers approach their projects differently despite working through the similar episodes noted previously.

The processes identified from this study do correspond with those in the literature, such as those from Pugh (1991) and Baxter (1995) with regard to the generic stages of designing; however, the differences occur within these episodes. One particular difference is the what the participants choose to focus on and how they think when developing their ideas. This phenomenon has been noted in the literature where artists were found to think differently from the architects with whom they were collaborating (Fernie, 2006). Some of the differences noted by Fernie (ibid) correspond with those found in this study, such as the artists focusing on experiences, being used to working on their own and being more idea focused than project focused.

Within this study the first three objectives have been achieved: the participants’ working processes have been identified, similarities and differences have been noted between them and differences in their attitudes were found. The fourth objective for this study was to determine whether the decision to research into sculpture, originally based on the findings from study one, remained viable in the light of the more detailed data collected from the interviews and design exercise. Looking back through the chapter to the findings from the interviews and design exercise and at the summary lists it is apparent that the majority of differences are between the sculptors and the other participants. The sculptors may follow a similar generic process but within this they have particular ways of achieving their goals that differ to the ways a designer or architect will progress. The architects, who were included in this study for their ability to develop functional buildings that can also captivate human desires, were found in this study to work in a similar manner to the designers. When sourcing inspiration they would search almost anywhere, and so too would the designers (the sculptors were more selective). Many of the participants used similar research methods but the architects and designers were more rigorous and when undertaking a research project they had clear aims in mind. The generation of ideas was a more communal affair for the architects and designers and they each detailed their ideas using CAD software. The main difference between the architects and designers was their attitude towards physical modelling. The sculptors’ attitudes also differed from those of the architects and designers in the design exercise where they worked on the same brief but explored and appraised it differently. The architects’ and designers’
approach to the exercise have more in common with each other than with those of the sculptors.

The final objective was to identify aspects (episodes, activities, etc) of the art process that could be studied more closely in future research, from which art methods could be sourced. The aspects worthy of future research were those that appeared to differ the most from the actions of the industrial designers. These may contain methods that are unfamiliar to designers and may facilitate their creativity; this is based on the theory of trying something new (Fletcher, 2001). These aspects were determined from the two lists of similarities and differences identified from the interviews and design exercise. In total there were sixteen differences, of which eight referred to the exploration episodes at the beginning of the processes: how they approach a project and explore a topic area. The remaining eight differences related to the other two episodes or more general aspects, such as attitude. The number of similarities totalled eleven and four of these referred to the exploration episode; however, these were general similarities, for example, they all used projects briefs when working with clients or they all undertook some form of research activity. Therefore, despite working through similar episodes, it is the activity within these differs and the sculptors appear to differ the most from the architects and designers during the exploration episode. One further difference identified is how the sculptors approached and began their project work. The sculptors often focused on intangible aspects such as themes or feelings whereas the architects and designers did not appear to work like this; instead they selected more functional specifications later in project following research activity.

When the findings from the design exercise were compared to the reflections of the architects participating in the tea and coffee towers project (TCT) (Mendini, 2003) some resemblances were noted. Unfortunately due to having only the book that accompanied the TCT project as reference these resemblances are purely speculative but they do help to demonstrate a more sculptural approach to designing.

The participants of both projects worked within a similar context; they had fewer constraints to work to and could solve the brief as they wished. David Chipperfield, one of the participants of the TCT project noted this additional freedom:
Freed from the industrial and economic constraints of commercial design, the preferences of the author are both liberated and exposed. (Mendini, 2003, p55)

The TCT participants seemed to enjoy this freedom with many of the architects' passages in the book referring to the development of self-expressive solutions. For example:

Start with the world (since the tea and coffee set should contain everything that's needed for serving coffee and/or tea, it should be a self enclosure, it should be a world in itself, it should wind around itself and wrap itself up). We could start with any regularised form, any standard, any convention (that can then be deviated from), since we've used the word 'world', let's start with a sphere. (Vito Acconci, ibid, p21)

The reason why I designed this coffee set in abstract white ceramics was that I wanted to express the blank spaces that spread infinitely. And of course, the frogs allude to water. (Toyo Ito, ibid, p103)

Working as architects in a 'new world' grid city, we have a perspective that is unconstrained by 'old world' limitations. ... Our proposal therefore is for a tea and coffee set that stands as a tower - a micro-skyscraper for the table. (Denton Corker Marshall, ibid, p63)

Of the twenty-two architects who participated in the TCT project it appears that only three referred to commercial issues such as mass production or users in general; however, their designs still seemingly originated from a personal perspective. In contrast, the architects and designers participating in the design exercise focused on more commercial issues and existing products, allowing these to influence their solutions. The sculptors were more self-expressive and focused on intangible and more abstract aspects, as did the TCT architects. This demonstrates that those from disciplines other than sculpture can approach a project with intangible aspects in mind and is perhaps a way of thinking that can be learnt or applied. Therefore, perhaps any methods sculptors may use to think and work in this way could be used by industrial designers.
7.6 Conclusions

The main conclusion from this research is that the sculptors differed from the other participants by approaching and exploring their work differently. In particular, they selected their approach perspective (goal) at the beginning of a project and not after research as the designers and architects did.

Other findings from the study confirm the literature and existing knowledge. The findings noted below are those that also helped to provide a direction for the next study.

- The architects were too similar to the designers in these studies to be considered for inclusion in future research. Their working processes were similar, used similar methods, researched using similar methods, focused on similar aspects and held similar attitudes.

- The sculptors, architects and designers applied a similar working process with general episodes of exploration, ideation and detail development.

- The sculptors held different attitudes to the designers and architects; they were less concerned with utilitarian aspects and more interested in the experience.

- Sculptors appear to find their inspiration from different sources to the designers and architects.

Therefore, how sculptors approach and explore a project, rather than their general process which appears to be similar to designers, is a topic worthy of future research and is where methods that may be of use to designers may reside. These conclusions contributed towards achieving the research aim through the identification of where to look for the art methods that could facilitate design creativity.
Chapter 8: Study 3 - Focusing on Sculptors

In this chapter the details and findings from the third study of this research are presented. This study was the simplest to complete since it was essentially a hunt and gathering exercise as depicted by Thackara’s quote in the introduction (section 1.1). As with previous studies this one also begins with a rationale and the aims and objectives for the study. The applied method and strategy for analysing data collected are detailed prior to the discussion of the data.
8.1 Rationale

From the previous study, sculptors were found to work slightly differently from the industrial designers and architects who participated, especially with regard to how they approached and explored their projects. The purpose of this study was to focus on the sculptors and discover in more detail how they did this. In particular, the focus moved from the overall working process to identifying any methods the sculptors may use when progressing their work.

8.1.1 Aim

The aim for this study was to identify methods the sculptors used to approach and explore their work.

8.1.2 Objectives

The objectives for achieving this aim were:

- To obtain detailed information from professional sculptors regarding how they work, especially when beginning a project.
- To review the data collected for methods used.

8.2 Method

The most suitable data collection method for identifying methods used by sculptors when approaching and exploring projects was deemed to be the interview. The interview method has been used previously in studies 1 and 2 for its suitability for collecting detailed qualitative data in a flexible manner where the interviewer can control the session and react with further questions to the interviewees’ responses.

To obtain details of the methods used, the interviewees were asked to recall how they had worked through three of their past projects. This approach simplified the exploration for methods since the participants could refer back to precise experiences that have occurred and would therefore be easier to recall. Methods identified in this way would have originated from events that had, according to the interviewee, occurred and the methods were more likely to have been tried and tested by them. Supposing how they may have worked on a future or hypothetical project may have resulted in less reliable data for it would not be based on fact.
The interview protocol was designed to encourage the interviewee to talk freely about their projects and the interviewer would intervene when clarification or more information was required, or to direct the progression of the interview. Cohen, Manion and Morrison (2000) referred to this type of interview as an interview guide approach and the use of an outline (e.g. recollection of three projects) can result in comprehensive data being collected. The consequence of the absence of precise questions means that data is not comparable between participants (Cohen, Manion and Morrison, ibid). However, comparability was not a requirement of this study.

Data were collected using two techniques. The interviews were audio recorded in order to collect everything that was said. However, from study 2 it was discovered that some of the sculptors worked in noisy environments, such as communal studio spaces with other artists. On occasions the dictaphone was unable to record the interviewees’ voices clearly. Therefore, to avoid this the interviewer also took notes in addition to the audio recording. This note taking reduced the time required for sorting data since the interviewer could identify and note the methods during the interviews. Data reduction such as this can occur throughout a qualitative research project (Miles and Huberman, 1994).

8.2.1 The Sample

The sample targeted were professional practising sculptors working in England. This sample were located via the axis website (www.axisweb.org). Axis is a charitable organisation that enables British based artists to promote themselves by uploading their portfolios to a website. Search functions can be used to locate a particular type of artist, such as sculptors. The sculptors’ work can then be reviewed to determine whether or not they are a conceptual artist, prior to contacting them.

Pilot interviews were undertaken with two professional sculptors (sculptors 2 and 5), who had participated in study 2, to test the design of this study. Once completed the interviewees were asked for their opinions of the session and of the questions asked. Neither of them expressed any problems regarding the recollection or description of three past projects. Sculptor 5 commented on the suitability of this research method since sculptors generally love to talk about their work and themselves. Consequently, the interview design remained unaltered and data from these two participants were included in the analysis. Thirteen other sculptors were also recruited for participation in this study (sculptors 8 to 20).
8.3 Data Analysis and Identifying Methods

From the outset of this study, the researcher was aware that the aim was to identify methods and it was natural that the notes made reflected this interest. However, the audio recordings of the interviews were used to check the handwritten notes for omissions and to ensure they corresponded accurately with what was said. Since the information required was of a precise nature and easily identifiable, verbatim transcriptions were considered unnecessary. Robson (2002) agrees that while audio recordings are vital for increasing the trustworthiness of qualitative research they do not always require transcribing to obtain the findings. Nvivo was used to simplify the search for methods since aspects could be coded and clustered. This revealed and grouped the participants who used similar methods.

In chapter 2, a method was described as an aspect of a project that can be a way of working, such as using a tool like brainstorming or sketching, or a way of thinking or approaching a project. In short, a method is a way of doing something and therefore, what the sculptors do to approach and explore their projects can be considered a method. A few examples are noted below:

One participant was noted for describing herself as a systems artist:

She is a 'systems artist' where she sets and works to strict criteria that she will only work within a certain area. For example she limited herself to just using angle iron or to a philosophy, in this case continuous line and colour. She would follow the rules but would often not know what would happen until it appeared. (Sculptor 8)

A few other interviewees were also noted for applying rules:

For one piece she regimented her drawing time to a certain number of hours for each piece to see how she could get rhythm into a piece. (Sculptor 9)

He said that he would apply his rules, these are: particular colours, forms, material use and a way of leading the eye. (Sculptor 10)

From these interviewees, the method of systems approach was formed, where a set of rules are applied by the artist/designer prior to generating ideas; these act as guides or constraints by which to work. This method originated predominantly from
sculptor 8 but other sculptors were found to apply rules too. Methods can also be sourced from individuals, for example:

She does not like conflict but aims to simplify the experience and focuses on one dominant aspect such as form or colour. (Sculptor 11).

The above sculptor described her dislike of conflicting aspects of a piece and she preferred to focus on a single aspect and simplify the experience. This demonstrates how a simple statement can reveal a method.

8.4 Results and Discussion

The strategy of asking the fifteen sculptors in an interview to recall past projects, combined with a clear focus for noting how they worked, enabled 44 methods to be identified. In order to reduce bias and ensure analytical rigour was maintained, three design researchers and one lecturer reviewed the methods. The review process required the four reviewers to read and comment on the methods, using the following criteria as a guide:

- Are any methods hard to understand?
- Are any methods too similar to another method in the list?
- Are any methods too long or complex - should they be split?
- Are any of the methods too simple, offer no obvious assistance or are confusing?

The purpose of the review session was to filter any methods that perhaps were not really a method or offered no obvious assistance. One method was deleted and two other methods were merged into one since they were too similar to each other. The final number of methods identified from the fifteen sculptors was 42. The statements from the interviews, from which the methods were extracted, can be seen in appendix 3.1.

The 42 methods can be divided into two types. The first (n=17) are those that are advice orientated. These methods are more abstract and apply to personal philosophies, general ways of working or sources of inspiration. The second (n=25) are those that are more obvious in their application and have a clearer procedure. The methods are listed below in tables 8.1 and 8.2. Each table consists of the methods' name; the number of sculptors who applied the method; a brief
Chapter 8: Study 3 – Focusing on Sculptors

description; links to the literature or their similarity to methods noted in previous studies.

<table>
<thead>
<tr>
<th>Advice Method - Name</th>
<th>No. Sculptors n/15</th>
<th>Basic description of method</th>
<th>Corresponding method from literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blind research</td>
<td>2</td>
<td>Most things are related in someway or can inspire seeming unrelated things. Take time to research anything at all.</td>
<td>Knowledge based creativity (Dasgupta, 1996). Brainification (theory (Koesteiler, 1970))</td>
</tr>
<tr>
<td>Capture</td>
<td>5</td>
<td>Ideas can strike anywhere; be prepared. Sculptors take note pads or sketchbooks with them wherever they go.</td>
<td></td>
</tr>
<tr>
<td>Child's view</td>
<td>2</td>
<td>Those sculptors who worked with children found them to be more freethinking, viewing the world from a different perspective.</td>
<td>IDEO employs children in their design process (Kelley, 2005).</td>
</tr>
<tr>
<td>Constraints</td>
<td>2</td>
<td>Removing or questioning constraints and thinking that anything is possible - throughout a project.</td>
<td>Similar to brainstorming but more insular and longer duration.</td>
</tr>
<tr>
<td>Dialogue</td>
<td>8</td>
<td>Many sculptors will talk to anyone about their work or ideas in order to bounce ideas around and have abstract thoughts.</td>
<td>Less focused version of brainstorming (Kelley and Litman, 2001)</td>
</tr>
<tr>
<td>Environment</td>
<td>4</td>
<td>Changing and working in a new or alternative environment; this change can help generate new ideas.</td>
<td>Similar to the Set designer noted by Kelley (2005).</td>
</tr>
<tr>
<td>First idea - best idea</td>
<td>2</td>
<td>A couple of sculptors referred to the importance of their first ideas; often they were the most intuitive and better than subsequent ideas.</td>
<td>Study two – two of the architects referred this philosophy.</td>
</tr>
<tr>
<td>Head soup</td>
<td>1</td>
<td>This regards knowing or finding out what makes your mind tick, identifying the conditions in which you are most creative.</td>
<td></td>
</tr>
<tr>
<td>Honesty</td>
<td>6</td>
<td>This regards matching your morals and ethics to your work.</td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td>8</td>
<td>Sculptors work towards developing and evolving their own language; language is the essence of your work and what makes you unique.</td>
<td>Noted in Study two by a designer.</td>
</tr>
<tr>
<td>Nature</td>
<td>5</td>
<td>One third of the sculptors referred to nature as an important source of inspiration.</td>
<td>Bionics (VanGundy, 1988).</td>
</tr>
<tr>
<td>Advice Method - Name</td>
<td>No. Sculptors n/15</td>
<td>Basic description of method</td>
<td>Corresponding method from literature</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Obviousness</td>
<td>3</td>
<td>Considering sources of inspiration carefully; are they too obvious, would everyone begin a project with that source? Less obvious sources may provoke more innovative ideas.</td>
<td>VfP (Hekkert and van Dijk, 2001).</td>
</tr>
<tr>
<td>Out of the discipline</td>
<td>4</td>
<td>Sculptors rarely allow art to inform art. Some sculptors look to other disciplines for ideas, processes, inspiration etc.</td>
<td>Thackara (2005) noted the importance of looking elsewhere for processes.</td>
</tr>
<tr>
<td>People watching</td>
<td>4</td>
<td>This is not just observing what people do or how they do things but also noting the physicality of the body: the shapes, colours, positions, movement and so on.</td>
<td>Noted by a designer in study two.</td>
</tr>
<tr>
<td>Philosophy</td>
<td>6</td>
<td>The sculptors appeared to think very hard about their work and look for abstract ways of interpreting situations or ideas.</td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>7</td>
<td>Sculptors are often experts in a particular process or using a particular material. However, they frequently try new materials or ways of doing things.</td>
<td></td>
</tr>
<tr>
<td>Relax</td>
<td>6</td>
<td>Some sculptors would take a break from their work and relax if they were struggling to progress. Taking a walk was a popular relaxation method.</td>
<td>Incubation period in creativity process (Baxter, 1995)</td>
</tr>
<tr>
<td>Reprocessing</td>
<td>5</td>
<td>Sculptors do not copy things directly, but interpret things in their own way, re-applying other people's ideas.</td>
<td>Source of inspiration - follows biassocation theory (Koesteller, 1970)</td>
</tr>
<tr>
<td>Spoon feeding</td>
<td>3</td>
<td>This regards the withholding of information, requiring the viewer to think for themselves and interpret things in their own way.</td>
<td></td>
</tr>
<tr>
<td>Too comfortable</td>
<td>1</td>
<td>One sculptor kept an eye on how she worked, and when things were getting too easy or repetitive she purposely altered her working process - avoids complacency and encourages new ideas.</td>
<td></td>
</tr>
<tr>
<td>Why</td>
<td>3</td>
<td>Some sculptors made a point of asking themselves why they liked or disliked something.</td>
<td>Why technique (De Bono, 1990 and Von Oech, 1984)</td>
</tr>
</tbody>
</table>

Table 8.1 Advice orientated methods from the sculptors.
### Chapter 8: Study 3 – Focusing on Sculptors

<table>
<thead>
<tr>
<th>Technique Method</th>
<th>No. Sculptors</th>
<th>Description of method</th>
<th>Corresponding method from literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collections</td>
<td>3</td>
<td>Surrounding themselves with things they find elegant, beautiful, ugly and so on can be inspiring.</td>
<td>Study one – textile students were noted for collecting items for inspiration.</td>
</tr>
<tr>
<td>Conflict</td>
<td>1</td>
<td>One sculptor believed that reducing the number of conflicting elements in a piece could enhance the overall experience, making it more pure.</td>
<td>Study two – another sculptor worked in this way.</td>
</tr>
<tr>
<td>Conventions</td>
<td>2</td>
<td>Breaking conventions or assumptions can lead to new ideas.</td>
<td>Breaking assumptions (De Bono, 1990)</td>
</tr>
<tr>
<td>Detail</td>
<td>2</td>
<td>Artefacts consist of many elements such as line, planes, volumes, textures, colours and so on. Two sculptors noted how they select particular elements to focus on and develop.</td>
<td>Rowena Kostellow taught a design programme that touched on this. (Hannah, 2002)</td>
</tr>
<tr>
<td>Essence</td>
<td>6</td>
<td>This is the fundamental aspect of a piece. Sculptors focus on this and work to realise it. Sculptural essences tend to be more intangible (feelings, emotions)</td>
<td>Study two – architects and designers noted finding core issues.</td>
</tr>
<tr>
<td>Frames</td>
<td>1</td>
<td>Using a piece of card with a square cut out, the user can frame things; this can reduce the amount of surrounding information.</td>
<td>Method used in schools of art.</td>
</tr>
<tr>
<td>History</td>
<td>5</td>
<td>One third of the sculptors used historical information to inspire ideas for their work.</td>
<td>Architects stated this in study two. Biassocation theory (Koestler, 1970)</td>
</tr>
<tr>
<td>Interaction</td>
<td>3</td>
<td>Nothing lives in isolation; therefore, note and consider possible interactions.</td>
<td>Biassocation theory (Koestler, 1970)</td>
</tr>
<tr>
<td>Links/relations</td>
<td>4</td>
<td>Linking seemingly unrelated things can promote new ideas.</td>
<td>Biassocation theory (Koestler, 1970)</td>
</tr>
<tr>
<td>Mindless mark making</td>
<td>4</td>
<td>Ideas can develop from mindless mark making or doodling.</td>
<td>Method used in schools of art.</td>
</tr>
<tr>
<td>Modelling</td>
<td>14</td>
<td>Modelling ideas was an important method for all but one sculptor – no amount of sketching can replace physical interaction with models.</td>
<td>Study two – the designers also model to test ideas.</td>
</tr>
<tr>
<td>Play</td>
<td>11</td>
<td>Play is unstructured doodling in three dimensions; many ideas can form from this interaction with media.</td>
<td>Play (Von Oech, 1984)</td>
</tr>
</tbody>
</table>
## Table 8.2 Technique orientated methods from the sculptors.

From this study it is apparent that sculptors use methods (advice/strategy or technique) to help them progress their artwork. Art does not appear to be the random realisation of a form that some in the literature believe it to be; instead art is often the result of applied processes that can help the artist to generate ideas and explore possibilities. The most common methods, those stated by seven sculptors or more, were:

<table>
<thead>
<tr>
<th>Technique Method</th>
<th>No. Sculptors n/15</th>
<th>Description of method</th>
<th>Corresponding method from literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td>5</td>
<td>Altering scale and the perspective of things can change the way things are seen, helping to generate new ideas.</td>
<td>Aldo Rossi sketched using extreme scales (Rossi, 1988)</td>
</tr>
<tr>
<td>Series</td>
<td>5</td>
<td>One third of the sculptors liked to produce a series of pieces that share a theme: different perspectives of the same project.</td>
<td>Similar to Adidas when they design safe and risky concepts (Lucas, 2004)</td>
</tr>
<tr>
<td>Site specific</td>
<td>5</td>
<td>Some sculptors develop pieces that are destined for a particular site. Sites can inspire ideas and direct projects.</td>
<td>Study two – architects also design for sites Biassocation theory (Koesteller, 1970)</td>
</tr>
<tr>
<td>Systems approach</td>
<td>5</td>
<td>A systems artist will apply self-imposed rules on their ideation; such constraints can also inspire new ideas.</td>
<td>Selecting criteria (Cross, 1994; Jones, 1992)</td>
</tr>
<tr>
<td>Twist</td>
<td>7</td>
<td>Almost half the sculptors interviewed liked to include a pleasant twist or surprise in their work for the viewer to find.</td>
<td></td>
</tr>
<tr>
<td>Uncomfortable</td>
<td>1</td>
<td>One sculptor would reverse engineer his pieces by starting to develop pieces he did not like and then work out why he did not like it and change aspects to improve it.</td>
<td></td>
</tr>
<tr>
<td>Ways of seeing</td>
<td>3</td>
<td>One sculptor said to be an artist you must learn how to look. To inspire ideas, some sculptors looked at things differently, putting things under microscopes or taking aerial photographs.</td>
<td></td>
</tr>
<tr>
<td>Workshops</td>
<td>4</td>
<td>Not all sculptors work in isolation, a few hold workshops to allow members of the public to generate ideas that they can interpret.</td>
<td>Study two – the architects and designers referred to using workshops.</td>
</tr>
</tbody>
</table>
Modelling and playing are the top two methods used by the sculptors demonstrating that these are perhaps important ways of exploring and approaching a project. These two aspects were also noted in study 2 (chapter 7) as being used by the sculptors and reinforces this inference. The three other commonly applied methods are more philosophical since they refer to ways of thinking and approaching a project. Essence refers to the core focus of a project, the key aspect that guides the sculptor and as in studies 1 and 2 these were mostly intangible characteristics such as feelings, emotions and experiences.

