



Fluid Speculations: Drawing Artefacts in Watercolour as Experimentation in Research Through Design

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ABSTRACT

This pictorial paper presents design experimentations using drawing, watercolour and storytelling as forms of speculation about artefacts and technologies. The use of watercolour, a medium that bleeds and has leaky boundaries, allowed ambiguity, defamiliarization and critical reflection to enter the research space, encouraging new understandings of artefacts and their latent possibilities. Watercolour was also valuable for speculating about designs that deal with bodily fluids, and for *Drawing Conversations* that facilitated reinterpretations of artefacts through drawings created by two different people.

Intersecting themes about cognition, creativity and technology, this pictorial presents examples that illustrate how watercolour drawing can impact on the representation of speculative concepts, including the creation of visual conversations. The drawings shown here are presented as representations embodying families of ideas and themes related to the objects they symbolize, together with the design spaces they suggest and the stories they invite us to imagine.

Authors Keywords

speculative drawing; watercolour; artefacts; experimental; ambiguity; defamiliarization; research through design

CSS Concepts

- Human-centered computing-Interaction Design

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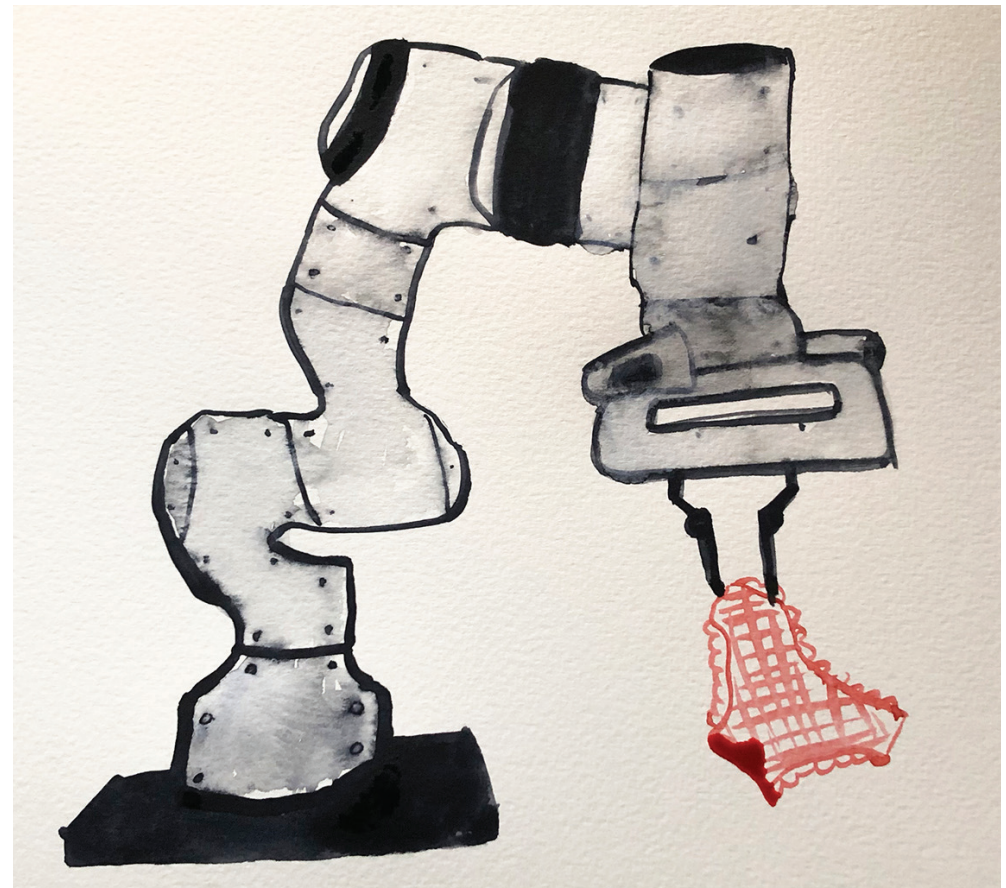
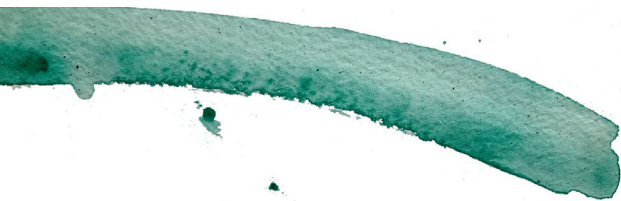


