PENCILS DON'T CRASH

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ABSTRACT

While the title might suggest otherwise, this is not a polemic against CAD. The aim of this paper is to examine how the emphasis on drawing in design education has changed and the future implications in a digital world.

Drawing is unquestionably an important part of *"designers' cognitive processes"* [1]. To quote Nick Talbot, of design group SeymourPowell, in his keynote speech at the Institute of Engineering Design Education Conference 2005,

"Drawing = thinking and communication"

Twenty years ago, in the introduction to his book *Presentation Techniques* [2], Dick Powell talks of drawing as being one of *the "forgotten subjects of design education"*. Yet today the teaching of drawing as a design skill has been overlooked even more to make room for the necessary acquisition of new skills, like 3D CAD modelling.

That CAD is a valuable tool in the design process is without question, but before we enter the 3D CAD modelling stage, we sketch and doodle. It is part of the rapid cognitive mapping of design brainstorming and idea generation. *"Without this skill,"* says Powell, *"too many designers are forced to design only what they can draw, rather than draw what they can design"* [2]

The emergence of 3D CAD modelling as a presentation tool has rendered (no pun intended) the eponymous *Presentation Techniques* of Powell's book obsolete, but the sketching principles described are still relevant to early stage visual cognition and will be for as long as we use pens and pencils.

The cognitive (thinking) visual (communication) process (hereon in referred to as design sketching) of design is becoming increasingly rare as a skill in design graduates, and this is a problem that requires attention in academia.

1 INTRODUCTION

Leonardo Da Vinci's 500 year old sketches of his many famous inventions, from flying machines to weapons, are not dissimilar to those made by product designers today, in that they record thinking in a way that is compelling to the viewer (Fig 1).

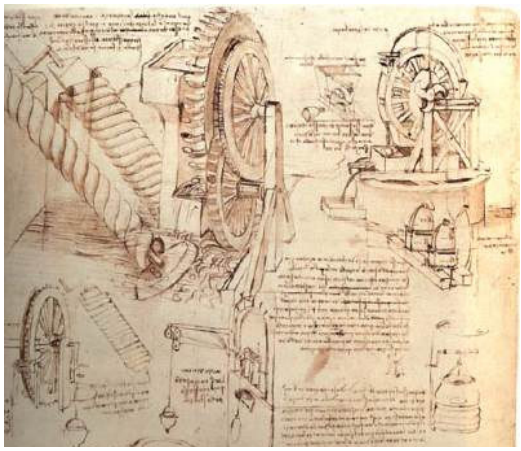

Fig 1. Leonardo Da Vinci Drawings of Water Lifting Devices c.1480

There are some designers, who imagine a future where the art of using a pencil and paper to design - sculpting a 3-dimensional form on 2-dimensional paper, by eye, with the simple technology of a carbon-graphite rod encased in wood - may be a rare or even lost skill. Of course, it is probably safe to assume that pens and pencils will be around for some time to come, but the notion of a future without them is not unreasonable: there are also many that cannot remember the last time they had *writers' cramp*.

3D CAD modelling has opened new doors for designers, engineers and architects and the software is developing at such a speed that the hardware can barely keep up. It enables designers to make adjustments to detail, produce glossy presentations, and even print CAD models in three dimensions.

2 WHY DRAW?

While students worry about their employment prospects because their CAD skills might not be strong, there is growing evidence that employers are demanding greater skills in sketching. Colin Burns of Martach Consulting and formally of IDEO says, *"What we look for in graduates is their ability to think and draw. If their CAD skills are weak, we can just send them on a 2 week course to learn our software."* The same cannot be said of sketching – this skill takes several years and much practice to develop.

Many designers working in industry have said that they value the quality of drawing in sketchbooks above CAD skills when gauging the suitability of a design graduate for employment. Architect Will Whimshurst, of Richard Rogers Partnership says,

"It is essential for somebody to be able to sketch within an architectural office, as a quick sketch can transcend language in terms of the ability to convey relatively complex ideas quickly. Not to mention the fact that sketching is an international language…A lot of our work within the office is still drawn/sketched out by hand, allowing for quick options to be explored and discussed. Especially at the start of a project ideas and concepts are changing constantly, and quickly sketched options allow you to explore various options without getting into the precisions of CAD."

