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Paper Proposal: Crafted Computation

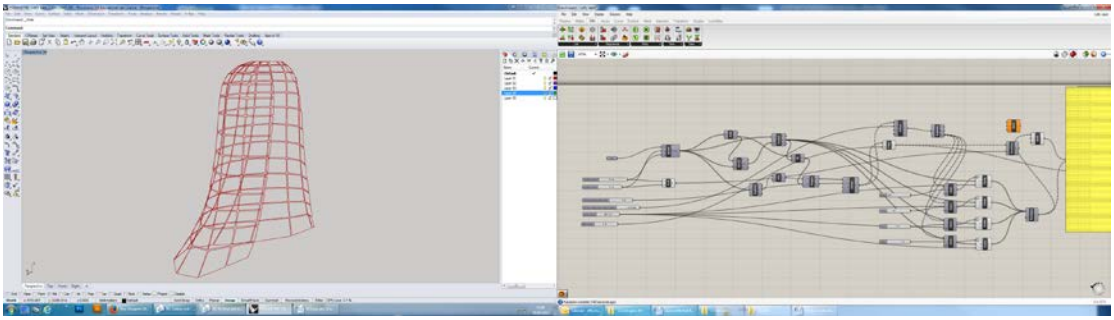
Synopsys

The word digital is somewhat overused as a very wide brush nowadays covering a wide range of subjects, from TV broadcast systems, music recording, arts, communication, it has become a prefix with semantic connections, slick stylistic graphics and exacting binary precision. Digital skills have become second nature, as a generation are growing up as prefixed "digital" Natives who have learned how to interface, often before they could walk. Like the skilled craftsperson becomes at one with their tools, becoming an extension of their hands so too the digital tools have become deeply embedded in everyday communication, operation and expression. We now live in a world where both the digital and analogue coexist with their human operators in the centre in a kind of three-way symbiosis, or guild.

There is however a tension in the perception of the use of digital manufacturing processes for craft practice. There is a commonly and often vehemently held view that it is cheating to create an object in Google Sketchup, save it as an STL file and have it printed on a makerbot. This view however is somewhat one dimensional, as with any material based craft there are varying degrees of quality and skill that can be applied in the making of a digitally created object. To use 3d modeling software to a professional standard takes thousands of hours of work. Additionally there are varying degrees of thinking that can be applied to generate meaning in a crafted object. To create something meaningful takes skills in the manipulation of concepts and knowledge of context gained through careful analysis and reflection over time. These two skill sets are exercised in the creation of both physically and digitally well crafted and conceived objects.

The root of the cheating sentiment with regard to digital manufacture comes largely from the comparison between a crafts person's tacit knowledge with that of the machine made rapid prototype where tacit knowledge of the material is emulated through algorithms. The repeated manipulation of familiar materials generates an understanding that is inherently layered in our consciousness. Watch a child play with dough and they will squeeze it through their fingers to see how it feels, they describe it as feeling like something else, mud or gloop etc, making connections in their minds with other things they have experienced in a visceral sense. These early experiences are the start of what can be described as our tacit understanding of the world. As we develop knowledge and understanding of the materials that we manipulate, over time the more we experience and experiment the stronger our understanding becomes. To elevate this tacit knowledge to the level of a master crafts person, with wood, or clay or metal or molten glass is very hard to achieve, taking years of exposure and practice.

The guild of physical mental and virtual by some craftspeople and artists has developed into and established method of making, with its own visual language and fluency, the tools of the maker have shifted to become virtual tools which can be used to: cut and paste, trim, bend, extrude, fillet, chamfer, bake, light, texture and render. There is no reason why we cannot blend the skills we learn as craftspeople with materials and digital manipulation and manufacture. And there is tacit knowledge to be gained in exposure to digital creative environments that can help us be better creators, makers or crafts people.



