H(EC)I – Human Ethno-Computational Interaction: (Re)Conceptualizing Wire-Bending and Design in the Trinidad Carnival[1]

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Introduction

Investigating the ways in which humans engage with digital technology, and the development of novel interfaces for making use of technology are key contributions of HCI. Since it focuses on people's interactions with computers, it might be assumed that by incorporating digital tools into non-digital environments, insight may be gained into the power and limits of new technologies. Despite recent investigations into craft, particularly in discourses on digital and hybrid making, the interactions between craft persons, their tools, artifacts, and their communities are generally positioned as outside the boundaries of digital making. Thus, the socio-technical processes and cultural meanings involved in these maker cultures are not usually brought to the forefront.

In this position paper, I argue that a comprehensive understanding of craft-persons, the ways in which they interface with their tools, artifacts, and each other, as well as an understanding of their beliefs, can yield valuable insight to inform and demarcate this potential field of Digital Craftsmanship – specifically by (re)conceptualizing the term "digital" as one with real social, historical, and cultural dimensions, i.e. computational. I call this approach H(EC)I for Human Ethno-Computational Interaction. Using the craft of wire-bending, and design in the Trinidad Carnival as the site for my study, I demonstrate how traditional (non-digital) craft and digital practices can merge through ethnography, computation, and interaction through this approach – from culture to technology.

I grew up in a family where making was, and still is, an important part of our culture – making by hand. I learned through making, and made to learn. I enjoyed nothing more than engaging my hands and my brain in making. (TEDx Talks 2016; Schumacher 1989) In my training as a computational designer, I have learned how to think, make, and design computationally, and digitally. My work in craft, computation, and technology is motivated by my love of making, my interest in interactions embedded in making cultures, empowering people through familiar signs and symbols, and introducing computation and digital technology via culturally-relevant support. The current gap between traditional (non-digital) and digital making is more than a technological one, it is a cultural one. Western versus non-Western, making by hand, versus making by computers.

To reconcile this gap, we need to first understand the ways in which non-digital cultures engage with their tools and materials to create objects, and the problems they may be experiencing. Secondly, we need to develop culturally-relevant interfaces and systems for advancing their craft in their communities. Thirdly, we develop systems that integrate craft interfaces with digital technology. Let's briefly consider my attempt to reconcile technology and craftsmanship using the practice of design in the Trinidad Carnival, and the craft of wire-bending as an example. The Trinidad Carnival was invented by newly emancipated slaves in 1834 to celebrate their freedom, express their creativity and aesthetic sensibilities (Brown 1990). Cultural practices, meanings and social conditions are articulated through the carnival (Lee 1991; Ryan and Institute of Social and Economic Research 1991); it forms and sustains local communities

(Riggio 2004); creates a sense of pride (Miller 2013); brings different generations and people together; and positively impacts local and global economies (Tull 2005). The Trinidad Carnival is culturally, historically, and economically important to Trinbagonians, and the diasporic communities.

The craft of wire-bending is a “specialized art, combining elements of structural engineering, architecture, and sculpture” which developed in the 1930s in carnival in Trinidad and Tobago (Velasquez 2016; Bailey 2013). Wire and other thin, flexible strands of material are bent and assembled to create two-dimensional (2D) and three dimensional (3D) structures. Through this craft, people interface with tools and materials to create objects.

(Human) in Ethnography

Through ethnographic methods I examined sites, conducted interviews with designers and craftsmen, inspected wire-bent artifacts, and observed the ways in which craftsmen engaged with their tools and materials to create these large artifacts (Figs. 1 and 2). By carrying out the above I developed a comprehensive understanding of the community and what making means to them. I gained insight into the meaning and importance of, as well as the problems being experienced in designing and making in carnival. One problem is the lack of involvement by communities in designing and making artifacts for carnival. Consequences of this are the loss of local knowledge, the lack of development of new structural forms, techniques, and knowledge in design. Additionally, the indigenous practice of wire-bending is dying due to the slow rate of transmission of this knowledge, its labor-intensive nature, and the younger generation’s love of technology (Noel 2014; Noel 2013). Here I illustrate the first point of my argument, understanding what making means to this community, examining the ways in which craftsmen interface with their tools and materials, and articulating the problems experienced by that community.

