

Digital Crafting: Re-evaluating Promises and Pitfalls

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Introduction

My presentation today will be focusing on links between craft and digital technologies. Let me start by saying I am not here to promote digital making technologies, or claim they should be an essential part of all or even most craft practice. But I would like to offer some examples of where and how craft workers are using successfully digital technologies as part of their making process. My aim is to help other craft practitioners, and the people that support them and appreciate the work they produce, better understand the existing and possible relationships between craft and digital making technologies. When we reflect on how far apart – or near – different approaches to making actually are, this helps us explain what is really special about what professional craft makers do and the objects they produce.

In order to help us do this, I need to give a brief outline of how in Europe, craft as *an idea* has developed and changed over time – especially its relationship to industrial manufacturing and machine production – and what this meant for the people who made and appreciated manually crafted objects.

I will then describe some social factors that have recently changed our relationship to craft in the West, including de-industrialisation and the rise of the idea of luxury craftsmanship. I will also give a brief description of some new, alternative ways of describing making: object hacking and the Maker Movement. These provide an interesting contrast to the world of craft and craftsmanship.

Then I will give an outline of the interim results of some of the research projects I am working on that look at digital crafting and what we hope to achieve over the next few years.

I will finish by explaining why I believe digital crafting in an Asian context, *if* it appears, might turn out to be very different from digital crafting in Europe or North America.

Jewellery Communities in the UK

As a first step, I believe it will help to explain why I am interested in the crossover between digital technologies and craft, craftworkers and craftsmanship. Many years ago I was educated as a ceramicist, with advanced training at the Rietveld Academy in Amsterdam and the Royal College of Art in London. So I have personal experience of professional craftworking and finding a place in society as a maker of objects. During this time I even experimented with integrating the digital technologies then available

into my making, but found they were too undeveloped to make a meaningful contribution.

More recently I studied for a masters and doctorate in anthropology at University College London. During my studies and fieldwork I was especially interested in examining how communities of specialist makers come into existence and endure over time, including how they secure and maintain a place in societies and wider cultures. I am also interested in how skills and attitudes to making and how the results are judged are passed on within these communities – a process that in anthropology is called *cultural transmission* – and how this affects the adoption or rejection of new technologies and ways of thinking about making.

During my doctorate my fieldwork was amongst people who worked with gold, including jewellers working in England. There are two main centres of jewellery production in the UK: Hatton Garden in London and the Birmingham Jewellery Quarter. In these communities you can find both industrial manufacturing and craftworking. Though some methods of jewellery manufacturing are highly mechanised, other processes are dominated by manual making. There are specialists who only practice one technique, such as polishing, stone setting or lapidary, and generalist professionals, who make each piece from beginning to end. Some pieces of jewellery are commissioned, with the jeweller having a close relationship with their client; other are speculative, or make for large retailers. Most of the jewellers working in these districts were trained as apprentices to make jewellery using a range of manual techniques.

Despite the high level of existing expertise, over the past decade 3D printing has become widely accepted as the most effective and reliable way of creating wax models for the very popular technique of wax casting, with the resulting cast gold and silver pieces then being finished using traditional methods. Unknown twenty years ago, today 3D printing has now become fully integrated into the working practice of the two biggest working communities of professional jewellers in Britain.

But the arrival of digital manufacturing technologies was not universally accepted by the jewellers I spoke to. The specialist digital programmers necessary to support 3D printing technology were sometimes treated as external to the jewellery community and its ideals. The leaders and supporters of both communities (most of whom had trained long before digital technologies arrived) had very firm ideas about what was important to the jewellery trade, and digital technologies did not feature in these beliefs. The contrast between what was happening on a day-to-day basis and what people thought about themselves and their working community fascinated me.

This situation is not unique. I have encountered many other individuals and groups that believed themselves to be the embodiment of traditional making values, as well as those who consider they are innovators *sui generis*, that is without any predecessors. In the School of Material at the RCA – which includes the jewellery, textile, fashion, ceramics and glass programmes - I work with a range of experienced professional practitioners, including both craft traditionalists and radical creative innovators (see also Frayling 2011).

Like other makers around the world, these two groups often feel they are either in direct opposition or completely disconnected. In reality they are intertwined. A tradition becomes most obvious in the face of radical change. In some sense traditions really only come into existence as traditions when there is a directly competing alternative to contrast them with. Many people fear their traditions will be overwhelmed by the new. But these negative feelings are a sign of the tradition's continued relevance. It is only the most special and socially valued parts of a culture that are able to induce this feeling of anxiety: we worry interminably about losing these special places, objects and skills, whilst a multitude of other things slip away unnoticed.