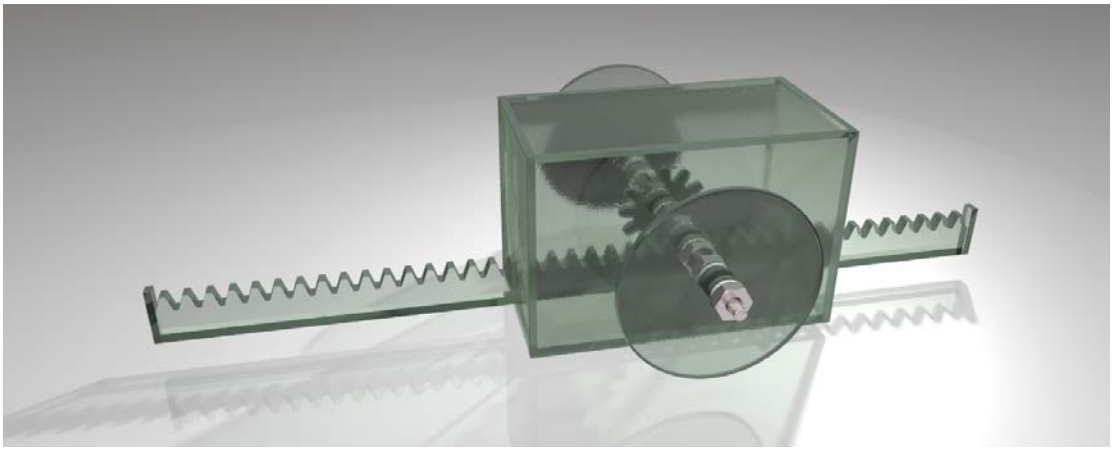
Grasshopper definition and model: parametric Cape, student project

Pedagogically it is possible to blend teaching approaches from the workshop to the computer suite, to instill a craft ethos in the teaching of computationally derived form. For example the use of scripting programs such as Grasshopper for Rhino, can be explored with constant reference to the physical world as components are plugged together, boolean applied or trimmed. The satisfaction that can be found in solving a geometric procedural problem in a virtual space is amplified when that object is then output through a CAM process. The craft of making is naturally extending its toolbase as those tools become available and the methods of using them are shared. I argue however that there is great benefit in teaching modeling skills from the bottom up, from first principles, geometry and logic. Just as we teach students to stand at the furnace and gather, we need to teach good fundamentals in how geometry is generated manipulated and output. If this is done well students benefit from a deep knowledge and understanding of how computation can be a powerful tool in their craft practice and the cheating myth fades over the horizon as they learn the craft skills needed to manipulate objects well in three dimensions.

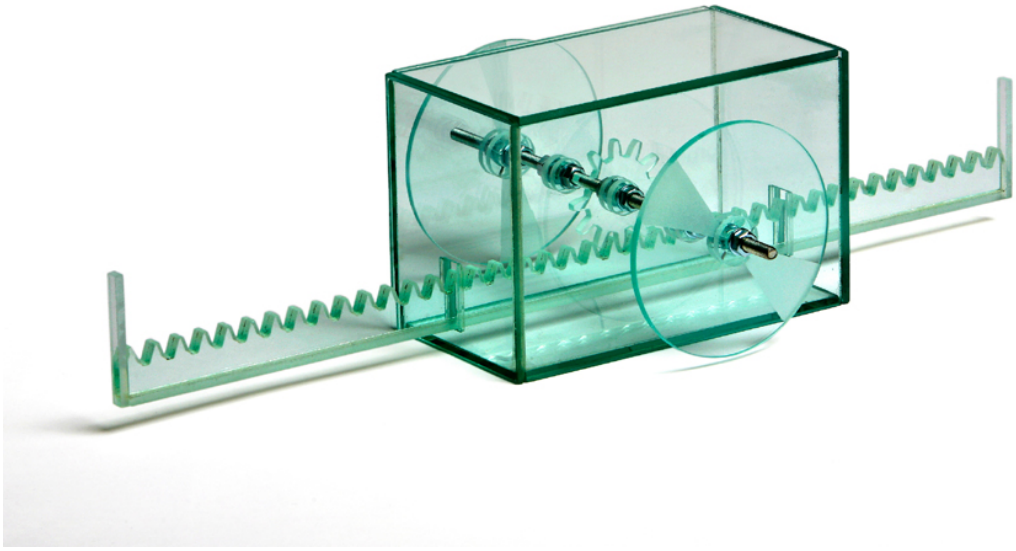
Colin Rennie 2015

Colin Rennie, *Capture*, 2014, hot formed glass and steel. Digitally scanned glass elements that have been fitted with armatures in 3d software (left image) which is then cut out on a waterjet from steel and assembled.

Colin Rennie, *Capture* 2014



Flatpack Project: student work, Rhino model render in Flamingo



Flapack Project: student work, Waterjet cut glass object