Should these findings be applied to the general population of sculptors it could be inferred that the majority will apply methods similar to the aforementioned top five. This contributes towards demystifying the phenomenon of how sculptors work that was discussed in chapter 3. However, a further 37 methods were also identified and that 31 of them were stated by five sculptors or fewer. This is an indication that despite having a few commonly applied methods many more are applied on an individual or niche basis. Perhaps the sculptural process is more varied than the findings from previous studies suggest.

When reading through the list of methods identified, it is clear that a number of them are not new in the sense that they have been noted in literature. One area of the literature that has many links (~15/42) is creativity, noted in chapter 2. Some have loose links with the brainstorming technique that is used by designers (Kelley and Littman, 1999) and others are similar to techniques promoted by DeBono (1990). The most common link to creativity appears to be Koesteller’s (1970) bisociation theory where the methods encourage the user to look for links between two seemingly unconnected aspects.

With regard to the overall aim of the research, to explore the arts for methods that may facilitate design creativity, the similarities to creativity methods could be a concern. In study 2 designers were found to have a low opinion of creativity methods which concurred with the findings of Roy (1993). However, when disguised as art methods designers may not dismiss them so readily. Furthermore,
Chapter 8: Study 3 – Focusing on Sculptors

during the interviews none of the sculptors referred to creativity methods or their use of them; these links appear to be more coincidental than definitive decisions by the sculptors to use creativity methods.

Six of the methods identified were similar to those used by the designers interviewed in study two and are unlikely to contribute to design any further. For example, the designers mentioned modelling their ideas, people watching, finding the essence of a product, brainstorming, developing their own language and using workshops or focus groups. A further seven methods were also similar to those used by designers in industry, noted in the literature (chapter 2), such as developing a series of ideas in parallel, selecting key criteria to work to or recruiting children in the design process. From the previous studies and the literature it was found that artists work towards different goals and work from different perspectives to designers, yet from this study it is surprising to find that they appear to use similar methods.

Kelley, (2005) wrote a book titled The Ten Faces of Innovation which describes particular characters in an organisation that contribute towards innovation. When describing the traits of these characters, Kelley (ibid) also noted ways in which they worked and the methods that they may apply. When comparing the methods identified from the sculptors with those noted by Kelley, some similarities were apparent. For example, the anthropologist is an innovator who searches for inspiration from all sources with an open mind and one who looks at situations from different perspectives. An anthropologist at IDEO employs children and people as sources of inspiration in workshops or by simply watching them undertake tasks, as do some of the sculptors. The anthropologist will also be ready to capture any information as it happens using their camera phone or notebook and five sculptors also stated similar advice. Table 8.3 (overleaf) consists of Kelley’s ten faces of innovation and the methods stated by the sculptors that appear to correspond to each.
Table 8.3 Links between Kelley's (2005) ten faces of innovation and the methods identified in this study.

It is impossible to make definitive links between the sculptors' methods and those noted by Kelley (2005) due to the limited amount of information, however, there appears to be similarities between the methods used by designers and sculptors. In addition to this, when considering the work by Kelley (ibid) and that of the aforementioned design literature in chapter 2, it seems that four of the five methods used most by sculptors are also used by designers. Twist was the only method unique to the sculptors.

The emphasis so far in this discussion has focused on noting the methods that link to literature and previous studies. However, approximately ten methods do not appear to have a link to other known methods. These are: capture, head soup, honesty, philosophy, process, spoon feeding, too comfortable, twist, uncomfortable and ways of seeing. The word approximately has been used since some of the boundaries between methods are unclear; for example, the method dialogue shares similarities with brainstorming but it is not exactly the same for it is less formal and encourages the sharing of ideas and abstract conversations rather than purely listing ideas. Some methods are not linked to others since they are quite abstract. For example, head soup is a method that can help the user think about their own creativity and what they need around them or where they need to be in order to maximise their ability. Some of the methods were also too general for
documentation in the literature, such as capture, which is concerned with being ready to take notes or record something. This method may date back to and beyond Leonardo DA Vinci's notebooks but its simplicity is not a reason to dismiss it provided it is a method used by the sculptors.

Despite the similarities with methods currently applied by designers none of the 42 methods identified from the sculptors were dismissed. The reason for this was that data from this study enabled, perhaps for the first time, the methods used by British contemporary sculptors to be documented. Methods in this list may overlap with those of design or other disciplines but it also provides an indication of how sculptors approach and explore their project work. The removal of any methods would dilute this contribution to knowledge.

8.5 Conclusions

From this study into how sculptors approach and explore their artwork a few key findings and contributions to knowledge were identified:

- Sculptors do use methods to progress their artwork and sculpture appears to be a rich source of advice/techniques for ways to approach or explore a project.

- A collection of methods used by contemporary sculptors does not appear to have been documented previously and this list can provide a greater insight into how sculptors work.

In addition to the above conclusions, it could be implied that the methods used by sculptors to progress their work and achieve their goals may not be that dissimilar to those used by designers. This was concluded from the comparison of the collected methods with those found in the literature and from the findings of the previous studies.

The methods collected from this study enabled the research aim to be achieved, for without the methods it would have been impossible to determine whether they could facilitate design creativity.
Chapter 9 : Study 4 – Introducing the Sculptors’ Methods to Designers

In this chapter the final study is presented. This study is a preliminary test of the methods identified from the sculptors in the previous study. The first part of this chapter begins with details surrounding the development of a mode of communication that can present the methods to the designers. The next part consists of describing the methods used to present the methods to the designers and a discussion of data collected. Prior to this, there is the rationale for the study and the subsequent aim and objectives.
Chapter 9: Study 4 - Introducing the Sculptors' Methods to Designers

9.1 Rationale

In the previous study 42 methods used to approach and explore projects were identified from interviews with fifteen sculptors. The purpose of this study was to present these methods to designers and gather some preliminary feedback. Originally, the 42 methods existed as a list and prior to presenting them to designers they were transferred to a more suitable mode of communication, one that would appeal to a designer. The first part of this chapter consists of a discussion of possible communication methods and reasoning for the final selection. The second part consists of the study where the methods were presented to designers for their feedback and the methods' potential usefulness to design is discussed.

9.1.1 Aim

The aim for this study was to gain an insight into the potential use of the methods used by sculptors for design.

9.1.2 Objectives

Three objectives were identified for achieving this aim:

- To identify a suitable mode of communication for the sculptors' methods
- To obtain feedback on the methods from designers: are the methods new, interesting or useful?
- To preliminary test the methods with designers.

9.2 Communication of the Sculptors' Methods

For the methods to be reviewed and tested by designers they required processing. The initial act was to re-write each method more clearly and where necessary include examples from the interviews. The second process was to develop a means for their communication to designers.

Designers are generally visually orientated people, designing and developing ideas through drawing (Schon, 1983; Jones, 1970; Lawson, 2004). Many also employ visually orientated methods such as mood or image boards, noted by the designers and architects in study 2 (chapter 7) and by Garner and McDonagh...
(2001) and Baxter (1995). With this type of audience the methods' description ought to remain concise and perhaps include a visual element to catch and hold attention. The communication method should also be appropriate to the available budget and time allocated to this study; this was approximately £150 and four months. The time constraint was present due to the impending completion of the researcher's contract and the availability of potential student participants prior to the end of the semester.

One option was to produce a database of the methods and this could have been easily distributed via a website or compact disk. However, the flexibility of using a website or compact disk is limited by the need for a computer. Another option was to print the methods; this can include cards, posters, books, pamphlets and leaflets. Paper based media may not offer the same level of functionality as a computer database, such as, keyword search functions or the saving of preferences, but they can be nice things to have and sort through.

Cards have been used previously for communicating methods to designers and one example is the IDEO method cards (2003). IDEO, a large international design and human factors consultancy, are known for developing and using unusual research methods that can help designers empathise with users more easily. They had collected 51 methods that they either developed or used and each method was described on a small card along with an example of its application. On the other side of the card a corresponding image was printed.

The Cambridge Engineering Design Centre have also developed a set of cards to promote, educate and inspire designers to apply the principles of inclusive design during new product development. The information provided by the cards extends beyond methods to case studies and statistics that demonstrate how beneficial designing inclusively can be (Cambridge Engineering Design Centre, 2005).

These two examples of using cards to communicate methodological information, demonstrate that they are a tried and tested medium for such as task. Cards are more flexible than a book or pamphlet since the user can sort through them, select and place their favourites on one side (Pink, 2003) or pin them up so they are in a prominent position making it easier to refer to them. The designer's interest in the cards can be increased by the accompanying image. Therefore, the card method of communication was selected. The time required for the
design and production of the cards was less than one month and the cost of printing was within the budget. Figure 9.1 is an image of the cards produced for this study. All of the cards have been listed in appendix 4.1.

Figure 9.1 The cards produced for this study to disseminate the sculptors' methods.

9.3 Method

The ideal research methodology would have involved presenting the cards to professional designers for them to use on a number of their projects over a long period of time. The methods they used and how they facilitated their projects (and thus design) could have been recorded in a logbook. The extra time spent using the cards and exposure to the methods would have enabled the designers' opinions to go beyond the first impressions collected in this preliminary test. Data collected from a strategy of this nature may have produced findings that were grounded in genuine design practice. Nevertheless, the methods used for this study had to work within the available time and a more suitable research strategy was required.
The aim of this study was to determine whether these methods have the potential to facilitate a designers' creativity and to achieve this aim, the following three points were considered when developing the research strategy:

1. **How new are these methods to designers?**

   This determines how familiar the designers are with the sculptors' methods. Methods that are unfamiliar and had not been applied by the designers would have a greater potential for offering something new to design and provide an alternative method for them to use.

2. **Do the designers find the methods interesting?**

   It follows that the methods considered to be interesting have a greater potential for being applied by designers and thus increasing the chance of facilitating their designing.

3. **Do they appear to have the potential to be useful?**

   Designers have control over the methods they use to solve a design problem and only the methods perceived to be useful would be considered. Therefore, how useful designers judge these methods to be, could determine their potential for facilitating design.

   One option was to provide designers and or undergraduates with a set of cards and ask them to review them using a questionnaire. Data from this strategy would provide an insight into their first impressions of the methods and the number of methods that were new or unfamiliar to them. Participants could also be interviewed to obtain more detailed data.

   Another option was the design exercise, similar to that organised for study 2. This would simulate a design project and provide an indication of the methods' potential for use in a design scenario. However, the design exercise used in study 2 permitted the participants to complete the exercise in their spare time and, as a consequence, the duration of the study was many months; this time frame was not suitable for this study.
The selected research methodology was a combination of these three methods. Questionnaires were distributed to a large sample to collect general opinions of the sculptors' methods whereas the design exercise and interviews were organised to obtain more detailed data regarding how the methods may be used and their potential use in industry. This combination would ensure a variety of data types which could be triangulated to increase rigour.

9.3.1 The Sample

The sample recruited for this study consisted of final year industrial design undergraduates and professional designers. The undergraduates were recruited for the questionnaire and the design exercise. These participants were easily accessible and large sample size was obtained. This enabled a general opinion of the methods to be obtained. The professional designers were interviewed and they provided more detailed data regarding their opinions of the methods from an industry perspective.

9.3.2 Part 1: The Questionnaire

The questionnaire was designed in two parts. The first set of questions put to the designers was succinct and direct: had they come across any of these methods previously; had they used any these methods before and which did they find interesting? To answer these questions each participant was provided with a set of cards and a table of the methods against which they could select the relevant answer. The second part of this questionnaire was designed to collect data on the methods' perceived usefulness and consisted of four questions:

1. Do you think these methods could be of use to you as a designer?
2. To whom would they be most suited? (individual or team)
3. How would they benefit the designer?
4. Do you have positive or negative feelings towards these methods?

The questionnaire can be viewed in appendix 4.2 and the tables used in appendix 4.3.

9.3.3 Part 2: The Design Exercise

The purpose of the design exercise was to allow participants to use the methods when answering a design brief. The participants, two male and two female, had
at least three years of design experience against which they could compare this design exercise and provide an indication of the usefulness of the methods. They were recruited from those who had completed the questionnaire and the product they were asked to design was a nutcracker, which was used for the same reasons as for study 2. Each participant was given approximately one hour to generate ideas and select their favourite. Afterwards they were interviewed and the key questions put to them were: to describe their solution and how they had reached it; which methods they had used and why; their opinions of the methods. The design brief and interview protocol can be viewed in appendix 4.4 and 4.5. The interviews were audio recorded but were not transcribed verbatim. The preferred option was to listen to the audio recordings and make detailed notes and extract quotations.

9.3.4 Part 3: The Interviews

Unlike the questionnaire and design exercise these interviews were with professional designers. These were organised to provide an insight into the impressions practicing designers had towards the methods. Each designer was sent a set of cards one week before the date of the interview to give them time to look through them. The interview protocol included questions similar to those of the questionnaire:

- which methods had they come across?
- which methods were new to them?
- which methods interested them?

They were also asked for their general thoughts. The interviews were audio recorded and the researcher took notes, which were checked for their accuracy and for omissions against the audio recordings. The interview protocol can be viewed in appendix 4.6.
9.4 Results and Discussion

In this section the results from the questionnaire, the design exercise and the interviews are noted and discussed.

9.4.1 Part 1: The Questionnaire

The questionnaire was completed by 34 participants (20 male and 14 female) and the findings have been noted in the same order as the questions on the questionnaire. Table 9.1 (overleaf) shows the findings from these questions and the results from the more general questions regarding their opinions of the methods are discussed later in this section.

None of the methods were absolutely new and each method was familiar to a number of participants. The least familiar method was language noted by eight participants and the most familiar was capture with 30. Despite no absolutely new methods some were new to individual participants. Of the 34 participants, 33 stated that they were not familiar with at least one or more of the methods. The mean number of new methods to individual participants was 18 of 42 with a standard deviation of 9.

The methods that were least familiar to the participants were language, links, spoon feed and uncomfortable, each of these being associated with ten or fewer participants. With the exception of language, these methods had been sourced from fewer than four sculptors and are perhaps more obscure methods in general. Language, however, was important to a number of sculptors since their language consisted of key aspects of their work that made them unique and recognisable to others. At this point in time, having just graduated, these participants may not have had time or opportunity to develop their own language (style) and may explain why this method was least familiar. A possible reason why the capture method was most familiar could be the advance in mobile camera telephone technology that enables images to be captured easily.
## Chapter 9: Study 4 - Introducing the Sculptors’ Methods to Designers

Table 9.1 Table showing the participants’ responses to the methods.

<table>
<thead>
<tr>
<th>Method</th>
<th>Number of participants x/34</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Knew</td>
</tr>
<tr>
<td>Blind research</td>
<td>13</td>
</tr>
<tr>
<td>Capture</td>
<td>30</td>
</tr>
<tr>
<td>Child’s view</td>
<td>12</td>
</tr>
<tr>
<td>Collections</td>
<td>24</td>
</tr>
<tr>
<td>Conflict</td>
<td>15</td>
</tr>
<tr>
<td>Constraints</td>
<td>20</td>
</tr>
<tr>
<td>Conventions</td>
<td>18</td>
</tr>
<tr>
<td>Detail</td>
<td>26</td>
</tr>
<tr>
<td>Devices</td>
<td>16</td>
</tr>
<tr>
<td>Dialogue</td>
<td>29</td>
</tr>
<tr>
<td>Environment</td>
<td>28</td>
</tr>
<tr>
<td>Essence</td>
<td>24</td>
</tr>
<tr>
<td>1st idea</td>
<td>23</td>
</tr>
<tr>
<td>Frames</td>
<td>26</td>
</tr>
<tr>
<td>Head soup</td>
<td>20</td>
</tr>
<tr>
<td>History</td>
<td>18</td>
</tr>
<tr>
<td>Honesty</td>
<td>19</td>
</tr>
<tr>
<td>Interaction</td>
<td>21</td>
</tr>
<tr>
<td>Language</td>
<td>8</td>
</tr>
<tr>
<td>Links</td>
<td>9</td>
</tr>
<tr>
<td>Mindless marks</td>
<td>20</td>
</tr>
<tr>
<td>Modelling</td>
<td>30</td>
</tr>
<tr>
<td>Nature</td>
<td>28</td>
</tr>
<tr>
<td>Obviousness</td>
<td>19</td>
</tr>
<tr>
<td>Out Discipline</td>
<td>20</td>
</tr>
<tr>
<td>People watch</td>
<td>23</td>
</tr>
<tr>
<td>Philosophy</td>
<td>20</td>
</tr>
<tr>
<td>Play</td>
<td>21</td>
</tr>
<tr>
<td>Process</td>
<td>13</td>
</tr>
<tr>
<td>Relax</td>
<td>24</td>
</tr>
<tr>
<td>Reprocessing</td>
<td>15</td>
</tr>
<tr>
<td>Scale</td>
<td>15</td>
</tr>
<tr>
<td>Series</td>
<td>22</td>
</tr>
<tr>
<td>Site specific</td>
<td>19</td>
</tr>
<tr>
<td>Spoon feed</td>
<td>10</td>
</tr>
<tr>
<td>Systems approach</td>
<td>12</td>
</tr>
<tr>
<td>Too comfortable</td>
<td>16</td>
</tr>
<tr>
<td>Twist</td>
<td>14</td>
</tr>
<tr>
<td>Uncomfortable</td>
<td>9</td>
</tr>
<tr>
<td>Ways of seeing</td>
<td>25</td>
</tr>
<tr>
<td>Why</td>
<td>23</td>
</tr>
<tr>
<td>Workshops</td>
<td>27</td>
</tr>
</tbody>
</table>

* Denotes the methods the participants had used previously and considered to be interesting. This is explained later in this section.
When the participants were asked which methods they had used the mean value was 16 of the 42 methods with a standard deviation of 7. The following methods were those that had been used least by the participants: blind research, child’s view, conflict, constraints, devices, language, links, obviousness, out of the discipline, process, scale, spoon feed, systems approach, twist and uncomfortable. These methods were also used by only a few of the sculptors (<5) with the exception of language and process with eight and seven sculptors. As noted previously in this section, perhaps these methods are also less well known within the sculptural domain too.

The participants had used the methods of modelling, dialogue, detail and workshops the most. With the exception of the detail method, these methods had been linked previously to those used by the designers partaking in study 2 and were also noted in design literature. For example, Pugh (1991) discusses the use of modelling; Kelley and Littman (2001) and Baxter (1995) note brainstorming (dialogue method) and workshops are similar to the focus group method (Langford and McDonagh, 2003). Since these methods are established in the world of design, it is unsurprising that they were used the most by the participants of this study.

The third question put to the participants was which methods did they find particularly interesting and would perhaps like to try. The mean number of methods considered to be interesting was 14 out of 42. The participants therefore, were familiar with most of the methods, had applied only a few of them but they considered approximately one third of them to be interesting enough to try. The variation between the participants was high with a standard deviation of 11, indicating that some were more enthusiastic about the methods than others. The methods considered to be most interesting by the participants were: child’s view, collections, conventions, environment, head soup, modelling, nature, play, relax and ways of seeing. This group of methods, highlighted in table 9.1 with an asterisk, are also some of the methods the participants were most familiar with and had used before. The expectation was that the methods considered to be interesting would have been those that fewer participants had experienced; in this case, the opposite occurred. The participants seemed to be interested in the methods that they could associate with or knew from past experience to perhaps work well.
Chapter 9: Study 4 - Introducing the Sculptors’ Methods to Designers

The final set of questions was included to determine the participants’ general opinion towards the cards and methods. The majority of the participants, 31 of 34 agreed that these methods could be of use to them as designers. The methods were noted for their potential for facilitating ideation (26/34), helping to think differently (25/34) and that they would be a useful source of inspiration (21/34).

The surprising finding from this questionnaire is that the majority of the participants recognised and had used a number of the methods identified from the sculptors. Some of the methods were new to some of the participants but equally many were not. This is surprising since it has been found from the literature and past studies that design students and sculptors work towards different goals and from different perspectives; it seems that some of the methods they use to achieve their goals are quite similar.

9.4.2 Part 2: The Design Exercise

Each of the participants completed the exercise by designing a new nutcracker within the allocated time and each referred to the set of cards. In total sixteen methods were selected and these are shown in the diagram below (figure 9.2).

![Diagram showing the methods selected by the participants.](image-url)
During the exercise the participants began by shuffling through the cards, glancing at the titles, and reading some of them. Methods were then put back into the pack or placed on one side for further consideration. This is similar to how the designers at IDEO used their method cards (Pink, 2003). Each participant selected a different number of methods and each combination was different. A synopsis of how each participant worked through the design exercise and applied the methods are shown below.

**Student 11.**
This participant began by reading the brief and sketching an idea which was a more traditional nutcracker using a lever mechanism. Once he had completed the sketch he began to look through the cards and selected two methods. He said the *twist* method made him think of products he likes that surprise him and he used the *obviousness* method to try and think of something that does not normally occur. His final solution was a playful nutcracker with an oversized handle. He described the aesthetics as not conforming to his usual style. When asked if the methods were useful he responded with “I could not say that I wasn’t inspired by them”. Figure 9.3 is his final solution to the brief.

Figure 9.3 Student 11 added a twist to his design by integrating adjustable teeth to hold the nut and an oversized handle.
Student 12.

This participant also began the exercise without referring to the methods. He started with a short session of brainstorming, noting aspects that were required for cracking a nut, such as the effort and forces involved, the containment of shell and not destroying the nut. He then considered some possible mechanisms before referring to the cards. He selected eight methods that he thought were relevant to him as a designer and were things he was interested in, such as breaking conventions and keeping things simple (conflict). From this point he sketched a more sculptural product for he wanted something that would not be kept in the drawer. His final solution did not resemble a nutcracker and incorporated an element of surprise and an unexpected twist (figure 9.4). He noted that prior to looking at the cards he was thinking of more conventional handheld nutcrackers but was pleased that his solution was more abstract yet still realistic.

Figure 9.4 Student 12 used a variety of cards that but developed an idea that was less conventional.
Student 13.
Unlike the previous participants this participant began by reading through the methods and selecting those that she found interesting. She selected some methods that she had used before such as finding inspiration from nature or looking to history for ideas and on this occasion she thought about a less technological age and designing a simple nutcracker. She tried to think of other products or concepts that used similar forces and she based her idea on a spring loaded centre punch her friend owned. Using the essence method she thought of words that she could design to: strength and solidity. She felt that looking through the methods helped her to start thinking of things and provided an element of direction. This gave her things to think of and, when she had an idea, she went with it. Figure 9.5 is her final solution to the brief.

Figure 9.5 Student 13 used a less obvious spring-loaded mechanism for cracking a nut.
Student 14.
This participant searched through the set of cards for methods she felt would be inspiring and then proceeded to look at the brief and thought of existing nutcrackers. The essence method reminded her to list words relating to feelings that she wanted to include in her design and the conventions method was important since she chose to dismiss existing nutcrackers and think of something new. Site specific made her to think of where it will be used. She began thinking of mechanisms and how to crack nuts; the device would have to work first and then she went more 'crazy' with the styling. She said the cards helped her to focus her thoughts.

