HUG - a reactive textile product for affective care environments

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Abstract
This paper presents HUG, a simple design concept developed initially as an art project for the Travelling Gallery’s Access All Areas exhibition. The textile ball forms combine two simple but powerful input and output modes, that of touch and sound. The first versions generated strong affective reactions from visitors, and this paper begins to unpick the possible psychological causes of such affect, towards refining HUG for use in care environments.

Introduction – Access All Areas
While visiting cousins in the United States, and against their advice, my family and I took a local bus across Galveston. The night shift was finishing and a woman boarded on her way home from work. She made sure to give every other passenger a flyer, on which was printed her manifesto for hugging:

“Hugging is healthy. It helps the body’s immune system; it cures depression, reduces stress and induces sleep; it's invigorating, rejuvenating, and has no unpleasant side effects. Hugging is nothing less than a miracle drug.” (Travelling Gallery 2007)

This statement inspired the HUG project subsequently commissioned by The Travelling Gallery: forms that echoed the ambiguous carved stone balls found in north-east Scotland with their raised circular areas, but that would invite and reciprocate touch through texture. The Travelling Gallery itself is a custom built bus which takes art to the remote communities of Scotland (2007). It is run by the City Art Centre, Edinburgh as a curated space with a special educational and community remit. Access All Areas brought together a diverse range of work, which emphasised engagement with art beyond the visual, and appealed to the other senses in an effort at inclusion. The exhibition enjoyed over seven thousand visitors over three months¹, most of them children, and the response to HUG was positive enough to warrant further development of the concept (figure 1):

“I liked the ball thing that felt like it had a heartbeat. It was scary.”
“the stress ball wis awry T” (sic)
“I love cuddles”

¹ Figures provided by The Travelling Gallery. Quotes taken from visitor comments book, a copy of which was given to each artist at the end of the exhibition.
Towards a psychology of HUG - touch, sound and embodiment

It has been written that all infant behaviour is motivated by the need to maintain contact with the mother (Montagu 1978:134). When contact is denied, comforting self-referential behaviour comes into play through, for example, self-touching, self-rocking and self-clasping. Leah Heiss deliberately addressed this in her work *Inner*, as did the author, indirectly, in *Stille*, a neckpiece which explores the boundary between intimate space and public performance, attempting to capture that moment when we gather ourselves before a performative event (Heiss 2007). Stephen Barrass’ work, *Zizzi the Affectionate Couch*, has also generated suggestions that it be comforting for people with autism (2009). Cranny-Francis demonstrated that works such as these reflect an increasing interest in touch within the intersecting fields of new media arts, wearable technology and physical computing, just as the humanities are exploring the significance of the sense of touch (2009). Our experience of the world is not driven solely by our cognitive intentions, but by our involuntary and constant touching and being touched – by the air itself, by sound, by pressure – and yet, we often feel a sense of disconnect. Much of the work in physical computing addresses this feeling of alienation, employing the very technologies held to ransom over the human condition to reaffirm our embodied human subjectivity (2009). However, where art and sculpture often aim to generate whole body memory through kinaesthetic strategies, tactile interfaces on the body can often be restricted and tight, informed in some way by the lingering philosophical hierarchies of body and mind, of the point and click user models of personal desktop computing, and fail to exploit the “epidermic self-awareness” that being clothed can produce (Eco 1986). HUG aimed to take the basic techniques of wearable interfaces learnt at the wearables media lab *reSkin* (Heiss 2007), and stretch them to create a context for embodied experience. While not
on the body, HUG is definitely of the body, an extension of clothing’s shelter and an element of domestic dwelling (Orta 2003).

The sounds used in HUG’s responses also seem to be key to the powerful affective impact the work has. Two types of sound were used: a vibrotactile ‘heartbeat’ and a sound sample of a cat purring. Two heartbeats were embedded in the smaller HUG (about 20cm diameter), while the larger (about 60cm diameter), a heartbeat and two purring devices were installed behind soft textile switches. Both these sounds have obvious anthropomorphic qualities, suggesting that the textile ball is in some a way a warm ‘body’, and that sounds are experienced physically as well as aurally is no doubt an important factor in the work’s success. Montagu writes that sound is experienced through the skin, and cites bodily metaphors used to describe sound, such as “smooth”, “velvet” or “caressing” (1978:136). Trevarthen has also suggested that music is to be found in the very first exchanges between parent and child, when patterns of ‘coo’ sounds and silences may be exchanged with “a regular andante pulse”, and even exhibit the final lengthening that marks the end of a musical phrase (2006). The heartbeat in particular warrants further study because it is created through the use of a motor, and because the vibration is felt throughout the enfolding arm and the chest, as well as heard as sound.

