PLYMOUTH COLLEGE of ART

making FUTURES

The Certainty of Uncertainty, Risk & Uncertainty = Originality

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Abstract

"Workmanship of risk (WoR) means that at any time, the workman is liable to ruin the job. It is in opposition to the workmanship of certainty (WoC), in which the quality of the result is predetermined and beyond the control of the operative found in its pure state in full automation." David Pye, 'The Nature and Art of Workmanship ' 1968 In 1996 I used a CNC to make one of my final degree show pieces. After 20 years of using and researching digital craftsmanship I wish to challenge David Pye and his implied preference for the 'workmanship of certainty' I would like to argue, from both an experiential and theoretical position, that 'full automation' will always present an element of uncertainty, no matter what techniques or technology are employed. Within my paper I hope to consider and question this, looking at the role of certainty and uncertainty particularly with reference to my past digital work and 2 new projects. In late 2006 I designed the Anne Table showing it in early 2007 and later that year, I designed the George Chest of Drawers. These pieces were celebrated within the industry: because of the digital manufacturing methods used, yet I would argue that these pieces were positioned between digital manufacture, design and hand craftsmanship. Indeed, the results demonstrated the limitations of digital fabrication at this time, when digital manufacture was still very much in its infancy, and highlighted the simplicity of contemporary design. Ten years on the original 'George' is still referenced in publications, flown round the world and discussed as an example of digital manufacturing. Where, then, is digital fabrication positioned for 2018? It is widely accepted that digital fabrication can be considered as craftsmanship and digital technologies have advanced greatly. Rapid prototyping has become commonplace, and the creative freedom digital technologies offer is far greater, So what should define a piece of digital craftsmanship in 2018? In January 2016 I started a new body of digital enquiry focussing on the idea of 'certainty' and another around 'uncertainty' in January 2017. 'Certainty' explores CNC fabrication and the possibility of 'the new Baroque', using perfection at the core of my thought process. The planned output is a re-creation of a Georgian chest of draws, which has involved a year of development and four months of making. 'Certainty' celebrates digital fabrication in 2017 yet equally highlights the role and importance of uncertainty, even within full automation. I would argue that without understanding certainty you can't define uncertainty, which prompted another creative enquiry with 'uncertainty' at the core of it being. The resulting pieces utilized robotic arms in their manufacture, yet the nature of the 'green wood' material used introduced the unknown. As the robot cuts into green timber the objects dry, finding their natural state, emphasising and cultivating the unknown alongside the certain. Can this body of work go some way in redefining a new definition for modern craftmanship?

In 1968 David Pye put craft and manufacturing in opposition, by comparing workmanship of risk against workmanship of certainty.

With the workmanship of risk, we may contrast the workmanship of certainty, always to be found in quantity production, and found in its pure state in full automation. In workmanship of this sort the quality of the result is exactly predetermined before a single saleable thing is made. In less developed forms of it the result of each operation done during production is predetermined.[i] (Pye, 1968)

He reinforces his point in a second quote, where he invites his reader to understand that craft is related to manual processes, although the words 'by hand' or 'manual' don't literally appear, he alludes to the hand and implies that results may alter during the realization of manual processes.

If I must ascribe a meaning to the word craftsmanship, I shall say as a first approximation that it means simply workmanship using any kind of technique or apparatus, in which the quality of the result is not predetermined, but depends on the judgment, dexterity, and care which the maker exercises as he works.[ii] (Pye, 1968)

With 20 years of experience making by hand and using digital, traditional and mass production methods, I aim to challenge Pye's seminal quote, and argue through this paper that opposing 'workmanship of certainty' against 'workmanship of risk' is no longer valid for 2018. The definition that craftsmanship can only come from the hand is outdated.

My three key issues are:
1: Defining craft through risk alone is limiting and inaccurate.
2: The notion that automated and/or manufacturing processes are without risk is false.
3: Risk does not solely lie within process, but within the ambition of the idea.

What is the relevance of 'risk' to craft?

If you have learnt to throw a pot, do you know how to throw a pot? It is bit like riding a bike, the outcome is, in fact, relatively certain. Unless unforeseen issues arise, such as being distracted or the material having imperfection, the risk is minimal. The best craftsmen work with authority, intuitively and instinctively, and with consistence like their automated counterparts (robots). When studied, it is possible to see that there is little risk within their approach, and near perfection can be achieved with regularity.

I believe the concept of risk within Pye's definition is, in fact, more an aesthetic of choice, a style, a method of embellishment, a type of decoration through the process of manufacture. There is a current trend that believes this aesthetic has more meaning, through the tacit qualities that are embedded by the hand and the tool. This can be evidenced by companies such as The New Craftsmen and wood workers such as Robin Wood, and in many ways this movement aligns to the Arts and Crafts movement.

