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"DESIGN THINKING" – A CRITICAL ANALYSIS

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ABSTRACT
The latest buzz phrase to enter the world of design research is "Design Thinking". But is this anything new and does it really have any practical or theoretical relevance to the design world? Many sceptics believe the term has more to do with business strategy and little to do with the complex process of designing products, services and systems. Moreover, many view the term as misleading and a cheap attempt to piggyback the world of business management onto design. This paper seeks to ask is design thinking anything new? Several authors have explicitly or implicitly articulated the term "Design Thinking" before, such as Peter Rowe's seminal book "Design Thinking" [1] first published in 1987 and Herbert Simon's "The Sciences of the Artificial" [2] first published in 1969. In Tim Brown's "Change by Design" [3], design thinking is thought of as a system of three overlapping spaces rather than a sequence of orderly steps namely *inspiration* – the problem or opportunity that motivates the search for solutions; *ideation* – the process of generating, developing and testing ideas; and *implementation* – the path that leads from the design studio, lab and factory to the market. This paper seeks to examine and critically analyse the tenets of this new design thinking manifesto set against three case studies of modern design practice. As such, the paper will compare design thinking theory with the reality of design in practice.

Keywords: Design thinking, design processes, design practice

1 INTRODUCTION

Design thinking has been described as an activity that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity. In short, design thinking converts need into demand. Tim Brown of IDEO [3] suggests that design thinking is best thought of as a system of three overlapping spaces and not a sequence of orderly steps (Figure 1).

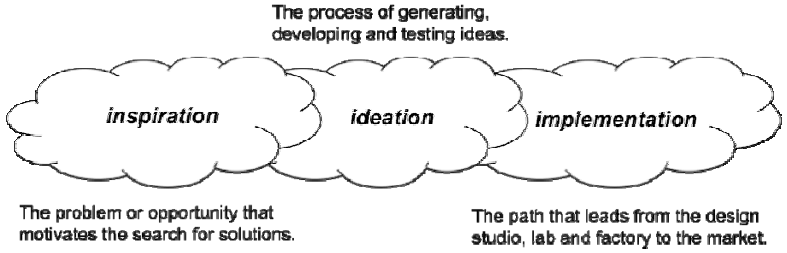

Figure 1. Design Thinking Process, after Brown [3]

But is design thinking anything new? Does design thinking have any practical or theoretical relevance to the design world? Historically speaking there have been many great design thinkers such as Henry Ford, Josiah Wedgwood and William Morris who brought us great developments such as the car assembly system, mass-production techniques and democratic design philosophies respectively [4]. Moreover, the experimental and explorative design work of the likes of Charles and Ray Eames, Joe Columbo and Ettore Sottsass made huge advances in the use of new materials, processes and finishes that many contemporary designers still adopt today in their work. According to Tim Brown, design thinkers are able to navigate between the three main criteria for successful products, namely feasibility, viability, and desirability. By feasibility, what is functionally possible within the

foreseeable future, by viability, what is likely to become part of a sustainable business model, and by desirability, what makes sense to people and for people.
The practice of design is generally a dynamic social affair that relies on a collaborative network of individuals all pulling together towards a common goal [5]. This activity is rarely an individual effort and it relies on a number of specialists from various areas working together to achieve the project's aims and objectives [6]. Designers typically will work with clients, customers, manufacturers, end-users, and specialists such as engineers, ergonomists, and marketing people. It is common nowadays for these specialists to be located all over the globe – often spanning geographical, social, cultural and temporal borders. It is also commonplace for new product design and development teams to comprise many individuals, and this highly social activity can often appear to be conducted in a somewhat ad hoc fashion [7]. This paper examines three different design scenarios with a particular focus on the collaboration between people and the specific stages of the creative process that they undertake.

2 METHODOLOGY

This section presents case studies of how three different design teams go about their day-to-day work. The authors used a combination of ethnography, face-to-face interviews, and surveys to collect data on how these three creative practices operate. The authors have been involved for several years in observing the way that interdisciplinary teams of creative practitioners such as architects, designers and engineers work collaborate on projects [8]. This form of cross-disciplinary working has gathered apace in recent years [9] whilst other researchers have noted that collaborative teamwork, social structures and processes within the studio are a significant part of any successful design process [10].