![figure 2](embroidery for soft switches)

**HUG iterations**

The first HUGs were knitted, with raised patches embroidered with stitches such as satin stitch and French knot (figure 2), providing heavily textured areas as an affordance for touch (Kettley & Smyth 2007). A number of patches incorporated textile switches, which operated the hacked sound modules from a high street toy retailer (figure 3). The sounds were embedded deep within the HUG forms, and were connected with conductive threads. Each module required three 1.5v coin cell batteries, and the patches were removable to allow batteries to be replaced.

After three weeks, the knitted forms were suffering from continuous handling, described by the gallery’s invigilators as being “loved up”: the wool was felting and the larger ball did not
hold its form well enough. The second iteration used fabric to resolve some of these issues, and the smaller HUG in particular was far more successful, using a quality tweed (figure 3).

Since Access All Areas, a number of other ideas have been considered with colleagues at Nottingham Trent University (NTU), including the use of a stretch sensor to create the soft switches, or to replace them with a textile variable resistor, allowing the qualities of touch to determine output. Basic weaving techniques can form a coarse membrane to deliver analogue input², or decorative lacing techniques may be used as part of the structure (figure 4). These concepts have not been pursued beyond the sketch prototype stage however, because the carbonised rubber cord proved to be unreliable both mechanically and electronically, failing to return satisfactorily to original resistance values (Breedon et al 2008).

Potential ways forward for the larger form include treating it as a soft furnishing design problem, or exploring alternative forms to simplify pattern cutting and making-up. It may also

² The woven sensor shown was developed by Danielle Wilde as part of her visiting fellowship with the Technical Textiles Research Group at Nottingham Trent University. The carbonised black rubber cord is commercially available from Merlin Robotics, UK (2009).
be necessary to bring the sound modules closer to the surface, housing them within the sensor patches themselves to relieve strain on the connections. Further, it may be necessary to permanently stitch the patches down to the forms, meaning batteries cannot be replaced: the impact of this on affective experience with HUG has still to be tested – its apparent demise may be traumatic for some users, or it might merely place HUG back in the realm of the gadget.

**Work in progress - affective care**

In continuing our initial work at NTU we are focussing on developing HUG for affective care environments. Affective disorders include specific anxiety disorders such as agoraphobia, panic disorder and social phobia, obsessive-compulsive disorder and post-traumatic stress disorder (PTSD), as well as Seasonal Affective Disorder (SAD). We are currently bringing together the team that we hope will be able to formulate some of our questions within a mental health framework. These include the analysis of experience with HUG for types and degrees of touch that may be difficult for some individuals to attain elsewhere (Argyle 1996:217). Occasional comments in the exhibition feedback such as ‘scary’ or ‘weird’ suggest that our assumptions about the positive, reassuring nature of interactions with the balls need to be interrogated. Similarly, while literature arguing for the importance of the physical environment for healing is increasing (Hosking & Haggard 1999, Waller & Finn 2004), little seems to be available explicitly on the design of physical props for carers working with affective disorders. We hope to contribute to this area in the future through collaboration with Isabel Jones, a movement and care specialist. Jones’ practice with children on the autistic spectrum has led her to develop methods of engagement using props to “enter into” the subject’s sensory world, or to provide a non-threatening mutual focus for interaction. The account of her success with a hard-to-reach child through the use of a ball in particular has resonance for this work (2007).

**Conclusion and future work**

HUG is still at the early stages of development and formal and electronic development is being undertaken to ensure its robustness as something more than a concept design. While we are recruiting psychologists and engineers to the team, we continue to add to our list of questions for users: why does HUG feel ‘alive’?; does it like you, and does it have preferences?; why is it comforting; when might you use it to feel comforted?, and how is it shared? We look forward to sharing the findings of this research with you in due course.

**References**


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