Crafting Human

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Abstract

This essay presents authors' views on the traditional human crafting process and its elements together with concepts presented in relevant literature. It then elaborates how the crafting process has been transformed due to the influences of the digital age. Further it briefly describes the concept of hybrid tools and related prior work in HCI and the importance of designing new fabrication methods to preserve traditional human elements in future crafting methods and processes.

The Form-Giving Process

The process of crafting can be considered as a process of "form-giving". On the one hand it can change the form of an object and transform it into a completely different entity. For example the carpentry process transforms a trunk of teak wood into the form of a chair. This process gives new meanings to objects. The chair is no more a trunk of wood, but a chair; a device specifically made to sit on. On the other hand it can combine different objects and make a completely new entity. It is quite similar to the way a painter blends an empty canvas with watercolors. The fusion of canvas and watercolor now has a new form. We often give this new form, a new name. In this case; a painting.

This form-giving process begins in the mind of the craftsman. Initially it is an image in his mind. The intellectual activity of thinking and imagination will then be followed by a series of physical activities. These activities will be unique to each form-giving process, for example, sketching, cutting, molding, drilling etc. It is through these physical actions of the body that the image of the mind takes physical form. Hence it is a process of both the mind and the body. This process of transforming a mental image into a physical artifact needs certain skills. A skill in this context is an ability to put both the body and the mind to work in concert to fulfill a certain task [6]. Skills are learned by doing;

doing for several times or maybe several years or even an entire lifetime. Unlike talent, which can be argued that one is born with; skillfulness is acquired by continuous practice. Practice tunes the mind with body and vice versa and it is this body-mind harmony that lies at the heart of traditional craftsmanship. Therefore each craft practice and craftsman were committed to the development of skill.

Another indispensable fact about crafting is the way the final physical product captures the unique identity of its creator. Since every human is unique from every other human the way each person's body and mind works together is different from one person to another. The simplest of examples is our handwriting. This difference or rather uniqueness is a key element of the crafting human. The end result of the form-giving process therefore represents its creator, his imagination, his skills, his flaws and the process he followed. Each crafted object carries the signature of its creator. This is why different craftsmen working in the same workshop, with similar materials and processes will turn out objects that are different from each other.

Even with finely tuned, hard practiced skill, human crafts are rarely perfect. Before elaborating this further, try this little exercise. Take a pen and a piece of paper and write the word "apple". Now look at the two "p" s you wrote. Are they identical? This is a simple reminder that humans, being humans, not machines cannot replicate the same action in the exact same manner in order to produce the very same results. Each crafted object therefore embodies its own moment of creation, its own character even though it maybe made by the same human. Hence the end results of a human form-giving process cannot be completely pre- determined; it

is continually at the risk of getting a different form [5]. Rather than being a limitation, this imperfection and unpredictability is an integral feature of human craftsmanship. This results from human involvement in the form-giving process from beginning to end, complete with its flaws and irregularities. Through this process, the users of the crafted objects are able to catch a glimpse of the object's creator and being imperfect, the objects are altogether; more human.

Tools
Tools create interfaces between human and outer world entities. For example, a chisel and a mallet create an interface between a carpenter and a piece wood. At one end of the chisel, the blade takes out chunks of wood while the other end provides the perfect grip for a human hand to control it. The shape of the mallet's handle is carefully formed to transfer power from the human body into the piece of wood while its elastic properties protects the hand in the process. Together they help the carpenter to transfer his power and skill into a piece of wood and transform it into a new form - a form that resided in his mind.

Before the dawn of industrialization tools can be viewed as mediators of both human power and control. The end objects made using these tools represented the maker's unique skill of combining his or her power and control with the form-giving process [1,2]. A wooden goblet made by a young man with strong arms and lesser control was easily distinguishable from one made by his old teacher with lesser power and higher control. Thus the tools used, complimented human uniqueness and identity. With industrialization coming into full swing, the effect of a craftsman's power on the crafting process started to diminish. With more and more

power tools (powered by external sources) being introduced to form giving processes, human power was no more a significant deciding factor in the crafting process as in the past. These new kind of tools were mediators of human control, not human power and therefore required a new set of skills to be developed from the craftsman's point of view. They also enabled new possibilities in crafting such as increased work speed and accuracy. While power tools changed the way craftsmen were engaged in the crafting process, the fact of human involvement from beginning to end remained untouched. Not limiting themselves to idea generation each object made still carried a unique, distinctive character that represented its own human creator.

