# Sculptors and architects: can they facilitate the design process?

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**Abstract**

Methods or tools that designers use can originate from potentially anywhere. The aim in this research was to explore sculpture and architecture with the intention of uncovering new methods or ways of working that could facilitate the design process. A study was devised to compare the working processes of sculptors and architects with those of designers. Professionals from each of the three disciplines were asked to solve a design brief in their spare time, over a period of a few weeks. Data collected from diaries, interviews and design sheets, enabled their design processes to be identified and consequently, similarities and differences were revealed. The architects' way of working was too similar to the designers to offer any new methods, however the sculptors' processes were found to be the most different, especially with regard to how they approached and explored the design brief. They focused on intangible and more abstract aspects and did not allow existing products to inform their design. They were also more self-expressive and more concerned with the general experience of use than about solving precise problems with existing products or methods of mass manufacture. This approach resembled that of the architects, who participated in Alessandro Mendini's Tea and Coffee Towers project in 2003. This demonstrates the potential use of a sculptural process when designing products in order to produce interesting solutions.

**Keywords:** Design processes, attitudes, sculptors, architects, designers

## Introduction

Many methods, tools and processes that are currently used by designers have been sourced from sciences such as psychology, ergonomics, and social sciences; however, the creative arts do not appear to have been utilised to the same degree. This could be as a consequence of the close relationship art has traditionally had with design, resulting in a natural infiltration of methods over the years. However, design has become more specialised (e.g. web design, design for emotion, sound design, design ergonomics, sustainable design etc.) and many can enter this discipline without any consideration for the arts. Furthermore, it is possible for students in the UK, who have no knowledge of art or its methods, to enrol on design degree programmes. Whether or not this is disadvantageous for design in general is unknown but it is an indication that the relationship between these disciplines may not be as strong as it once was. The amount of new knowledge being uncovered and recorded is increasing at an incredible rate (Thackara, 2004) and it is possible that new ways of working or processes have developed, unknown to designers. In an attempt to determine this, the first author has been completing studies into the creative arts in order to further understand how they work. Much of this work focused on sculptors and architects since both of them produce three-dimensional outputs, as do many industrial designers. It is not unusual for sculptors and architects to undertake industrial design projects. Mendini (2003) and Painter (1999) have organised design projects for sculptors and architects and those who have crossed the disciplines include some famous names such as Ron Arad, Frank Gehry, Isamu Notuchi, Marcel Breuer, Arne Jacobsen (Design Museum, 2006). However, little work appears to have been undertaken into the sourcing of knowledge from these disciplines and its potential to facilitate design.

The aim of this study was to determine whether sculpture or architecture could offer alternative processes that may facilitate industrial design and also provide potential directions for future research. In order to achieve this aim a greater understanding of how members of these disciplines worked through projects was required and a number of objectives were identified:

To understand how sculptors and architects work through a project: their applied design processes.
To identify similarities and differences between the sculptors'' and architects' design processes.

To search for similarities or differences in attitude between sculptors, architects and designers.

**Methodology**

To identify similarities and differences between sculptors', architects' and designers' design processes a general understanding of how they worked was required. Lawson (2004) and Cross (1999) noted five research methods that could facilitate the understanding of what designers know and how they work; these were:

Sitting and thinking about design,
Observation of the designer under controlled conditions,
Observation in a natural setting,
Interview with designers,
Simulation of the design process.

All of the methods offer advantages and disadvantages but when used collectively the data from each can provide revealing findings into how designers work (Lawson, 2004). It was an educated assumption that such a methodology would also reveal data from sculptors and architects.