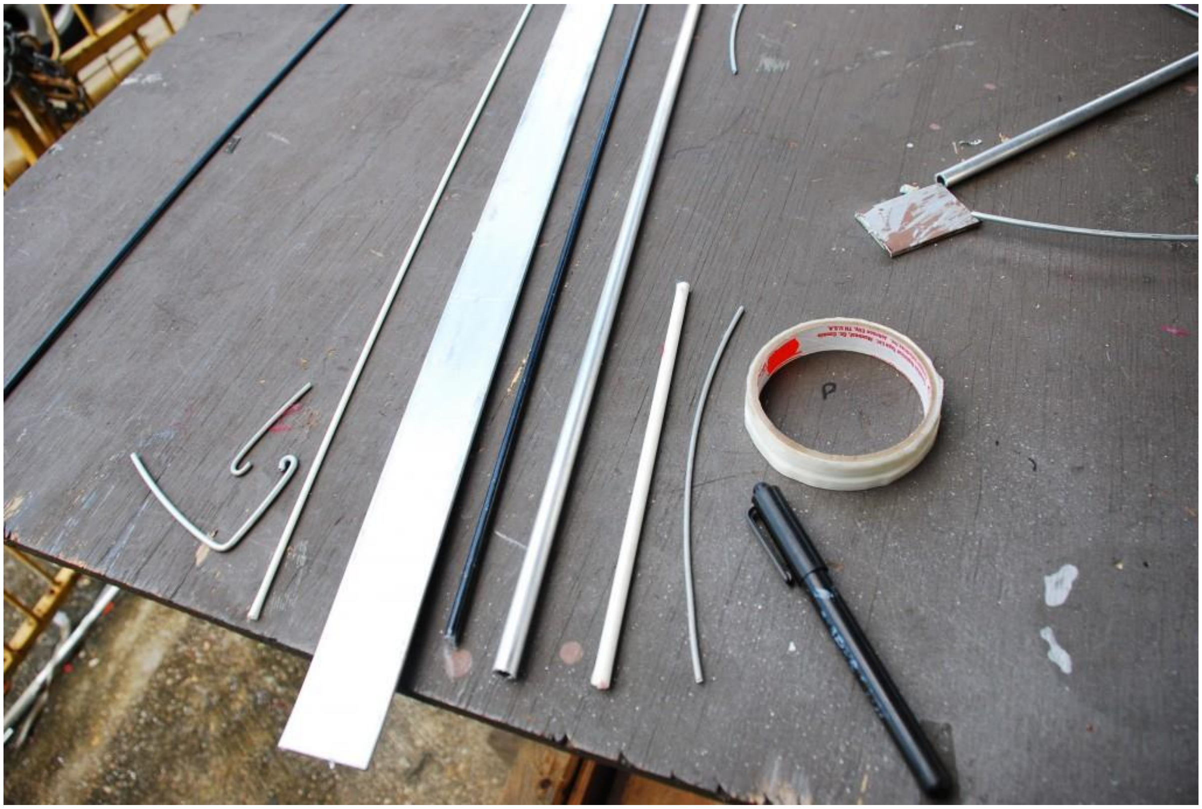

Figure 1. Materials used in wire-bending

Figure 2. Tools and processes in wire-bending

(Human) in Computation

After acquiring a comprehensive understanding of the situation, I then explored opportunities to develop culturally-relevant design support. I developed the Bailey-Derek Grammar (Fig. 3). – named after two local, expert wire-benders, Albert Bailey and Stephen Derek. This computational system which codifies the main techniques and spatial relation in wire-bending was developed to capture, explicate and reinvent vernacular knowledge in wire-bending. Externalizing this knowledge enables the recording and preserving of culture, its transmission to others, and the development of existing knowledge. This grammar is represented in the form of drawings, a familiar form of communication (signs and symbols) used by the craftsmen. This novel computational tool illustrates the second point of my argument, that of developing culturally-relevant interfaces and systems for advancing the craft of those communities.