Developing the Idea of Craft

This notion of immanent or ongoing loss was fundamental to the early development of craft theory in Britain. Craft as an idea developed at the same time as industrial manufacturing and was framed as its opposite the antithesis of high-volume, mechanized, industrial manufacturing (Adamson 2013). In contrast to the vulgar mass appeal of mass-produced industrial products, craftwork and its products were considered marginal to contemporary society, both in terms of their method of production and the limited number of enlightened people who could truly appreciate them. This way of considering craft persisted over 150 years. It appears in Ruskin's book: *The Stones of Venice* (1853); resurfaces a century later in Bernard Leach's: *A Potter's Book* (1940); and can be found again half a century later in the work of the influential craft critic Peter Dormer (*The Culture of Craft*, 1997).

These writers all focused on craft as an idea, not a practice. Though commercially successful, William Morris, Ruskin's most active disciple, was never able to successfully reconcile running his company with Ruskin's idealisation of what craft should be (MacCarthy 1994). Nor could Bernard Leach. His pottery in St Ives struggled as a business. (De Waal 1997). Craft has always been harder to actually do than to talk about.

Though in one sense craft was a rejection of the modern world, in another way it was a very modern idea. Craft objects were, and usually still are, typically judged according to modernist aesthetic values - the inherent nature and direct immediacy of materials. In Britain the working practices and aesthetic values of the modernist sculptors Henry Moore and Barbara Hepworth strongly influenced both craft output and craft practice. The result came to be called *studio craft*. Studio craft objects are ideally made by a single person and made by hand. The studio craft object is more 'sculptural' than 'functional' and is formally innovative rather than conventional (Adamson 2007; Risatti 2007).

During the second half of the twentieth century, the focus of almost all craft theorists was on the output of studio craft practitioners. Craftsmen and craftswomen that were employed by conventional companies within established industries were almost entirely ignored. This happened even though these people continued to produce exceptionally beautiful objects using traditional craftworking methods.

The exception was David Pye. In his book *The Nature and Art of Workmanship* (1968), Pye explored why the process of direct making was important. Pye argued that the core and challenge of craftwork was direct engagement with materials and the uncertainty inherent in handwork – what he called *the workmanship of risk* – rather than the notion of presenting a personal vision. Rather than just focus on studio craft makers, Pye included *Haute couture*, boatbuilding, gunmaking and even the assembly of satellites amongst his examples of craftworking.

Rather than expect crafts should be given special treatment, Pye was highly pragmatic regarding their future. He believed that craftworkers were in direct competition with all other methods of production. It would be commercial forces, not sentimentality, which would select which craft disciplines would survive:

The crafts will therefore survive as a means of livelihood only where there is sufficient demand for *the very best quality at any price*.

(The Nature and Art of Workmanship P77, author's italics)

Pye was a professional woodworker and wrote from his own experience as a maker. In his own practice he made use of numerous machines, but he also had a clear understanding of the pitfalls of relying too far on them. Pye recognised that the mechanised production available in his day lacked the flexibility to produce the formal diversity and nuance found in the best craftwork. Whilst discussing machine production, Pye made a prescient comment:

Diversity in shapes and surfaces could also, no doubt, be achieved fairly crudely by numerically controlled machine tools, and perhaps something more can be hoped for there in course of time.

(The Nature and Art of Workmanship P73)

Digital Manufacturing

Pye was writing in 1969, just when 'numerically controlled machine tools' were about to enter a new chapter. Basic programmable machines had existed for centuries; the Jacquard loom, publicly demonstrated in 1801, revolutionised the manufacture of decorated textiles and lace in the nineteenth century (Essinger 2004). The use of physical templates to guide machine cutting tools was commonplace in decorative manufacturing using wood, metal and even ceramics during the nineteenth century. Both Wedgwood and Bolton, major figures in the industrial revolution, made use of machines using this type of technology (Forty 1986).

But the invention and development of the integrated circuit, commonly called the silicon chip, created undreamed opportunities. The creation of very-large-scale integration (VLSI) chips during the 1980s meant that computing circuits could store massive amounts of information and undertake calculations on that data. This would lead to a new revolution in manufacturing.

The first digital machine control systems appeared in high-tech or niche situations where access was very restricted. They therefore became associated with the design

professions (e.g. product design, architecture) and were utilised to support the design approach to making: first develop the concept for an object, then create a prototype, and lastly scale up through industrial manufacturing, with the expectation that the final result being a mass-produced object intended for a mass market. Digitally controlled layer deposition machines (3d printers) were first developed to create prototypes and called rapid prototyping machines (Walmough 2007).

At the end of the twentieth century digital technologies seemed firmly entrenched within industrial manufacturing and industrial approaches to thinking about objects and creating them. But some of the unexplored capabilities of these digital technologies were yet to be recognised.