Figure 9.6 Student 14, the operation was to be magical since all was required was the press of a button.
The two male designers (students 11 and 12) referred to the set of cards following an initial period of design activity involving sketching and brainstorming. In contrast, the two female designers considered the cards carefully at the beginning and selected suitable methods that they could use prior to any design activity. Their selection of methods appeared to be based on those that they found interesting and/or those that corresponded with how they normally design. For the latter, the set of cards seemed to act as an aide-mémoire for how they normally design, reminding them of methods they have used previously that may work on this occasion. This reinforces the finding from the questionnaire that many of these sculptural methods are also used by designers.

From the exercise it appears that the participants used the methods to find inspiration and to help trigger ideas; this was likely to have been an important priority having only one hour to develop a solution. The participants completed the design exercise at different times and yet each had one thing in common: they all wanted to produce something that was less conventional. Three of the participants selected the methods convention, twist and obviousness which refer to questioning the norm, adding something unexpected and searching elsewhere for ideas. This occurrence could be a result of the methods or a coincidence since each participant may have wanted to show off his or her abilities and not appear inferior to the other participants. Known as participant bias this phenomenon is hard to avoid and can affect the validity of the data (Robson, 2002). This drive to be original also concurs with Thackera’s (2005) observation that designers are obsessed with finding original and creative ideas; it seems likely that these methods may have helped them achieve this in the short amount of time available to them. However, the solutions developed for the design exercise were not the focal point.

Since this design exercise had only four participants and a short duration it is perhaps unwise to make too many inferences. However, all four participants agreed that the methods were potentially useful for facilitating inspiration. These responses correspond with the general thoughts of the questionnaire participants who had also agreed that the methods were suited for ideation, inspiration and thinking differently. The appeal of the cards could be that they offer a high concentration of potential methods in one package.
Chapter 9: Study 4 - Introducing the Sculptors' Methods to Designers

I think they are a good little tool since you could use them in a range of different situations, probably more appropriate for initial concept generation and more abstract things like styling (student 14).

I could not say that I wasn't inspired by them (student 11).

The cards were inspiring (student 12).

I think I would use them in a situation when I was stuck or did not have much inspiration (student 13).

The cards give you confidence to try things (student 14).

As soon as I saw the brief the first things I thought of were conventional nutcrackers, where as this design is more abstract yet still a realistic design (student 12).

Reading through they are techniques that I am familiar with but they are not things that you remember or automatically do (student 13).

In summary, the methods appeared to work in a number of ways. They provided some form of encouragement to find another, perhaps less conventional, idea. They acted as an aide-mémoire for methods that they had not thought of trying or they could help to guide or focus thinking. The participants were unanimous in believing the methods helped to inspire them.

9.4.3 Part 3: The Interviews

Two professional designers, each working for a different design consultancy, were interviewed. The first professional designer (designer 2) worked for a small consultancy specialising in consumer electronics and the second (designer 1) was employed by a larger consultancy that also works on consumer products as well as projects for the rail and medical industries.

Designer 2 noted that he was familiar with the majority of the methods and how only two were new to him (scale and uncomfortable). He had come across the other methods during his art and design education but he only used a few of them regularly. Designer 1 had also come across many of the methods before and thought that four or five of them were new to him. These findings correspond with those from the questionnaire reinforcing the finding that there
are no absolutely new methods and that sculptors and designers may use similar methods when progressing their work.

Both designers noted how over time, they and others designers they know, work with a "distilled design process" where they "follow the same path each time" (designer 2) and that "most designers have their way of working and stick to it" (designer 1). The methods on these cards were seen as a "more unusual way of looking at things" (designer 1) and that they reminded them of "the fun ways in which he could and has designed in the past" (designer 2); this links to the aide-mémoire finding from the design exercise. Designer 1 also stated that the methods seem "genuinely helpful and should be used more". Therefore, with regard to the methods these two professional designers agree that they could potentially facilitate design and the cards could remind them of alternative methods and to help them alter or deviate from their normal design process.

The card communication method used was not liked by designer 1. He felt they were condescending and he did not like being told how to design. However, he did not offer an alternative to the card medium for communicating the methods. He also noted the implication that if a designer were using these cards does that indicate that the said designer is not creative because they require assistance? An opposing view to this, is perhaps, a designer using these methods is inquisitive and in the process of expanding his/her knowledge base. The reaction from designer 1 corresponds with findings from Roy (1993) and those from study 2 (chapter 7) where some designers do not like to use creativity methods. This reaction highlights an issue that may hinder the potential acceptance of any new method for design.

Designer 1 also noted a usability issue associated with the cards. He was unsure how to select or apply the methods and when stuck on a problem he did not welcome the thought of reading them all. The design exercise participants who searched, selected and applied some of the methods appeared to have no difficulty in this task and no problems were raised during their interviews. Their method of selection was based on whether the method appealed to them or not at that point in time or whether it was something they could think of and apply in the short duration of the exercise; the selection was context driven.

Throughout this study it could be considered that the participants were reviewing two things. The first was the set of cards and many of the participants referred
to the 'cards' in their feedback. The second were the individual methods on the cards. Designer 1 was the only participant to divide the two and appraise them individually. However, the documentation used in this study, such as the questionnaire and design exercise brief, referred to the methods and not the cards. When the participants referred to the 'cards' it could be assumed that this was applied as a collective term for the methods in general.

9.5 Conclusions

From this preliminary test the main finding and contribution to knowledge is that sculptors and designers appear to know of and use similar methods to one another. This has been deduced from the following key points:

- When viewing the sample as a whole, there were no absolutely new methods. However, each individual designer found some methods that were new to them.

- Many of the methods had been used by designers.

However, from this first preliminary test the participants found the methods/cards to be inspiring and could help provide them with alternative perspectives from which to work.
Chapter 10: Discussion and Conclusions

In chapter five, five objectives were developed and used to guide the design of the four studies detailed in chapters six to nine. The findings from these contributed towards answering the research question. In this chapter, how the contributions of the four studies did this, is discussed and final conclusions concerning the potential for art methods to facilitate designers' creativity are reached. The contributions to original knowledge and recommendations for future studies complete this chapter.
10.1 Objective 1: To Narrow the Scope

From the literature, in section 3.1, the art domain was found to consist of many sub-disciplines, more than was realistically possible to explore in the time available for this research. Therefore, narrowing the scope of the research was necessary through the identification of an art discipline that could be explored in greater detail; study one was developed for this purpose.

The key criterion used in study one to reduce the scope was the identification of an art discipline that appeared to be most different from industrial design. To determine this, data were collected using a questionnaire sent to students studying different art disciplines at Loughborough University. The questionnaire asked them to describe the types of project they undertook and answer questions on how they worked through them. The findings concurred with the literature: fine artists work on a different type of project and work towards a different type of goal to designers. The sculptors focused on more intangible and expressive projects whereas the designers were concerned with more tangible aspects, for instance a product's construction and functionality. Participants from the other art disciplines differed to a lesser extent.

To affirm these findings and to trial another mode of data collection an audio diary exercise was conducted to collect more detailed data regarding sculpture and design. Two sculpture and two industrial design students participated by verbally recording their progression through one of their projects. The findings concurred with those from the questionnaire and with the literature. Fine art sculpture became the art discipline that was investigated further in future studies and the scope of the research was successfully narrowed.

10.2 Objective 2: To Understand Sculptors and Designers

The next stage of the research was to understand further how professional sculptors and designers worked. Architects were also included in this study for they too have a history of designing interesting products and may be able to offer something to design. Study two was devised to collect this detailed data and consisted of two parts. The first was detailed interviews that enabled the
researcher to explore and gain an in depth appreciation of how the individual participants from architecture, design and sculpture worked through their own projects. The second part was the design exercise, which provided data regarding how participants from the three disciplines approached, explored and developed their solution to a design brief. The interviews provided a general insight into the participants’ working processes and the design exercise data enabled diagrams of their processes to be constructed. All this contributed towards further understanding of how architects, sculptors and designers work.

When collecting data using a grounded theory approach it is accepted that the collection process ceases when the data becomes saturated and the number of new findings reduces with each visit (Robson, 2002). This phenomenon occurred noticeably with the architects and designers. Once four or five interviews had been undertaken the way these practitioners’ worked became predictable. This phenomenon occurred less with the sculptors. For example, four of the six participants of the interviews worked with stone [5] but their idiosyncrasies made it harder to predict their processes. These idiosyncrasies were a feature of the sculptors’ processes but, this did not affect the findings from this study since a greater understanding of how the sculptors worked was still obtained. For example, how they work with clients, develop their ideas, their similarities and differences to designers. But, the data were not saturated; it seems that more could have been learnt if time were available. This may contribute towards further understanding why some of the theorists noted in the literature review (section 3.3) believed that the art process could not be defined; these small differences between each artist may increase the difficulty of identifying any general patterns that could apply to the whole population.

10.3 Objective 3: To Identify Differences

Study two, mentioned in the previous section, was also developed to provide data that would achieve this third objective. The intention was to identify the similarities and differences between the participants from the three disciplines. The purpose of this was to identify aspects of the sculptors’ or architects’ processes that differed the most from the designers. It is from within these

[5] Whiteley (2005) stated that contemporary sculptors are often differentiated by the type of material they work with.
aspects that the methods for facilitating designers' creativity may be sourced since these methods may be new to the designers.

Data sourced from the detailed interviews enabled the first set of comparisons to be made. From these comparisons the majority of the differences originated from the early episodes of a working process: the exploration of a project. The sculptors appeared to approach and explore their projects differently to designers.

Comparing data from the detailed interviews had one problem: each participant described their working process with regard to their own projects and therefore they were not directly comparable. The setting of a design exercise enabled the working processes they applied to solving the brief to be compared directly. From the data process diagrams, depicting the episodes of activity in chronological order, were constructed. The main finding was that all the participants followed a process of exploration, ideation, and detail development.

The few differences found lay within these episodes. The sculptors differed the most from the architects and designers, especially during the exploration episode. The sculptors also appeared to approach their work differently by seeing and appraising things in an alternative way at the very beginning. For example, they focused on more emotive and expressive aspects of the project and held different attitudes towards the subject of the brief. The architects and designers solved the design brief in a similar manner and focused on more utilitarian aspects. Whilst the original intention was to identify differences between these disciplines, at this stage very few had been found and no notable contributions to knowledge could be offered.

10.4 Objective 4: To Identify Methods Used by Sculptors

To answer the research question the identification of any methods used in an art discipline was a crucial requirement. Without a selection of art methods it would have been impossible to establish whether they could potentially facilitate designers' creativity.
Data collected for study two could have been used to identify some methods. For example, some of the sculptors referred to playing with material and one commented on avoiding obvious sources of inspiration; both could have been developed into a method. However, the interview protocol used in study two was intended for sourcing data concerning the whole working process; data regarding the approach and exploration of a sculptural project was only a small fraction of the total collected. Therefore, study three was designed from the outset to collect data that would reveal any methods used by sculptors during the earlier stages of their working process where they differed the most from designers: methods for approaching and exploring a project. This study consisted of detailed interviews with fifteen professional sculptors and from the data 42 methods were identified. This selection of methods could then be presented to designers.

The discovery of 42 methods from only fifteen sculptors is an indication of the idiosyncrasies described in section 10.3 and of the differences between the ways sculptors work. This study also provided a key contribution to knowledge: that sculptors do use methods when developing their artwork and for the first time 42 of these methods have been identified and documented.

10.5 Objective 5: To Test the Sculptors’ Methods

The previous three studies revealed data that contributed towards identifying suitable areas to explore and where to collect art methods. The 42 methods identified from the sculptors were embodied in a card format, similar to the IDEO method cards, which were used to preliminarily test the methods with designers in order to obtain their initial opinions.

Three data collection methods were used which ensured the findings originated from different perspectives to increase the study’s rigour. Questionnaires were used to obtain initial feedback from design graduates. Short design exercises were undertaken to provide an insight into how the methods could be used when solving a design brief and professional designers were interviewed to gather feedback from those working in industry.

The findings could be divided into two parts. Firstly, in response to the research question, the sculptors’ methods did appear to have the potential to facilitate design creativity. Each individual participant was able to identify some methods
that were new to them personally. The participants also answered prospective questions that asked them to state at what point in a design process they felt the methods would be of most use. The general consensus was that they were suitable for inspiration and ideation, and these are essentially creative activities. The participants had positive feelings towards the methods which further increases their potential for facilitating design creativity. The professional designers also held a similar attitude towards the methods and inferred that they could be used to prevent designers falling into a set way of designing and to make design more fun. Had the participants’ initial opinions of the methods been negative the potential for facilitating creativity would have been low.

The participants of the design exercise used some of the methods to help them solve a design brief. The participants found the methods inspiring and the cards reminded them of methods they could use. They used the methods to help find alternative perspectives from which they could approach the project from. This design exercise, despite being very short, demonstrated that designers could use and apply the sculptors’ methods as well as finding them useful when solving a design brief.

The findings from the preliminary test indicated that the sculptors’ methods were approved by the participants, who thought they would be suitable for facilitating their inspiration and ideation, and this was indicated by those participating in the design exercise. However, one key factor was raised by one of the professional designers. Designer 1 found the cards to be condescending and did not like to be told how to design. Fletcher (2001) noted a number of attributes of creativity and one of them was "being receptive to new ideas"; however, for these methods to facilitate a designer’s creativity, it is dependent upon the willingness of the designer to accept and try them.

The second part of the findings was the surprising fact that none of the 42 methods were absolutely new and that many of them were recognised and had been used by the designers. This was first noted in study three when data collected were compared to the available literature and then in study four when the feedback from the design participants was analysed. This indicates that sculptors and designers may use similar methods.
10.6 **Art Methods and Design Creativity.**

The studies undertaken as part of this research successfully contributed towards achieving the research objectives and as a consequence an answer for the primary research question could be provided. This was to determine whether or not contemporary art methods could facilitate designers' creativity.

Prior to answering this, one factor requires consideration. Since the scope of the research was narrowed in study one to the exploration of one art discipline (sculpture), the conclusions from the subsequent studies are not knowingly representative of other art disciplines. Nevertheless, data collected from the sculptors can still be used to answer the research question.

The first two studies found and confirmed with the literature the fact that sculptors work towards different goals to designers. The artists focused on intangible and experiential aspects rather than just physical attributes. Hekkert and van Dijk (2001) developed a method for designers called *vision in product design* (ViP) which encouraged designers to focus on these more intangible factors when exploring a topic area, which was similar to how these sculptors worked. In particular, one aspect of the ViP method was to discard the use of obvious sources of inspiration which was one of the characteristics of a sculptor's process in study 2 and was one of the methods found in study three. When this method was applied, Hekkert and van Dijk (ibid) found that designers could develop ideas that addressed not just the users' physical needs but also their social and cultural needs. KVD, a Dutch design consultancy used the ViP method when developing a new seat. Prior to developing ideas they focused on more experiential aspects such as *interaction* and *space to show emotions* and this altered their approach to the project and their thinking. This was similar to the processes applied by the sculptors in the design exercise in study two when they designed a new nutcracker. KVD's final design was an unusual seat that revealed the users' emotions (figure 10.1). This is an example of a sculptural way of working being applied by designers and it appearing to have the potential to facilitate design creativity.
Chapter 10: Discussion and Conclusions

From study three, 42 methods were identified from only fifteen sculptors; this indicates that sculpture is a rich source of methods for how to approach a project and for ways to explore a topic area. The findings from study four provided an indication of the potential for these art methods to facilitate design creativity. Firstly, the participants were positive towards the methods and the majority thought that they would be best used early in the design process when in need of inspiration or developing ideas. Generally, this stage of a design process is when the design problem is being explored and potential solutions sourced, which is a time when creative thinking is required. Those who participated in the design exercise in study four found the methods to be useful in sourcing inspiration and helped them to view the project from different perspectives, which is a key factor behind creativity methods as noted in the literature (section 2.5.3). The cards also reminded them of methods they could use and this too can facilitate their creativity. These opinions and experiences of the participants indicated that there is potential for art methods to facilitate design creativity and in particular are useful during the early stages of a design process. However, with reference to the professional designer who disliked the cards, it appears that while art methods may seem to have the potential to facilitate creativity this can only occur if the designer is willing to accept them.

10.7 Similarities

The original intention at the outset of this research was to identify differences between art and design disciplines. In doing so methods or processes used by one discipline, may be new and of use to another discipline. The literature reviewed in chapter four indicated a divide between art and design and some authors surmised how art could potentially facilitate design; this was the reason for searching for differences and new ways of working. However, as this
Chapter 10: Discussion and Conclusions

research into art and design progressed few new differences were found and the findings from the data mostly confirmed the existing knowledge noted in the literature. Sculptors and designers largely worked through a similar working (creative) process and despite finding many differences none could be considered as contributions to knowledge. Nevertheless, these studies did provide an indication of where to research next, such as focusing on how the sculptors approached and explored their work.

With the identification of methods used by sculptors it was surmised and concluded from studies three and four that the key finding from this research was not a difference but in fact, a similarity between these two disciplines. Despite sculptors and designers working on different types of project and focusing on different goals they appear to use similar methods when achieving them. The designers in study four had recognised and used many of the methods the sculptors had used to progress their artwork; four of the five methods used most by the sculptors were also used by the designers.

10.8 Conclusions

The aim for this research was to determine the degree to which art methods could facilitate a designer's creativity. From the studies undertaken it has been shown that the methods used by contemporary sculptors do have the potential to inspire designers. This is based on the following conclusions:

- The art discipline of sculpture is a rich source of methods concerning how to approach and explore a topic area or project and designers are likely to find some art methods that are new to them.

- The designers in this research held a positive view towards methods identified from the sculptors.

- When used in a design exercise the sculptors’ methods were of use to the designers by inspiring them to approach the project from alternative perspectives. The cards acted as an aide-mémoire for methods they could use.
10.9 Contributions to Knowledge

The aforementioned conclusions provide an answer to the research question, but they do not contribute to original knowledge. The contributions from this research are as follows:

- Sculptors do have methods that they use to progress their artwork. The identification and documentation of methods used by contemporary sculptors has not been undertaken before. The collection of these methods provides an insight into how sculptors work and of the ways they achieve their goals.

- There is not a great difference between the methods used by sculptors and designers. They appear to achieve their different goals in similar ways.

10.9.1 Papers

During this research two papers were written and presented at international conferences to communicate the findings, these were:


10.10 Recommendations for Future Work

Whilst this research has successfully achieved a number of objectives, a number of recommendations for future research that could expand on these findings are suggested below:

- Study four was a preliminary test of the sculptors methods with designers and therefore, a more detailed study would be recommended. Key objectives would be to determine how the designers use the methods over a longer period of time and how they may integrate them into their working
processes. Sculptors should be included the study to identify how they apply the same methods in achieving their goals.

- Having met and interviewed many sculptors the author believes that they can offer design much more than what was found in this research. Studies could be undertaken into further understanding how sculptors work through industrial design projects; particular attention should be paid to their goals and intentions since few differences were found in their working processes. Also, how does their sculptural education and experience affect their solutions and can designers learn from them or learn to think like a sculptor when necessary?
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Websites visited are as follows:

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THE ROYAL COLLEGE OF ART: http://www.rca.ac.uk/pages/study/ma_design_products_159.html [28 November 2006].
Appendices
1.1 Personality test information

This is a general personality test. Please do not write your name or contact details on this page to ensure anonymity. However please re-write your subject of study:

Please rate yourself on the following 25 scales.

On the centre scale, circle the point which most accurately describes you between each of the two terms presented. If the two terms are equally accurate in their description, then mark the middle point.

1. Eager 3 4 5
2. Prefer being with others 3 4 5
3. A dreamer 3 4 5
4. Courteous 3 4 5
5. Neat 3 4 5
6. Cautious 3 4 5
7. Optimistic 3 4 5
8. Theoretical 3 4 5
9. Generous 3 4 5
10. Decisive 3 4 5
11. Discouraged 3 4 5
12. Exhibitionist 3 4 5
13. Follow imagination 3 4 5
14. Warm 3 4 5
15. Stay focussed 3 4 5
16. Easily embarrassed 3 4 5
17. Outgoing 3 4 5
18. Seek novelty 3 4 5
19. Team player 3 4 5
20. A preference for order 3 4 5
21. Distractable 3 4 5
22. Conversational 3 4 5
23. Comfortable with ambiguity 3 4 5
24. Trusting 3 4 5
25. On time 3 4 5

Thank you for very much for your help.

Jon Mason - Department of Design and Technology

The big five locator personality test.
Appendix 1

Question Numbers Corresponding Trait
1, 6, 11, 16, 21 Negative Emotion
2, 7, 12, 17, 22 Extroversion
3, 8, 13, 18, 23 Openness
4, 9, 14, 19, 24 Agreeableness
5, 10, 15, 20, 25 Conscientiousness

Table 1. The processing method of the big five locator personality test.

<table>
<thead>
<tr>
<th>Low Openness</th>
<th>Preserver</th>
<th>Moderator</th>
<th>Explorer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical, conservative, efficient, expert</td>
<td>10</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Low Conscientiousness</td>
<td>Flexible</td>
<td>Balanced</td>
<td>Focused</td>
</tr>
<tr>
<td>Spontaneous, fun-loving, experimental, unorganised</td>
<td>10</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Low Extroversion</td>
<td>Introvert</td>
<td>Ambient</td>
<td>Extrovert</td>
</tr>
<tr>
<td>Private, independent, works alone, reserved</td>
<td>10</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Low Agreeableness</td>
<td>Challenger</td>
<td>Negotiator</td>
<td>Adapter</td>
</tr>
<tr>
<td>Sceptical, tough, aggressive, self-interested</td>
<td>10</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Low Negative Emotionality</td>
<td>Resilient</td>
<td>Responsive</td>
<td>Reactive</td>
</tr>
<tr>
<td>Secure, unflappable, unresponsive, guilt-free</td>
<td>10</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>High Openness</td>
<td>Curious, liberal, impractical, likes novelty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Conscientiousness</td>
<td>Dependable, organised, disciplined, cautious, stubborn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Extroversion</td>
<td>Assertive, sociable, warm, optimistic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Agreeableness</td>
<td>Trusting, humble, altruistic, team player</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Negative Emotionality</td>
<td>Excitable, worrying, reactive, alert</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Personality test decoder sheet.

Example:
A fine art student completed the test paper shown on the previous page. Each question on the test paper corresponds with one of the five personality traits, and this is shown in table 1. For example, questions 3, 8, 13, 18 and 23 correspond to the openness trait. For these five questions the fine art student circled the numbers 4, 3, 4, 1 and 5. The sum of these (17) is an indication of this student’s level of openness. Using the decoder sheet (table 2), an orange line has been placed at the approximate point where 17 would be. This indicates that this student is quite open and is more likely to be curious, impractical and liberal.

A number can be obtained for each of the five traits and be used on the decoder sheet or as part of a data set for statistical analysis.
1.2 Audio diary information page

Audio Diary Exercise - What to do
The aim of this study is to find out how you work and the working practices you employ to progress one of your projects.

Please apply this exercise to only one of your projects, preferably one that you will be working on considerably over the next 3 weeks. When you are working on your project please describe into the dictaphone the following types of information;

- What are you doing now?
- Why are you doing that?
- How are you going to progress?
- What inspired you?
- Is your work progressing as planned?
- If not, why not?
- And what are you proposing to do about it?
- Any thoughts that you feel may be of assistance.