This study was inspired by a project, organised by Alessandro Mendini in 2003, called Tea and Coffee Towers (Mendini, 2003). Mendini provided famous architects with a design brief that required them to design a tea or coffee set. Based on this idea, a design brief was given to sculptors, architects and designers, who were asked to solve it in their spare time over a period of a few weeks. Two sculptors, two architects and three designers participated in the study and the processes they applied to solve the brief, and their attitude towards it, were therefore comparable. As a consequence similarities and differences could be noted between them. The design brief 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.*

This was accompanied by a design specification to ensure the participants produced a credible design as well as presenting it in a suitable manner. The specification 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.*

**Data collection and analysis**

Data regarding how the participants solved the brief were obtained from three sources: diaries, interviews and design sheets. The participants were requested to record their thoughts, feelings, actions, influences and issues by writing in a diary whilst they solved the brief over the few weeks. This provided a running record of how they solved the brief. However, diaries rely strongly on the participant to make recordings and the quality of data can vary as a result (Pedgley, 1999). As a precaution each participant was interviewed at the end of the design exercise when they submitted their final design. The interviews were informal and enabled the researcher to uncover how they solved the brief and their design process. The data were obtained through audio recording the interview. The participants talked the researcher through their diary, final design and their design sheets, the third source of data. The design sheets were the drawings and notes the participants produced during the solving of the brief. It is acknowledged that it is almost impossible to infer accurately the thoughts behind a sketch (Pedgley, 1999); however, sketches are considered to be a visual form of thinking (Goldschmidt, 1994, Schon, 1983) and could provide an insight into the designer's process. Arnhiem (2000) described a sketch as being a tangible point in the design process at which the designer must decide where to go next. Therefore, when used in

combination with the diary and interview the sketch sheets can help to illustrate the designer's process.

The participants were provided with a booklet that informed them of the study and included the design brief, specification, contact details and diary pages. The data from the diaries was inputted into the computer as digital text. The digital audio files were transcribed verbatim, also into digital text format. These data were imported into Nvivo™ *qualitative data analysis* computer software, which provided a flexible platform for the researcher to analyse the data. Once imported, the data can be viewed, searched, coded, grouped, linked and compared. Features of the software, such as the search tools and model trees facilitate the identification of similarities and differences that may have remained unnoticed had the data been analysed using a paper format.

The design sheets submitted by the participants 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. The analysis of these data included noting the type and focus of the sketches, areas of interest, apparent order and the tools and methods used (e.g. mind-maps). These data were cross-checked with that from the diaries and interviews.

The data from the participants were also analysed to identify any attitudes they may have held. Attitude is generally defined as being a positive or negative evaluation of a subject (Petty and Cacioppo, 1996, Eagly and Chaiken, 1993, Triandis, 1971). Whether attitude can reliably predict behaviour has been a constant source of debate among psychologists. However, it was found that attitudes based on past experiences were a more reliable indication of behaviour than prospective ones (Petty and Cacioppo, 1996). As a consequence the participants were asked to retrospectively describe their solving of the brief in their diary and interview.

**Results and Discussion**

Using the data from the diaries, interviews and design sheets the participants' design processes for this particular design brief were identified. The data were divided into episodes of activity. Lawson (2004), who used episodes to facilitate his description of the design process, regards them as reasonably self-contained actions that are focused on a particular theme that contribute toward solving the overall problem. Placing these episodes together provides an indication of the participants' design process and they were the starting point for identifying the similarities and differences between the participants. Figure 1 shows an example of a design process diagram. Each episode consisted of an action or activity (orange boxes) and the blue boxes consist of thoughts disclosed by the participants. 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.

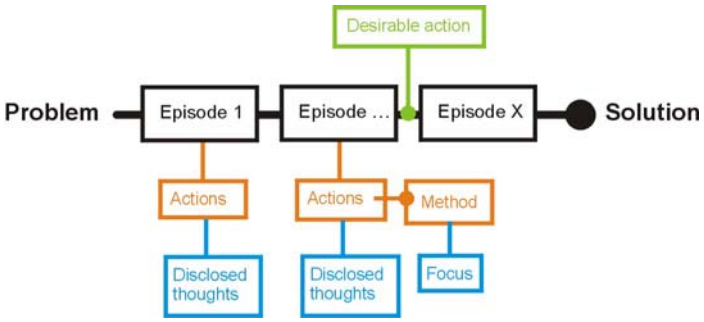


Figure 1: Key to the design process diagrams

The design exercise began with a problem (the design brief) and finished with a solution; this provided the main axis of the process diagrams. Located on this axis are the episodes in their apparent chronological order. 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 externalised or developed them later.