The two most influential figures were the theorist and critic John Ruskin and the designer, writer and activist William Morris. Ruskin examined the relationship between art, society and labour. Morris put Ruskin's philosophies into practice, placing great value on work, the joy of craftsmanship and the natural beauty of materials[iii]

This style or method of crafting is a personal experience and can be very pleasurable to execute, as the use of hand tools can come with silence and a sense of calm and mindfulness. However, the maker's experience of making is not a reliable indication of the quality of work produced. Those hand-forged traces of making can't define craft alone.

After 17 years of working in a workshop where machinery and kiln dried timber was the norm, I returned to the woods between 2010-2015 to carry out several projects. The Bodging Milano Project was set in the heart of a woodland in Herford, and gave the 9 participants only 5 days to make something prior to it being shipped to the Milan furniture fair. Removing all power from the equation, and with no preconceived idea of design, using previously unexplored techniques and only hand tools, risk was high. It was, without a doubt, one of the most 'crafty' or imperfect and hand made objects I have ever created. My relationship to the making process, during this project imbued me with an appreciation and love of the object that went beyond the satisfaction that comes from the machine, this was a very personal experience. Would other makers feel the same, given these tools and woodland workshop setting? Would the general public appreciate the value of the process and its origins?

Despite this affecting experience, I believe that whether manual or automated processes and techniques are used, with either workshops or factories as the place of their creation, risk is involved. However, the presence of risk alone does not make it the defining characteristic of the craft making process. I have tried to summarize this section with a mathematical formula:

level of skill + hours of experience = proportion of risk (POR)

If we think of being very skilled as a level 10 and little to no skill being a level 1, you can calculate the risk you might be taking with a project. If you have no skills and very few hours of experience, the project will be risky, but is this such a bad thing?

Challenging the notion that workmanship of certainty is without risk

In late 2006 I designed the Anne table, showing it in early 2007. Later that year, I designed the George chest of drawers. Both these pieces were designed on a computer programme called Rhino, my aim was not to produce a digital design but to celebrate traditional craftsmanship, as the simple exterior referenced modern design and the interior, the lost and dying craft skills of the Georgian period. The pieces were very well received and were celebrated for their use of digital manufacture, but in fact the reality of this work was that it was positioned between digital manufacture, design, and hand craftsmanship. The results demonstrated the simplicity of digital fabrication within this period. The carving techniques represented 'workmanship of risk' as pieces fractured and snapped from the chest of drawers under the blows of a chisel and mallet. Yet this also highlighted how hand making techniques could create far more interesting effects.

In 2018 craftsmen in the UK have access to some of the most advanced tooling and machinery, in digital labs, maker hubs, and universities such as the institute for making at UCL or the Architectural Association's woodland site, Hook Park in Dorset. They may even have them in their own workshops as the price of this kit has fallen dramatically.

The march of the machines, not just in China but around the world, has been accelerated by sharp falls in the price of industrial robots and a steady increase in their capabilities. Boston Consulting Group, a management consultancy, predicts that the price of industrial robots and their enabling software will drop by 20 per cent over the next decade, while their performance will improve by 5 per cent each year.[iv]

However, to achieve certainty as Pye defines, 'in which the quality of the result is predetermined and beyond the control of the operative'[v] is simply impossible. To assume that by setting up a machine or outsourcing to a technician and pressing a button on a digital process or mass production method you are eliminating risk, or in fact craft, is misguided. No matter the scale of the production process, there will always be an element of risk.

Since first engaging with digital manufacturing tools at university in 1995, using digital methods has always presented problems and risks, and I know to expect diverse results and size difference. In many

ways, digital tools and methods present greater risk, certainly when manufacturing small quantities, as you are often entering the unknown and commitment is required from the very start of the process.

Many of us will have experienced getting the simplest things back from a CNC machine or a laser cutter, knowing that in theory they should be the same, but this is not always the case. Sometimes it seems as though the machine stopped mid-process for some unknown reason and day dreamed. Even within fully automated factories there is a defect rate of 5% due to computer malfunction. 'Before the robots, the product defect rate was 25%, now it is below 5%'[vi]. Even master craftsmen occasionally have bad days.

Car manufacturers now use the word craft to promote their products, liking to portray their production methods as craftsmanship no matter how great the distance between the hand and the tool. At first, I was outraged. A great example is the advert for the Mazda CX5 & CX9 [vii], where the adverts showcase craftsmen shaving wood and stitching leather in aprons under sepia lighting. In 2014 I was approached by Glenlivet to be a Brand ambassador and had the opportunity to visit the Glenlivet refinery where its craft whisky is produced. There were a handful of people working in this factory to produce all the whiskey within their whole portfolio, and one of those people was the receptionist. A result of this was that I even wrote a small article 'When the word craft loses its meaning'[viii] expressing my frustration about the overuse of the word.