Image 1. watercolor drawing of a robot holding an intimate garment. ©P.Yurman

INTRODUCTION

In the last few years, we have seen a number of design and HCI researchers explore forms of ambiguity, speculative experimentation and open-ended outcomes, with propositions for art-inspired activities offering new examinations of design functions [2; 3; 10; 11; 15; 16; 45]. The contribution of this paper builds on such body of work, emphasizing drawing and an engagement with the materiality of drawing as forms of speculation in research through design [13; 14; 17; 33; 49; 54; 59]. The focus is directed towards watercolour drawings of artefacts, exploring the meanings and interpretations the drawings suggest and the experiences they evoke. Following the conference pictorials theme of *Ways of Seeing and Ways of Knowing, Ways of Saying and Ways of Showing*, this paper presents speculative forms of sense making, of seeing and showing designed objects in unfamiliar ways through the practice of drawing them with watercolour.

My pictorial describes the defamiliarization [4] that resulted from drawing artefacts with the particular media of watercolour and the reinterpretations that rose from merging seemingly unrelated objects and from creating visual conversations that evoked new stories, functionalities and experiences. While the relationship between watercolour and technology might appear challenging to some in the C&C and HCI communities, this pictorial invites the reader to openly consider ways in which both drawing and the medium used for drawing can help us reimagine objects in different configurations, a particularly important approach during the early exploratory phases of a speculative design investigation.



I organise this pictorial in themes that describe my experimentations, discoveries and reflections, to help the reader identify different aspects of the method that might be valuable as forms of speculative inquiry:

1. ENGAGING WITH AMBIGUITY: where I describe the particular value I found in drawing with watercolour, a material of characteristic fluidity that defies precision but invites ambiguity and narrative. Here I also illustrate how drawing artefacts in watercolour became a form of defamiliarization.
2. FREE ASSOCIATIONS AND MACHINE MUTATIONS: where I describe how drawing artefacts in kinship with other seemingly unrelated artefacts invited imaginaries and reinterpretations of their functionalities.
3. WATERCOLOUR AND BODILY FLUIDS: where I focus on how watercolour was particularly useful for speculating about artefacts and technologies that deal with bodily fluids.
4. DRAWING CONVERSATIONS: this is a further development of the method of watercolour drawing, in which I engaged with others in collaborative speculation and visual conversations.

John Berger wrote that *'a drawing of a tree shows, not a tree, but a tree being-looked-at'* [5], and the drawings presented here are intended to show how artefacts and technologies have been looked at through the process of watercolour drawing. Accompanying the themes mentioned above are the drawings, which are also presented as contributions in their own right. Their annotations provide background around the thoughts and themes that emerged while and after they were drawn, but readers/viewers are also invited to regard them with their own interpretations, since they are often ambiguous and open-ended, encouraging storytelling and critical thinking.

BACKGROUND

Interest in drawing as a form of knowledge production is an established body of work in the study of creativity and cognition and in the investigation of design processes. Drawing has been acknowledged as a practice that is creative, rational and communicative [33], and has been variously described as 'thinking in action, a form of sense making which only needs to make sense to the person drawing, an epistemological tool working in tension between the known and the unknown' [40]. It has also been recognized as 'another way of telling in which hand and head work together' [24]; or as 'a dialogue between the individual and the drawing' [42]. One of the most immediate activities practiced by artists, crafts people, engineers, designers and architects, it is also valued in scientific disciplines such as medicine [26] and mathematics [37].

Cognitive scientist Vinod Goel studied how designers use drawing in their work and suggests that their process often relies on the manipulation of drawings of an artefact rather than the artefact itself [18, p.128], particularly in the early stages of a project. This works well for testing ideas before committing to any particular direction, with sketches and CAD drawings giving form to tangibilities that can be pointed out, discussed, altered and retried and refined [8; 20]. Each type of drawn representation will invite a different type of content: a technical drawing created in CAD can prompt specific conversations about proportions, size, angles or radii, while a freehand sketch might invite more conceptual ideas to be discussed and explored. While accuracy in drawing has an important place in the design process (for example, when the design needs to be specified for prototyping or mass production, or when the amount of material used is critical to minimise waste or weight), what I present here is a method for encouraging freedom of associations and conceptualizations of what could be, that can be particularly relevant in the initial ideation stages of a speculative design project.