Three main episodes were identified, these were:
Exploration
Development/generation of ideas
Detail development

**Exploration**

The exploration episode consisted of activities related to understanding the brief, such as thinking around the problem, research or partaking in discussions. All of the participants solved the brief by first undertaking some form of exploration.

Architect 1, was the only participant to conclude that the brief did not require solving since satisfactory nutcrackers already exist, following discussions with colleagues (figure 2). This architect was the only participant to solve the brief without adding to or developing the brief further. The other participants approached it from their own perspectives, such as a sculptural one, and, or by finding problems with existing nutcrackers.

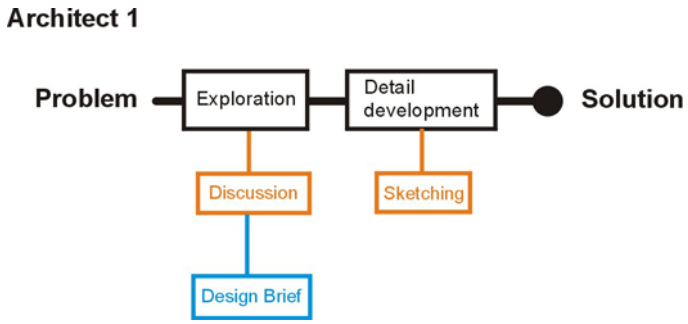


Figure 2: Architect 1 – shortest design process

The two sculptors decided on a direction for their project and began producing design specifications before the other participants. Sculptor 1 and designer 1's design process diagrams highlight this difference (figure 3). The sculptors' specifications noted more intangible aspects regarding nut cracking and provided them with a general direction to work in. Sculptor 1 also decided upon the material at this early stage. In contrast the architect and designers appeared to specify theirs during the last episode. The designers' and architect's specifications were formed later in the design process, following a more intensive period of exploration and research, these were more detailed and focused on tangible aspects; they noted particular requirements that their solution must either resolve or include. The sculptors were also the only participants to consider their solution to be a one-off, as opposed to being mass produced, referring to their work as a form of functional sculpture.

