The Craft of Creating Accessibility in the Post-Digital Era

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Abstract

The elevation of traditional craft practice as a form of resistance against technological development is a key attribute of the post-digital era. In this paper, I posit a sympathetic relationship between Chinese papercutting and computer art (CA). An arts-based research methodology will be applied to analyze the outcomes of an international community art project titled *The Float*. Undertaken between January and June 2015, it engaged over 100 young people in traditional Chinese craft workshops across Australia, Canada, China, and the USA. The project culminated in a series of exhibitions that emphasized humanity's shared stewardship of the oceans. The artworks presented included both computer-assisted animation (CAA) and computer numerical control (CNC) cut paper. In this case study, the oft-polarized media of craft and CA were simultaneously engaged.

Keywords

Computer Art (CA), Computer-Assisted Animation (CAA), Computer Numerical Control (CNC), Post-digital, Papercutting, Community Art, Community-based Participatory Action Research (CBPAR), Image Segmentation and Craft.

Introduction

The Float was designed to test the capacity of papercutting to collect and process data. To enable the broad dissemination of information, CNC cutting and CAA were also engaged. The title of the project references the 'floating' shares on the stock market. It is an allegory for democratic access for the entities seeking to distribute information and the readers/viewers seeking to access it.

In post-digital theory, crafts such as papercutting are considered the antithesis of CA [1]. In the 1980s the handmade became symbolic of the resistance against the state and corporate media. The virtual 'renaissance' [2] of paper as an independent medium in the museum and galleries sector of North America and Europe during the mid-1990s was a significant component of post-digitalism. By demonstrating the continued ubiquity of the material, this paper revival contravened the 1970s' trope of the digital era: the 'paperless office' [3]. In this case study, the method of papercutting was employed to enable greater accessibility to digital technologies.

Background

Is there precedence for using craft to collect, process or disseminate information?

The methods explored in this paper have been employed informally by activists and formally by healthcare providers. In the public health sector craft is used in community-based participatory action research (CBPAR).

The application of craft as a form of activism extends beyond the post-digital era. In Britain and the United States of America in the 1960s and 1970s craft played an integral role in both the "counter-culture" and feminism [4]. This was championed by Judy Chicago [5]. In 1979 her seminal *The Dinner Party* redressed the underrepresentation of women in Eurocentric history using embroidery, ceramics and porcelain [5].

Knitting is the principle medium in craftivism. The term was coined by writer and avid knitter Betsy Greer [4] in the early 2000s. Some feminists during the 1960s disregarded needlework as a province of housewifery [4]. It was reclaimed by other feminists in the 1970s as a form of political expression. There are presently innumerable knitting collectives aligned with social causes such as anti-materialism, environmental conservation and domestic violence [4].

In the 2000s, the *Leaving Homelessness Intervention Research Project* used quilting as a method to engage a group of homeless mature-aged African American women [6]. The processed fostered reflexivity amongst participants. It also provided researchers a nuanced insight into homelessness.

Whether an aspect of shared labour or a form heuristic inquiry, textiles are a recurrent aspect of community cum participatory art. These craft-based collaborations also transformed non-traditional art venues into sites of political resistance [7].

What is papercutting?

Papercutting involves the creation of images using a concatenation of incisions [8]. Historians concur that the practice originated in China. The technique was applied to a variety of substrates, such as gold leaf [9], prior to the invention of 'modern' paper during 2nd Century AD [10].

Distinct papercutting traditions emerged with the availability of the substrate. *Papel Picardo* evolved in Mexico with the arrival of paper during the 18th Century [11]. Infusing an eclectic of religious iconography, the tissue paper banners play an integral role in the annual Day of the Dead celebrations. The British *Shades*, which would become popularized as *Silhouettes* during the 18th Century, were an adaptation of 14th Century ecclesiastic portraiture [12]. Although the first paper mill in the UK was established at Hertford in 1495 [12], the first to achieve commercial success opened at Dartford in 1588 [13].

An example of *Papel Picado*.

The recurrent affiliation between papercutting and ethereality began at the inception of the technique. Chinese papercuts played a ceremonial role in both private and public rituals. For example, papercutting was used to create effigies of objects for the deceased [9]. The posting of talismanic papercuts for good luck is a custom maintained by Chinese people both on the mainland and in diasporic communities.

An offering ornament papercut designed to pay respect to the gods and deceased relatives [9].

Why use papercutting to collect data?