Richard Firth, a tutor in design and director of design consultancy Edo (and contributing author to this paper), describes how he can very quickly draw and render ideas to a *"presentable"* level, sometimes as the client looks on, compelling them towards the design, or what Erik Olofsson and Klara Sjölén describe as *persuasive sketching,*

"Persuasive sketches go further than exploratory ones – they not only explain the product but are also drawn to influence the audience and to sell a design concept." [3]

Firth also points out that hand drawings are fast and immediate, *"they occur as quickly as reaching into your pocket for a pencil."* To this end, the designer can save a lot of time and money, although it can leave the client asking what they are paying for when they have an expectation of a rendered 3D CAD model. But as Firth says…

"… it just isn't necessary much of the time. Clients seemed to be seduced more by the style of the computer generated image, then the thinking contained in a pencil sketch. But being able to use clear, informative, well-drawn initial sketches has the added advantage of keeping the energy, excitement, immediacy and passion alive in the concepts and, ultimately, in the presentation."

Firth, who like Wimshurst regards sketching as an international language, also values its capacity to communicate and share ideas (Fig.2).

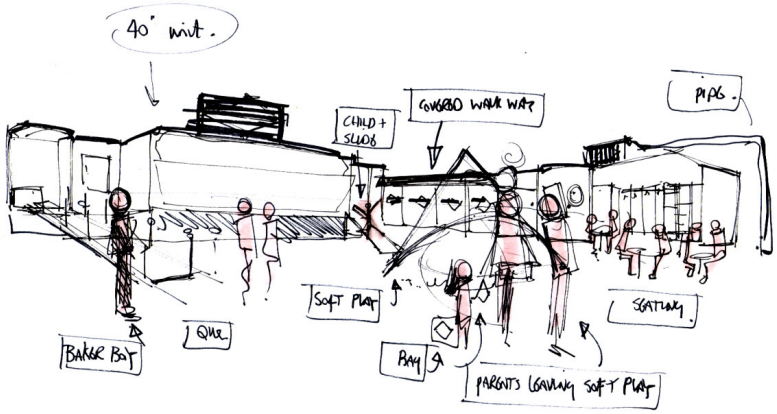

Fig 2. Exhibition Design Sketch, Richard Firth 2005

"To use this skill on the shop floor or on site often helps to problem solve in situ and forges understanding and confidence with client, manufacture, contractor or co-worker. …Beer mats, workbench tops, corners of timber, plasterboard walls, gutted cigarette packets; have all been used as a canvas for doodles, sketches, design musings and development. What a resource."

Speed is important to the author (Lambert) as well, who as a designer was required to supply an image of his work for an exhibition catalogue (Glass Box [4]) that was going to print some time before the work was complete. A sketch was submitted explaining the design as clearly as a CAD rendering, yet only took a few *minutes* to prepare (fig 3).

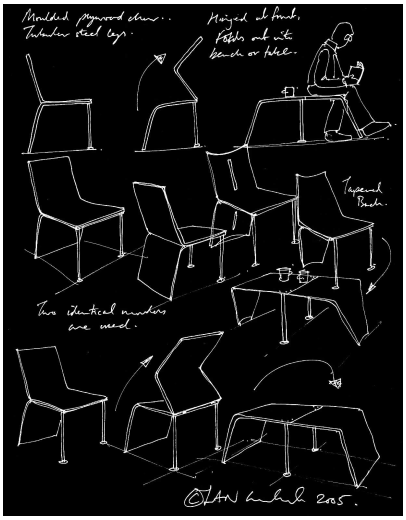

Fig. 3. Ian Lambert, Chair sketches 2005

Powell's *Presentation Techniques* became the drawing handbook for a generation of industrial designers, but twenty years on the products are dated, leaving today's students asking if the techniques are still relevant. The latest book on this subject, *Design Sketching* [3], was written by Erik Olofsson and Klara Sjölén when still students at the Umea Institute of Design in Sweden. With examples of drawings by twenty-two of their fellow students, it is certain to usurp Powell's book. *Design Sketching* brings up to date many of the techniques first explained by Powell, with products for the 21st century including digital enhancement techniques, for more "finished" presentation drawings.