Figure 2. Creative Reflection Probe in Action

In this project, the authors used a Creative Reflection Probe (Figure 2), which prompted the three individual designers to talk about the particular activities in their design processes, the personnel involved, and the specific tasks undertaken during those processes. By using the Creative Reflection Probe during the face-to-face semi-structured interviews within the natural surroundings of the three designers' own studios, the authors were able to identify the design thinking activities carried out during each design process and who the key collaborators were that they completed them with.

3 NIKKI TAYLOR, FASHION DESIGNER, OLANIC

Nikki Taylor is an independent fashion designer based in Glasgow. She undertakes commissioned work for major companies such as Marks and Spencer and Schuh, but her main work is conducted under her own OLANIC label. The design thinking processes of Andrew Shoben, Nikki Taylor, and Jason Bruges and is illustrated in Figure 3 below.

3.1 Nikki Taylor Design Activities

Nikki Taylor's creative process can be seen to progress through six key stages including defining a concept, design (including reviews), prototyping and manufacture, development, assemblage (*i.e.* pulling many constituent parts together into one coherent package) before the final fashion show in London. OLANIC's design process is characterized by several significant phenomena, including the fact that Nikki doesn't use a brief when she is designing for her own collection. The starting point for Nikki is a concept, which is largely informed through her travelling, hanging out in the library, going to music gigs, and watching films. She says that, "*Music is quite a big inspiration, art as well... I remember, kind of, pulling out some book about atoms and I ended up basing a collection around [them]… So I guess that's the starting point and then from there I'll just start designing.*" Nikki then translates her initial concept into a more planned range where she will begin to make a number of two-

dimensional cutting patterns "*…because it then makes me think a little bit more about how it's going to be constructed.*" At this stage of the process Nikki starts modelling on the stand [mannequin], experimenting with materials, pinning fabrics and trims on. The fast-paced nature of OLANIC's design process is exemplified by the fact that Nikki might only make one sample. This is largely dependant upon how much time is left before the start of the show. Once she has agreed on the patterns, she goes on to make a toile (first sample). Nikki suggests "*I've been designing for a while now, so I can quite often just get my first sample right and I don't have to amend it because I just, sort of, know, you know, I guess that just comes with experience.*" Once the garments are completed, Nikki conducts model castings and meets with marketing people and photographers and coordinates the overall theme of her catwalk show. Towards the end of the process Nikki attempts to pull the show together which involves many discussions with hair and makeup stylists, musicians, PR and marketing people, clients, buyers, press, and sound and lighting engineers.