The decision to use papercutting to collect data was due to its accessibility. *The Float* workshops required few materials to be implemented. Participants have usually been exposed to at least one of the established traditions of papercutting, such as *Scherenschnitte*, *Kirigami*, or *Wycinanki* [8]. Limited instruction was required to develop proficiency in the technique. Papercutting also has precedence as a research method. Since the 1980s, Chinese papercuts have been interpreted using an ethnographic framework [14]. A ubiquitous practice among 'peasant women' [9], papercuts reposit the maternal traditions and oral histories of an illiterate proletariat [15].

In 2004, the Long March Group conducted "The Great Survey of Paper-cutting in Yanchuan County" [16]. 15,006 individuals contributed papercuts to the initiative. This ethnographic study investigated the effects of the Cultural Revolution, the policy of Social Mobilization during the 1950s–70s, and cultural imperialism.

What demographics were targeted in The Float?

The Float engaged over 100 participants in a series of craft workshops across Australia, China, Canada, and the USA. They can be differentiated into two groups by age: five to seven year olds and 16 to 20 year olds.

Compositions by the young children were processed using papercutting techniques. The young adults were directly engaged in papercutting practice.

The workshops were administered in Redcliffe, Ipswich and Brisbane (Australia); Brooklyn and Boston (USA); Toronto and Vancouver (Canada); and Beijing (China).

How were the data collected?

The younger participants were engaged in a combination of woodblock printing and calligraphic drawing. The children used barens to handprint from a series of pre-existing woodblocks. The central motif of each of these unique woodblocks was a rubber ducky. They were asked to draw a marine environment witnessed by the object cum subject. What did the rubber ducky see along the way?

Using woodblock printing, a masculine equivalent of Chinese papercutting, [5] enabled the children to participate with limited training. The technique of calligraphic drawing was familiar to the children who regularly painted on paper.

The motif of the rubber ducky referenced the research of esteemed oceanographer Curtis Ebbesmeyer. He tracked a shipment of the bath toys blown off course during a storm en route to the USA from Hong Kong in 1992 [17].

The organizations hosting the children's workshops included Riverview State School, Kelvin Grove State College, North Vancouver City Library, The Children's Art Studio (Toronto), The Western Academy of Beijing, and the Brooklyn Children's Museum.

Participants at the Western Academy of Beijing creating a background for their woodblock print using calligraphic styled pen and ink drawing.

The older participants at Redcliffe State High School and CATS Academy in Boston undertook workshops in Chinese papercutting. They received instruction in a papercutting technique adapted from Shandong Province in Northeast China. The use of 'exactor' style knives as opposed to 'box cutters' was a major point of departure.

The participants were also shown examples of Chinese papercutting. To provide context, the totemic function of papercuts in Chinese culture was also discussed.

These participants were asked to respond to the theme of the effects of human intervention in the marine environment.

How was the technique of papercutting used to process the image data?

A unique attribute of papercutting is its capacity to cohere disparate visual styles. An exemplar is the preeminent North American papercutter of the late 20th Century, Kara Walker. Her compositions enmeshed pornography, silhouettes from the early 19th Century depicting 'Boston Antebellum' [12], and the 'Carnivalesque' theories of Russian post-structuralist Mikhail Bakhtin [18].

Kara Walker's cutouts installed at the Musée d'Art moderne de la Ville de Paris in 2007 [19].

The motifs created by the younger participants were editioned from documentation of their monochromatic drawings. The majority of the compositions were laid out on a flat surface to dry and were photographed with a digital camera. Others were scanned at 100dpi. This enabled the children to keep their own artwork.

The documentation was printed out, stapled to a piece of Canson Mi-Teintes paper, and cut as an 'original' using an exactor knife. Likewise, the papercuts of the older participants were scanned or photographed. A second set of motifs were created. This also enabled the original cutouts to be retained by the workshop participants.

183 drawings of the younger participants were collected. 142 unique papercut motifs were generated from the compositions. A further 23 papercut motifs of the 35 created by the older participants were editioned.

Children at Riverview State School with their papercuts. The edition was cut using CNC technology.

How was post-digital technology used to distribute the artwork?

The Float culminated in an exhibition in Australia and a series of satellite displays in the workshop host organizations in the USA and China.

The 165 hand-editioned paper-cuts were exhibited as an original set at The Pine Rivers Art Gallery in Queensland, Australia. The artworks presented included four CAA. A further 291 cutouts were machine-edition for the satellite displays. Each on the children who participated received a papercut.