The above list is not exhaustive. Please consider how you are working and the practices you are undertaking to progress your work and tell me about them.

Audio diary studies are renowned for uncovering vast quantities of qualitative data. Therefore I will be limiting you to only one tape a week. This equates to two hours of talk time (1.2 speed) which is approximately twenty minutes a day. Since the dictaphone is set to 1.2 speed please remember to speak very clearly.

A disposable camera has also been provided. Please capture anything that has inspired you or that you feel is significant to describing your working practices. If possible please record each photo taken on the provided sheet.

If you have any queries please contact me.
1.3 Example of an audio diary transcript

<table>
<thead>
<tr>
<th>Transcription of Audio Diary Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
</tr>
<tr>
<td>Discipline / Year</td>
</tr>
<tr>
<td>Affiliation</td>
</tr>
</tbody>
</table>

Right now I am reading, I have got a lot of research to do around the subject, which is useful for inspiring new theories to be included in my work.

I am also doing a lot of drawings mainly of cages, like birdcages to try and inspire form for my piece of work and am doing a lot of research on the Internet for cages and corsets and various different restraint type objects.

I am going to progress in my work, hopefully through doing these um, my inspiration for the piece is personal relationships and sexual relationships in how your past can influence these kinds of relationships and the borderline between support and restraint.

The general idea for the next piece is some form of cage that I can fit in, but this time comfortably, the last one was very cramped. Um, the general idea being that I am referencing my feminist upbringing quite heavily in this piece, the way my mother always told me you were never to belong to anyone, you know you are nobodies possession, you are a strong woman. And actually being in a, err; serious relationship the only thing I actually want to do is to belong to this person, to be his possession, which is the general idea for the cage.

I am making this cage thing, that I voluntarily lock myself into and can get myself out from the inside, but it is my choice to be there, so I am putting myself in this situation. At the same time the cage is very pretty, it's got bronze locks on it and little padlocks and has etching on the inside that allude to love and trust and pleasure and pain and the varying relationships between the pole opposites.

Right now I am going back to drawing and do a bit more and reading and try and err get a design down for the final piece of this year.

I have now decided that reading and drawing can only take me so far and although I already have one 'maquette', I am going to make another in a slightly different scenario to see if it can give me a new perspective on the piece.
Tuesday 17th February, I have come in, um, and really haven’t a lot of inspiration this morning, I have to go and do an MA application. So I am helping a second year to do a cast to just try and take my mind off things and give me some extra skills for the future.

It’s about 2 O’clock now and I have finished my cast of Matt, it went quite well but didn’t really benefit my work at all. So um, just going to sit down bit more and have a bit of a think and let everything filter through. I think I need to give myself some time to just kind of let all the research and all the reading that I have done recently work its way into my head. I am going to work on my bird cage drawing again to try and get that done properly and see what it will actually look like and then maybe, possibly this afternoon try and make a ‘maket’ of it. I am still not sure.

Gave up on the drawing, cos it wasn’t going anywhere so I have just been sitting for the last ten minutes just looking at all of my pictures around me. I have in my workspace various bits of my last project, ideas for my new project things that inspire me, pictures of things like cages and corsets and of birdcages, artists that inspire me, fashion designers and things like that. I have been just looking at my pictures and just thinking how to bring this all together and reading all of the quotes I have on my wall. I think I may have managed to fuse it all together now. By taking some of the drawings, some of the bits from my pictures and maybe fusing them into one object, hopefully.

It’s morning of Wednesday the 18th, I think, of February, um, once again I have come in and I just find that I am just staring at stuff and thinking, but I have kind of got a form now I think, in a little bird cage and a swing, I just haven’t quite got the meanings together why it is important and what I need to do specifically, and the specific meaning for each bit of it. So I am going to sit down and write, cos that normally helps me quite a lot. I just sit and write out what I am using and why I am using that material and what I am doing with each bit and how it is going to look and how I am going to form it. If I explain it all in writing now it then gives me a chance to refine it later. But it give me a chance to look and see how I am feeling at this particular point so I can see why I have to change it or where I went wrong for next time so I can learn a bit. So I am going to sit down and write the world now.

I have written out a certain bit of what I am thinking now and it has really really helped quite a lot having my actual thought process and ideas on paper, it’s allowing me to actually sit back and look at them rather than ponder them in my head. When they are down in black and white it’s a lot easier to concentrate on bits of it and realise which bits of it sounds stupid. In your head something might sound really good and sound like it is really worthwhile and when you write it down you just think it sounds really wanky and awful. So a lot of the time it helps to write stuff out so you realise when you are just being self-indulgent and when you have actually hit on a good idea. I am hoping this will allow my work to progress a bit today because I have been a bit stagnated for the last two days. I have just been quite bored and have trying to get out of it by doing other things and helping other people, reading a lot. But ultimately I feel I have to give myself two days off or three days, whatever, just to allow everything to filter through. If you spend two weeks researching something and thinking and reading a lot and doing a lot of work on the internet, finding out images and running around everywhere. I think you need to sometimes stop and give your brain a rest, to let everything filter through and trickle down into the middle. I often feel that things are stored in different parts of my brain the only way I can bring them all together and make them make sense is by writing them down. Which has helped an awful lot now and I am going to move onto another bit.
and just do a load of writing today, and try and figure out exactly what I am trying to achieve and if the piece I am going to make will actually achieve that outcome.

As well as writing and doing all my drawing I am also constantly looking at my little board next to me with pictures on and quotes to see how I can pull all these threads together into one object.

Right it is the 19th today, um just to bring you up to speed on what I have done, I got a phone call today that Jean Paul Gaultier might be interested, possibly, well not Jean Paul Gaultier but someone who works for him, in redoing some work um, towards him making a great big show in Paris about bread. I don't quite understand, but I am going down to London tomorrow to err, brainstorm with the guy and find out what sort of thing he wants. So I have had to do a lot of quick thinking as to what kind of ideas I can come up with. I have been given a few basic pictures of the kind of dress designs he wants but he has basically asked for kinds of corsets and jewellery and all that kind of thing, but in bread. Using you know, bread making techniques and traditional French bread. So I have um, done some quick research into French bread on the internet and found a bread called fausgass, which is a very flat bread with lines down both sides, kind of heart shaped, with lines going in opposite directions on each side. It is very pretty and it reminds me a lot of corsets so I have come up with a two part mould for a bread corset with plats around the trim as well, like bread plats. Um, with some poppy seed on for some decoration. But we will have to see what happens tomorrow. I also did some quick research into Jean Paul Gaultier's work to help with the corset type thing and had a conversation with Nick, who is working with him at the moment to find out what kind of thing he wants. Also talked to a few tutors and various people about what they would be expecting and what they would expect of me and what I should expect of them as well, cost wise.

Um, it has been a kind of hectic day trying to get a small portfolio together and basic ideas that would go with it and a few drawings, obviously it has been a very scale project and they would want samples for the end of February, which is about a week and a half away. So it has all been very very quick. Will have to see if I have any more ideas.

End of transcription.
### 2.1 Interview protocols

<table>
<thead>
<tr>
<th>Sculpture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
</tr>
<tr>
<td>Interview No.:</td>
</tr>
<tr>
<td>Interviewer: Jon Mason</td>
</tr>
<tr>
<td>Location:</td>
</tr>
<tr>
<td>Duration: ~ 45mins</td>
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</table>

<table>
<thead>
<tr>
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<tbody>
<tr>
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<thead>
<tr>
<th>Introduction</th>
<th>To the research, To this interview, Sign agreements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude and constraints</td>
<td>What type of work do you undertake? (commissions, personal or public) And why? If public art - (workshops) describe the process of what you do with the public.</td>
</tr>
<tr>
<td>Type of work</td>
<td></td>
</tr>
<tr>
<td>Inspiration</td>
<td>What inspires your work?</td>
</tr>
<tr>
<td>Problem exploration</td>
<td>Do you explore your ideas? if so how? (Exploration, manipulation, unusualness)</td>
</tr>
<tr>
<td>Research</td>
<td>Do you research? If so, how, why, what, where, when?</td>
</tr>
<tr>
<td>Idea generation</td>
<td>How do you develop your ideas? Do you draw, model...? What do you feel are your main constraints? To what extent do you compromise your intent?</td>
</tr>
<tr>
<td>Creativity</td>
<td>When do you feel that you have succeeded with a piece? Do you consider the viewer (their experience, emotions etc.)</td>
</tr>
<tr>
<td>Process diagram</td>
<td>Can you draw a flow diagram of how you work? Feedback, Next study and Photographs.</td>
</tr>
</tbody>
</table>

Protocol used when interviewing the sculptors.
<table>
<thead>
<tr>
<th>Architecture and Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
</tr>
<tr>
<td>Interview No.:</td>
</tr>
<tr>
<td>Interviewer:</td>
</tr>
<tr>
<td>Location:</td>
</tr>
<tr>
<td>Duration:</td>
</tr>
<tr>
<td>Introduction</td>
</tr>
<tr>
<td>Attitude and constraints</td>
</tr>
<tr>
<td>Type of work</td>
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<tr>
<td>Problem exploration</td>
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<tr>
<td>Inspiration</td>
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<tr>
<td>Research</td>
</tr>
<tr>
<td>Idea generation</td>
</tr>
<tr>
<td>Creativity</td>
</tr>
<tr>
<td>Process diagram</td>
</tr>
<tr>
<td>Feedback</td>
</tr>
<tr>
<td>Future research</td>
</tr>
<tr>
<td>Photographs</td>
</tr>
</tbody>
</table>

Protocol used when interviewing the architects and designers.
2.2 Pilot study: Data Collection Methods

The purpose for undertaking this pilot study was to identify a research strategy that could be used to collect comparable data on how professional artists and designers work.
1 Introduction
When viewed chronologically, this pilot study followed the questionnaire and audio diary study which were reported in chapter six. The purpose of this study was to pilot a number of data collection methods and a design brief. From the findings a research strategy for the next stage of the research was developed. This next stage was to understand further how professional practitioners work and in particular, be able to compare their working processes directly.

In order to compare the participants’ processes directly the participants need to have undertaken or answered an identical task. This pilot study reflected the tea and coffee towers project [1] and provided participants with a design brief to solve. How they solved the brief was at their discretion and data collected from the participants should be comparable to one another. The key question for this pilot study was how should this data be collected.

Aim
To identify a suitable research strategy for collecting comparable data on how professional practitioners, from various disciplines, work.

Objectives
This pilot study had three main objectives:

- To test a design brief and specification
- To identify potential data collection methods
- To test the most suitable data collection methods

2 Design Brief and Specification
The design brief was the heart of this study. The setting of a standard design brief for the participants to respond to should result in comparable data and allow for the identification of the differences in the working process. The brief focused the participants’ attention onto a single subject. The specification acted as a guide to inform the participants of how to deliver their responses.

The scope of the design brief was limited so it could be completed within a short time period. The content of the design brief corresponded with a typical industrial

design brief and therefore focused on the design of a small household product. The design brief used for this study was:

To design a nutcracker. You are encouraged to consider and design peripheral items such as bowls or trays as well as offering a positive user experience. This is an opportunity to design a wonderful creative product that will be admired by all who see it.

The subject, a nutcracker, was chosen for a number of reasons:

- a nutcracker is a known product type
- a nutcracker can be mechanically very simple or complex; there was scope for numerous solutions
- nutcrackers have contextual aspects such as users, nut storage, the mechanism, shell disposal etc.
- nutcracker design can be approached from numerous perspectives such as aesthetics, ergonomics, mechanics, manufacture, need, etc.

Selecting a simple product such as a nutcracker for the participants to design was not dissimilar to Mendini [1] who, in his design exercise, provided his participating architects with the brief to design a tea and coffee set. These are essentially a selection of containers and vessels and, as with a nutcracker, can be designed to be as simple or complex as the participants desire.

The specification detailed the deliverables required, thus ensuring that all the participants produced a similar style of output to aid comparison. The specification given to the participants was:

To ensure the success of this research project please adhere to the following specifics:

- Your design must be able to practically or theoretically crack nuts
- Your design will need to be finished to a presentable degree for exhibition at Loughborough University. How you present your design is at your discretion; detailed sketches, marker rendering, CAD imagery, models or maquettes are all suitable
- Have fun and show off your creative abilities
The first specific grounded the project in reality, acting as a safeguard, to ensure that the participants would have to think about their designs and produce a comprehensible solution that could work. This prevented the participants from relying on unknown technology or using the project as a base for an artistic statement.

The second specific encouraged the participants to produce something that can be used to compare them to the other participants and to ensure their final design is clear to the researcher. During the development of the study the intention was to display all the participants’ nutcrackers in an exhibition at Loughborough University. This served two purposes: to ensure that the participants produced clear and understandable designs (this facilitated data analysis); to act as a form of encouragement and was something for them to work towards. The third specific was a reminder to the participants that whilst this was a research project they were encouraged to have some fun.

3 Data Collection Methods

An important aspect of this pilot study was the identification of a suitable data collection method that would enable the participants’ responses to the design brief to be recorded. A suitable method was defined as being one of a practical nature that facilitated the collection of representative data whilst minimising the chance of influencing the participants.

How the participants responded to the design brief was not regulated so they could develop their solution using their normal process without external influence; the data collection methods had to be flexible enough to cope with this. For example, they may have produced sketch sheets, CAD models or physical models. Sketch sheets and modelling are a source of data that can provide an insight into the participants’ general though patterns [2] but much information remains hidden [3]. Therefore, to gain a greater insight into the participants’ working processes additional data collection methods were required.

Table 1 lists a number of potential data collection methods. Table 2 lists and defines the criteria used to filter the data collection methods and table 3 is the list of methods set against the criteria.

<table>
<thead>
<tr>
<th>Methods</th>
<th>Description</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol (Task) analysis</td>
<td>Observation and recording of a participant whilst they complete the task (in this case the design brief) in real time. With traditional protocol analysis the participant verbalises their thoughts whilst completing the task.</td>
<td>[4][5][6]</td>
</tr>
<tr>
<td>Ethnography: Shadowing/Observing</td>
<td>Observation of the participant in their environment whilst they complete the task. The researcher shadows the participant making notes on their actions.</td>
<td>[7][8]</td>
</tr>
<tr>
<td>Interviews</td>
<td>Structured conversations with an agenda between the researcher and the participant. In this case interviews can be conducted during or following the completion of the task.</td>
<td>[7][9]</td>
</tr>
<tr>
<td>Questionnaires</td>
<td>Forms with predetermined questions that the participants can complete during or following the completion of the task.</td>
<td>[7][10]</td>
</tr>
<tr>
<td>Diary / Longitudinal method</td>
<td>Diaries: a form of logbook that the participant adds to frequently during the completion of the task.</td>
<td>[3][7]</td>
</tr>
</tbody>
</table>

Table 1. Potential data collection methods.

## Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Participants are unlikely to give too much of their time to a research project, therefore any data collection method should not keep them for too long. Maximum time for a single sitting would be 4-5 hours.</td>
</tr>
<tr>
<td>Cost</td>
<td>There is no prescribed budget for this research study, however any data collection method chosen should be inexpensive to set-up and run.</td>
</tr>
<tr>
<td>Travel</td>
<td>Excessive travel would increase the cost of the study.</td>
</tr>
<tr>
<td>Intrusiveness</td>
<td>This refers to how intrusive the data collection method would be for the participant: would they have to give up whole days and sit with the researcher or would they be able to partake in the research in their own time and choice of location.</td>
</tr>
<tr>
<td>Chance of influencing the participant</td>
<td>Should the participant be influenced (such as into a course of action they may not normally take) by the data collection method or the researcher, data could be invalidated as a consequence. The chance of influencing the participant must be kept to a minimum to correspond with the research strategy (chapter 5).</td>
</tr>
</tbody>
</table>

### Potential for...

<table>
<thead>
<tr>
<th>Corresponding to creativity literature</th>
<th>Creativity and innovation are at the heart of design and therefore any design exercise should acknowledge this. The theory that 'the creative process and subsequent development of creative ideas takes time and effort' [11] [12] [13] was considered when choosing the method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtaining quality data</td>
<td>Any data collected should be usable and of sufficient detail to obtain findings and that can potentially represent a typical design process; Waltz, Elam and Curtis [14] noted that many of the studies into design processes used shorter and less complex projects which were considered uncharacteristic of 'typical' design projects, this too was considered when choosing the method.</td>
</tr>
<tr>
<td>Revealing their design process</td>
<td>Any data collected should contribute to understanding the participants’ working / design process.</td>
</tr>
<tr>
<td>Data preparation time needed</td>
<td>Data can be collected in many formats, such as audio, video, written notes, photographs etc., and some forms of data take longer than others to prepare for analysis, for example transcribing audio data. Ideally the data would require little preparation prior to analysis to save time.</td>
</tr>
</tbody>
</table>

Table 2. Criteria used for filtering the data collection methods

### Table 3. List of methods set against the criteria

The diary/longitudinal method matched the 'ideal' criteria the most closely, meeting all but two of the criteria. The first was the time needed to conduct such a study. Diaries/longitudinal studies involve presenting the design brief to a participant for them to take it away for as long as necessary in order to complete it; therefore, the exact time period for such a study is unknown. The diary method relies on the honesty of the participant and their understanding as to what they must note down. This presents a risk, for such a method could reveal very little [3]. Equally, the opposite could occur, with frequent and detailed additions to the diary. Following the success of the audio diary study in chapter six, with three of the four participants providing sufficient data to form an idea of how they worked, this risk appeared to be worth taking.

Forms of ethnography, such as shadowing or observation, corresponded positively with the criteria and shadowing seemed to be the most ideal method. Being able to observe the participant in real time in their natural environment, whilst they complete the design brief would ensure that little information went unrecorded and a high quality of data can be collected [7]. Nevertheless, such a study would be highly intrusive and too costly.

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<table>
<thead>
<tr>
<th>Method</th>
<th>Criteria</th>
<th>Practicalities</th>
<th>Intrusiveness</th>
<th>Potential for...</th>
<th>Data preparation</th>
<th>Time</th>
<th>Cost</th>
<th>Travel</th>
<th>Corresponding to creativity lit.</th>
<th>Obtaining quality data</th>
<th>Revealing their design process</th>
<th>Data needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diary studies: Longitudinal method</td>
<td>Days unknown</td>
<td>Low</td>
<td>No</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Not very</td>
<td>Not very</td>
<td>Very</td>
<td>Very</td>
</tr>
<tr>
<td>Ethnography: Shadowing Observing</td>
<td>Days unknown</td>
<td>High</td>
<td>Yes</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Interviews</td>
<td>Hours</td>
<td>Low</td>
<td>Yes</td>
<td>Low</td>
<td>Low</td>
<td>Depends on setup</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Protocol (Task) Analysis</td>
<td>Hours</td>
<td>Low</td>
<td>Yes</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Questionnaires</td>
<td>Hours</td>
<td>Low</td>
<td>No</td>
<td>Low</td>
<td>High</td>
<td>Depends on setup</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>&quot;Ideal&quot; method</td>
<td>Hours</td>
<td>Low</td>
<td>No</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>
The interview method enables a researcher to ask a variety of questions and question type (e.g. informal, formal, open or closed questioning, frequency of interviews, incorporation of tasks etc) to also react to the participants’ responses with additional enquiries. Due to this flexibility the interview method corresponded well with the ideal methods stipulated in table 3, however, the participant would always be thinking retrospectively and may have forgotten some details.

The protocol analysis method required a participant to respond to the design brief in a short period of time whilst verbalising their thoughts. This method did not correspond well with the criteria, however, such a method would require only a few hours to complete and would be low cost, requiring one visit to the participant only. How accurately this method would reveal the participants’ design process is unclear. Waltz, Elam and Curtis [14] believe that short design exercises such as protocol analysis are unrepresentative of ‘real’ design projects, however this does not mean that a design process cannot be revealed, perhaps in a more condensed format. Another issue is that solving a design brief in such a short period of time (2 to 4 hours) does not correspond with the creativity theories which state that creativity requires time and effort.

The primary advantage of protocol analysis is that the participant’s response to the design brief is captured in its entirety. Other methods rely on the participant to either record their own thoughts in a diary or to recall past events. A potential disadvantage of protocol analysis is the requirement for the participant to verbalise their thoughts whilst they design since this has been found to be distracting and hard to do [6]. This issue could be overcome by allowing the participant to retrospectively state their thoughts once the design activity had been completed, whilst watching a video recording of them designing.

The questionnaire matched the ideal method for its practicality but did not match with all of the other criteria. The main disadvantage of a questionnaire is that it could unduly influence the participant. For example, a question may focus on a particular aspect of the design process (e.g. research) that the participant had not considered, causing them to amending their response accordingly. It is also uncertain with how well a questionnaire could collect data regarding the participant’s design process and response to the design brief. During study one (chapter six) of this research the questionnaire to the undergraduates failed to reveal many clear trends. In contrast, the interview method would allow the
researcher to review the participant's response to the design brief with them and structure questions accordingly; the questionnaire method would not offer this freedom.

**Methods selected for piloting**
Following the comparison of methods the decision was taken to pilot test three methods: the longitudinal diary method; a concurrent protocol analysis; a retrospective protocol analysis. The longitudinal method was selected for its low level of intrusiveness, low cost, correspondence with the creativity literature and was based on knowledge gained from the successful audio diary exercise in chapter six.

The two protocol analysis methods, unlike the longitudinal diary method, can be completed within one day and how the participant solved the design brief is captured fully. For the concurrent method the participant discloses their thoughts whilst designing and retrospective version allows them to disclose their thoughts at the end. The structure of these has been described in more detail below.

**Longitudinal Diary**
This test had three stages. The first was a meeting with the participant where the pilot test, the design brief, the specification and the diary of designing (figure 1, overleaf) were explained. The consent form was also presented. The second stage was when the participant responded to the design brief in their spare time and for this test they were allocated seven days; this was then they recorded their design activity in the diary. The third stage was the concluding interview which was when they described how they solved the brief to the researcher. They also returned the diary as well as any additional material that formed their response to the design brief (e.g. design sheets, models, mind maps etc) at this time.
Protocol Analysis
Two versions of the protocol analysis method were piloted: a concurrent protocol analysis and a retrospective protocol analysis. The concurrent version required the participant to verbalise their thoughts concurrently whilst responding to the design brief. The retrospective version was tested to try and overcome the issues associated with verbalising thoughts whilst designing. On this test the participant commented on their design activity once they had solved the brief by watching a video of their solving the brief.

One week prior to the tests each participant was provided with a copy of the design brief. This was so they could research and familiarise themselves with the topic and was an attempt to correspond with the creativity theory. They were also informed that they could bring any media or equipment with them. The tests took place in a studio in the Department of Design and Technology at Loughborough University.

Concurrent protocol analysis
Before the test began the details of the pilot study and protocol analysis were explained to the participant and the consent form was presented to them. The participant then proceeded to respond to the design brief whilst concurrently verbalising their thoughts; this was recorded using a video camera. Two to three hours were allocated for them to produce their design and once completed the session concluded with an interview.
Retrospective protocol analysis
This test began identically to the concurrent version except the participant was not required to verbalise their thoughts. Their design activity was video recorded and once completed the participant reviewed the video, providing a commentary of their thoughts and reasons behind their actions. This commentary was audio recorded. The session concluded with an interview.