In the HCI community, some researchers have emphasized the value of drawing, in particular speculative drawing, for communicating insights and suggesting design spaces. Khovanskaya et al. [27] raise points about how drawing in speculative design can defamiliarize the ethnography and help bridge the gap between ethnographer and designer. Blythe et al. [7] explored how ambiguous annotated sketches and images, compiled through imaginary design books, can be useful for constructively exploring critical and experimental thinking, while Sturdee and Lindley [45] established recommendations and rationales for those interested in using sketching and drawing in their HCI research. In addition to interest in drawing, some researchers in HCI have highlighted methods for thinking and building creatively through engaging in conversation with materials [2; 3; 41; 49], where material speculation is used to generate possibilities and alternatives around designed artefacts. Through defamiliarizations that make the familiar seem strange [3; 4] in order to open new research spaces, such initiatives can reinterpret designed artefacts and their functionalities. In this pictorial paper, by drawing attention to both the materiality of watercolour and the process of drawing as vehicles for speculatively reinterpreting artefacts, I highlight a potential method for troubling current understandings of artefacts in HCI and for evoking the experiences and functionalities these reinterpretations may embody.

ENGAGING WITH AMBIGUITY

The unfinishedness that is characteristic of early conceptual sketches, which Goel associates with parts of the brain usually tuned to deal with uncertainty [18;19]; can invoke multiple interpretations in the space between what is drawn and what is left out [48]. Ambiguity, already recognised as a valuable source in design research [15; 16; 25; 29; 43], can be enhanced and enriched when watercolour is included in the process of drawing. A fluid and imprecise medium that bleeds as pigment and water move in unpredictable patterns on paper, watercolour can prompt accidental forms and ideas to merge and

mutate, leaving a space for uncertainty and chance to play a part. Precisely because of its characteristic unpredictability and inexactitude, it invited an abandonment of attempts towards accuracy, evoking instead narrative and multiple interpretations. Most of the drawings presented in this pictorial were created directly with brush and watercolour onto paper. Mistakes were experienced as shapes, at times accidental, that could not be erased but were in turn experienced as possibilities, as forms of planned coincidences that invited multiple iterations.

Defamiliarization, proposed by Bell et al. [4] as a research method for making familiar artefacts and technologies seem strange, was presented mostly as a literary style of writing. They point out that the act of portraying artefacts in unfamiliar ways can encourage critical reflections about the design of technologies and open new research spaces. While drawing has been described as another way of telling [24], drawing artefacts in watercolour can be a particular way of telling them that renders them strange yet familiar. The provocation that results from bringing together a material that feels incompatible with what it represents has been extensively used by surrealists, as in Meret Oppenheim's *Object*, a cup, saucer and teaspoon, made out of animal fur [58], bringing uncanniness to an everyday object. The retelling of artefacts, through representations with a material that is ambiguous and that subverts the machined precision they are meant to embody, produced such a defamiliarization. Machines and artefacts, traditionally drafted in clean, thin straight lines that reflect the rationales of manufacturing processes, became uncanny when hand painted with the hazy, diluted and evocative strokes of watercolour, a medium historically associated with art and illustrations of landscapes, botanicals and organic forms.