Digital Age
With the dawn of the digital age, mass production and consumerism that stemmed from industrialization started to further evolve ever so rapidly. The 'throw-away' attitude towards the consumer products encouraged quantity over quality. The need of producing bigger quantities of goods quickly and cheaply has become the need of the hour. The role of the craftsman and the process of form-giving have therefore changed drastically as machines began to further resemble the human mind with the development of 'smart-machines'.

Today, these smart-machines controlled by computers are the ultimate form givers. They are capable of doing what human hands and hand-controlled tools did in the past, much more quickly and with features in par with the modern culture of consumerism. In these modern form-giving processes, human involvement is limited to transferring the image of the mind into a virtual

representation, which the computer can read. Tools, which were interfaces between the human and the physical object itself, are now merely interfaces between the human and the computer. In this process, the craftsman transfers his mental image into this virtual representation and not directly into the physical form. The work of the hands is limited to a few subtle actions, presumably with the same grip and a few movements. A typical scenario would be a person sitting at a computer terminal, giving command with the click and drag of a mouse. The complete arc of controlled and complex actions of the craftsman's hand have now converged into a smaller set of repetitive actions. Instead of utilizing the plethora of hand postures, grips and actions available, it is mostly just one or two similar actions that are used to achieve different end-outcomes.

"The computer or information device is inherently a tool for the <u>mind</u> - not the <u>hands</u>. It essential actions is to process and transmit not power but symbols. Its products are not mechanical artifacts but abstract information" -McCullough, Abstracting Craft [3]

In modern digital age processes, objects are made after their final form has been thoroughly calculated and perfected. Objects therefore bear the stamp of a repetitive process that replicates to perfection. Physical activities of working with materials are replaced by machinery. Humans are therefore not involved in the whole form-giving process. Truth and empathy to material is lost. This has inevitably resulted in the de-humanizing of objects, stripped off their element of risk in the process of making.

Hybrid Tools

While modern crafting practices are deviating towards a completely orthogonal trajectory from its traditional values, a ray of hope has started to glimmer in the realm of human computer interaction and design in the form of a new hybrid interaction paradigm. This hybrid approach encourages synergetic work between humans and machines in the crafting process and it ensures human involvement until the end of the process. Here, the involvement of machines does not diminish skill and labor of the human body, especially the work of hands, but assists intelligently. This hybrid crafting process also starts in the craftsman's mind, similar to fully manual or fully digital extremes. Then it is transferred into a medium of machines-a digital format comparable to a CAD model. This digitally represented model is the starting point of the machine's involvement in the crafting process. The machine then starts to assist the craftsman in transferring the form in his mind to the materials based on this model. Craftsman can override this model at any point in the process and the intelligent machine will adapt to the real time changes he makes and modify its initial model. Hence, the initial digital model is just an abstraction of the actual physical product, just like the mental image in craftsman's mind. The concrete form of the resultant physical artifact cannot be exactly predetermined until the craftsman finishes his work.

Even though a considerable amount of prior works is found in the HCI domain which attempt to blur the gaps between human craftsmanship and digital technologies, FreeD - a digitally controlled milling tool created by MIT media lab researchers stands out as the most prominent work, up to date. Subsequent publications by Zoran et al [8,9,10,11] have made important contributions towards conceptualizing the idea of hybrid crafting tools. User experience studies done using FreeD with the participation of both professional and amateur craftsman suggest the possibility of integrating digital technologies into the traditional crafting process to produce unique and personified artifacts.

However these hybrid tools still have a long way to go from their current conceptual prototypical models in order to be used in real world crafting processes. A myriad of technical challenges still need solving. Multifaceted research in the domains of HCI, design and engineering is needed. It is hard to predict now whether this new emerging territory of hybrid craftsmanship is the future of the human form-giving process. It will be interesting to note the extent in which these hybrid tools can be contextualized within the socio economic parameters of mass production. At present at least, we can be content that it has already uncovered an alternative path. A path largely overlooked by humans since the inception of the digital age. A path that may well make our digital age processes and objects wiser, deeper, more thoughtful and considerate; more human- like.

Future

It is undeniable that successive advancements in technology disburdened the human craftsman from performing difficult, tiring and painful tasks. However, these gains came at the cost of integral human elements of both the process and the product. In such context, may we be able to create new technologies that will successfully merge the best of traditional and digital form- giving processes? Any such attempt should be driven by the need of keeping the 'crafting human' alive.

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