Reconstructing Craft

During the second half of the twentieth century, the studio crafts approach became firmly entrenched in Europe and North America as the dominant way of thinking about what craft was. But the social shifts during the first fifteen years of the twenty-first century have challenged this dominance.

Firstly, the long-term results of globalisation have drastically altered Europe and North America's relationship with industrial manufacturing. Over the last fifty years there has been a long-term decline in the Western industrial manufacturing base. During this period many industries that once dominated European and American cities and even entire regions dwindled to almost nothing. In many places we are reaching a point where there is no collective memory left of the working factories and mills that used to support entire cities and towns. Discussions about remaining industrial clusters now focus on concerns about their survival, not anxieties about their dominance. Craft was once described as the antidote to industrial manufacturing, but now this has largely vanished from the West, what should craft now be contrasted to?

Secondly, most commercial manufacturing is now responding more to consumers' personal emotional desires rather than fulfilling basic needs (Forty 1986; Norman 2004). This is due to the long-term success of industrial manufacturing in meeting the elemental requirements of existence (in the developed world at least). This has affected both the types of things now being offered for sale and the individuality of specific items. Serviceable but dull goods made using cheap materials are no longer viable to produce and retail in large numbers for sale in Western markets. In contrast, the desirability for (and profit margins from) exclusive goods made from exceptional materials has grown.

Thirdly, leading European luxury companies (or *Maisons de Luxe*) have started to actively promote exemplary craftsmanship as a key feature of their products. In the late twentieth century the luxury companies relied on luxury branding *per se* to drive sales. Today, they are turning to claims of quality craftwork. This is a response to the maturing expectations of international luxury consumers and the rising threat of counterfeit goods. But '*luxury craftsmanship*' is very different from studio crafts. Luxury craftworkers are *artisans* rather than *artists*. Luxury craftsmanship is concerned with making elite functional goods rather than personal sculptural statements and places

more of an emphasis on continuity than formal innovation (Roberts and Armitage 2015). Lastly, and very important in terms of our current topic, these companies have no inherent aversion to employing new technologies when these technologies offer a competitive advantage. An example of this combination of craftsmanship and technical innovation is the Talaris saddle by Hermés. Made of carbon fibre, titanium and full grain leather, the introduction of novel, more flexible materials and new construction methods makes the saddle lighter and more comfortable for both horse and rider.

At the same time as these social shifts have occurred, the meaning of the word *craft* has been subject to fundamental ideological revision by academics (e.g. Crawford 2009; Korn 2013; Sennet 2008). In his book *The Craftsman*, Sennet included cooking, playing a musical instrument and writing computer programmes in his discussion of what crafting is. For Sennet, craft as an idea is associated with an open-ended perfectionist approach to any making process, rather than shorthand for the studio practice of a limited range of specific material disciplines.

Hacking and the Maker Movement

This expansion of the application of the word craft is closely associated with the rise of two new groups: object hackers and the Maker Movement. The newest meaning of the word hacker is derived from computing. Hacker and the verb *hacking* were initially used to describe anti-establishment programmers who used rogue software to infiltrate and sometimes damage institutional computer systems. The anarchic and dynamic overtones gave the word a subversive appeal: soon hacking was being used as a verb to describe any innovative ad hoc intervention, including cannibalising and re-purposing existing consumer products or combining commercially available products to do unexpected things. Hacking was a creative response to the overbearing intentions of the product design system. Rather than meekly using consumer goods the way their designer had envisaged, hackers took ownership of the embedded technologies by re-combining them in open-ended play.

A rejection of passive consumerism is also part of the rationale behind the Maker Movement, which campaigns to democratize access to a range of making technologies through the provision of communal facilities (Hatch 2014). These places, called Fab-Labs, Maker Spaces or Tech Shops, are intended to reconnect the general population with the excitement of actually making things themselves.

In their rejection of the monolithic power of industrial manufacturing in favour of the home made and personal, both these movements come close to the ideals of the early craft writers. Their communal workshops also bear a similarity to the group workshops and educational classes of the early Arts and Crafts movement in Britain and America.

But these movements have not adopted language from the history of craft or specific craft disciplines. Instead they borrow terms from the digital world and politics to frame and promote their ideas (see Hatch 2014). From this rejection it is obvious both hackers and the Maker Movement want to present themselves as entirely new in outlook.