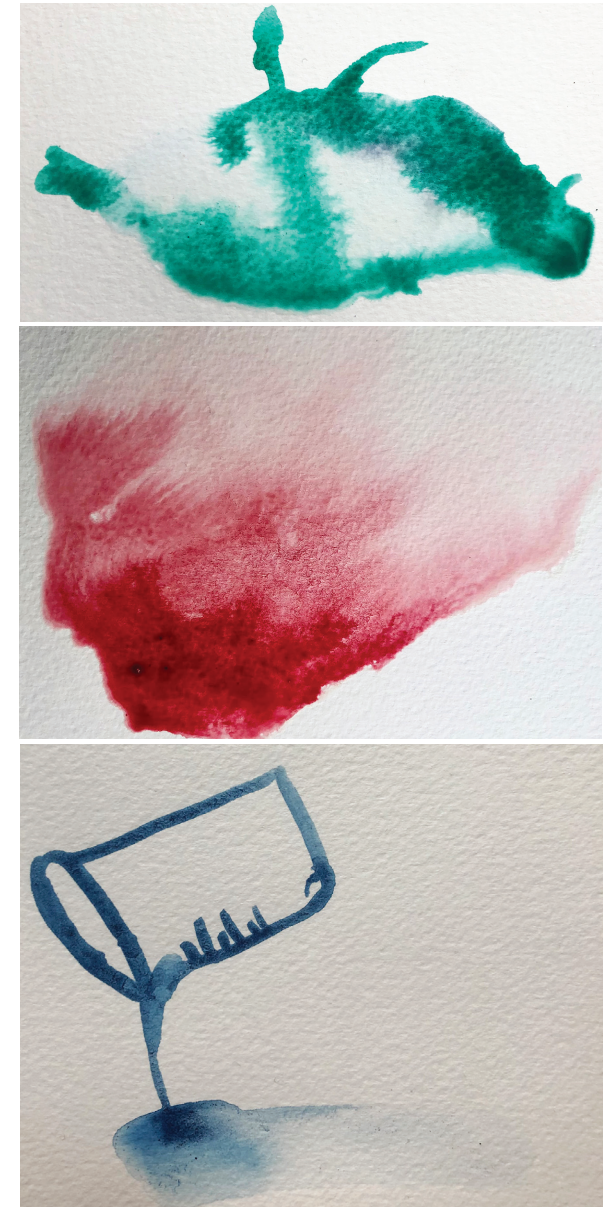


Image 2. Blots of watercolour on water. The fluid material can move in unpredictable ways, suggesting forms.

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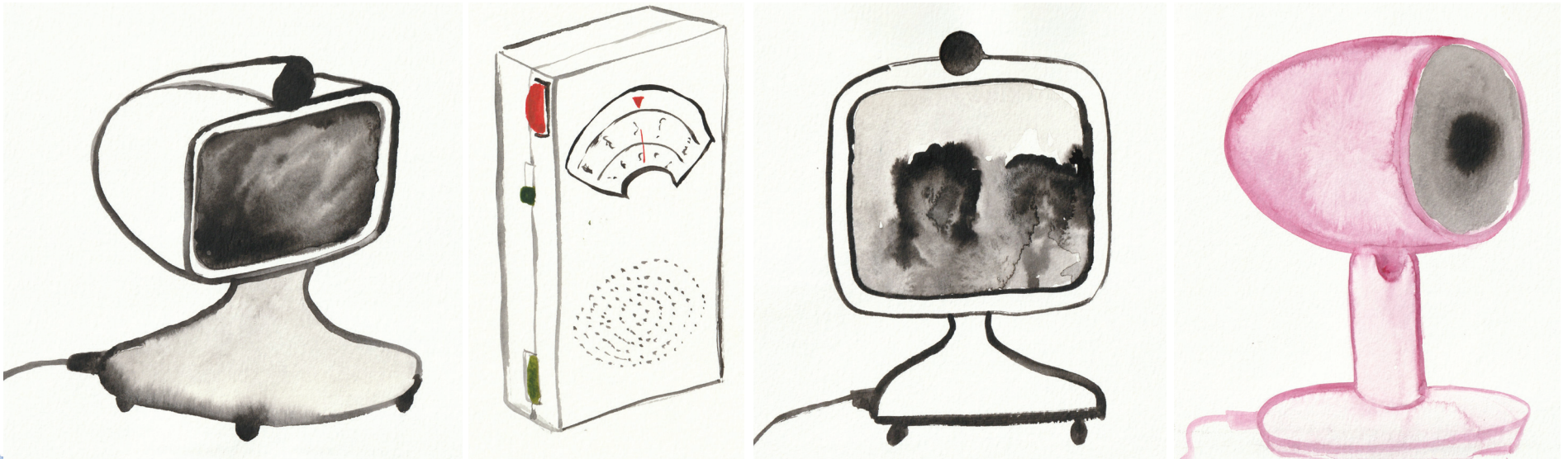