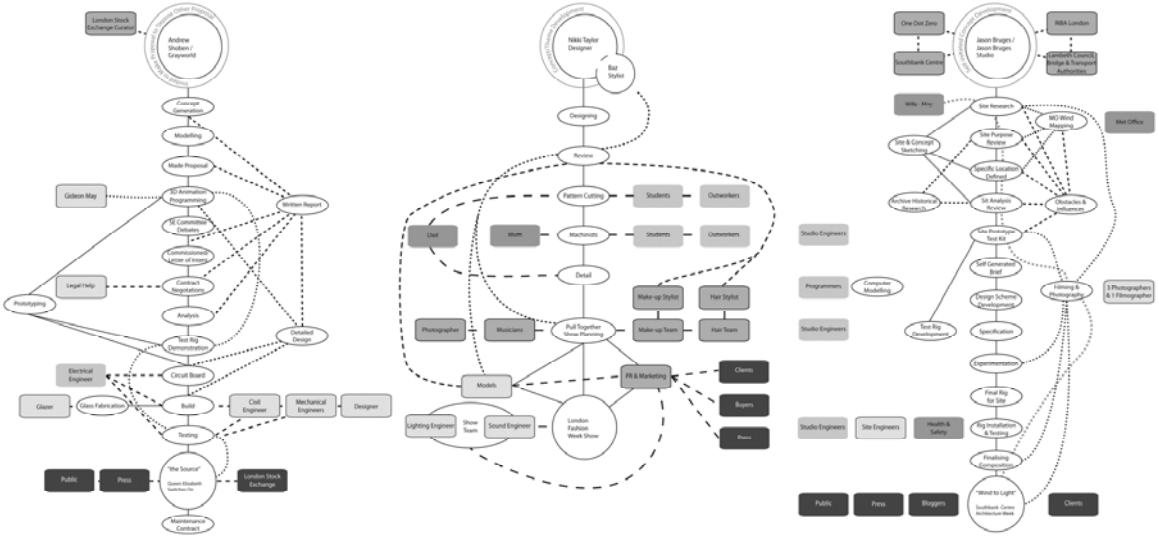

Figure 3. Three Design Thinking Processes

4 JASON BRUGES, CREATIVE DIRECTOR, JASON BRUGES STUDIO

Jason Bruges Studio produces innovative installations, interventions and ground breaking works creating interactive spaces and surfaces that sit between the world of architecture, site-specific installation art and interaction design. The multi-disciplinary studio, founded by Jason Bruges in 2001, comprises an experienced team of architects, lighting designers, industrial design and project managers. The Studio creates interactive spaces and surfaces that sit between the worlds of architecture, interaction design and site-specific installation art.

4.1 Jason Bruges Design Activities

Jason Bruges Studio's design process illustrates that the team undertake a number of major activities starting with research of the proposed site, the creation of a self-generated brief, design including experimentation of materials, structures, and technology, development, and finally installation. Jason Bruges Studio's "Wind to Light" installation at the Southbank Centre, London, was not a typical project for the studio mainly because Jason himself ultimately set the design brief. The start of the process involved the studio holding a number of conversations around an opportunity to do something at the Southbank Centre. These conversations were held with several stakeholders including RIBA, London, the Southbank Centre and arts funders including One Dot Zero. As Jason recalls, "*Before the project even started, there was a lot of conversations in text, mostly telephone conversations to do with the process.*" After paying a visit to the site near the Royal Festival Hall and the Queen Elizabeth Hall, Jason started thinking about doing something stable that mapped invisible atmospheric flows through the area. He states, "*…first of all I took some measurements, did an analysis, looked at the views, worked out composition, and then started to think about how high this sort of soft hat idea over the top of the Queen Elizabeth Hall could be. We started to think about spoiling the shape of the Queen Elizabeth Hall, so at any point these little nodes made from small turbines were actually illuminated, based on where they were. So the wind coming through would continually attack the only*

part of the installation." At this particular stage of Jason Bruges' design process the team are heavily involved in both the analysis of the site and analysis of the proposed installation. Here, there is significant communication between all the stakeholders involved in the project.
The next major stage in the process was building and testing prototypes. Jason explains, "*We actually added some tests. I walked round the site and I checked that the wind speeds around here with a small turbine with an LED in it that would glow looking at what this will look like from there – what does it look like from below – what does it look like from above – what colour should this be, and all that kind of thing.*" After these initial tests, Jason Bruges self-generated the brief. He states, "*I suppose I wrote, probably at this time, a description as a sort of classic aid or summary of what this thing might be, in other words a brief for ourselves.*" Jason Bruges Studio next decided what materials they were going to use and, based on an existing set-up, this led them to consider the components, lay-out and the spacing of what they were going to do and how it was going to work. The "Wind to Light" installation had a substructure that was lightweight and strong enough to withstand 50 mph winds and not get blown off the roof. An important driver at this point in the process, as Jason reflects, was the input they had from various collaborators. Next, the team experimented by building a full size section of the installation in the studio, which included building a makeshift wind tunnel using electric fans. This involved measuring the quality of light in relation to the wind speeds. The other element of the installation being tested was the amount of flex in the uprights. Key concerns at this point were the issues of testing and recycling, as Jason recalls, "*…we wanted to use the parts in other projects afterwards – timber, recycled polypropylene which we would shred afterwards – we have to recycle these. In this project, we continually evaluated and modelled both in the real world and in the studio. Whilst this was a physical thing, we filmed it, and this was put online and probably explains why actually a lot more people online than off line saw it… so a lot of people have seen what this looked like, as a result of them seeing it online.*" Reflecting on this design process Jason Bruges states, "*I see a process like this will actually have other projects feeding into it, how this was built, how energy got taken out of this, and so on. There's another project we're working on currently with masts that vibrate and bend and a lot of the ideas and things we've looked at here have sort of fed into this project. So there's a sort of cross pollination across different projects. It's very hard to say, well, that's one process because it starts feeding off into so many other things, and subsequently we re-use bits of this process and that process and it carries on.*"