Whereas commercial production of papercuts utilizes a limited number of motifs reproduced in a large edition, *The Float* required the reproduction of small editions of a large quantity of different designs. CNC technology enabled the required cutouts to be produced by an individual within a two month timeframe.

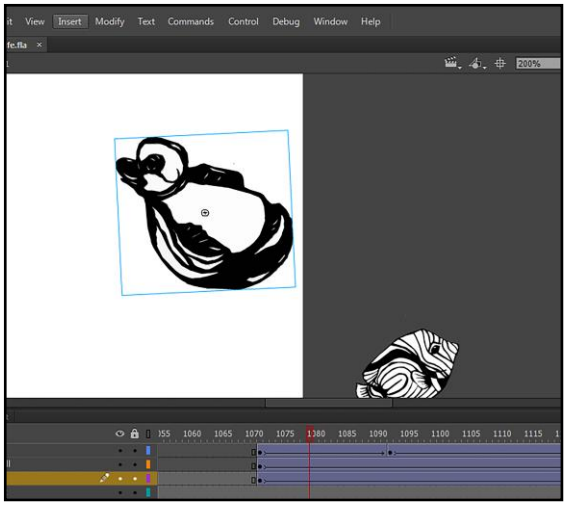
Papercuts, scanned at 300dpi and above, readily translate into scalable vector graphics (SVG). The file format is suitable for both CAA and CNC. Converting cutouts from a bitmap into an SVG requires tracing the internal and external boundaries into a series of nodes. Like cutting an object out by hand, this process can be extremely laborious [20].

In *The Float*, interactive image segmentation was utilized. The 'Live Trace' function in Adobe Illustrator CC 2015 is an example of the technology that emerged during the mid-1990s [20]. Using algorithms, the software program defines boundaries within images [8]. The tools were designed to replicate the cutting of paper images for collage [21]. For instance, a user may wish to separate a figure from the background of a composition. Interactive image segmentation has developed to negotiate shape boundaries from photographs. Subsequently, it is highly effective in tracing papercut forms.

Once the papercuts were Live Traced in this project, they were converted into Fuzzy C-means (FCM) and Shockwave Flash (SWF) formats. The lasercutting of the motifs was investigated. Lasers had a tendency to burn the edges of paper. Subsequently, the editions were made using a small router-like device call the Brother Scan'n'Cut 110. The machines use FCM files. This is opposed to typical CNC cutters, which utilize Drawing Exchange Format (DXF) files. The technology runs algorithms that cluster together objects of high similarity [22]. The machine cuts around these conglomerations. It enabled the cost-effective and accurate reproduction of the papercuts.

SWF files were developed during the late 1990s for use primarily on the internet [23]. The files use vector-based graphics and play using plug-ins embedded into internet browsers. This enables the efficient delivery of animated sequences.

The four regionally specific animated sequences were compiled for *The Float* using Adobe Flash Professional CC 2015. They were exported in MPEG-4 format, with the total length of 15 minutes and 6 seconds.



A screenshot from the production of a CAA sequence.

The host organizations were mailed their editioned papercuts and animations on USB sticks. There were two demographically specific exchanges in *The Float*: (a) between CATS Academy in Boston and Redcliffe State High School; and (b) between Kelvin Grove State College, Riverview State School and the West Academy of Beijing. Satellite displays were organized at CATS Academy of Boston, the West Academy of Beijing, The Brooklyn Children's Museum and Kelvin Grove State College.

A selection of papercuts from a satellite display CATS Academy in Boston.

Future Work

A series of workshops enabling participants to make papercuts and process them into CAA is presently in development. A pilot for the model was undertaken at Logan Art Gallery during September 2016. A second initiative involves the processing of children's artwork using CNC technology to produce sculptures.

A lasercut acrylic sample created by Mao Qing Hu from a design by a CATS Academy of Boston student.

Conclusion

This case study demonstrates the capacity of craft as a method to collect and process data. Since the 1980s, Chinese papercutting has been used as part of ethnographic studies. It is textually affiliated with a maternal, illiterate rural proletariat. In the context of community engagement, workshops can be administered with few resources and limited participant training. Papercutting also has a sympathetic relationship with CA technologies. Digital processes, such as interactive image segmentation, were designed to replicate cutting up compositions by hand. Through this inherent compatibility, craft can provide access to post-digital methods of distribution, including CAA and CNC cutting.

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