Image 3. various artefacts, drawn in watercolor. ©P.Yurman

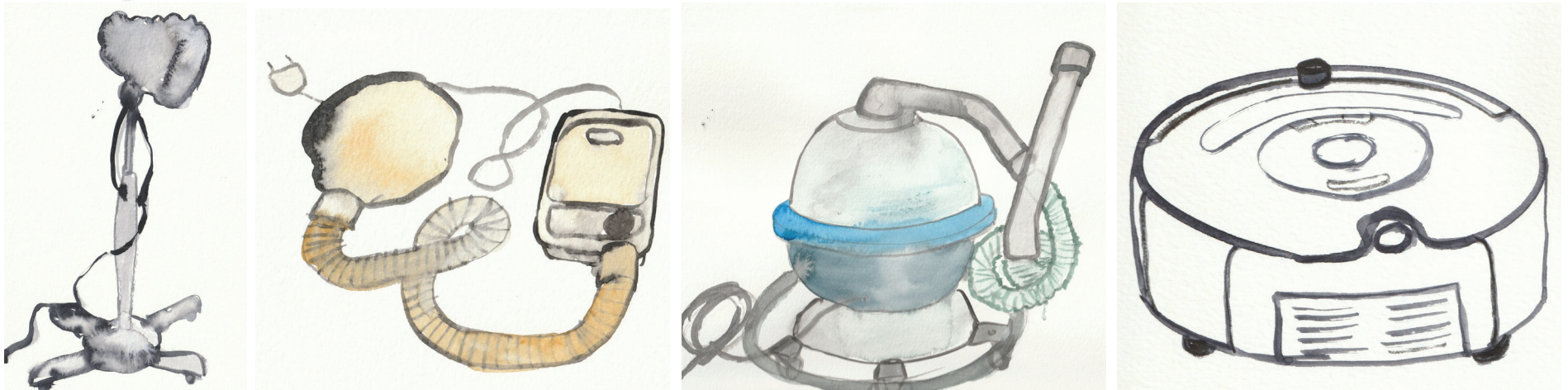


Image 4. Various artefacts, drawn in watercolour. The imprecise fluidity of watercolor encouraged an abandonment of attempts for accuracy in representation that instead invited thoughts about other related artefacts with similar features, forms, components or functionalities. The exercise of drawing an artefact such as a standing hairdryer brought references to other artefacts that I found similar or somehow related: the bonnet hairdryer, the vacuum cleaner and the roomba. ©P.Yurman

FREE ASSOCIATIONS AND MACHINE MUTATIONS

Defamiliarization also facilitated the drawing of connections between objects previously thought of as unrelated, opening a space for new associations to be insinuated. Understood as a form of sense making [40], drawing can also serve as a tool for better understanding an artefact and for speculating about its possibilities in relation to other artefacts. The exercise of drawing a camera (for example) enables first a consideration of its components and form, but later a template from which to change, diminish or exaggerate its features. Depicting it with or in contrast with other objects, related or otherwise, can work well to suggest new meanings and associations. This works in similar ways that games of free association, exquisite corpse and automatic writing, which have previously inspired design researchers [10; 16], can produce unforeseen combinations and functionalities. Drawing in watercolour a pair of objects and then pairing them into hybrid or interrelated artefacts was useful for inviting ideas and stories about their potential relationships. This was done by simply drawing two artefacts together on the same page, as if the drawings 'spoke' to each other [51] or by merging them into one artefact formed by two smaller ones. The fluidity that characterizes watercolour diluted the boundaries where one object ended and another started, facilitating their amalgamation and producing strange mutations. Creating a form of pictorial apophenia [31], such pairings invited speculations about possible kinships between artefacts. For example, the drawn combination of a projector with an artefact for personal care such as a weight scale, suggested themes such as privacy and the desire to share bodily information. In other cases, the act of drawing one artefact with a particular feature, functionality or form, evoked other similar artefacts that were then drawn and integrated into the process, as seen in image 4, where a standing hairdryer suggested a vacuum cleaner and then a Roomba.

Drawing provided opportunities for speculating in design, that watercolour enriched. The fluid and amalgamating quality of the medium enabled drawn objects to become merged or connected in ways that prompted a revision of their forms and functionalities, and of their social and cultural worlds. Sociologist Madeleine Akrich compares the life around artefacts to film scripts, where artefacts embody roles for users and for other objects to play and perform [1], and the transformations and free associations drawn with watercolour enabled a reinterpretation and revision of such scripted roles. The merging of a pushchair with a surveillance camera not only invited the speculation of potentially new uses for pushchairs or cameras, it also reconsidered the kind of roles that are written for them and the problematic discourses that emerge when certain technologies enter domains that are emotionally charged [52].