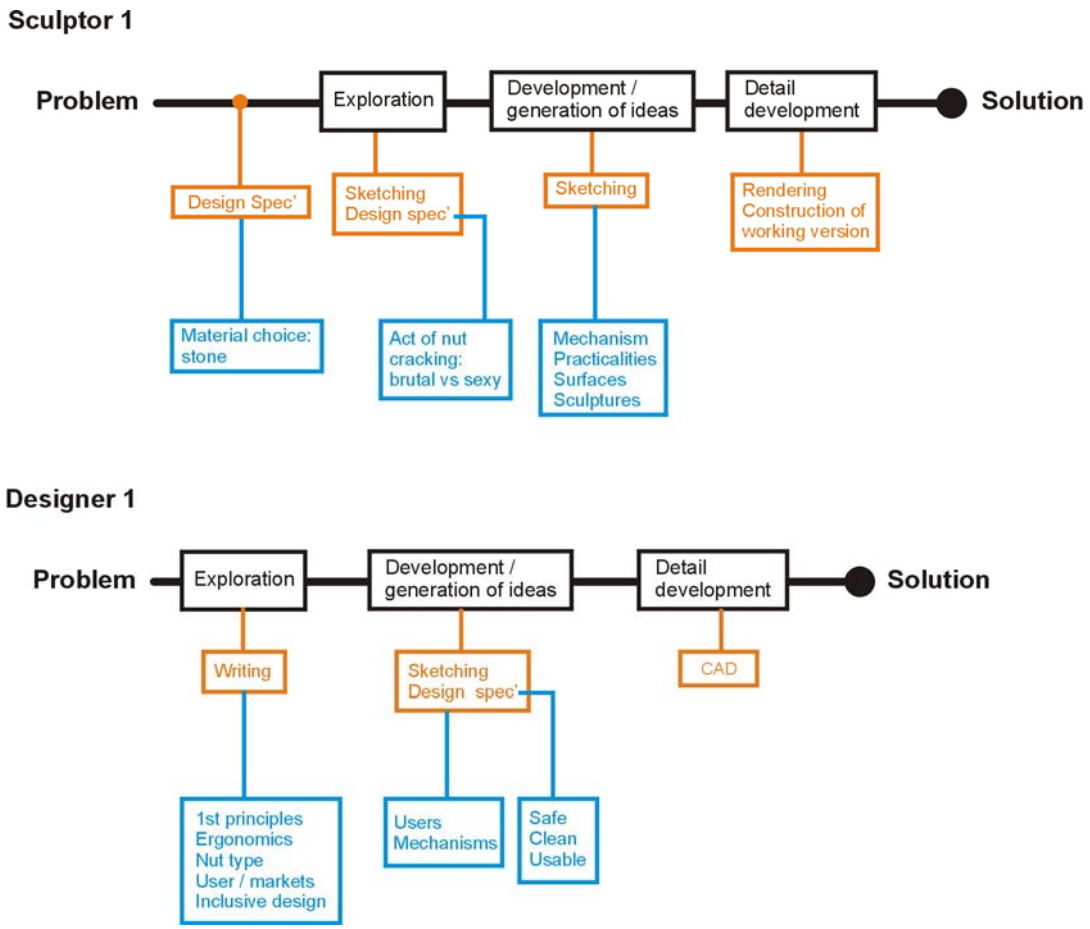


Figure 3: Sculptor 1 and designer 1 – generation of a design specification

Sculptor 2 introduced another episode titled *gestation (*figure 4). This was a period where little activity took place and the sculptor waited for an idea to come to him. Following an incident with some automatic doors, which he likened to nut cracking, he began developing an idea. Once this idea was developed he started to explore issues that related to it prior to developing and detailing his solution. In contrast the other participants were more proactive when searching for ideas, such as discussing the brief with colleagues, undertaking research or considering the user and problems with existing nutcrackers.

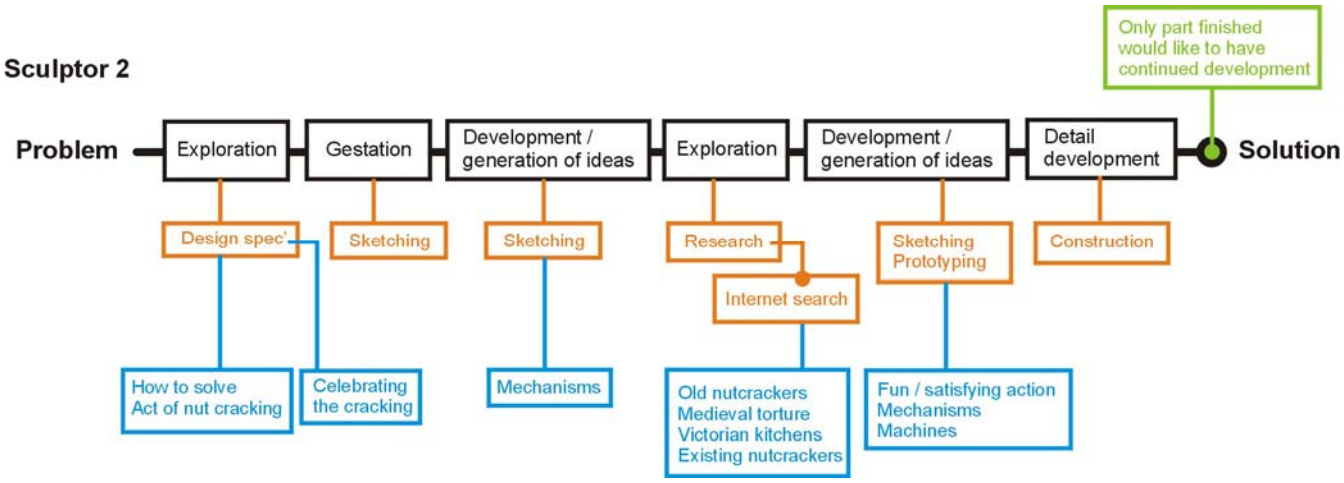


Figure 4, Sculptor 2 – introduction of a gestation period

Three of the participants, one from each discipline, explored the brief through research activity. Architect 2 visited shops to view existing nutcrackers and similar products whereas designer 3 and sculptor 2 browsed the Internet for images (figure 5). The designer sourced images of nutcrackers and mechanisms for cracking nuts and these were arranged in image taxons and were accompanied by a mind map consisting of potential markets, users, problems and opportunities he could focus on. He was very research focused and wished he could have included user trials.

