

# Art Exhibition proposal

Hand Thought

Craft-oriented hybrid analogue/digital practice and a Digital Craft Ethos

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Hand Thought is a hybrid digital/analogue making research project that originated from an ongoing interest in investigating the aesthetic opportunities that digital design and production technologies holds for the craftsperson. Alongside this motivation this project seeks to explore and demonstrate how a disruptive craft-based approach to engaging with digital making tools can act as a stimulus to reconsider the relationship between hand and machine, and our wider relationship with technologies and how we assess their role and value.

Through challenging the rational instrumentalist industrial design engineering understanding of what digital technologies are 'good' for, I propose a *Digital Craft Ethos* that aspires to: fidelity *not* accuracy, sensitive making *not* efficient manufacturing, affective *not* effective technologies, augmenting existing practices *not* replacing established ways of working, uniqueness *not* infinite replicability, and continual 'hands-on' interaction with tools *not* full automation.

CCS CONCEPTS • Human computer interaction (HCI)

**Additional Keywords and Phrases:** Craft, Digital Craft, Design, CNC, Hybridity, Pragmaticism, Instrumentalism.

**ACM Reference Format:**

## 1 INTRODUCTION

The integration of digital tools into craft practices is now well established within the UK and beyond, with over 30 years of research and practice in the field [8, 14]. The works exhibited continue my, and other designer's and craftspeople's interest in investigating the aesthetic opportunities offered by computer numerically controlled (CNC) production technologies and associated software (e.g., metalworker Masterton [19], ceramic and glass designer Jorgensen [20], woodworker Neil [21], product designer Grimshaw [6]). Much of my practice-based research, including this ongoing project, has been underpinned by a consideration of, not just the role, but also the significance and implications of creating hybrid practices that integrate digital technologies with established craft practices [11, 18, 10]. Within HCI literature notions of digital craftsmanship [1] and hybrid practices [2, 3, 9] have also been explored and interrogated. This research project adds to this body of knowledge, bringing understandings from the specific perspective of a researcher-practitioner with a background in craft making traditions. As such, I am inclined to create works that can have value as outcomes-in-themselves, while also recognizing their process of production as being a site of insight generation, and for them to function as manifestations of physical evidence that supports any wider research claims.

Inspired in part by Wallace's 'Unpicking of the digital' [17], in which she challenges assumptions and strategically reverses expectations about what digital technologies are 'good' for, and by reflecting on my experience of technological mediation in the creation of the work within the Hand Thought project, I propose a Digital Craft Ethos (aligned to a pragmatic theoretical framing) which sits in contrast to instrumentally framed industrial design/engineering attitudes to the digital toolset. The Digital Craft Ethos aspires to making practices that embody:

fidelity *not* accuracy

sensitive making *not* efficient manufacturing

affective *not* effective technologies

augmenting existing practices *not*, replacing established ways of working

uniqueness *not* infinite replicability

continual 'hands-on' interaction with tools *not* full automation.

### **1.1 The instrumental characterisation of technology**

Instrumentalism views technologies as functional tools designed to achieve specific tasks efficiently. It emphasizes objective measures like speed, productivity, and accuracy, prioritizing procedural, effective, and repeatable interactions. This approach provides a straightforward and compelling logic, avoiding the need to grapple with the complexity of real-world situations, where distinguishing causes (means) from effects (ends) can be challenging, or even impossible. It aligns with the positivistic scientific tradition and reflects the ideals of modernity as seen in the dominant industrial production model that has shaped Western culture for over two centuries [16]. It would be misleading to claim that framing technology in this way hasn't brought enormous economic success and benefits to many individuals, communities, and societies. However, it is worth noting that this success (principally for the global north) has come at the expense of other populations, environments, and ecosystems [5].

The concept of design emerged from the industrial revolution and the division of labour into specialized tasks, forming the basis of mass manufacturing. Consequently, it's not surprising that industrial designers often approach the use of digital tools with an instrumental mindset, as it could be argued that it is deeply ingrained in their very definition.