This difference may be linked to another aspect. Both hackerism and the maker movement celebrate the amateurism of just 'having a go' (e.g. see Frauenfelder 2010), rather than the excellence in execution demanded of good craftsmanship – a key aspect of what distinguishes crafts and creativity according to Crawford, Korn and Sennet. Maker spaces are characterised by the mixture of technical equipment available, rather than a focus on one tight-knit group of techniques and associated equipment. Due to this eclectic mixture of processes and a limited concern about the quality of their results, I suspect hackers and Maker Movement makers will tend more to the *bricoleur* or the 'do-it-yourself' hobbyist than to the studio crafts or luxury craftworkers.

A New Type of Craft?

So is there a space somewhere between the now embattled artistic vision of studio craft and the new, enthusiastic amateur maker communities? Does the integration that has occurred in the commercial luxury sector hold any lessons?

After my fieldwork experiences in Hatton Garden and the Birmingham Jewellery Quarter, I was interested to discover if digital technologies were being used by other professional craft practitioners. I also wanted to find out if digital technologies were being explored or employed, what issues had the practitioners faced? Were these practitioners still enthusiastic about, or were they disillusioned by, digital technologies? So in 2013, together with the organisers of Making Futures 3, I convened a panel called *Crafting with Digital Technologies* to collect other case studies and discuss the issues. Though the panel was initially planned to run for one day, so many interesting papers were submitted we decided to run the session for the whole of the conference.

A key finding was how the craftworkers that had explored digital technologies had kept their direct engagement with materials. Rather than using the equipment to just produce finished pieces, these practitioners kept creating test pieces and samples, iteratively developing their initial idea through responses to these tests. In terms of their active engagement and ongoing material experiments, craftworkers appeared to treat digital manufacturing technologies more like hackers than follow 'design' rules.

We have just revisited this subject at the latest Making Futures conference, which was held last month. Many of the original contributors from 2013 returned to take part in a panel discussion and forum. Over the next few years I intend to research this further. This is very much a work in progress, supported by colleagues at the Royal College of Art and Making Futures. I want to explore further if there is a typical way craft practitioners relate to digital technologies. If they do, in what way does it differ from product designers, fashion designers or architects? I am also interested to find out if practitioners working with digital technologies are coming to see themselves as a distinct group with communal interests, or if they prefer to retain their allegiance to their original material discipline. Will a new type of craft emerge in response to the appearance of digital technologies? Or are digital technologies just going to become additional tools within specific material disciplines?

Some final thoughts on Craft and Digital Crafting in Asia

I would like to finish by offering some thoughts on differences between European and Asian experiences of craft and craftworking. Though there are many global commonalities to crafts practice, there are also regional and local cultural aspects that will affect how digital technologies are received.

An important difference is the variation one finds in craft hierarchies and the existence of local or regional craft disciplines or sub-disciplines which have no obvious counterpart. As someone who studied ceramics, I am acutely aware of how differently ceramics are treated in different European countries, and the far bigger differences between Europe and Asia. We have to accept that whatever the immediate impact of the piece of work we are looking at (or sometimes even holding), these classifications still affect our viewpoint. How we conceptually group these activities is an important part of how we consider them, relate them to each other and consider their appropriateness in different situations. This applies as much to comparisons of digital and analogue making technologies as it does to the different traditional craft disciplines. Where within the Asian relationships to making would an engagement with digital technologies possibly fit?

The second difference relates to the wider social role of craft. I believe there is a more direct interaction between crafts and cultural heritage in Asian crafts than one finds in Europe or North America today. Though the earliest British crafts theorists and practitioners often looked to medieval religious and courtly crafted objects for their inspiration, their choice of prototype was generalised and subject to personal whims. Morris's decorative patterns were often inspired by Southern European or Islamic visual and material culture rather than the Northern Gothic native to Britain. But even this tenuous cultural connection was severed in the early twentieth century by the adoption of a modernist aesthetic and its new emphasis on abstract formalism and sculptural qualities. As a consequence it is difficult for Western studio craft practitioners to reconnect with local stylistic compositions and culturally embedded object forms. Attempts to do so tend to suffer from a knowing irony that undermines the simplicity of the result and affects its integrity.

In contrast, in the revival of the Korean Royal Craft Studios one can see a very specific link to the national heritage of Korea as a distinct and enduring culture. Though the social influence and output of the studios varied during its long period of existence, the overall output of the Royal Craft studios remains the touchstone for excellence in Korean craft practice. Such a tradition can, at times, almost feel oppressive – will it be possible to equal the achievements of these past crafts masters? But acceptance that one is working within a long tradition opens up a space to work creatively within the boundaries of existing cultural conventions: the masterpieces recently displayed in the exhibition *The Korean Craft: human, Place, History* (You *et al* 2015) are examples of this. The success of the Talaris saddle shows that exquisite craftsmanship and innovative technology can be sensitively combined. The conventional forms of Korean and other Asian craft traditions might be equally receptive to similar sensitive and respectful innovation.

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