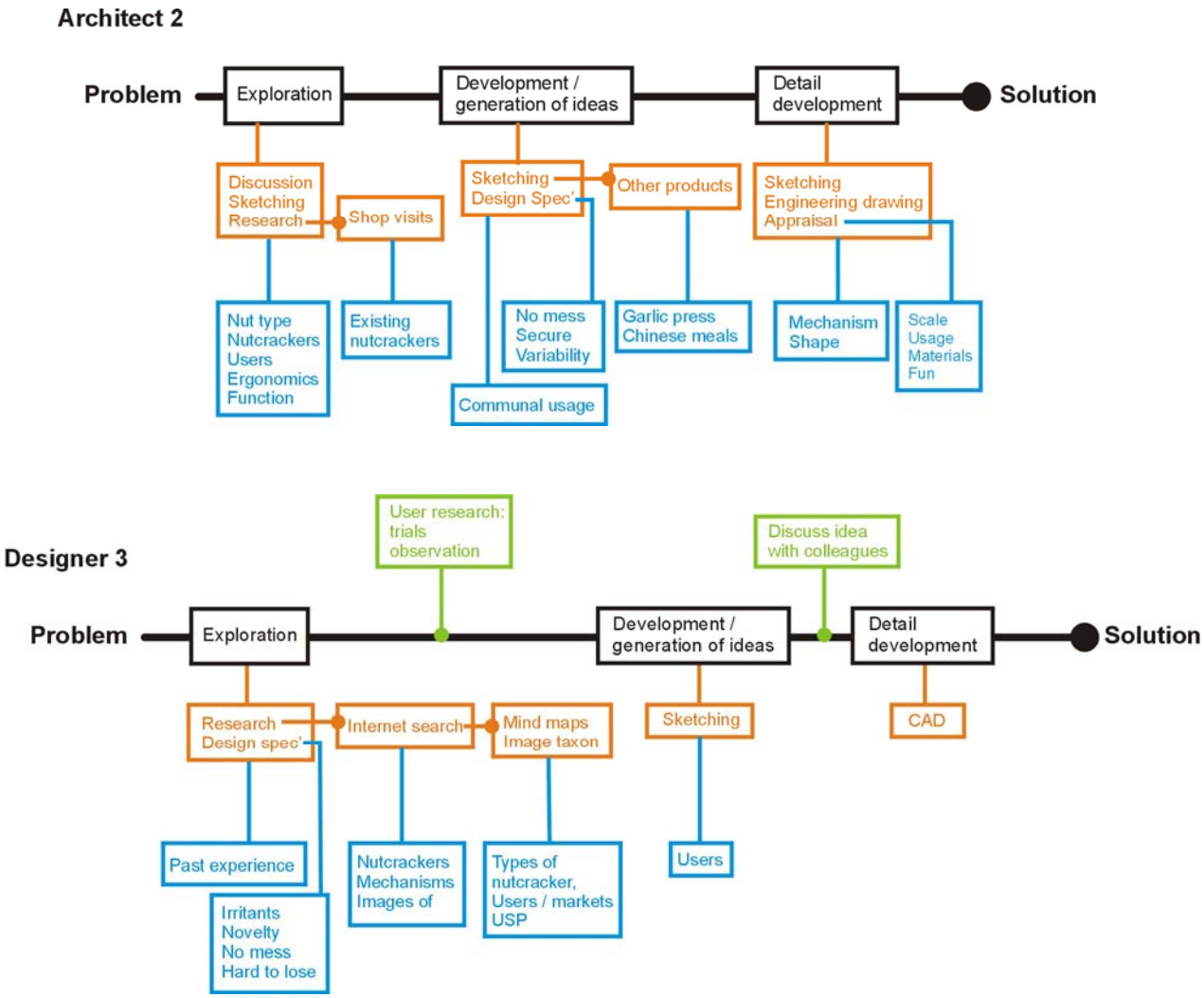


Figure 5: Architect 2 and designer 3 – research methods

Sculptor 2's use of images was less rigorous and was used to inspire ideas for aesthetics and mechanisms. He focused on more abstract topics such as Victorian kitchenware and medieval torture equipment. Sculptor 1 also considered (but did not research) aspects other than nutcrackers, such as obelisks and sculpture by Henry Moore. This highlights a key difference between the sculptors and the other participants and the information they source to progress a project. The architect and designers allowed existing products to inform and influence their design of a new product. This was a practice the sculptors appeared to avoid since they focused on more abstract sources that were not directly related to nutcrackers. One further difference was the focus of the participants' intentions; the architect and designers were generally concerned with the satisfying the user's needs where as the sculptors were more self-expressive and designed what they wanted.

Designer 2 undertook a second episode of exploration since he was dissatisfied with his ideas up until that point; he re-evaluated the problem and developed a new idea (figure 6). Sculptor 2 also had more than one exploration episode; this was to explore areas of interest that originated from his first development/generation of ideas episode.