5 ANDREW SHOBEN, INTERACTIVE ARTIST, GREYWORLD

Greyworld are a highly successful collective of London based artists who are interested in public-activated art, sculpture and interactive installations. Greyworld's goal is to create works that articulate public spaces, allowing some form of self-expression in areas of the city that people can see every day but would normally exclude and ignore. Greyworld are now based in London, having started out in Paris, with permanent works in many major cities around the world. Although Greyworld have built up an impressive history of acclaimed works since they began in 1993, their most celebrated piece, so far, is probably "The Source" (2004) a permanent installation for the new London Stock Exchange.

5.1 Andrew Shoben Design Activities

Originally, Greyworld's "The Source" installation began with a telephone call from a curator that led to a meeting and then Greyworld formalized an idea. This project was unconventional in many ways as Andrew Shoben reveals, "*What we'd normally do is ask for some money at that point, because we can give them an idea but in order for it to be a realistic thing we need them to commission us to write a report, and it's an important thing for us otherwise we just do proposals all day long and we'd never get commissioned to do anything and we'd go bust.*" So, Greyworld's first stage is usually a report – a bit of writing.
Next, Greyworld made a concept proposal to the team of curators, which included the media events team in the company, the marketing and arts people. Certain members of the team liked the competitor idea and some liked Greyworld's idea. During this stage of the process, Andrew recalls, "*We started developing the concept and of course we're always prototyping in public. We're always making up a new idea and then coming up with the solutions as we go along. The concept is good but clients often say how do you do it, and we can go well we think it'll be like this, and they're like what do you mean, you haven't built one of these before? We're like no, of course not, if we'd done one of those before we wouldn't want to do another one. So a lot of our creative process is actually*

development as we go along." Greyworld's concept generation is somewhat unique in that it comes immediately. As Andrew states, "*It's just the way we work. I saw this woman give a speech entitled the art of lazy design, and she got up and said when someone asks me to do a project, the first thing I think of is always the best.*" This is now a key feature of Greyworld's process as Andrew reports, "*In the old days I used to struggle and sit around all day trying to do ten other ideas but I always came back to the first thing anyway, so now I just think it's lazy, I just think fuck it and I do it anyway. Usually I know what I want to do and it comes straight out.*" As can be seen from Greyworld's design process in Figure 3, the concept generation proposal comes quickly but then the major part of the process is taken up with modelling, programming, meetings, further stages of commissioning, negotiating, and testing. One of the first test pieces created included the use of bits of string and marbles that were made to hang on the strings so that they could be slid up and down like an abacus. After the 2D abacus test, Greyworld enlisted a computer programmer, Gideon May, through the website www.rentacoder.com. He was likely going to write the code for "The Source", however, he was first engaged to do a 3D animation of the building and the installation. At this stage of the process Greyworld undertook lots of modelling and lots of design development. The clients didn't decide to actually commission "The Source" until February 1, 2004, but the 3D model was completed in September 2003 and then not much happened. Andrew recalls, "*We are still working on the project, but at the same time we don't want to spend too much time on it because it might not get commissioned fully. The Queen is coming on June 24, 2004 to open it whether we're there or not and the clients are still worried about it right up until 1 February, 2004. So there's a large part of this design process where not a lot really happens.*"