Concluding Interview
Following each of the pilot tests the participants were informally interviewed. This was the researcher's opportunity to ask the participant how they responded to the design brief and for them to explain their process, talk through their design sheets or workings and describe their final solution. The interview was audio recorded.

4 Sample
Ideally there would have been two types of participant, one sculpture student and one industrial design student, for each of the research methods tested. Unfortunately, no sculpture students volunteered, despite speaking to the students, their tutors and offering monetary reward for their time. Only industrial design students participated in the pilot tests. This undesirable circumstance was beyond the researcher's ability to resolve in the short time and with the limited budget available.

5 Results and Discussion
There are two main parts to this results and discussion section. The first considers the merits of setting of a design brief and whether it helped to reveal the participants' design processes. The second is a discussion of the quality of data collected and concludes with a decision on the most suitable research strategy for collecting data on how people solve a design brief.

Revealing a design process
The use of a design brief to help reveal a participant's design process worked well in this pilot study. All of the participants, in each of the tests, responded to the design brief by producing a solution following a period of design activity. The data collected from this design activity could be used to piece together a process diagram representing their design process (figures 2, 3 and 4, overleaf). Furthermore, none of the participants raised any issue with or showed signs of having a problem with the design brief or design specification used in these pilot tests.
Figure 2. Longitudinal diary participant's working process.

Figure 3. Concurrent protocol analysis participant's working process.

Figure 4. Retrospective protocol analysis participant's working process.
These process diagrams were constructed using data collected from the pilot tests. Further detail could have been added to these diagrams such as the influences behind their ideas or when each participant considered mechanics, aesthetics or users.

Data from the longitudinal diary method took the form of notes made in the diary (figure 5). The notes were written in chronological order and stated the main activities the participant undertook in response to the design brief. The interview transcripts and the seventeen design sheets provided an additional insights into the participant's process.

Figure 5. Page from the diary.

The visual data recorded from the concurrent protocol analysis test showed the participant’s response to the design brief in its entirety, such comprehensive data was not available for the longitudinal diary exercise. The video data was split into two parts: the audio and the visual. The audio data was transcribed and next to the relevant text in the transcription was the participant’s actions at that time (figure 6). The design process the participant applied could be inferred from this.

Figure 6. The method of displaying data from the protocol analysis tests.
Data from the retrospective protocol analysis was processed differently from that of the concurrent version. The main data source used to construct the design process diagram was the audio commentary the participant gave in response to watching the video of her designing. As with the longitudinal study, the sketch sheets of the participants from the two protocol analysis tests (concurrent and retrospective) further assisted with the construction of the design process diagrams. For example, the sheets indicated the number of concepts produced and in which order they were conceived.

The concluding interview proved to be an informative source of data that contributed further to understanding the participants' design processes. This was especially true for the longitudinal diary exercise where the researcher was not present during the design activity.

In summary, from each of the methods tested sufficient data was collected that could determine the working process the participants undertook to solve the design brief. In the next section the quality of this data has been reviewed.

**Quality of data collected**

The design process diagrams show how the participants' responded to the design brief. Each participant indicated that the design process they applied had been amended to suit the test. The amendments were all omissions of tasks they would have normally done when responding to a design brief:

I think the way I went about it wasn't normal; normally I have lots of spreadsheets going on and bits like that, such as matrices, this that and the other. I sort of skipped through that. I still did it but not formally.

Longitudinal diary exercise participant.

I think in terms of what I have produced I have done quite well to develop a product with a mechanism and almost sort out each individual component is quite good. Having done that though I have kind of ignored the aesthetics side of things it is just a very boxy kind of functional thing.

Concurrent protocol analysis participant.

I normally do quite a lot of research
Retrospective protocol analysis participant.

It appears that none of the methods tested could reveal perfectly the participants’ design processes. Therefore, it was necessary to establish which of the three methods could be used to collect data that was most representative of the participant’s actual process. Four aspects were used to determine this: the duration of the test; the potential for undue influence; the data collected; reference to design process literature.

**Study Duration**

The most detailed design process diagram was constructed using data collected from the longitudinal diary exercise. The additional detail obtained was not believed to be the result of a superior data collection method, but the extra time the participant had to respond to the design brief. The participant gave approximately seven to ten hours of his time to respond to the design brief over the seven day period, almost three times more than the time allocated to the participants of the protocol analysis. Moreover, the longitudinal diary participant produced approximately four times as many design sheets and eight times as many concepts. This corresponds with the theory of creativity taking time and effort with the participant producing the greater number of concepts. This extra information provided the researcher with more sources of enquiry when interviewing the participant, resulting in the more detailed design process diagram. Figures 7, 8 and 9 show the final solutions produced by the participants.

![Figure 7. Longitudinal diary participant’s final solution.](image-url)
The extra time afforded by the longitudinal diary exercise's methodology provided additional freedom to the participant to respond to the design brief as and when desired. For example, he could take breaks from designing, research topics, spend time thinking about the brief whilst undertaking other tasks etc. This freedom is more representative of a normal design process unlike the more restrictive laboratory conditions of the protocol analysis tests. Dorst, (p14) [15] describes the design process as being gradual and how ideas evolve over time; the longitudinal diary method therefore encourages more realistic design activity.

Influences
Participants of research studies should not be unduly influenced when providing responses for risk of invalidating data collected. The longitudinal diary exercise had the lowest potential for influencing the participant since the researcher had no contact with them whilst they responded to the design brief. In contrast, the researcher was present throughout the two protocol analysis tests, to operate the video camera; despite this nothing occurred on these tests to cause concern.

During the two protocol analysis tests two sources of distraction were noted. The participant of the concurrent protocol analysis stated that he was concerned about "talking rubbish" whilst verbalising his thoughts, implying that he was not entirely comfortable; however, this was not unexpected for such occurrences have appeared in the literature [6]. The act of being video recorded made the participant of the retrospective protocol analysis feel uncomfortable and as a consequence she took greater care over her sketches; she stated during her commentary that she normally sketches quickly. This anomaly is an indication that the design process revealed using the protocol methods might not be entirely representative of the participant's normal approach to a design brief.

An additional issue was raised during interviews with sculptors as part of another study. It was clear that sculptors do not favour being told what to do and if they struggle for inspiration they prefer to leave and do something else. Since sculpture is likely to be one of the disciplines targeted in subsequent studies is seems that they would not favour the constrained set-up of a protocol analysis.

Data Collected
From the protocol analysis tests detailed data were collected using video recording. The detail was such that microscopic levels of information could be identified, such as what the participants think of when sketching, or why they alter their sketching techniques from 'doodling' to detailed. For example:

When I sketch I either sketch really quickly because I am thinking a lot or I am thinking about one thing and I just draw that over and over again. Um... but because when I am thinking a lot about it, this is why I move around the page and I draw, I draw something then I draw something else then I will go back because I would of thought of something and would have to draw it down.
Retrospective protocol analysis participant.

So just trying to sketch out this bubblegum machine. Just make it a bit more like a nutcracker so kind of lever down here. Starting to think how maybe the mechanism might work.

Concurrent protocol analysis participant.

Nevertheless, despite this level of detail the participant had a shorter design process with fewer actions than the longitudinal diary exercise participant. This is most likely due to having less freedom when working in the laboratory style arrangement of the protocol analysis tests. In summary, the data from the protocol analysis tests offers microscopic data that is not possible from the longitudinal diary exercise, however, the breath of this data is limited by the lack of freedom and time available to the participants.

Literature

The three design process diagrams constructed using data collected, all conform to some degree with the design process diagrams in the literature [16] [17] [18]. Each of them include the main aspects of a ‘typical’ design process: a form of problem exploration, a generation of concepts followed by a period of detail design.

The longitudinal diary exercise participant’s process diagram further corresponded to the literature examples since he researched the topic area, used a design specification and undertook a more iterative process when designing and selecting concepts. His solution was also appraised at the end. Therefore, this particular design process had the greater likeness to those found in the literature.

6 Most Suitable Research Strategy

Based on the findings from this pilot study the most suitable methodology for revealing representative data regarding a participant’s design process using a set design brief, would be to organise:

- a longitudinal study where the participant takes the design brief and specification away with them for an extended period of time,

- provide a diary for the participant to add to during this period of designing,
- a concluding interview when collecting the participant's response to the design brief.

7 Conclusions
From this pilot study the following conclusions were drawn:

- The use of a standard design brief and specification can facilitate the revealing of a participant's design process.

- None of the participants in these pilot tests had any issue with the brief or specification used and they all responded to it with a period of design activity that was open for recording with a data collection method.

- The most suitable methodology for recording the said process is a diary method, which is completed by the participant as they respond to the design brief over an extended period of time. Further data is collected from a concluding interview that takes place when the participant returns their work.
## 2.3 Reviewer’s guide

<table>
<thead>
<tr>
<th>Reviewer’s Guide</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participant’s discipline:</strong></td>
</tr>
<tr>
<td><strong>Media type used:</strong></td>
</tr>
<tr>
<td><strong>Annotations versus sketching:</strong></td>
</tr>
<tr>
<td><strong>Areas of interest:</strong></td>
</tr>
<tr>
<td><strong>Tools or methods used:</strong></td>
</tr>
<tr>
<td><strong>Presentation media of final design:</strong></td>
</tr>
</tbody>
</table>

Reviewer’s guide for analysing the visual work produced.
2.4 Studio session

During the second year of this PhD research the opportunity arose to organise a studio session with a professional sculptor and students, studying industrial design at Loughborough University. In this studio session the design students were observed working with a sculptor in order to solve a sculptural brief.
1 Introduction
The primary research question for this PhD was, can contemporary art methods facilitate designers’ creativity? One of the strategies for conducting the research was to understand further and identify differences between the ways artists and designers work. This studio session was an opportunity to identify differences between the practitioners of these two disciplines. A professional sculptor agreed to conduct a studio session with students of industrial design. He provided a brief for the students to work on and offered them his assistance in solving it. The sculptor and the students had different creative/working processes and some of these differences revealed themselves during the session as they worked together.

This studio session is not unique; other art and design educational institutions also employ artists to teach their designers. For example, the painter Gabriel Klasmer lectures on the Design Products masters degree at the Royal College of Art in London. However, few collaborations of this nature appear to have been documented and the findings from this session were informative and beneficial to the overall research.

Aim
The aim of the session was to identify similarities and differences between the sculptor and the design students’ ways of working and thinking.

Objectives
To achieve the aim the following objectives were used:

- To monitor the reactions of the design students to the sculptural brief and the sculptor’s way of working
- To identify the sculptor’s reactions to the design students and their way of working

2 Studio Session Organisation
The organisation of the studio session required four key aspects to be attended to. The first was the sculptor and ensuring he could find the time to come to the session. The second was the recruitment of design students who attended the session. The third was the brief they were to solve, which was developed by the sculptor, and the itinerary of the session. The fourth aspect was the location and the equipment available to the participants. Each of these aspects are noted in more detail below.
The sculptor

John Atkin is a practicing sculptor and lecturer on the fine art degree programme at the Loughborough University School of Art and Design (LUSAD). John's work is inspired by the use and interpretation of garment patterns and how they facilitate the transformation of fabric into a three-dimensional object (Figures 1 and 2).

![Figure 1](image1.png)

Figure 1. Example of the garment patterns

![Figure 2](image2.png)

Figure 2. Examples of John Atkin's sculptures

The design students

Undergraduate and postgraduate students studying industrial design at Loughborough University were invited to participate in the studio session. Six students volunteered, these were:

- 3x undergraduate Industrial Design and Technology students (participant numbers 5, 6, and 7)
- 2x postgraduate Industrial Design Masters students (participants numbers 8 and 9)
- 1x postgraduate researcher - industrial design qualified to Masters level (participant number 6)
The advantage of having only six participants is that the sculptor’s time was divided more generously when providing guidance and feedback. This extra time may ease the observation and identification of any differences between their processes.

**Brief and Itinerary**

The participants were provided with a brief to focus their attention and give them something to work towards during the session. The brief was based on the sculptor’s area of interest (garment patterns) and was typical, according to the sculptor, of one given for a commissioned piece; the brief was as follows:

*The local council are proposing a new play/recreational area for children, aged 5-12 years, to be built on the site of an old petrol station (70m by 40m). The council would like the site to echo Loughborough’s textile history by reference to garment patterns.*

*The council does not want traditional play equipment, such as swings, slides, or roundabouts, for these are clichéd and are often easily vandalised. This is an opportunity to develop new equipment using garment patterns for inspiration.*

The itinerary for the studio session is shown in table 1. This was adhered to closely and the session did not over run.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Equipment</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction lecture</td>
<td>Presentation by John Atkin; introducing himself and his work</td>
<td>PowerPoint via projector</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Design Brief</td>
<td>Presentation of the design brief and itinerary</td>
<td>PowerPoint via projector and handout</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Design session</td>
<td>Students work on the design brief with John Atkin offering guidance</td>
<td>Paper</td>
<td>165 minutes</td>
</tr>
<tr>
<td>Student presentations</td>
<td>The students present their designs to the group via a critique</td>
<td>N/a</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Final sum up</td>
<td>Verbal appraisal and final info’ such as when they get the work back etc</td>
<td>N/a</td>
<td>5 minutes</td>
</tr>
</tbody>
</table>

Table 1. Itinerary of the studio session
Location and Equipment
The studio session took place at Loughborough University in one of the studios in the Department of Design and Technology. The participants were provided with drawing and modelling equipment and were informed by the sculptor that they could approach the study however they wished.

3 Data Collection Methods
Two data collection methods were used during the studio session: observation and a sentiments page (a form of logbook given to each participant on which they can make notes). All of the work produced by the participants during the session, such as sketch work and models, were retained as a potential source of data. The sculptor was also interviewed at the end of the studio session in order to record his thoughts of the session.

The choice of methods was based on the need to limit the researcher’s interference with the participants and the sculptor during the session. Observational methods are unobtrusive and the sentiments page could be used at the participant’s discretion. Other methods such as focus groups at the end of the session or individual interviews during were considered too time consuming and intrusive. Detailed questionnaires would have been unobtrusive and potentially quicker to complete but it would have been uncertain what questions to have asked. The two data collection methods used are detailed below.

Observation
Observation was particularly suited for obtaining first hand, live data and therefore, suits exploratory studies such as this one where the researcher was on hand to experience and gather the data during the session [1]. The researcher took the role of a complete observer since he did not take part in the design activities.

There were no strict guidelines for the observation of the studio session except to note the sculptor’s and participants’ reactions to the brief and any differences in working process or attitudes.

Sentiments Page
Each participant was provided with a sentiments page and was requested to make notes during the session. This is a self-disclosure method that relied on the participants to complete. They were asked to note any unusual experiences or departures from their normal ways of working; for example, if anything were unusual, particularly hard or easy, or what had been helpful or unhelpful during the session.

The aim was to provide the participants with an outlet for noting their thoughts of the session as it progressed. The open-ended questions were appropriate for this study as they are suited for collecting honest and personal comments from the participants [1]. Since this was an exploratory study it would have been presumptuous to ask precise or closed questions.

Interview with the Sculptor
Following the studio session the sculptor was informally interviewed. The aim was to identify what the sculptor thought of the session and how well the participants responded to the brief. There were also questions relating to the work produced by the participants.

Additional sources of data
The participants of the studio session produced sketch work and card models of their design proposals. These were potentially useful sources of data since sketch work is considered to be a form of thinking where the designer plays and reflects on their ideas [2] [3]. However, to the contrary, Pedgley [4] stated that "by looking at a sketch it will not be possible to tell what was thought". This could be true for precise thoughts, which may never be known or reliably externalised, but sketches can provide the onlooker with small insights into the creative process [5]. Additionally, all the sketch work from this study was comparable since it was produced at the same time in response to the same design brief.

4 Results and Discussion

Within this section the reactions from the design participants and the sculptor towards the studio session are discussed. The data collection methods used were also reviewed for their suitability.

The participants’ reactions to the session

The reactions of the design students to the studio session have been divided into three main sections: the alternative working process; response to the design brief; potential influences; drawing and modelling. In each of these sections differences have been noted between the design students and the sculptor. However, prior to this, it is worth recording a more general observation of the session: the participants seemed to have enjoyed the session and the experience of trying an alternative way of working. Some found it to be an unusual way of working and most provided positive comments. At the end of the session each participant was pleased to have attended. This demonstrates that experimenting with alternative processes can be enjoyable and that this sculptural process was a positive experience for those involved.

Alternative working process

The sculptor introduced to the design students an alternative working process. Aspects of this process were imposed on the students by the brief and other aspects by the sculptor himself. The first aspect was the open brief; there were very few constraints to work towards or within and it encouraged the participants to be explorative. A second aspect was the requirement to use only one source of inspiration (the garment patterns). Finally, the third main aspect of the alternative process was the use of three-dimensional modelling to express their ideas. Normally a design student would not model his or her ideas in three dimensions until much later in a design project (days or weeks), and rarely after only one or two hours. Notes made on the sentiments pages supported these observations and the sculptor's process was seemingly different from their typical design process. Most frequently noted was the reflection of the session's apparent freedom:

Good for ‘freeing-up’ design (student 5)

Freedom of design (student 7)

Creatively it feels less constrained (student 8)
One participant found this to be a negative aspect stating that it is "difficult when it is so free" (student 10), which highlights the fact that not all design processes suit all designers.

The design brief forced the participants to use garment patterns as their sole source of inspiration for their design ideas. This constraint and the sculptor's process seemed to be new to them since the participants stated that it was:

- Interesting for different approaches (student 5)
- Unorthodox approach to concept generation (student 8)
- Seems to be a different method of adopting things (student 6)
- Concept – quick generation – good – no details bogging down (Student 7)

From this it could be inferred that this sculptural process was slightly different from their typical design process. This may not have been a popular aspect of the session since the participants found that the 'patterns are restrictive in some way'. However, others stated that the garment patterns promoted 'exploration of shape' and 'much more manipulation of shapes'; the session produced a mix of opinions reiterating that there is no single suitable process or method for designing.

Modelling their ideas sooner than normal was considered to be unusual, but also a positive activity by one participant stating that it was "quick 3D modelling – nice – but unusual – exploration easy" (student 5) and "different instant modelling – new thought patterns" (student 7). This adds support to the observation that this was a new, or unusual, process to them. Another participant realised during the session that modelling was preferable to sketching in this case; "working with real material and creating 3D was better for me" (student 10), perhaps this was making some of the participants reconsider their own design process.

The fact that this alternative working process was seemingly unusual and beneficial to some of the participants supports those in the literature, such as Yair, Tomes and Press [6], and Schmiedeknecht [7], who believe that the sharing of knowledge from other disciplines for even a short period may benefit creativity.

The participants also observed that the sculptor appraised things from an alternative perspective. Whether the sculptor was appraising a model or providing unusual sources of inspiration it seemed to be a new approach for the participants concerned. Furthermore, student 8 praised the sculptor’s process for using external inputs and deemed it to be a better process than he used when designing.

*It was good the way he communicated the idea and gave suggestions and looked at things from other perspectives – didn’t constrain it by saying it’s not possible.* (student 10)

*Sculptors seem to have a more underlying reason for a particular shape / form, not just aesthetic reasons* (student 7)

*Use of external inputs as an idea generator e.g. in design we use object primitives to generate a form therefore this approach is better* (student 8)

**Response to the brief**

All of the participants responded to the brief in a similar manner. They began with a period of sketching which lasted for approximately 1.5 to 2 hours. One participant noted key issues regarding playgrounds prior to sketching ideas. The remaining participants began sketching following a short period of individual contemplation. Everyone worked individually and there was little conversation during the session. The sketching was followed by card modelling and the development of their final solution and the duration of this was similar to the sketching.

Von Oech [8] states that it is a desirable not to make a mistake or appear to be wrong and this is conditioned into students through education: those with the most right answers do well. When this occurs within a school of design the students could be conditioned to design in a certain manner, by striving to meet the requirements of a syllabus in doing so are rewarded with high marks. Since all of the participants were educated in industrial design within the same department it is likely that they would have been conditioned into using a similar design process. This became apparent when all of the participants responded to the design brief by sketching their ideas. Furthermore, sketching has been proven to be a taught


process that is instilled into students, for those with no formal design education prefer not sketch when developing ideas [9]. The participants in this study appeared reluctant to model in three dimensions, seeming to ignore the sculptor’s encouragement to begin. This reluctance to model, combined with the comments from the sentiments pages demonstrates that this was potentially a break from their normal and, perhaps their pre-conditioned design process.

Alternatively the reason given by Welch, Barlex and Lim [9] for their participants preferring to model rather than drawing was due to their lack of confidence or ability in using such a medium to express their ideas. Perhaps the opposite occurred here, where the participants felt more confident drawing their ideas than modelling.

Another possible reason for this is conformity. The three groups of participants rarely mix outside the session and they chose to sit in their own groups. Furthermore, this studio session was an unusual activity which the participants may not have been familiar with and, perhaps the situation proved uncomfortable for them. This could have caused conformity, where individuals within groups do not wish to appear foolish and therefore, they conform with the rest of the group [10]. Hence all of the participants in this study began by sketching their ideas and transferred to modelling at a similar time.

**Potential Influences**

The participants were likely to have been influenced strongly by the sculptor’s presentation of his ironwork sculptures of garment patterns. This presentation was an example of how the sculptor was influenced by the garment patterns but ultimately it may have influenced the entire group. Presentations prior to a design session may restrict or focus creative thoughts unduly and potentially limit the output.

One further issue is that the participants were either qualified or were undertaking a qualification in industrial design and this may have also been a factor behind their designs all being of a manufacturable nature. Their design solutions were also

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similar for they were all metal structures that could be cut, welded and formed and were similar to the sculptor's work. Lawson [11, p8] used a hypothetical scenario to highlight this phenomenon:

Let us briefly examine a situation. Imagine that a railway company has for many years been offering catering facilities only on certain trains and has now discovered that this part of the business is making a financial loss. What should be done? An advertising agency might suggest that they should design a completely new image with the food repackaged and differently advertised. An industrial designer might well suggest that the real problem is with the design of the buffet car... An operations research consultant would probably concentrate on whether the buffet cars were on the right trains; and so on.

Had this brief been given to architects, landscape designers or horticulturalists for example, the solutions may have been different, perhaps the use of topiary or brick instead of ironwork. A wider range of solutions could have been obtained if a mix of disciplinary backgrounds had participated in the study.

**Drawing and Modelling**

The studio session can be split into distinct halves. The first was the time the participants spent sketching ideas and the second was the time they spent modelling their ideas. Their sketch work showed their ideas and the majority of the participants focused on smaller individual elements of the playground, such as pieces of play equipment. However, once the participants began modelling their ideas in card their attention turned to the whole site (figure 3). Pugh [12, p175], from his research also noticed this phenomenon and stated that:

They (prototypes) give members of the design team a tentative understanding of the interactions between the components embodied in the product, which collectively make the whole.

Therefore, during the session the drawing activity facilitated development of components of the play area but it was the modelling activity where the participants pieced them together as a whole playground.