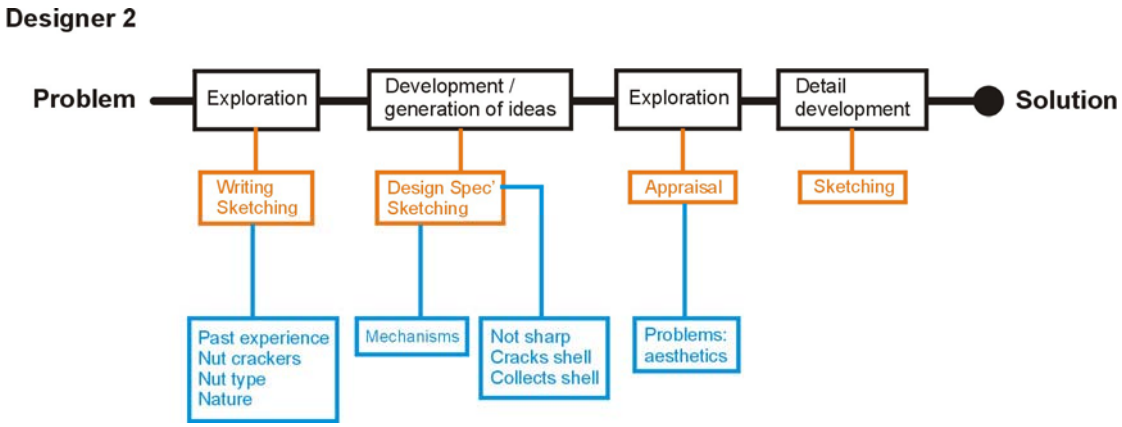


Figure 6, Designer 2 – example of a design iteration

**Development/generation of ideas**

The exploration episode was generally followed by greater emphasis on development and generation of ideas, for which sketching was the most commonly used method. The vast majority of the sketches were small, rough, of a low fidelity and appear to have been drawn quickly. Sketches such as these are typical of how architects and designers generate ideas through the visualisation of existing ideas and the act of sketching can generate new ideas or 'test' mechanisms (Garner, 1989, Goldschmidt, 1994, Schon, 1983,). This, it seems is also true for sculptors. However, sculptor 2 also developed and generated ideas via playing with material in his studio, as well as sketching, like any of the other participants.

**Detail development**

During this episode the participants developed a particular idea that they would solve the brief with. This was the participants' final episode and was a period of applying detail to the roughly sketched ideas generated previously. Activities included the production of presentation or engineering drawings, models or the use of computer-aided design software.