Contract negotiations featured large in this process where contracts kept getting modified and Greyworld didn't know that a nine by nine by nine grid of balls was wanted by the clients. Up until that point Greyworld believed that they were doing a ten by ten by ten grid which is 1000 spheres instead of 729 spheres. As Andrew states, "*Just by making the sculpture one ball less you save 270 balls. Now that's massively less of a headache for us. It makes no material difference to the artwork. None. We found that sculptures with odd numbered balls in them look nicer because you have a central sphere, whereas in a ten by ten by ten matrix there's nothing in the centre point.*" Prototyping and building the final artwork were carried out simultaneously at this point, as Andrew recalls, "*I can remember we were arguing no, we should do the balls like this, no, we should do them like that. Do we need sensors that protect one ball from another, and then we'll go back and we start to go back…it's sort of a funny little process of you go round and round and round like that. And, like I say, you usually end up where you started and go that was probably the best way.*" Two weeks before the Queen arrived to formally open "The Source", a major problem with the functionality of the balls meant that the main electronic collaborator was called upon to resolve technical issues. Towards the end of the project Greyworld sent a number of things to external collaborators and to manufacturers. The end of this process, as Andrew states, "*…is that no-one else could maintain a sculpture like "The Source" so we have a contract with them which states that we go in once a month and replace damaged things and it's quite good for us to do that.*"

6 RESULTS

Figure 3 illustrates the critical importance of collaborators in modern design practice. As can be seen from these three maps, each project is dependent on a dedicated team pulling together towards a common goal. The three maps each highlight the interplay between many different disciplines such as engineering, computing, business, and the arts and the reliance the design leaders have on their particular knowledge, skills and expertise. What is obvious from these three maps is that the designers would not be able to fulfil their clients' demands without the significant collaborative input from the key collaborators illustrated. Contemporary design practice, then, is as reported a highly social affair carried out with the support of many people from many different backgrounds and experiences.

Table 1 Comparison of Nikki Taylor, Jason Bruges, and Andrew Shoben Design Activities

	Inspiration	Ideation	Implementation
Nikki Taylor	Concept	Design review	Prototyping Development Assemblage Show
Jason Bruges	Research Brief [self-generated]	Design Experiment	Development Installation
Andrew Shoben	Concept Commission	Prototyping Contract negotiations	Development Installation Maintain

In terms of the specific design tasks carried out during the three design processes outlined above, Table 1 shows that there is a great degree of similarity amongst the three design cases presented in this paper. The key design stages reported in Table 1 show a commonality around particular design activities such as concept [design], prototyping, testing and experimentation, design development, and final delivery of outcome be that an interactive installation or a fashion collection. The key design stages in Table 1 are, however, a summary of the more complex and chaotic process maps illustrated in Figure 3 above. Using Tim Brown's [3] three overlapping stages notion of design thinking [*i.e.* inspiration, ideation, and implementation] appears to match the design processes of Nikki Taylor [fashion design], Jason Bruges [architecture], and Andrew Shoben [interaction design]. There are, however, some activities such as experimenting, commissioning, and contractual negotiating in Table 1 that are difficult to locate in Brown's design thinking model. Moreover, there are other activities such as designing and prototyping that appear to transcend Brown's notion of ideation and implementation. In summary, however, it would appear that Tim Brown's model of three overlapping stages in design thinking covers the design processes of the three disparate design projects reported here.

7 CONCLUSIONS

This paper has examined the design thinking of three different designers. The paper has described the unique and different design processes of the three designers and outlined their particular ways of doing things. The paper has shown that each unique project is critically dependent on a dedicated number of individuals from a variety of disciplines such as engineering, computing, business, and the arts all cooperating towards a common set of objectives. The paper has also highlighted the similarities around particular design activities such as concept design, prototyping, testing and experimentation, design development, and final delivery of design outcome across all three of the design case studies. Lastly, the paper has shown that Tim Brown's three overlapping stages of design thinking describes adequately the three disparate design projects presented in this paper.

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