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One participant noted a difference between the sculptor's attitude and his own with regard to modelling, this was as follows:

*Sculptors seem to seek for more detail from building a model. I normally use it for initial form; build detail in further sketches and cad model (student 6)*
This quote, in addition to the others that described how it was unusual to model so soon, contributes to the case that this sculptor worked in a different manner to these participants.

**The sculptor’s reactions to the session**

During the studio session the sculptor acted as a mentor to the participants, offering them his opinion and critiquing their ideas for their playground. Two main observations of the sculptor’s behaviour were noted. The first was that he preferred to review models rather than sketches, and the second was that he held a different view of the value of the models than the participants.

**Model, don’t draw**

From the studio session it became clear that the sculptor preferred to review physical models. He encouraged the design students to put their pens down and begin playing with material and he paid less attention to the participants whilst they were sketching. He stated that:

> A drawing is a selected view from one perspective; a model can be interacted with, rotated, moved in and out of the light etc., more scope for inspiration. A model instantly invades space (sculptor 7)

Many have reported in the literature that sketching is a good way of developing new ideas when designing and solving problems [3] [13] [14]. Furthermore, drawing is also considered to be the quickest and most fluid modelling technique [14]. This may explain why the participants initially chose drawing over modelling in response to the short duration of the session. This also highlights a difference in the sculptor’s working process to that of the design students and how he prefers to model ideas rather than sketch them.

**Attitude to the participants’ designs**

The sculptor also held a different attitude towards the models than the participants. This attitude difference related to the finality and fixity of the models; the participants seemingly considered their model as being a fixed representation of their solution to the brief whereas the sculptor remained open to all possibilities. This was also noticed by one of the participants:


He seemed to have a more open view of models, if the model flexes may be the final solution could (student 6)

For example, figure 5 shows a card figurine that the participant modelled to demonstrate the scale of her piece; however, the sculptor questioned as to whether this could be part of the piece.

![Figure 5. Card girl; scale representation or feature?](image)

A further example is shown in figure 6, the orange aspects, highlighted in the figure, flexed gently and the sculptor asked if they were meant to do so. The participant stated they had not considered this.

![Figure 6. Could the highlighted aspects rotate or flex?](image)
The studio session had a natural deadline at the end of the day and the participants would have been working to that; their aim was to produce a final solution that satisfied the brief within this time. Therefore, their designed solution at the end of the session would in their minds have been final since they were not expected, or requested to continue its development following this session. However, the sculptor considered the models as a way of progressing ideas and were not final representations, as considered by the design students.

This further highlights the notion that a person's frame of mind and how they think can alter the way they appraise a subject. For example, the theory of vertical and lateral thinking, where vertical thinkers are goal orientated and lateral thinkers are idea orientated [15]. Which type of thinker a person is depends on how they view the problem at hand, do they wish to find a solution quickly (as the participants may have wanted) or do they wish to explore new idea (as the sculptor may have done).

5 Review of the research methods

Data collected from the observation of the studio session focused on the sculptor's mentoring of the participants to help them with their designing. The researcher had unknowingly focused his attention on the sculptor and his interaction with the participants.

Attention also allows us to select some aspects of a scene for consideration, while ignoring others. We focus on the figure, not the ground, and if several figures are present, we choose the one to which we'll attend. [10, p205]

This quote highlights a potential weakness with observation as a method for collecting data. The observer focuses their attention in order to collect data, but risks missing data from other sources. This, it seems, occurred during the observation of the studio session and additional data, such as, how the participants interacted with each other or their model making processes went unrecorded. Employing a second observer, who could focus their attention on another aspect of the session, may have reduced the potential to miss data. When using two or more observers a plan of observation, outlining who observes whom or what, may be required to ensure the same event is not observed or recorded twice.

Theoretically if data were not observed, there can be no certainty that any data were missed; however, the researcher had a general awareness of what was occurring in the environment. Despite this, the saliency of data collected is not reduced.

The intention was for the participants to add to their sentiments page during the session. However, the majority only added to their page at the end of the session. This meant that the notes made were reflections of the session’s activities and not intuitive reactions noted down as they occurred. As a consequence issues may have been forgotten by the participants due to the large amount of information put to them during the session and the need to concentrate on their design work. Gleitman, Fridlund and Reisberg [10, p219] notes two ways in which information is lost from a persons’ short term memory:

*The best evidence to date that both factors play a role, that some packages [of information] on the platform [memory] erode (decay), while others are shoved off by other packages (displacement). In either case, it is clear that they are generally not allowed to remain on the platform for long.*

This supports the notion that the completion of the sentiments page at the end of the studio session may not have revealed as much data as had they made notes during the session when the thoughts occurred to them.

This could be due to the attention phenomenon discussed earlier since the participants would have been focused on solving the design brief and not paying attention to formulating thoughts on the session or studying their own behaviour. The participants may have also felt under pressure to complete their design in the time available; under such conditions attention would be focused toward the most important tasks. Once the designs had been submitted at the end of the session only then could they reflect on the session. Alternatively, it may have been the case that there were no obvious or salient issues to note down during the session.

The comments noted by the participants’ on the sentiments page were written as bullet points: short single sentences with little surrounding contextual information to aid comprehension. Due to having little explanatory information much of the data were superficial. For example, participant 1 stated:

*Interesting for different approaches (student 5)*

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This statement is ambiguous and could be referring to numerous aspects of the session, such as the open design brief, the use of a single and unusual source of inspiration or the approaches offered by the sculptor. Any one of these could have been a different approach or interesting. This method should not be dismissed totally for the data obtained did reveal some thoughts, agreements and disagreements between the participants that were useful. Furthermore, the sentiments pages were simple to organise and perhaps the solution would have been to remind the participants more often during the session to use them.

One data collection method that could have been used was the interview. Interviewing each participant during and after the session may have provided more detailed data. An interview methodology of this nature was originally dismissed when planning this session for being too intrusive and time consuming. However, this seems to be an acceptable risk in order to gather useful data.

Holding interviews would require the participant to be removed from the studio session enabling them to refocus their attention and allow them to comment on the session and their own behaviour. The participants' could use their sketch work and models to clarify their responses in the interviews. The interviewer would additionally have the advantage of being able to ask follow up questions [16].

Interviews and the sentiments pages could have been used along side each other during the studio session enabling, not only more data to be collected, but data that can be triangulated. A second data collection method could increase the reliability of a methodology, should one fail to collect useful data.

6 Summary
From the studio session it seems that the sculptor had a different working process to the design students. These students found the sculptor’s process to offer more freedom and that the single source of inspiration and the use of modelling to generate ideas as unusual. Their reactions demonstrated that different creative disciplines can offer potentially new working processes and alternative ways of working.

The sculptor showed a preference during the session towards the participants' models. He felt that models invade space and subsequently are more flexible than a static drawing. However, the participants initially favoured drawing and used the technique for creating individual elements of their playground design. It was not until the modelling phase when they applied a more holistic view of the playground they were developing. Toward the end of the studio session the sculptor critiqued the participants' playground designs and in doing so highlighted a difference in attitude towards the models. The participants saw their models from a fixed and final perspective whereas the sculptor was more open and used the models to inspire alternative ideas.

The review of the data collection methods used for this studio session shows that the observation and sentiments page methods each had weaknesses. Future sessions ought to have two researchers observing to ensure that information is not missed. The sentiments pages, which provided ambiguous notes, should be replaced with short interviews that takes the participant out of the session for a few minutes so they can reflect on what is happening.

7 Conclusions

The following conclusions were drawn from the studio session:

- A sculptor has a different working process to a design student
- The design students found that using a single source of inspiration to be unusual
- The design students preferred to sketch their ideas whereas the sculptor preferred them to model
- The design students sketched small components of their playground but only developed the whole playground when modelling in three dimensions
- The sculptor viewed the models differently from the design students; he saw things from a different perspective
- The design students found that the studio session (brief and sculptor's process) offered more freedom than their normal way of designing
- This collaboration between sculptor and design students provided the students with an alternative way of working.
Appendix 3
3.1 Codes from Nvivo for each method identified

Advice methods

Node: /Advice/Collecting
Card Name: Collections
Description: collect items that may help you

Document 1 of 15 Sculptor 17
8: Boxes of collected and found bits are dismantled and carefully arranged in a space.
21: This involved collecting old electrical equipment and disassembling them into their basic components and laying them out on the ground.

Document 2 of 15 Sculptor 19
33: She noticed and began collecting old shoes washed up in the Thames and began to place them on the printing press and printed them! Ideas flowed from experimenting.

Document 3 of 15 Sculptor 10
37: As before, recycling used or found objects he went about producing worldly beings and creatures brings the objects alive in peoples' minds.

Document 4 of 15 Sculptor 16
5: as well the things she collects such as handbags, shoes, old things such as pots or jugs. Fascinated by the lines, form, and shape of the artefacts.
27: She collects many artefacts and surrounds herself with them since they can inspire ideas.

This Node codes no other documents in this set.

Node: /Advice/comfortable
Card Name: Too Comfortable
Description: does your design strategy need an update?

Document 1 of 15 Sculptor 11
58: Constantly re-evaluate your position and language.
59: Are you too comfortable? If so it is time to try something new.
60: Are things too easy? Take a risk and experiment. Sometimes you need to restart and see things from afresh perspective. This can add new energy into your work.

This Node codes no other documents in this set.

Node: /Advice/Constraints
Card Name: Constraints
Description: anything is possible - try things freely

Document 1 of 15 Sculptor 9
37: Do not become too attached or rigid to one idea, be open to others and look at possibilities. Reduce your constraints, and do not be too literal.

Document 2 of 15  Sculptor 18
8: Artists can bring to projects a sense of philosophy is that 'anything is possible' and to leave no stone unturned. I would not accept 'no', there must be some way of doing it; normally there is a way and most things are possible. This is a creative journey and he will go anywhere for ideas and inspiration.
48: Do not unduly constrain yourself and think that anything is possible somehow.

Document 3 of 15  Sculptor 2
79: Most impractical routes and work back by applying the constraints later.

Document 4 of 15  Sculptor 14
51: Remove constraints.

This Node codes no other documents in this set.

Node:  /Advice/Conventions
Card Name:  Conventions
Description:  break convention

Document 1 of 15  Sculptor 13
48: Context why should art be only found in a gallery?

Document 2 of 15  Sculptor 10
28: He also broke and did not worry about gallery conventions and old ways of doing things - such as things behind glass or not to touch or how the space is used: hanging things across the space etc. bale to treat it as a playground essentially.

Document 3 of 15  Sculptor 15
24: In the past sculpture has not been included in some open house trails due it requiring dusting or maintenance. She wanted to test this convention by producing sculpture that was of a low maintenance.

This Node codes no other documents in this set.

Node:  /Advice/Detail
Card Name:  Detail
Description:  what do you focus on?

Document 1 of 15  Sculptor 9
9: She 'likes' the idea of residue and traces of what went before and how one thing can progress onto another thought such as finger prints relate to touch, hand and pressure. She focused on a very small part of a piece of fabric where the thread had been removed, this was drawn, pieces cut out and noting the residue marks and the traces left behind.

Document 2 of 15  Sculptor 12
18: She looked at mood and began to remove the detail and simplified her work. Looked and aimed to represent the essence of the subject.

21: She preferred to look and play with shape - to focus on the shape and the overall form of the piece. Detail was not so important to her.

53: Plays with detail adds detail or removes it to test ideas

This Node codes no other documents in this set.

Node: /Advice/First idea
Card Name: First idea = best idea
Description: is this actually your best?

Document 1 of 15 Sculptor 9

37: Do not become too attached or rigid to one idea, be open to others and look at possibilities.

Document 2 of 15 Sculptor 11

19: Trust instinct often the first idea is the best.

This Node codes no other documents in this set.

Node: /Advice/Head soup
Card Name: Head soup
Description: what helps you be creative?

Document 1 of 15 Sculptor 18

17: How you handle your own brain is really important take responsibility for its evolution be alert as possible and think in different ways. Vary your perspective to things change my height, crouch and temperature how does temperature affect my creativity understand how my mind works and hopefully produce more ideas. Having control over your own creativity and an awareness of how your mind works is a very sensible thing to do. Colour theory and how it affects your brain changes in chemicals in your brain head soup all things around you change the soup in your head and change how alert or creative or dull you are.

This Node codes no other documents in this set.

Node: /Advice/Honesty
Card Name: Honesty
Description: be true to your feelings, morals etc

Document 1 of 15 Sculptor 18

50: Design on your own and be true to yourself.

Document 2 of 15 Sculptor 11

64: Who are you? Is your work being honest to you or are you doing things to please others all the time? Maintain your core needs, morals, ethics but aim to challenge your language and move forward.

Document 3 of 15 Sculptor 13
51: Aim to understand yourself. What do you want to do? What are you interested in? Extend personal likes (or dislikes) also try to move on and try new things.

Document 4 of 15  Sculptor 10
51: Be strong and follow what excites you. Totally immerse yourself in the project.

Document 5 of 15  Sculptor 14
44: Chose to change her own focus and interests. She questioned her way of working, how, why.

This Node codes no other documents in this set.

Node:  /Advice/Language
Card Name:  Language
Description:  how do you stand out?

Document 1 of 15  Sculptor 17
27: Researches into other artists who use found objects but still ensures he has his own way of doing things his language.

Document 2 of 15  Sculptor 9
9: Main work follows an underlying theme(s) of gesture, mark, echo and drawing.

Document 3 of 15  Sculptor 8
6: She is a 'systems artist' where she sets and works to strict criteria that she will only work within a certain area. For example she limited herself to just using angle iron or to a philosophy

Document 4 of 15  Sculptor 11
11: She refers to her language; this is her current style and things that she is working on at that point in time. Her language changes all the time.
58: Constantly re-evaluate your position and language.

Document 5 of 15  Sculptor 15
29: This method of stone working was her current language how she worked and expressed herself. This was her style and that was linked to her process. Languages change and so do the processes that underlie them.
39: She tries not to be too influenced by other sculptors she notes their work but aims to develop her own language. I want to see things my own way and not as another sculptor sees it.
41: True originality comes from the experimentation and development of your own language.

This Node codes no other documents in this set.

Node:  /Advice/Nature
Card Name:  Natural
Description:  popular source of inspiration

Document 1 of 15  Sculptor 17
23: He was interested in recycling and issues concerning the environment
Appendix 3

Document 2 of 15  Sculptor 18
10: He is inspired mostly by nature hugely rich source. Nature has solutions for most things and he aims to search and understand aspects of nature to help him with his own problems solving. He stated that nature is the embodiment of form and function which constitutes beauty. Inspired by and can learn from the principles of nature he does not copy nature but uses it in an abstract manner.

Document 3 of 15  Sculptor 19
9: She went to the beach and cast sections of the beach (areas where the sea had withdrawn and left marks)

Document 4 of 15  Sculptor 8
6: She relates it to natural processes and nature it looks random but underneath there is a clear system of how things evolve and develop.
15: Also noted how nature also has its own systems how a rose climbs a wall or the trail of a snail each has its own system or way of doing things

Document 5 of 15  Sculptor 12
4: Seeds breaking through nature influence not literal, an emotional response
6: Liked the idea of rebirth and re-growth
19: She has done some representational pieces, such as the grain of wheat and that was when she saw the beauty of the seeds. She wanted to interpret the beauty of the seed and not copy it. No literal work.

Document 6 of 15  Sculptor 16
5: Nature plants, shells, seeds etc, play a big part in her inspiration
27: For example she had a dried leaf from a flower that was semi-opaque and had ribs running down it she said that from this she may try including pleats or use a very thin material to obtain the effect of light passing through it or she could use the shape and how it folds over etc...

Node:  /Advice/Obvious
Card Name:  Obviousness
Description:  are some sources too obvious?

Document 1 of 15  Sculptor 5
11: To find that unique idea relies on finding out what is special to that place.
12: Investigated the village history found link to breeding of bulls concentrated on this.
13: Did not wish to sculpt the obvious a giant bull! But they are too common.
14: Must associate it to Bodenham without making it a cliché or obvious; achieved by taking the opposite view big bull was once a small calf linked to breeding and positioned them as if they were in a pen.

Document 2 of 15  Sculptor 19
52: She thinks of feelings be literal too sometimes most obvious things can be best. How do you feel when walking on grass? If you like the feeling of grass and the connotations it embodies use grass!

Document 3 of 15  Sculptor 2

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10: Back to basics inspired by the mountain. This time he was enjoying the obvious. Local people lived by this amazing mountain but ignored it, where as he came in and wanted to observe it! Some said that the mountain was too obvious to do, let's try something else.
11: Obvious or not? Need to question why and also why not!
30: Discarded the obvious, such as the twisted spire of chesterfield church.

Document 4 of 15 Sculptor 12
19: She wanted to interpret the beauty of the seed and not copy it. No literal work.

This Node codes no other documents in this set.

Node: /Advice/other disciplines
Card Name: Out of the discipline
Description: look elsewhere, far and wide for ideas

Document 1 of 15 Sculptor 20
18: She started her career by undertaking an interdisciplinary art course during which she tried many types of art and worked with many other artists from different disciplines. This still inspires her work.

Document 2 of 15 Sculptor 2
15: This was Sculpture 'unplugged' all free and open to explore. Looked at local art and geology inspired geometric and angular drawings.

Document 3 of 15 Sculptor 10
39: Produced surrealist pieces but did not research other than what he experienced and thought in life in general. music, people human figure, plant life, nature other worldly things.
41: Also influenced by popular culture.

Document 4 of 15 Sculptor 14
13: theology, poetry and writing
41: Miniature architecture inspired by gothic buildings.

This Node codes no other documents in this set.

Node: /Advice/questionning
Card Name:Why?
Description: question everything

Document 1 of 15 Sculptor 9
15: She constantly asks herself 'why do I like this' and is rather introspective when finding out why.
25: She was interested in space and the relationships of things. She always focuses in on tiny aspects or parts of things; for example if looking at a stone she notes the surface quality and wonders why it is like that, what made those marks etc. the rest of the stone, its mass, shape may go unconsidered.

Document 2 of 15 Sculptor 8
46: She always asks herself how she can make something interesting and tries to be inspired by the material.
Document 3 of 15  Sculptor 12
65: Home in on things of interest.

Document 4 of 15  Sculptor 14
13: Such as considering deeply "why does that draw me in?" and questions people's reactions to work why does it scare them when they know it will not move or come and get them...?
35: Physical interaction, ask why people do things.

This Node codes no other documents in this set.

Node: Advice/Recording
Card Name: Capture
Description: how they record information

Document 1 of 15  Sculptor 9
39: Track your ideas too, all the time write them draw them model them record them always.

Document 2 of 15  Sculptor 20
61: Tip for public art visit the site, walk around it, photograph it, find out information about it
63: Do some sketches. Get some people to do some photomontages.

Document 3 of 15  Sculptor 2
6: Keep sketchbooks all the time and will go back to review past thoughts and Ideas.
7: Drawings have become a work of art in their own right new way of seeing things
28: Method for inspiration was a brainstorm of images

Document 4 of 15  Sculptor 12
59: Always notes and tries to remember shapes or details of buildings records things with a quick sketch.

Document 5 of 15  Sculptor 13
46: Always takes a sketchbook and sketches whilst out walking.

Document 6 of 15  Sculptor 16
19: She liked to watch seeds develop and how flowers decayed or dried out these were drawn or photographed. Work is based on still life.

This Node codes no other documents in this set.

Node: Advice/relax walk
Card Name: Relax
Description: taking a break

Document 1 of 15  Sculptor 17
43: This was an installation and he had no idea what to do! He researched by walking around looking for things he could use.
48: Take time to be still take action by being still and thinking.

31: Think about what you are experiencing at the time go for a walk and think always helps! Whilst on a walk she was looking at surfaces and noted the adverts on the floor... from this she thought and also placed pieces of advertising paper that can be stuck on the floor to capture the marks people’s feet make as they pass over them.

29: This was inspired by her walks along the banks of the Thames and at that time they were lifting the London eye into place and it was coming up in stages.

53: Allow time for yourself refresh, relax and take a change from your old routine.

Node: /Advice/Research
Card Name: Blind research
Description: research into anything - most things are related and could help

58: Breath of knowledge she applies knowledge from many different sources to her work, reads and researches widely. She will also draw on the knowledge of others simply by asking them.
60: Random approach can work well; look at anything and random things all things in this work relate to each other somehow.

20: Sites are inspiring too, they are full of culture and history.
46: This was followed by extensive research into the history of the park. She also looked at old maps and photographs.

4: No structure to drawings or defined outcome.
5: Self generated brief and focus.

62: Surprise yourself and learn more.

Node: /Advice/Thinking
Card Name: Philosophy
Description: sculptors really think about their work
16: He focuses on fractions of things as a piece in its own right and not fragmented rubbish originating from a whole.
23: This was to the degree that he did not see why as a sculptor he should add to the number of things in this world when so much stuff already does that he can work with.
25: He sees the issues differently sustainable art, all his work is recycled afterwards and much of it would not have been. Likes to question social viewpoints on disposability and the material world and consumerism.

Document 2 of 15 Sculptor 9
31: She works with the idea that nothing works in isolation.

Document 3 of 15 Sculptor 18
8: Artists can bring to projects a sense of philosophy is that 'anything is possible'
12: He also looks for drama that is around us all the time, but is easy to miss and looks at things in different ways.

Document 4 of 15 Sculptor 19
27: Philosophy - energy marks she likened the surface marks made by the bugs to being energy, they required energy to make them, light is energy so she chose to project her work in a light form. She thinks very carefully around each problem; this takes a long time this project took three years in total for ideas to develop. She was very focused on the idea of what she wanted to produce. She did not research in the sense of books or Internet etc, just focused on the idea.
42: She considered emotions and how they change following her divorce and how we experience things over time. She linked emotions to marks on the soul goes back to her original philosophy of examining marks.
62: De-linear-ise; look for new ways of approaching a project, find a new angle but once you have done it make sure you move on.

Document 5 of 15 Sculptor 2
26: Thinking of the theme of law. Noted negative thoughts that he wanted to avoid such as the big hand of the law coming down that are too one-sided. Wanted to promote positive feelings of balance and fairness; he chose to avoid the traditional and overdone scales of justice. Looked for a new positive symbol of justice.
28: looked for double meanings and underlying notions such as books are a foundation of the legal system and became the foundation stones for the sculpture. Looking at things in an abstract way.
44: Visited Madrid and its archaeological museum where he saw fragments of jewellery that had been flattened; however he looked at them as pieces in their own right and not what they were before. When drawing them he considered the reduction of the 3D to 2D.
51: Philosophy look at things with a very open mind.

Document 6 of 15 Sculptor 14
13: Also interested in philosophy
51: Think openly and abstractly.

This Node codes no other documents in this set.

End of Advice Methods
Appendix 3

Technique methods

Node: /Techniques/Children
Card Name: Child's view
Description: Some use children to help think of ideas due to their free thinking minds

Document 1 of 15 Sculptor 20
6: Worked with the local community stencil work with elderly residents, print work with young people in schools
67: Ask Kids they sometimes have the best ideas.

Document 2 of 15 Sculptor 10
4: visited a local school to let the children have a go at producing pieces

This Node codes no other documents in this set.

Node: /Techniques/Conflict
Card Name: Conflict
Description: Pare down the piece to remove complexity and items that are fighting for attention

Document 1 of 15 Sculptor 11
24: Inspired by 3D spatial factors play with space and how people interact with it or experience it. She does not like conflict; aim to simplify the experience such as form or colour.