However, having reflected whilst creating some of my latest work and after hearing a talk by Anthony Tovey, an industrial sculptor for the automotive industry, at Making Futures 2017, I believe there is an element of craft within all aspects of manufacturing and at every stage of production no matter the quantity. Perhaps the issue is not with the manufacturers, but with the public and makers who do not accept digital manufacturing as craftsmanship.

I would like to argue that no matter how predetermined the results of digital manufacturing should be, there is still most definitely risk. In fact, I can vouch for this, having sat for five days during 'the wish list project'[ix] staring into a window in the side of a flat bed CNC machine, holding an emergency stop button in a complete state of anxiety as I lived and breathed every movement of the tool cutting across the surface of the Ves-el I designed in collaboration with Zaha Hadid. It might as well have been the end of my finger.

There is clearly a correlation between volume and risk: the more you make the smaller the risk. Yet this is the same for the potter on his wheel as he first learns to throw. There are disasters, inaccuracies and imperfections until the program is fully learnt, after which they can just fall from the hand. Surely it's time to accept that engaging in the use of digital tools is just an extension of our hands. Yes – it is divorced from touch and the sensory evaluation process during its conception, meaning extra caution needs to be applied, but it is craft none the less.

However, 'workmanship of risk' if considered as an 'aesthetic of risk' can be mimicked or introduced to the design or production process to create those treasured inaccuracies and faults so attractive to touch. Conversely, an aesthetic of certainty can be introduced through the handmade. For example, the furniture designer Fred Baier pioneered the use of early computer modelling, yet the pieces were in fact rarely crafted using digital technology, as the design programs and the CNC machines struggled to communicate at this period in time, hence it was generally too risky. It was easier for a skilled craftsman such as Baier is to achieve the desired results by hand. I have tried to summarize this section with a mathematical formula:

POR (proportion of risk) + VOP (volume of production) = level of certainty

First calculate the proportion of risk using the formula in the previous section, and then add it to the volume of production. The greater the figure, the greater the certainty.

Risk does not lie purely within process but the ambition of the idea (AOI)

I feel it is contentious to merge risk with making or manufacturing processes, as it all gets far too messy. As I have argued, risk in making is related to skill sets, and the more appropriate the skills and knowledge that you, the technician, or the machine has, the less the risk. If we were to now challenge those skills, risk would increase. The more we push the skills, the greater the chances of failure. Risk in making is related to appropriateness of skills, or the ambition of the idea (AOI). These skills or questions can be gained or answered through experimentation and innovation, but the more appropriate the skills or experience you have, or the machine operative has, the less risk. If we challenge those skills or processes, risk would increase and the more we push the greater the chances of failure. But if failure does not occur, the greater the chance of originality and authenticity.

When I asked Michael Eden if the 3D printing of his vessels sometimes failed he answered,

'Basically, no. As it's such an expensive business, I can't afford for prints to go wrong. But, it's difficult to say with certainty that a design is going to work. Experience helps (as with any craft) and having a good relationship with the technician is also invaluable. He has software that can provide a different analysis.' [x]

Recently I started making spoons as a hobby and only one of all the spoons I have made has failed. The reason it failed was due to the fact I tried to carve it as thinly as I possibly could, making it so thin it snapped. I have also been teaching friends who have never made anything in wood before, and – so far – no one has failed to produce a spoon that could not be used. However, with the first spoon, ambition of form is not the priority, it is much more about achieving a finished spoon-like form without cutting yourself.

I believe risk is related to ambition, and ambition is related to making new discoveries. I believe risk is related to finding new insights within processes and materials. Risk is research, and the failures that come with risk are the process. Ambition pushes ideas, materials and process into new undiscovered territory, directions and forms. So I would like to argue strongly that risk is an approach to materials.

I agree with Pye that when we engage in risk we engage in uncertainty, but uncertainty does not define craft and what comes with certainty comes with a lack of risk.

As in the previous two sections I have tried to summarize with a mathematical formula, however risk needs to be calculated first, by adding up level of skill, hours of experience and volume of production. The greater all these figures, the greater chance of certainty. Significance of ambition makes it a little more complicated, so ambition has to be applied separately.

LOS + HOE + VOP = WOC (workmanship of certainty)

LOS + HOE + VOP + AOI = WOR (workmanship of risk)

Conclusion

It is now nearly 50 years since Pye wrote 'The Nature and Art of Workmanship'. Pye was of his time and worked in an era that had different aims, values and class structures. In this era, designers designed and craftspeople made. I wish to conclude by honouring his text and rewriting Pye's definitions of 'workmanship of risk' and 'workmanship of certainty'.

Workmanship of risk (WOR) means crafting or manufacturing at the far boundaries of ability or skill, with new or unexplored processes or ideas. This is in opposition to WOC, which applies to tried and tested methods where results can be assured and risk can be minimised.

To further support this, I say:

Craftsmanship means workmanship using any kind of technique or apparatus. Quality will be predetermined by the skills, judgment, dexterity and care which the operative exercises as he works.

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