### **1.2 The pragmatic characterisation of technology**

In contrast, Pragmatism offers a theoretical framework grounded in human experience, presenting an alternative understanding of technology. It acknowledges and seeks to understand the broader implications and significance of technologies in practical use [7]. Drawing from John Dewey's pragmatic philosophy [4], McCarthy and Wright [11] argue that we don't merely utilize technology; but we live with it, we experience it; it has emotional impact and significance in our lives. Thus, technologies are not only efficient but also carry affective elements. Their research delves into the sensed experience of, and engagement with, technologies. From a pragmatic standpoint, knowledge, action, emotion, and sense-making are intertwined. "Dewey's perspective on human action—the key to understanding felt experience—is that action is situated and creative. There can be no separation of means and ends" [11:17]. Furthermore, Dewey stresses that: "... means are not merely neutral ingredients of a plan: they have inherent values and disvalues...The choice of means, in short, enters into and qualifies the nature of the end" [13:230-231].

Paralleling Sennett's stance on the means-ends relationship in his work *The Craftsmen* [14], this re-evaluation challenges the neutral instrumental viewpoint and opens up room for broader reflection on the consequences of choosing a specific technological course of action.

## 2 THE WORK: THE INTERFERENCE/INTEGRATION SERIES

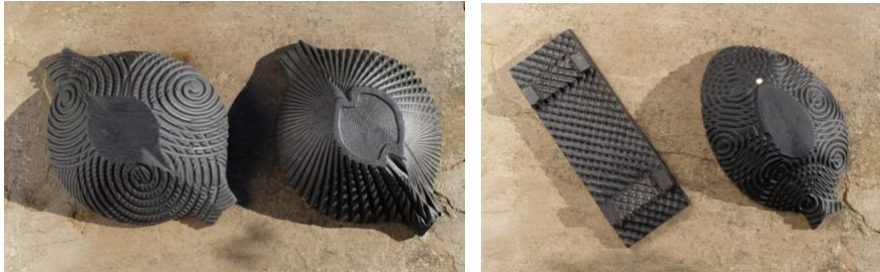


Fig 1 Large radial bowl & Large Spiral Bowl (hand carved & CNC milled undersides), rust stained oak, 400x300x100mm each.

Fig 2 Long platter and Fishtail bowl (hand carved & CNC milled undersides), rust stained oak, 420x140x40mm & 420x140x40mm.

Selected from the wider *Hand Thought* body of work the wooden tableware and associated drawings exhibited were created using various configurations of computer aided design (CAD), specialist toolpath software, computer numerically controlled (CNC) milling, a cutter/plotter, watercolour painting and traditional wood carving techniques. In order to create hybrid forms and surfaces which are not easily categorized as digital or analogue, so questioning the role of the hand and of mediating technologies in a creative making practice. In doing so, I sought to establish an aesthetic language that defies easy categorization as purely handmade or machine manufactured.

The creation of these hybrid 3D work started, not with a virtual CAD (computer aided design) model as might be assumed within a digital making project, but by sourcing green (unseasoned) wood and using traditional techniques and tools (i.e., axe, adze, spoke shave, and chisel) to carve bowl and platter forms. The hand carved forms were then scanned using a white light 3D scanner to produce highly detailed digital surface models that captured not only the form, but crucially, also the cut marks and other textures of the bowls, which are the characteristics and the traces of the analogue process and natural materials used. Unlike reverse engineering strategies in which cohesive full 3D models are the goal, separate and partial models were sufficient for the requirements of this craft-oriented project whose ethos did not aspire to complete and accurate correlation between the digital and physical.

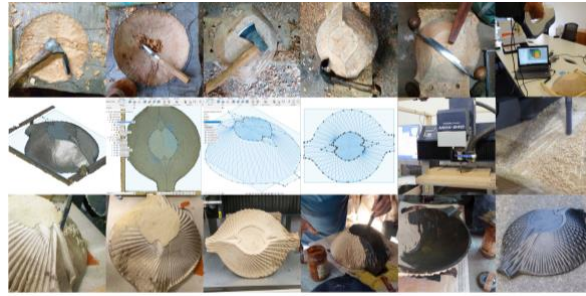


Fig 3 Hybrid analogue/digital process of creating Large radial bowl.