The method applied by the two architects to do this was drawing, with one of them producing engineering drawings so that she was sure the components would fit together. Two of the designers produced computer generated visualisations of their final designs and it seems that much of the development took place during this procedure; this is implied from the apparent jump from the rough sketches to a pristine visualisation. The sculptors were the only participants to construct and present their final solutions as fully working pieces. Their solutions were more simple than the designers and architects since they did not include mouldings, castings or other mass manufacturing techniques. Additionally, the sculptors probably developed solutions with their own ability and the available construction facilities in mind. The other participants, however, would normally use engineering drawings or visualisations to communicate their solution to others who would then construct it. Figure 7 shows the seven nutcracker solutions produced by the sculptors, architects and designers.

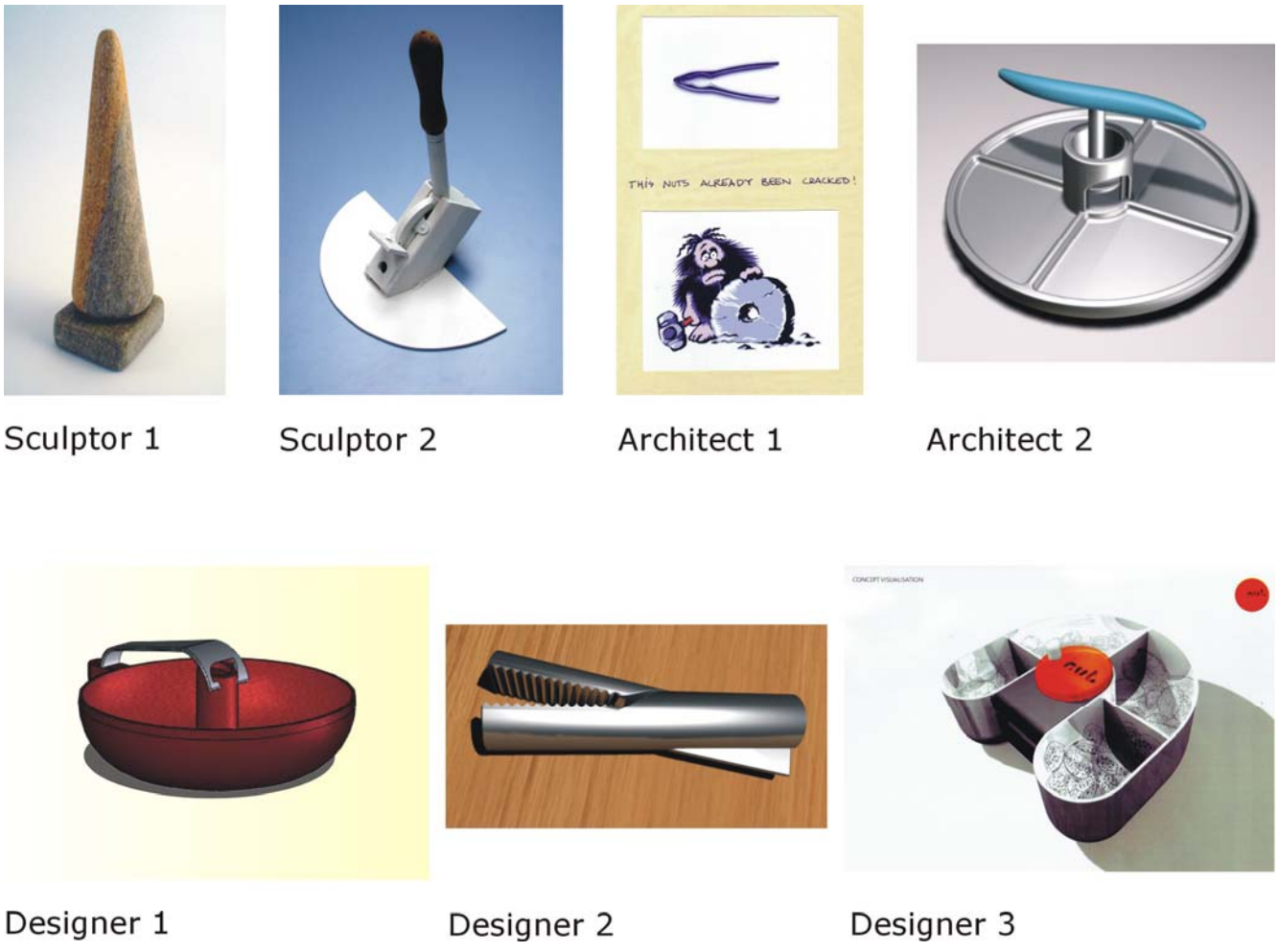


Figure 7, The participants' solutions to the design brief.