This Node codes no other documents in this set.

Node: /Techniques/Devices
Card Name: Devices
Description: aspects of a piece that draw attention

Document 1 of 15 Sculptor 10
32: At the end of the month he took over the gallery space and when people viewed his pieces they became aware of their own bodies and their own physicality when around the work and whilst moving it, so they did not touch any.

Document 2 of 15 Sculptor 14
33: Methods for dictating where people look and how they may see things she called these devices lead the viewer through a piece with devices. Place a line from the door to another wall and you look along the line and connect with the other wall, a wall you may have ignored previously.

This Node codes no other documents in this set.

Node: /Techniques/Dialogue
Card Name: Dialogue
Description: Importance of talking to people

8: Bounce ideas off the residence.

Document 2 of 15 Sculptor 17
10: Some of his commissions require community involvement; this was often achieved by simply talking to people on the street asking them what they like or what has interested them.
38: He speaks to many people about his work getting feedback, finding out what people think and getting them to think about the work and issues it represents.

Document 3 of 15 Sculptor 18
43: Spoke to many people and found out what they wanted but he then distilled this information down to what he felt was the most important. It was based on his personal desires and what he felt would solve the brief.

Document 4 of 15 Sculptor 19
50: She also talks and has an ongoing dialogue with other artists whose work is not too dissimilar to her own. These informal conversations enable her to sound out her thoughts and ideas or ways of thinking. It is important not to live or work in isolation; this produces poor work and ideas shrink since no one is around to provide critical feedback or help you develop your ideas. Abstract talk is most important.

Document 5 of 15 Sculptor 20
56: She met with local people to get ideas and stories community involvement important not to be seen as an outsider who will place some art in their park and leave. She really enjoys meeting people.

Document 6 of 15 Sculptor 14
44: She also discussed how she worked and her work with other sculptors.

Document 7 of 15 Sculptor 15
11: She asked them for ideas that she could interpret. She sympathised with the users and thought of their emotions.
13: She obtained feedback from the users.

Document 8 of 15 Sculptor 16
23: When working with the designers she discussed ideas with them and experimented with ideas.

This Node codes no other documents in this set.

Node: /Techniques/Environment
Card Name: Environment
Description: Change of environment in which you work

Document 1 of 15 Sculptor 19
Appendix 3

9: She went to the beach and cast sections of the beach (areas where the sea had withdrawn and left marks) she took her process, what she did already into the landscape - the beach and scaled it up to and see if she could obtain some interesting findings this was printmaking off the land.

29: Visited locations to search for ideas and to simply look at new things and let her mind flow.

Document 2 of 15 Sculptor 20

36: Ideas were taken from different sources visited the park, did drawing, the participants made models.

Document 3 of 15 Sculptor 2

13: Going to the mountains he was having a break from his own environment and also a break from his past work and way of working. This was a back to basics trip.

Document 4 of 15 Sculptor 11

21: Her way of working is, often start in the space (make notes), go away and scribble, return to space and scribble some more, relate the two and relate it to the space. Location triggers thinking.

Document 5 of 15 Sculptor 10

22: He chose to work in the environment and essentially live in the gallery. Chance to try working in a new space.

This Node codes no other documents in this set.

Node: /Techniques/Essence
Card Name: Essence
Description: describing the precise essence of a piece to help focus the mind

Document 1 of 15 Sculptor 5

11: To find that unique idea relies on finding out what is special to that place.

51: This was a self expressive project. He knew the people and wanted to emulate their temperament, being calm and peaceful.

Document 2 of 15 Sculptor 9

9: Main work follows an underlying theme(s) of gesture, mark, echo and drawing.

Document 3 of 15 Sculptor 18

4: psychological experience of the image

Document 4 of 15 Sculptor 2

26: Wanted to promote positive feelings of balance and fairness;

Document 5 of 15 Sculptor 11

5: She is inspired by minimalism, scale, lighting, shadow and interaction

Document 6 of 15 Sculptor 12

16: always looked for beauty in things and started to make her work more fluid and abstract.
18: Looked and aimed to represent the essence of the subject.
49: But transforms the seeds using abstract form, shape and purity.

Document 7 of 15  Sculptor 15
25: thoughts of luxury
37: Currently she likes the thought of strength, beauty and movement as if her work were a live.

Document 8 of 15  Sculptor 16
21: She wants things to be magical by this she means to provide an atmosphere in a space this is why she likes to make ceramic lamp shades.

This Node codes no other documents in this set.

Node: /Techniques/Frames
Card Name: Frames
Description: a tool for focusing attention by removing unwanted visual information

Document 1 of 15  Sculptor 12
64: Use a piece of card with a hole in it to frame sights focus on the detail.
65: Home in on things of interest.

This Node codes no other documents in this set.

Node: /Techniques/History
Card Name: History
Description: research into history for ideas of how things have or could be done

Document 1 of 15  Sculptor 5
12: Investigated the village history found link to breeding of bulls concentrated on this.
31: Idea came from local historian and an image in a book.

Document 2 of 15  Sculptor 2
32: Important to note that he referenced architecture or features of it but did not copy it. Visited museums for ideas.
58: Researched into the history of the hip joint and focused on the empirical process that founded the prosthetic joint. The joint is a perfect design (beauty through its perfect form founded on its function) yet sculpture is more ambiguous. Looked at the original design and spoke to experts for ideas.

Document 3 of 15  Sculptor 10
8: history of bodily contact.
41: Also influenced by popular culture.
42: Liked to use objects that are a sign of the times and current or 'now' materials.

Document 4 of 15  Sculptor 14
9: Art history was a keen interest.

Document 5 of 15  Sculptor 15

25: Inspiration came from the golden age of cruises images from the 1930s, thoughts of luxury and their history

This Node codes no other documents in this set.

Node: /Techniques/Interaction
Card Name: Interaction
Description: how do things interact with their surroundings etc

Document 1 of 15 Sculptor 11
9: Changing experience as people walk by and interact with the sculpture.
24: Inspired by 3D spatial factors play with space and how people interact with it or experience it.
32: Interaction:
33: piece + person
34: Person + environment
35: Piece + environment

Document 2 of 15 Sculptor 10
32: At the end of the month he took over the gallery space and when people viewed his pieces they became aware of their own bodies and their own physicality when around the work and whilst moving it, so they did not touch any.

Document 3 of 15 Sculptor 14
15: Peoples' interactions are also a source of interest how and why they move about a space. Sculpture in space, feelings and working with the environment.

This Node codes no other documents in this set.

Node: /Techniques/Links
Card Name: Links and Relations
Description: link unusual items to discover new things

Document 1 of 15 Sculptor 9
5: Her work is linked through relationships between each other
25: She was interested in space and the relationships of things.
34: Looks and is interested in the links artist + viewer, viewer + piece, artist + piece.

Document 2 of 15 Sculptor 18
15: He incorporated a moisture air sensor and when the mist across the river rose lights in the chimneys would illuminate giving the impression of smoke.
30: Within the VR environment he developed four different worlds that people could jump to instantly in nano-seconds! Birth, light, death and the dark essence and breath of feeling his aim to imbue into VR. He wanted this to be a reflection of real life and how it could be happy one second and then disastrous the next.

Document 3 of 15 Sculptor 19
40: she thought about things and made links and formed relations.
19: All things she does links back to the system even if she is unaware of it at the time.

26: Material is also an important consideration and source of inspiration... for example, time line used brass which was a link with the brass on the canal boats.

This Node codes no other documents in this set.

Node: /Techniques/Mark making
Card Name: Mindless marks
Description: mindless doodling or drawing to inspire shapes or ideas

11: She will try a variety of ways of mark making such as dancing on the card.
13: She would play with mark making and how to get marks finger printing, dancing on paper, stencils etc. Everything she researches she relates back to drawing.

17: He would draw and forget about them providing a change of perception. Always looks at things from perspective, scale, proportion, geometry and this trip was a way of breaking away from that for a moment.
19: He used basic tools pens, pencils, charcoal and mark making media. Let ideas evolve not self critical; he tried not to ask why am I doing this.

6: Did lots of scribbles just drawings from memory as well, it is all stored in the brain and just comes out through the pencil.
8: Drew lots of drawings and scribbles to get a feel for the people and the piece

49: Set tasks 30 second drawings and review afterwards Sometimes remove sight close eyes and draw.

This Node codes no other documents in this set.

Node: /Techniques/Models
Card Name: Modelling
Description: use models to help visualise ideas

34: Played around with maquettes to develop idea.
49: Ideas came from playing about with clay. You cannot always generate ideas from just drawing; need to get a feel for the three dimensions. Things can happen by accident or appear.
57: Try physical interaction and look at things abstractly and make associations with abstract sources of information.

59: No amount of research can replace the physical interaction with material.

**Document 3 of 15 Sculptor 18**

34: When modelling the grand chair (interface) that would seat the viewer when they were in his VR world he used chicken wire and an old office chair to test ideas for shape and scale.

**Document 4 of 15 Sculptor 19**

46: She often gets her ideas from doing things; she may start to use her printing machines finds it to be an organic process of allowing her hands to do the searching things happen that way

**Document 5 of 15 Sculptor 8**

21: Made maquettes from acrylic and worked out and asked herself "how can I make this interesting?" she positioned the bricks so they increase in number and splay outwards and also from the side the whole structure twists... that is what makes it interesting, the added twist. Also the light going through it and the changing light levels makes it interesting.

**Document 6 of 15 Sculptor 20**

36: Ideas were taken from different sources visited the park, did drawing, the participants made models.

**Document 7 of 15 Sculptor 2**

46: Explored shape through play with materials

**Document 8 of 15 Sculptor 11**

28: play with swatches and new materials.

57: Find out by doing!

**Document 9 of 15 Sculptor 12**

60: Uses pipe cleaners or wire to make form so she can see all around it and through it can read the surfaces from all angles.

**Document 10 of 15 Sculptor 13**

32: Wanted to sculpt this particular violinist that she liked. Took photos of them, sketched him and made maquettes.

**Document 11 of 15 Sculptor 15**

19: The piece was developed through loose sketches and maquettes.

50: blocks of plaster then carve into them.

This Node codes no other documents in this set.

Node: /Techniques/People
Card Name: People watching
Description: watch people - their mannerisms and way of doing things can be inspiring
Document 1 of 15  Sculptor 9  
34: She observes human interaction and movement and gets feedback.

Document 2 of 15  Sculptor 18  
36: He focused on the whole psychological experience.

Document 3 of 15  Sculptor 19  
20: She observed social activity how and where people moved and the marks they leave behind she finds intrinsic beauty of worn surfaces that surround people that fight with the many advertising hoardings.

Document 4 of 15  Sculptor 8  
4: Looked at lines, straight lines and window frames. Intrigued by living space and the shared human experience.

Document 5 of 15  Sculptor 13  
38: She really enjoys sketching musicians. When sketching people she looks for the shapes that they make.  
53: People watch what do they do? Draw them. Look at habits and shapes  
54: Look at proportions and relationships of eyes to ears etc. look at them in an abstract way.  
55: Focus on detail.

Document 6 of 15  Sculptor 14  
4: Interested in the human form and its condition and human emotions.  
5: Also how people react in groups and following massive traumas. She worked with the body and its form since it was a good bridge for most people and they could easily appreciate it and identify parts.  
35: Physical interaction, ask why people do things  
46: Enjoys performance in space and how people react to a space

This Node codes no other documents in this set.

Node: /Techniques/Play experiment  
Card Name: Play  
Description: play with anything to get ideas

Document 1 of 15  Sculptor 5  
34: Played around with maquettes to develop idea.  
49: Ideas came from playing about with clay. You cannot always generate ideas from just drawing; need to get a feel for the three dimensions. Things can happen by accident or appear.  
61: Get stuck in and see what happens. Mess around with material.

Document 2 of 15  Sculptor 17  
5: He works on numerous ideas at once and uses his studio for experimentation only  
21: He uses form, shapes, patterns and associations when placing the work plays with them and their orientation.  
40: He experiments with rubbish and finds out new things such as the effect of light through polystyrene.

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55: Try combinations, experiment and enjoy the failures; ride the storm it is a learning process.
59: No amount of research can replace the physical interaction with material.

Document 3 of 15  Sculptor 9
11: Her work always includes and often begins with drawing and exploration through drawing.
13: She would play with mark making and how to get marks, finger printing, dancing on paper, stencils etc. Everything she researches she relates back to drawing.

Document 4 of 15  Sculptor 18
32: He played with different ways of interfacing the viewer with the VR world sat on a lazy-susan and span around and knew that was it!

Document 5 of 15  Sculptor 19
33: Ideas flowed from experimenting.
46: She often gets her ideas from doing things; she may start to use her printing machines finds it to be an organic process of allowing her hands to do the searching things happen that way. Be touchy feely and experimental then pull things together towards the end.
48: Play is very important work to an idea then test it (through thinking about it) and most of all enjoy playing. Do not always go out to solve a problem play instead, even if you have no idea, just have fun.

Document 6 of 15  Sculptor 8
44: through play and practice through making which encourage ideas to develop over time and one piece leads onto another.

Document 7 of 15  Sculptor 20
52: She played with things to hand a disc of acetate on her desk sparked the idea, she wanted to encourage people to go around the park and interact with the work.

Document 8 of 15  Sculptor 2
46: Explored shape through play with materials, Exploration through play. Object to drawing back to object again. Old object becoming new! looked at wreckage from aeroplanes from the wars.
77: Switch off knowledge learn to play

Document 9 of 15  Sculptor 11
23: Studio practice her time for experimenting, practicing ideas and preparation
24: play with space and how people interact with it or experience it.
27: She experiments with new things so to re-evaluate her thoughts.
28: Begin with intent, idea and work from there, apply experience, play with swatches and new materials.
40: Practical and play with shadows, light

Document 10 of 15  Sculptor 12
21: She preferred to look and play with shape
53: Plays with detail adds detail or removes it to test ideas
55: Plays with shapes/forms and also texture main things is to enjoy her work.
66: Play with material.
Document 11 of 15  Sculptor 13
19: Often uses found material and files it or plays with it.
22: Played with wax, experimented with material and tried casting new materials such as acrylic.

Document 12 of 15  Sculptor 10
30: He played with space.
42: Enjoy the process of making and creating.

Document 13 of 15  Sculptor 14
35: Juxtapose things and use architecture to help. - play with size and shape, question devices and thing of what is used.

Document 14 of 15  Sculptor 15
31: She played with ideas drew lots and lots - noted spaces, negative spaces on the stone, tensions and balance between the sections of soapstone and limestone.
37: As well as this she pushed the material to its limits and experiments sees what she can get away with.

Document 15 of 15  Sculptor 16
13: She worked with an idea in her head plus experimented/played with materials and technical aspects of ceramics as well as adding flights of fancy and adding things that she felt were required to enhance the interest or decoration of the piece.

This Node codes no other documents in this set.

Node: /Techniques/Process
Card Name: Process
Description: expert in a particular way of doing something

Document 1 of 15  Sculptor 5
32: Linked one image to a sundial instantly. He had done sundials in the past.
46: This used a totally different process; from the twisting of clay it took a different process when carving it from stone.
47: Inspired by the stone as well let the material guide the final idea.

Document 2 of 15  Sculptor 9
7: Works 3 dimensionally but also uses video, stitching, drawing more of an artist than a sculptor.

Document 3 of 15  Sculptor 18
6: He wanted to fully understand the process of Virtual reality - how it was produced, altered so he could undertake the work himself and ‘tinker’ with it when he wanted and as he wanted in his studio space.

Document 4 of 15  Sculptor 19
7: This inspires the use of her process use of printmaking techniques. Embossed paper, blind embossing etc.
Document 5 of 15  Sculptor 8

11: She has a love affair with angle iron and enjoys using it so she keeps applying it to her work. It has an inside and an outside.

Document 6 of 15  Sculptor 13

21: It is important to have technical competence fully understand the process and how things work.

Document 7 of 15  Sculptor 15

48: She had little knowledge of the material and experimented with it.
50: She enjoyed the reductive process; particular issues surround this in that you cannot reapply material once it has gone. Balance between being delicate and brutal.

Document 8 of 15  Sculptor 16

7: Works to the principles of ceramics shrinkage, firing, clay properties etc.

This Node codes no other documents in this set.

Node: /Techniques/Reprocessing
Card Name: Reprocessing
Description: using ideas or processes in new ways

Document 1 of 15  Sculptor 19

13: Likes to look at other artists. Adam Lowe. She liked his idea and applied the process he used to try it for herself and to her own work. Many projects must come from an idea. Idea focused.

16: Used Adam Lowe's project idea but applied it to her own work and took the idea a stage further. Laid a sheet of steel, coated with Vaseline, on her garden grass and left it so the bugs would crawl across it so they would leave patterns. This links back to her marks of evidence philosophy. Snail tracks made patterns she could etch and then print. She also laid paper on the grass and using a pen followed the paths made by ants as they walked over it.

Document 2 of 15  Sculptor 15

11: She asked them for ideas that she could interpret.

This Node codes no other documents in this set.

Node: /Techniques/Scale
Card Name: Scale
Description: how could scale change or be changed to inspire new ideas?

Document 1 of 15  Sculptor 19

5: Would look at things from many many metres down to using macro lenses and a few centimetres. Scale is very important.

Document 2 of 15  Sculptor 2

17: Scale and perspective played a big part. He would draw and forget about them providing a change of perception. Always looks at things from perspective, scale, proportion, geometry and this trip was a way of breaking away from that for a moment.
36: Looks for links between things, scale, proportion, style, history, repetition etc. He does not like making sculpture for the sake of it; it must be in keeping with its surroundings.

37:

Document 3 of 15  Sculptor 11
9: Inspiration scale, practicality (transportation, architecture etc.) Changing experience as people walk by and interact with the sculpture.

This Node codes no other documents in this set.

Node:  /Techniques/Seeing
Card Name: Ways of seeing
Description: How else could you look at something?

Document 1 of 15  Sculptor 17
16: He focuses on fractions of things as a piece in its own right and not fragmented rubbish originating from a whole.

Document 2 of 15  Sculptor 19
5: Liked to look at things from aerial, overhead perspectives.
18: Really looked at them using a macro lens. She also found beauty in nature and looked at many surfaces captured using Photos; hard to improve on nature. For her MA project she had a gut instinct to have bits of it moving to do with people moving and marking these surfaces without being aware of doing so.

Document 3 of 15  Sculptor 8
32: Her training involved the use of clay and her teacher used to say that training to become a sculptor involved “learning how to look”.

Document 4 of 15  Sculptor 12
43: Following the seed project she began to look at other seeds under a microscope and using a magnifying glass. She collected seeds and looked at them for their shape and form. Looked at a massive selection, and even many of the same variety.

This Node codes no other documents in this set.

Node:  /Techniques/Series
Card Name: Series
Description: Sculptors often produce a series of pieces

Document 1 of 15  Sculptor 9
5: does not like to produce a single piece but a series.

Document 2 of 15  Sculptor 19
33: Process led since she had to produce 100 pieces the size of a credit card. She noticed and began collecting old shoes washed up in the Thames and began to place them on the printing press and printed them!
Document 3 of 15 Sculptor 20
10: She also aims to produce a series of pieces that work together it is about a journey people in time and space.

Document 4 of 15 Sculptor 12
12: She absolutely loved the shape and has reproduced it in different materials.

Document 5 of 15 Sculptor 15
33: She made sure that the pieces worked together despite being positioned apart from each other when on the ship.

This Node codes no other documents in this set.

Node: /Techniques/Sites
Card Name: Site Specific
Description: design for a precise location

Document 1 of 15 Sculptor 5
6: Each piece must relate to the heritage / history of the village.
11: To find that unique idea relies on finding out what is special to that place.
12: Investigated the village history
16: Location of the sculpture is a big consideration, so is the budget.
28: Considers the location barren place in Wales.
29: Had to be mining orientated but hates the cliché!
56: Walkway through Leicester
57: Had to consider the location and that influenced the type of stone.

Document 2 of 15 Sculptor 8
31: Project Theme show for gallery on Creekside
32: Really wanted to take part but wanted to do something that was relevant so she focused on the creek.

Document 3 of 15 Sculptor 20
20: Sites are inspiring too, they are full of culture and history. Uses her gut feelings when visiting a place... also considers the space generally, the architecture, her journey through the space.

Document 4 of 15 Sculptor 2
36: Looks for links between things, scale, proportion, style, history, repetition etc. He does not like making sculpture for the sake of it it must be in keeping with its surroundings.

Document 5 of 15 Sculptor 11
6: Worked to the space. Sculpted to a particular space in mind.
18: She used the lines of architecture to inspire her ideas relation to space
26: The site is a big influence how to use the space and she tries to give an idea of space so that people understand it. How else could you use it, see it?

Document 6 of 15 Sculptor 10
this was a new experience for him: outside sculpture

Things were related to the space they were to inhabit.

Very excited about it being very site specific art for a particular space.

This Node codes no other documents in this set.

Node: /Techniques/Spoon feeding
Card Name: Spoon feeding
Description: giving all the information away too soon

He likes abstraction in his work. He does not produce work that is clearly something such as a duck; he wants the viewers to think for themselves and to explore the piece, build a dialogue with it. Ideally they should begin to question what they are seeing. Much information is spoon-fed these days and he wants his work to be a bit harder to read!

She wants the viewer to look and find things for themselves. She does not like producing literal art where people can see what it is or when they question 'what is it?'; she wants them to imagine and question the pieces, ask why.

He did not want people to understand or 'box' his work too soon.

As before, recycling used or found objects he went about producing worldly beings and creatures brings the objects alive in people's minds.

David likes to include a message or play on the viewers' emotions; he does not want to dictate which emotion they must feel but produced work that will evoke some emotion, good or bad. Let the user explore it for themselves, likes to get them to imagine and titillate or tease the viewer; he is not a me me me artist but wants the viewer to find things in the piece for themselves. Work is more suggestive and ambiguous.

This Node codes no other documents in this set.

Node: /Techniques/Systems approach
Card Name: Systems approach
Description: self set, predetermined criteria to work to

For one piece she regimented her drawing time to a certain number of hours for each piece to see how she could get rhythm into a piece. How could mark making represent rhythm?
6: She is a 'systems artist' where she sets and works to strict criteria that she will only work within a certain area. For example she limited herself to just using angle iron or to a philosophy, in this case continuous line and colour. She would follow the rules but would often not know what would happen until it appeared. She relates it to natural processes and nature it looks random but underneath there is a clear system of how things evolve and develop.

Document 3 of 15  Sculptor 2
78: Induce false situations; try the opposite or reverse of the accepted norm.

Document 4 of 15  Sculptor 10
6: Also had a four-day time constraint to complete the piece expedient process for this very intense period and working on instinct.

This Node codes no other documents in this set.

Node: /Techniques/Twist
Card Name: Twist
Description:
how else could things be done to making things less obvious

Document 1 of 15  Sculptor 5
13: Did not wish to sculpt the obvious a giant bull! But they are too common.
14: Must associate it to Bodenham without making it a cliche or obvious; achieved by taking the opposite view big bull was once a small calf linked to breeding and positioned them as if they were in a pen.

23: Want to find a new way to represent things. New take on things. More to things than meets the eye.