Working in CAD/CAM (computer aided design/computer aided manufacture) software, a variety of cutting regimes were explored to create toolpaths that produced complex surface patterns and textures and that mapped onto the scanned bowls' surfaces. Hence, patterns can be milled onto the surface of a bowl that do not eradicate the hand carved surface, but follows and overlays it. Thus, the physical characteristics created using hand tools are retained, while also deploying and celebrating the possibilities that the digital processes afford. In addition, my approach explicitly aims to subvert the software's mission to create optimum toolpaths to reproduce CAD models efficiently and accurately, as would be the aspiration of a design engineer. A range of techniques were used to achieve this, including deceiving the software by mismatching software settings with the actual tool shape and sizes used. Tool "step over" settings (i.e., the amount a tool moves across once one circuit of cutting has been completed) were also used that emphasised, rather than concealed, the way in which the tool moved over the surface of the forms. Making the means of production visible (i.e., in this case the use of a milling machine) rather than invisible (and therefore of no consequence to the appreciation of a final product) is another distinction I would highlight between craft production and industrial manufacture.

Through these strategies each piece is therefore a one-off, bringing together a particular piece of green wood uniquely carved, with a toolpath that maps only onto that form, in a particular way, at a certain point in time. Assumptions of speed and efficiency in the use of digital tools are confounded. Continual engagement and presence are necessary in this process in order to respond to outcomes as they unfold. None of the pieces created in this series were completed with a single deployment of a set of predefined cutting toolpaths, they all required iteration, adjustment, tweaking, or even significant rethinking, in response to the particularities of the work as it evolved. This iterative, actively engaged process can again be contrasted with aspirations in industrial design engineering to create efficiencies of production through minimising the need for human engagement beyond a divorced design phase and the setting the initial parameters of manufacture, i.e. fully automated production.

A hybrid drawing accompanies many of the wooden pieces produced. The intention was not to create direct representations of toolpaths, or use them as a form of explanatory illustration of the processes of production, but to make 2D work as a strategy to explore the visual language that the software generates in its mission to optimize the paths that the cutting tools will follow. The starting point is the creation of traditional watercolour drawings which are then overdrawn using a digitally controlled plotter/cutter which was adapted to hold a variety of pen types and sizes, so extending the repertoire of marks achievable. Broadly there is an aspiration in these drawings to find a sympathetic hybridity of the digital and analogue, rather than set up a tension or dichotomy.

### 3 CONCLUSION

Hand Thought, alongside a range of projects I have undertaken in previous years, which have integrated digital technologies into creative making practice, has provided a foundation for the development of this Digital Craft Ethos. The practices, mindset and aspirations embodied within this ethos are distinct from digital design and engineering approaches, and can be aligned to a broader Pragmatic understanding of technological mediation. Rational Instrumentalism tends towards the agnostic when considering the impact of technology use beyond a set of fixed and well prescribed goals, using speed, efficiency, consistency, and repeatability, as measures of success - simply a means to an end. In contrast if Pragmatic lens is applied when developing and using technologies, whose ultimate goal is not to reduce the need for human input/labour, then this creates the potential for a parallel mode of technological engagement that changes the current dominant emphasis: from effective (efficient) to affective (felt), from focusing on the ends to recognising the significance and values of the means.

I argue would that thinking more carefully about *all* the ways in which technologies can create value could lead to different avenues of technology development and provide opportunities for richer relations with our future tools. I would also contend that this does not discount the role of the digital, but it requires the mindset of the craftsperson to help direct us along a path of sensitive, appropriate, and humane technology development and adoption. One of the ways this may be manifested is as new forms of digital/analogue 'hybrid' practice.

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