**Attitude**

The three designers and architect 2 solved the design brief by focusing on aspects of nut cracking that were either important to themselves or perceived to be important to other users. These aspects were practical requirements, such as its ability to crack the shell and safety. There was a consensus that making a mess, by scattering shell or nut, was undesirable. However, the sculptors' attitude was different; they focused on the act of nut cracking, user experience and the contradiction between the brutal act of bashing a nut and the elegance of sculpture. Neither were concerned with solving the problems associated with existing nutcrackers and mess was considered to be a positive part of the nut cracking process.

Whether or not mess is a good thing is not a point for discussion in this paper; however, the key finding is that in this exercise the two sculptors saw something positive in something the designers and architect clearly assumed to be negative.

**Summary**

Generally the participants from the three disciplines solved the design brief in a similar manner by following an exploration, ideation and development process. The main differences noted occurred within these episodes. The sculptors approached the brief differently by developing a general specification sooner, which focused on intangible aspects and they designed in a more self-expressive manner. Furthermore, aspects the architects and designers considered to be negative were thought of in a more positive light by the sculptors.

One participant from each of the disciplines explored the brief through research. For one designer research and its analysis played a large role in his design process. However, he and the other designers and architects searched for information that was closely related to nutcrackers, whereas the two sculptors considered more abstract sources.

Sketching was the predominant method for developing and generating ideas and sculptor 2 also combined this with playing with materials. How the participants developed and presented their solution depended on their 'normal' way of doing so.

Can sculpture or architecture offer processes that may facilitate industrial design? The architects in this design exercise appeared to work in a manner too similar to the designers to reveal anything new. However, the sculptors seemed to explore, source inspiration and

appraise the brief differently; therefore, this could potentially hold information or processes that may facilitate design. Once the sculptors have identified a direction they worked in a similar manner to the other participants on this occasion. This supports a theory held by Dorst (2003) that "once an artist decides on a goal to pursue, his or her creative process looks very much like a design process" (p25).

**Sculptural way of designing**

When the findings from the design exercise were compared to the reflections of the architects participating in the tea and coffee towers project (TCT) 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 thus 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 certainly seemed to enjoy this freedom with many of the architects' elucidatory 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); but 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 the TCT architects did.

With regard to design, these examples demonstrate that the application of a more sculptural process when designing products can produce innovative and interesting solutions. Perhaps rather than being inspired by existing products and allowing them to inform new products, should we be looking towards how those products were conceived? In this case, working more like a sculptor: having the confidence to develop more self-expressive concepts, not being inspired by existing products, sourcing more abstract sources of inspiration and focusing on intangibles aspects may facilitate the generation of new ideas.

**Conclusions**

From this design exercise and the combination of the three research methods, the design processes showing how sculptors, architects and designers solved a design brief were identified. Despite the small sample size, similarities and differences, and a direction for future research, were revealed.

All of the participants followed a general process for solving the brief and the main differences were found within the episodes. The architects solved the brief in a manner most similar to the designers, where as the sculptors, particularly during the exploration episode,

were the most different. Further understanding how sculptors appraise topics could be a potential direction for future research and demonstrate how sculpture could provide useful knowledge for application in the industrial design process.

And finally, the resemblance with the Tea and Coffee Towers project is a further example of sculptural design in practice. The sculptors from the design exercise and the TCT architects appeared to work in a similar manner when solving design briefs. Rather than allowing products to inform products and being inspired by obvious sources a more sculptural approach could lead to the development of alternative ideas.

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