Document 2 of 15  Sculptor 9
5: Currently she also likes shadows and light projections and wants the viewer to feel as though they are inhabiting the space. Likes to place her work so that people have to move through it and what else they see in the space. Wants people to see the relationships between the pieces.

Document 3 of 15  Sculptor 18
15: This project involved producing a light installation for two tollhouses either side of a bridge that spanned the river. The two buildings were lit using different coloured lights. He also moved with the environment so the lights would change colour with the currents of and rhythms of the river so each time people experienced the toll houses they may be different. He incorporated a moisture air sensor and when the mist across the river rose lights in the chimneys would illuminate giving the impression of smoke. He worked to applying these quiet and subtle twists that would surprise people. As the environment changes things adapt accordingly as nature does.

Document 4 of 15  Sculptor 8
25: Likes things to be ordered from one view and disordered from another but all the disorder is the result of an ordered and precise systems approach.
8: When developing pieces she aims for a surprise element: the chimes from the slabs and an interactive element too.

48: Interactive art and movement around a space to experience it differently.

55: This piece is playing on the viewers' imagination and on their minds. This project was exploration through process until it reaches a point.

41: Also people could move the piece.

42: Wanted to change the experience.

47: She appraised old window displays found they were all pieces in the window she did the opposite and used the window itself.

50: She wanted to change the experience of the space as you went passed through it.

18: Had his own aims for it to be an alien, have its own life, and become a creature.

26: This was a change from his old ways, this project was an opportunity to try new things in progress sculpture people could come and view his work yet it was unfinished so it would change and morph between viewings.

32: At the end of the month he took over the gallery space and when people viewed his pieces they became aware of their own bodies and their own physicality when around the work and whilst moving it, so they did not touch any.

22: Wanted to force people in to a position where they become a part of the installation. Body space, architectural space.

Node: /Techniques/Uncomfortable
Card Name: Uncomfortable
Description: design in reverse - start with uncomfortable aspects

78: Induce false situations; try the opposite or reverse of the accepted norm.

30: His work was based on personal preference and instinct - what colours, forms, textures he liked but was based on playing around. He also worked in the reverse fashion what made him feel uncomfortable.

Node: /Techniques/Workshops
Card Name: Workshops
Description: groups of people helping with a task

Document 1 of 15 Sculptor 5
7: Organised workshops with the public to get ideas from them.
35: Workshops provide a starting point which narrows the field, often this occurs from day one.

Document 2 of 15 Sculptor 20
6: Worked with the local community stencil work with elderly residents, print work with young people in schools and interviews with local residents (living history interviews) or those who live and work along the canal / tow path. Text from the interviews also made it into the final design along with images produced by the residents.
22: Likes to work with the local community and holds workshops with residents.
36: They designed a sculptural bench using the pieces and suggestions from the workshops.
63: Making models with people or community or school children, photographing them and then over imposing them into the environment so they can see it in situ.

Document 3 of 15 Sculptor 10
4: Did two pieces for this gallery 1st was to place a piece inside the taxi and visited a local school to let the children have a go at producing pieces.

Document 4 of 15 Sculptor 15
4: Worked with visually impaired people and taught them sculpture.
15: Other research included taking people at the RNIB to a sculpture park and sensory gardens this increased her sympathy with them and understood what they liked.

End of technique methods
Appendix 4
4.1 List of method cards

**Advice Methods**

<table>
<thead>
<tr>
<th>Blind research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take some time to research and learn something new - anything at all. Creativity favours the prepared mind and you never know when this knowledge will come in useful. Nothing lives or works in isolation and everything is linked in some way. Additionally, working on something different can be a refreshing break.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoy collecting and surrounding yourself with things that you find beautiful, elegant, inspiring, ugly etc. These artefacts will naturally inspire you and influence your work and they could become a starting point for when you are stuck for ideas.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be prepared: how do you record or capture the amazing things you may see everyday? Many sculptors carry a small notebook or camera wherever they go in case they see something remarkable. Many creative people say that 'inspiration can come from anywhere', therefore, is it not best to be ready?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not unduly constrain yourself; allow time for crazy thoughts and ideas. Think that anything is possible and try and work towards it; most things can be done.</td>
</tr>
</tbody>
</table>

Remember that whilst taking a photograph is easy, a sketch can record your interpretation and reaction at that point in time, plus it can be annotated.
Do you always follow convention? Have you questioned their raison-d'être or tried to break them? Questioning conventions and finding alternative approaches can lead to new ideas. Some broken conventions include 'art in the home' and 'mass produced products in the gallery'. One sculptor broke gallery conventions by hanging work from the ceilings and placing it on the floor, requiring the viewers to bend and twist their way around the art.

Simply changing the context can break conventions: products on a plinth, kettles in the garden, art in a drawer etc.

Look at things in detail. Artefacts consist of lines, planes, volumes, textures and colour. Some sculptors will focus on one particular area such as the texture whereas others may concentrate on the planes or overall volume (shape and form). What do you normally focus on? Try numerous ideas by varying the combination of line, plane, volume, surface, texture, colour and detail.

When solving a problem your first idea is often your most intuitive reaction to solving it do not dismiss it too soon. One sculptor and numerous architects have stated that they have often returned to this initial idea and used it to solve the problem at hand. Perhaps this thought is worth bearing in mind when you are stuck for ideas.

Contrastingly, it is equally important to avoid becoming too attached to one idea; be open and look for other possibilities.

Do you understand what makes your mind tick? Do you know what conditions you need in order to be creative? Why not try new environments or locations, surrounding yourself with different artefacts, being on your own or in company, hot or cold, inside or out? What type of information do you respond to the best: images, text, audio, 2D or 3D? Surround yourself with different colours or textures that can stimulate the brain; find what works for you.
### Advice Methods

#### Honesty

Look at what are you designing. Do you agree with what you are doing or how you have to go about it? How or what would you like to design? Is the project in conflict with your morals and can you do anything about it?

Be honest to how you design, your style and your own feelings. Many sculptors honour their way of working more highly than money, turning projects away if there is a conflict.

---

#### Language

What is your design language or unique style? How do you stand out from all of the other designers? For example, one sculptor's language was always to include a continuous coloured line; this was the underlying principle behind her work. Why not try a new or alternative language? Could you evolve your language to meet new demands?

---

#### Nature

Nature is full of solutions to all sorts of problems. Whether you are searching for mechanisms, textures, forms, colours, systems (etc), nature could provide the answer. Furthermore, these natural solutions are often extremely beautiful and elegant following many years of evolution.

Why not look to nature when feeling uninspired.

---

#### Obviousness

When searching for inspiration and ideas consider your sources carefully. Are they almost too obvious? Would everyone look for inspiration in those directions or have they done so in the past? Perhaps consider searching for more abstract sources and applying them to your project.

Of course, the most obvious sources may also be the best; consider them wisely.
### Advice Methods

<table>
<thead>
<tr>
<th>Out of the discipline</th>
<th>Relax</th>
<th>Philosophy</th>
<th>Too comfortable?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sculptors rarely allow art to inform art; instead they look elsewhere, to architecture, history, geology, ergonomics, religion, geometry, nature etc. However, designers will often refer to past products to inform new products, so why not look elsewhere for ideas? Go back to basics and start from first principles.</td>
<td>Creativity takes time and effort; it is hard to force creative thoughts. When suffering from a creative block, some sculptors will simply take time off from their normal routine and away from the problem. This is time to relax and think, enabling them to return to their work refreshed and ready to proceed. Sometimes the problem can solve itself whilst on one of these breaks. According to some sculptors, walking can facilitate creativity; it can provide an opportunity to relax, change your environment and allow your mind to mull over ideas and thoughts.</td>
<td>Sculptors really do think very hard and will practise thinking as a philosopher. How intensely do you think about your work? How else could you view or interpret the same situation? Think abstractly and play on imagination and the way things are. How else could things be and how could they be achieved? What if anything were possible? Is it possible? What is your philosophy towards your own work, the project or the user?</td>
<td>How do you design? How long have you been designing in that way? Perhaps it is time for a change? If you are getting too comfortable and your designing is too easy a change may do you good and keep you on form. Try a new way of doing something or a whole new design process. If you are idea/solution led perhaps try focusing on a more process led design path or use alternative media when designing. Try user centred design or design for emotion; try anything new and push yourself to progress your design ability.</td>
</tr>
<tr>
<td>Take time to think and play with your thoughts.</td>
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</tbody>
</table>
When viewing things some sculptors ask themselves why they like or dislike something and they really consider and reflect on their thoughts. Why does that draw me in? What is it that captivates me? Why does that repel me? Is it the object or my associations?

Do you practise this or pass things by without further thought? If you truly understand what you like (or dislike) and why, this may begin to influence your designing and ease your decision making.
### Technique Methods

**Sculptors use devices to draw the viewers' attention to particular aspects of their work. A device is anything that stimulates the senses and increases levels of curiosity; lines, spaces, text, images, bumps, spots, colours, sounds, textures, light, aroma, features (etc) can all be a device.**

One Installation-artist would place lines on the floor and walls which would lead the eye around the architecture and the space. Devices can confuse the viewer, causing them to think and question why, whilst others can help explain situations. Consider the devices you use; perhaps there are alternatives you could experiment with.

---

**Some sculptors work with children when developing their artwork since they find them more freethinking and they can see the world from unusual perspectives; this is a good source of inspiration and ideas.**

---

<table>
<thead>
<tr>
<th>Child's view</th>
<th>Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim to simplify the experience people have when interacting with your designs. The more pure the experience is, the greater the impact, since too many things competing for attention can only cause confusion. For example, one sculptor would focus on the shape and form by reducing the amount of detail and using only one colour.</td>
<td>Sculptors use devices to draw the viewers' attention to particular aspects of their work. A device is anything that stimulates the senses and increases levels of curiosity; lines, spaces, text, images, bumps, spots, colours, sounds, textures, light, aroma, features (etc) can all be a device.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Conflict</th>
<th>Dialogue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talk to people. Talk to colleagues, friends, family, experts, users, artists, teachers - anyone who will listen. Bounce ideas off people. Talk through abstract concepts. Speculate, reminisce or obtain feedback.</td>
<td>It is important not to live and work in isolation; this breeds poor work and ideas shrink.</td>
</tr>
</tbody>
</table>

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**Appendix 4**

**Technique Methods**
Do you always design in the same environment - your office, study or studio? Why not try working elsewhere; a change of environment may help to generate new ideas or inspire new ways of working. Take your sketchbooks and work outside, in a gallery, museum, shopping centre, coffee shop or rent a barn for a week! Environments can trigger thinking.

Travel to new environments and experience new things. Why not take others with you, such as users, to obtain their perspective too?

Have a clear understanding of what you want to achieve with regard to the intangible feelings or desires you have. Use words to sum up the feelings and emotions you want to embody in your work and then work towards them: strength, power, growth, beauty, delicacy, joy, life, alien, magic, fun, movement, echo, gesture, marks, drama, performance, energy, light, safety. Or you could think of things such as cathedral like, gruesome, tense, uncomfortable, interactive, surprising, twisting etc.

Use a piece of card with a hole in the middle to frame things of interest. The frame can help you look at something more intensely by removing the surrounding information.

Design may involve creating things for future use but they soon become a part of history. Look to the past and discover facts, stories, artefacts and old ways of living that could inspire the future. Bring life to a project by searching for living history; find people who experienced historical events first hand.

Sculptors who use historical information to inspire their work do so in a non-literal fashion; for example, one sculpture used only the lines of gothic architecture, rejecting the excessive ornamentation, to produce a clean and contemporary piece.
Appendix 4

**Technique Methods**

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Mindless marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carefully consider the interactions and relationships between things. Nothing lives in isolation; therefore, how can you play, influence or complement these interactions to your advantage? Some interactions to consider are:</td>
<td>Hold a session of mark making that is uncritical and free flowing, allowing you to play with marks on the paper. Scribble, doodle, sketch, or as one sculptor said &quot;take a line for a walk&quot;. Use a mixture of media and paper size and try new techniques. Look for shapes and forms within your mindless marks and also use the sessions to develop a feel for the marks you are making. Which lines felt good to make or which feel comfortable to look at? This activity could easily inspire new ideas.</td>
</tr>
<tr>
<td>Piece + person</td>
<td>Piece + person</td>
</tr>
<tr>
<td>Person + environment</td>
<td>Person + environment</td>
</tr>
<tr>
<td>Environment + piece</td>
<td>Environment + piece</td>
</tr>
<tr>
<td>Piece + Piece</td>
<td>Piece + Piece</td>
</tr>
<tr>
<td>Person + Person</td>
<td>Person + Person</td>
</tr>
</tbody>
</table>

Try to link unusual or seemingly unconnected things or concepts together and see what you can do or what ideas blossom. One sculptor linked everything she read or experienced back to drawing, such as rhythm and drawing, pressure and drawing, time and drawing, shadow and drawing etc. For time and drawing, she would allow herself to draw for only a certain period of time. With pressure and drawing she focused on the scars pencils could make on paper or how images could be drawn so lightly that they were almost invisible.

Most sculptors will spend much of their time working in three dimensions, producing models, playing with material, experimenting with ideas and seeing what they can do. Any type of media can be used, from wire (able to see around and through this material, as on the face of this card), clay, plaster, metal, found objects, wood, plastics, food etc.

One stated that no amount of research could replace tangible interaction with material or object.
The human body, and how it works, can be the source of a multitude of ideas. What do people do? How do they act? How do they interact? What shapes do they make? How do they stand, sit, walk, and run? Look at the negative space around people. Look at details of the body and its proportions. Look at the movements and dynamics. And soon...

Many sculptors become experts at something, whether it is a process, understanding a material or a way of working. However, they also try to develop their knowledge by pushing processes or materials to extreme limits, to discover what happens or what else can be done.

For example, a stone carver wanted to determine how thinly a piece of stone could be carved. She carved a piece with an area so thin it would glow in the sunlight, producing a magical appearance. This was the result of understanding the carving process, the material and a desire to see what could be done.

Play is an incredibly important part of the sculptural process. Nearly all sculptors confess to playing and generating their ideas and work through the act of play.

Play is about relaxing, having fun, being childish and experimenting with anything. Play with materials, media, found objects, tools and equipment, and let your hands search for ideas on your behalf. Play will work whether or not you have an idea. If you are stuck for ideas, play can help you uncover some. If you have an idea, play can help you develop it further.

Sculptors rarely copy something directly; they prefer to interpret what they see in their own way, enhancing aspects they like, removing bits they do not and often focusing on the essence or feelings they have.

Some will take an idea or a process as a starting point and apply it to their own work and interests. They experiment by using the idea or process in new ways; perhaps it could be scaled up or down, used in a new or unusual location or with different materials and so on.
How do you see what you are looking at? How else could it be seen? Some sculptors pay close attention to scale and perspective; how big is it in relation to other objects and from what angle do you see it?

Playing with scale and perspective can help you see things in a new light. What if a house were the size and shape of a kettle as in the image on the face of this card? Altering the distance, light levels, light source, positioning of the eye (etc) can provide a new perspective from which to view things. How would these affect your opinion, feelings, emotions, reactions and creativity?

Are all your designs singular? Why not try and design a series of pieces that share common links or have a relationship? When asked to produce work for a gallery, many sculptors will provide a series of pieces. Each piece will be individual but there will be links between them, some obvious and others less so. Links may include a theme or topic, a similar process of creation or use of material, or particular styles and detail.

In design it has been stated that products should be intuitive and easy to understand and in some cases this is a vital requirement. However, sculptors generally like to produce more abstract pieces which force the viewer to use their imagination. This also requires them to think about what they are seeing and question its meaning.

Do your designs need to be so easily read and understood or could you play with more abstract concepts? In this spoon-fed information age would people appreciate less obvious artefacts that encourage their minds to think and wander?

Some sculptors will develop a piece that is destined for a particular site which consequently informs their work. As a designer you may not have the luxury of knowing intimately the precise site in which your work will live. However, why not pretend for a moment? Challenge yourself to design for a particular location; how does your chosen site inspire your design? What does the environment require your product to be like?

Experience the site your design will live in first hand. Visit it, research it, speak to local residents, owners, and users. Live and design there; this immersion may help you generate ideas.
<table>
<thead>
<tr>
<th>Systems approach</th>
<th>Technique Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some artists (systems-artists) develop strict rules and criteria that they stick to when developing their art. For example, one artist's rules were to use only angle iron, to include a continuous coloured line and apply geometry. Another sculptor set time constraints for his creative process seeing what he could do in a certain period of time and how it affected his thoughts. Any rule, or set of rules, can be applied. This might sound constraining but it can provide a clear framework to work within and facilitate the development of ideas. Surprisingly a systems approach can produce seemingly random effects.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Uncomfortable</th>
</tr>
</thead>
<tbody>
<tr>
<td>When searching for ideas, often you know exactly what you don't want, so why not start from there? Make something look uncomfortable, feel wrong, have awkward tensions and then work out why or what causes it and do the reverse.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Twist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include pleasant twists and surprises in your designs. Identify what people are expecting - then surprise them with a little something they are not. This will prevent the natural and immediate classification of things in people's minds. Some of the twists developed by sculptors include: dynamic environments that change as you walk through them; production of a bazaar of artefacts that appear to be creatures but are constructed from found objects; highly detailed pieces where new things can be seen on each viewing; light and moisture sensors which enable nature to control the lights; pieces which appear ordered from one perspective whilst appearing random from another.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Workshops</th>
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</thead>
<tbody>
<tr>
<td>Sculptors do not always work in isolation waiting for their own ideas to strike; some will proactively organise community involvement in the form of workshops and allow the ideas of others to inform their work, since many heads are better than one. A workshop is a collection of people (who they are is up to you) that work on a project. During the course of a session they may mind map ideas, draw, model, speculate, role-play, sort images, take photographs, produce montages and so on. During the workshops make sure you record all the ideas!</td>
</tr>
</tbody>
</table>
A sculptor stated that to be an artist the first thing you have to do is "learn how to look".

In order to generate ideas and discover new shapes and forms, some sculptors will change the way they see things. They may place items under a microscope or use a macro lens on their camera. They may view things from a distance, enlarge them, crouch down to see things from low down or climb up high for a bird's eye view.
4.2 Questionnaire presented to the students

Preliminary Questions

Are you:
Male
Female

Which type of degree have you studied for:
Bachelor of Arts
Bachelor of Science

Please list the A'level subjects you studied:

Main Questions

1. Have you come across any of the methods offered on these cards before?
Using table one, on the next page, please tick all those that apply and where possible state where you originally came across it.

2. Are there any methods that you find interesting?
Using table two, on the third page, please tick all those that apply and where possible provide a reason why you find it interesting.

3. I think these methods could be of use to me as a designer.
Do you agree with this statement? Please tick the most suitable response.

Strongly agree
Agree
Neutral
Disagree
Strongly disagree

Please expand on your response:

__________________________________________________________________________________________

__________________________________________________________________________________________

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4. These methods would be most suited for:
Please tick one.

The individual designer
For use in groups e.g. a design team
All of the above

Please expand on your response:

5. In what way would these methods most benefit the designer?
Please tick all those that apply.

Idea / concept generation
Offering inspiration
Learning new techniques
Thinking in new ways
Other, please state below
Or, the cards would not benefit the designer

Please expand on your response:

6. Finally, do you feel positive or negative feelings towards these methods?
Please tick the most suitable response:

Positive
Indifferent
Negative

Please expand on your response:

Thank you for your time.
### 4.3 Questionnaire tables 1 and 2

**Table One**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Have used this technique/ advice before</th>
<th>Where did you hear or discover this technique or advice?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blind research</td>
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<tr>
<td>Capture</td>
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<tr>
<td>Child’s view</td>
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<td>Collections</td>
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<td>Conflict</td>
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<td>Essence</td>
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<tr>
<td>First idea, best idea?</td>
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<td>Frames</td>
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<td>Head soup</td>
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<td>History</td>
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<td>Language</td>
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<td>Link’s relations</td>
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<td>Mindless marls</td>
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<td>Modelling</td>
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<td>Obviousness</td>
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<td>Out of the discipline</td>
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<td>People watching</td>
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<td>Process</td>
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<td>Reprocessing</td>
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<td>Spoon feeding</td>
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<td>Systems approach</td>
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<td>Too comfortable</td>
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<td>Uncomfortable</td>
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<td>Ways of seeing</td>
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<td>Why?</td>
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<td>Workshops</td>
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## Table Two

Please tick those that apply

<table>
<thead>
<tr>
<th>Blind research</th>
<th>Why do you find it interesting?</th>
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</thead>
<tbody>
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<td>Capture</td>
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<td></td>
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</tbody>
</table>
4.4 Design exercise brief

Design exercise

Task:
You have approximately one hour to produce ideas to solve the design brief. Should you wish you are permitted to use any of the methods in the set of cards.

Design Brief:
Design a new type of nutcracker.

Once completed:
At the end of the hour I would like you to talk me through your ideas.

The whole session should take approximately 90 minutes and in return for your time and effort you will receive a pack of the cards.

Thank you for your time.
### 4.5 Design exercise interview protocol

<table>
<thead>
<tr>
<th>Date:</th>
<th>Participant / interview notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview No.:</td>
<td></td>
</tr>
<tr>
<td>Interviewer: Jon Mason</td>
<td></td>
</tr>
<tr>
<td>Location:</td>
<td></td>
</tr>
<tr>
<td><strong>Introduction</strong></td>
<td>To the research and this design exercise</td>
</tr>
<tr>
<td><strong>Design exercise</strong></td>
<td>Complete the design exercise - solve the brief. Provide pencils, pens, paper, inspiration cards</td>
</tr>
<tr>
<td><strong>Interview</strong></td>
<td>Ask if it is ok to audio record the interview</td>
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<tr>
<td></td>
<td>Talk me through the hour and how you developed your ideas.</td>
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<tr>
<td></td>
<td>Which card(s) did you choose and why</td>
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<tr>
<td></td>
<td>How did you interpret the card(s)? Do you think they helped you when designing?</td>
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<td></td>
<td>If yes how, if no why.</td>
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<tr>
<td></td>
<td>Do you think the card(s) helped you generate ideas that you may not have originally considered?</td>
</tr>
<tr>
<td>Notes</td>
<td></td>
</tr>
</tbody>
</table>
### Professional designers' interview protocol

#### Study 4 - Protocol for interviews with designers

<table>
<thead>
<tr>
<th>Date:</th>
<th>Participant / interview notes:</th>
</tr>
</thead>
<tbody>
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<td>Interview No.:</td>
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<td>Interviewer:</td>
<td>Jon Mason</td>
</tr>
<tr>
<td>Location:</td>
<td></td>
</tr>
</tbody>
</table>

#### Introduction
- To the research, To this interview, Sign consent form.  
- 5 mins

#### Questions
- How long have you spent with the cards.  
- Have you look through them all?  
- How many have you heard or before?  
- Please tick the list or point them out.  
- How many have you used before?  
- Please tick the list or point them out.  
- Have any of the techniques jumped out at you?  
- Which ones and why?  
- What are your general thoughts and opinions  
  +ve or -ve  
- As a designer do you feel that this tool could be of use? Why?  
- How do you think it could be used - individual or team  
- What would they be most useful for?  
- When would they be of most use?  
- 25 mins
The End.