What is more important, though, is that the book shows that sketching is as alive and important as ever. In his forward to the book, Niklas Andersson, Director of Studies at Umea, describes how the word to sketch comes from the Greek skhedios *"...done without preparation."* [3] This is the immediacy of drawing – or what Bjorn Rodnes of Napier University refers to as *"drawing at the speed that you think."* Later in the book the authors give examples, of quick sketches, saying,

"[Investigative and explorative] *sketches are often drawn quickly with a loose hand and are created for the designers use or for use in a design team. Readable ideation sketches can play an educational role later in the design process because they illustrate the basis on which decisions have been made and explain the sequence of work to others. The often quick nature of these sketches makes it possible to generate a large quantity of drawings, allowing for many solutions to be tried and evaluated."*

In reviewing *Design Sketching* for the Design Research Society, product designer and academic Rob Curedale calls for more books on the subject, stating that,

"Sketching skills are an essential tool for industrial designers, just as spelling and grammar are for writers… During the early stages of the design process, designers must record ideas rapidly to explore a wide range of ideas in a short time. The more ideas, the better the final design." [5]

THE PROBLEM IN DESIGN EDUCATION

Part of the problem in UK design higher education is that design courses and the number of places on them have expanded in the last 20 years to such an extent that there are now more places then there are students wanting to fill them. Applicants no longer have to compete against each other, and consequently students' drawing skills upon embarking on a design degree are generally much less adept than in the 1980s. This is where CAD modelling and digital media provide a tempting means to put some "gloss" on students' visuals and make up for or hide the demise of a cognitive visual skill.

And thus we enter an ever-decreasing circle – CAD modelling skills and the use of digital media software is learnt, while the teaching of drawing and design sketching is neglected even more. Will Wimshurst believes this is often the case among students and graduates working in architecture.

"*Nearly all of our students come to us being highly proficient at 3D visualisation and have a high level of graphic ability. It has been noticeable with some students that the ease of allowing computers to generate section perspectives and elevations has given rise to difficulty in the fundamental understanding how they are drawn. 3D visualisation has its place, but can often be too precise giving clients the wrong impression of a finished scheme or design. Hand sketching allows you to convey an idea and an atmosphere whilst keeping the image loose. This allows the client to interpret the drawing for themselves.*

The computer allows you to be drawn into the trap of drawing unnecessary detail. On computer you are drawing at 1:1 although the drawing will never be printed at that scale, this is especially true for detail work. Sketching details by hand allows you to give a holistic approach at the exact scale for that drawing."

The importance of drawing is not in the presentation, but in the thinking. Frustrated at their inability to develop forms through quick sketches, students turn to 3D CAD modelling too early in the design process, applying time consuming detail before a variety of ideas have been tried and more fundamental issues have been resolved, like whether it will work or not, i.e. before they have thought it through.

In the opening chapter of his book *Rapid Viz*, Kurt Hanks describes realisation of the connection between sketching and thinking almost as a revelation,

"I finally reached an acceptable level of proficiency [in drawing]… I realised, however, that something else had happened. Yes I had learned to draw; but more importantly I had learned to think. My whole method of thinking experienced a complete switch. I began to see the world more clearly. As my hand sketched the lines, my mind revealed a whole new method of thinking that I had not known before…What happened to my mind was much more important than the sketches I produced." [6]

Further to the cognitive element of drawing Rob Curedale goes on to say, *"The ability to draw well and the ability to give an attractive form to a product seem to be linked."* [5] Which takes us back to Powell's notion of students drawing what they can design.

CONCLUSION

Drawing is immediate, fast, and inextricably integrated into the designer's thinking process. Employers want new designers who can think, and who can visualise ideas quickly. An awareness of CAD modelling is very important, but on this evidence given here, and the fact that students are entering design courses with less skill we should be weighting more of our teaching time towards drawing than ever before at undergraduate level, as well as in secondary schools and sixth form colleges. Books are not enough, and while Curedale calls for more on the subject, we need more time in the curriculum.

There is something compelling about the sketches in the books of Powell, and of Olofsson and Sjölén, who say of this *persuasive* element of drawing,

"... sketches are considered by many to have certain invaluable and exclusive characteristics, such as expression, picturesque qualities and artistic flair, which can be difficult to achieve in 3D renderings." [3]

How refreshing, if at the annual showcase for young British design graduates, the New Designers exhibition in London, instead of the vast boards of printed CAD models, were hand drawn sketches hung on the walls, communicating thinking at the moment that pen (and idea) was put to paper.

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