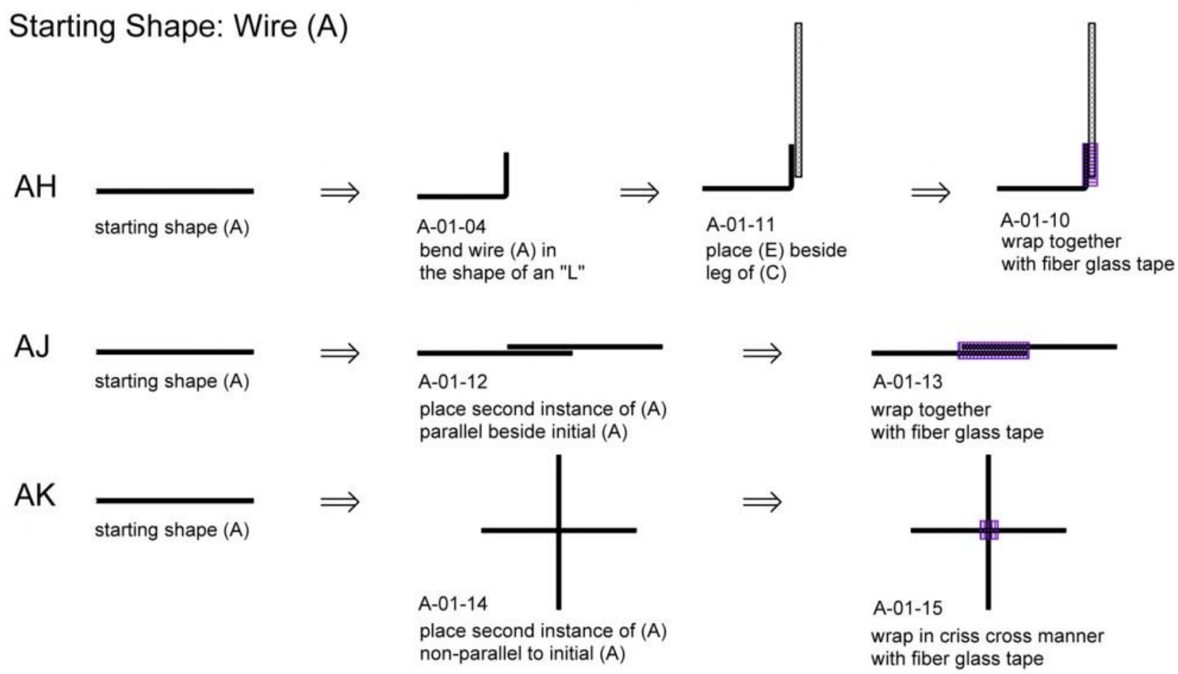

Figure 3. An example of the Bailey-Derek Grammar codifying techniques and steps in wire-bending

(Human) in Interaction

Interaction with design ideas allow users to engage in simulated conversations with designs that can inform design decisions, and allow the exploration of "spatial and temporal movement" (Visser 2009; Kalisperis 2002). Including computer-aided tools in the design process can enable idea generation, exploration, and evaluation of design alternatives, thereby reducing total reliance on full scale, physical prototyping for feedback, thereby having a positive impact on design outcome (Blessing 1995). By creating rule-based descriptions of designs and implementing them in a computational environment, I was able to create several design alternatives. Human interaction with these designs through computers creates a new space for those interested in digital technology and design.

In this stage of the work, I tested the interaction between a chosen design and the body to explore how the interaction might impact or inform design and design thinking. I used a visual programming language (Grasshopper and Firefly) along with an input/ output motion-sensing device (Kinect) to allow interaction between the body and the design (Fig. 4). Since these artifacts are performed by the body in carnival, the ability to visualize and simulate its movement with the body was paramount. The development of this interface illustrates my third point. It integrates digital technology to address the issue of the younger generation's love of technology, and the simulation of design to aid in design exploration. The interface integrates the cultural practice with digital technology (Noel 2016).

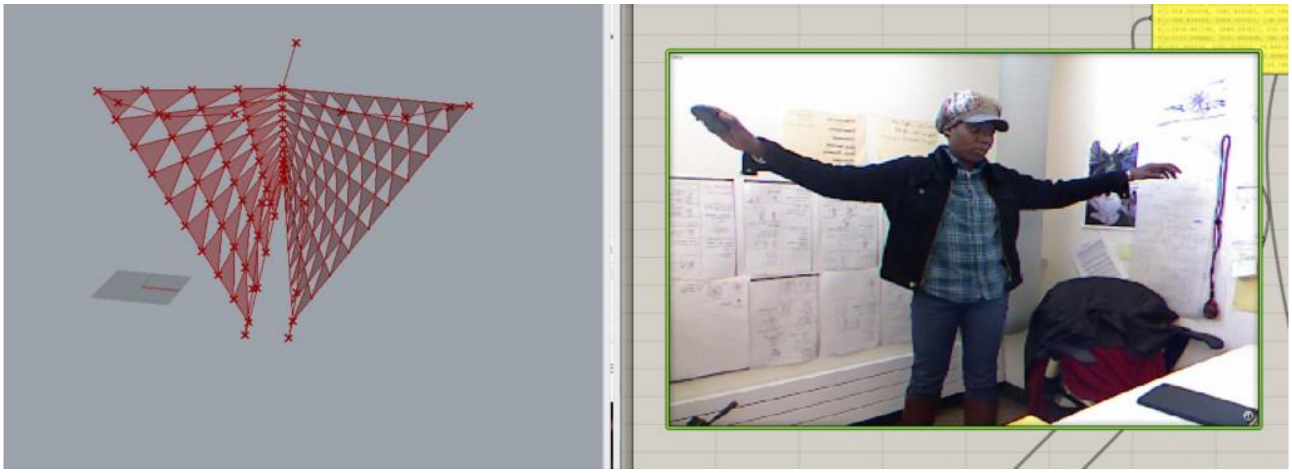

Figure 4. User/ Designer interacting with designs with motion-sensing technology

Conclusion

This example of the H(EC)I approach to reconciling technology and craftsmanship highlights the importance of understanding the values of different cultures; developing computational, culturally-relevant support which may be digital or non-digital; and creating interfaces that merge the computational with the digital.(Vernelle Noel 2016) If we are to understand how to reconcile technology and craftsmanship, and enable diverse forms of expressive practice by many different people, then we must carry out ethnographic examinations to understand the meaning, importance, and problems that exist in these cultures, with the goal of empowering them. (Eglash et al. 2006) After understanding these problems, only then can we develop culturally-relevant support that would also inform HCI. My purpose is to suggest that this H(EC)I approach to digital craftsmanship as a field of research in HCI could benefit from linking culture to technology through ethnography and computation – which existed long before computers. An approach to Digital Craftsmanship could consider the ways in which human interactions are crafted through computation and making as a form of inquiry – re-conceptualizing "digital" instead as something computational, exploring the ways in which craft cultures are already computational and "digital."

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