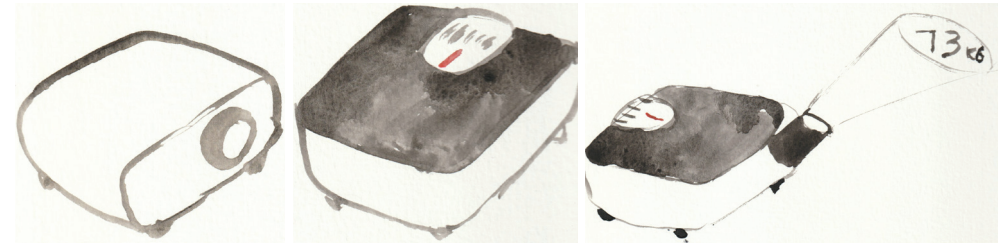


Image 5. projector and scale, merged into an artefact that would display a person's weight. ©P.Yurman

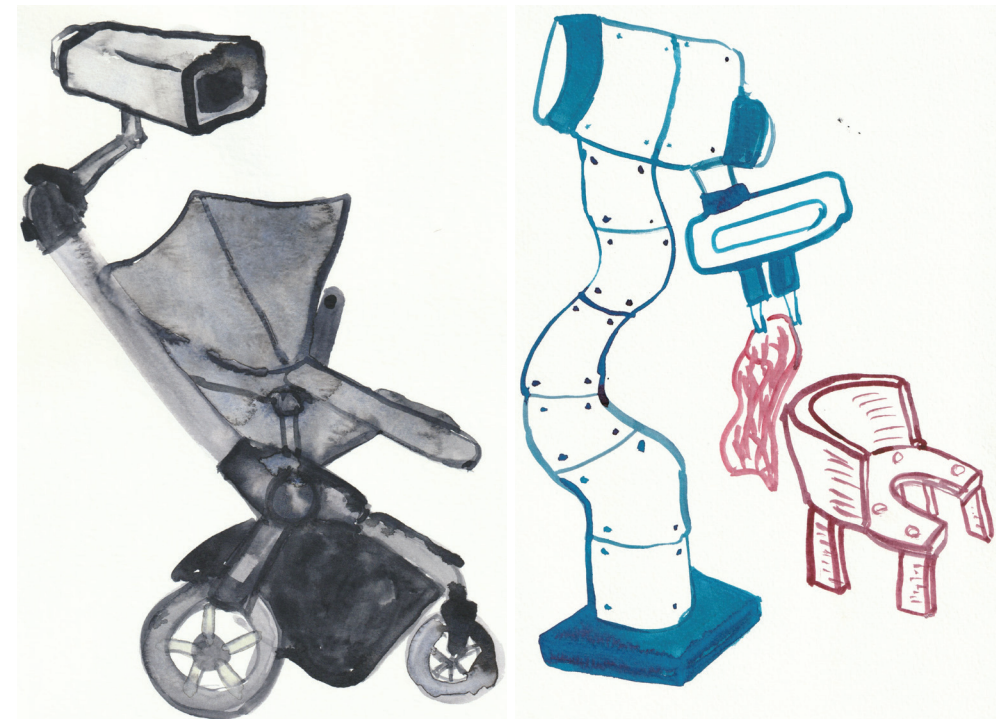


Image 6. A pram and surveillance camera; a robot and a 16th century birthing stool. Contrasting artefacts, either merged into a hybrid combination or drawn together on the same page can invite conversations about the problematic presence of technologies in certain domains such as childbirth and childcare, which are emotionally charged and socially constructed as belonging to the 'natural' or 'organic' [52]. ©P.Yurman



WATERCOLOUR AND BODILY FLUIDS

Some of my drawing experimentations focused on products for bodily fluids, such as bedwetting alarms, UTI tests, urinals, menstrual cups and breastfeeding pumps, artefacts that bridge the divide between what is inside and what is outside our bodies. In the case of the breast pump, a machine that has attracted much attention to feminist HCI research [12; 23; 50; 56], associating it with other artefacts evoked useful themes for speculating about potential new functionalities. A breast pump drawn integrated with a camera suggested questions about privacy, voyeurism and intimate surveillance [30]. Drawn as merged with a radio, with dials and buttons adapted to indicate milk flow, suggested ideas about community radio and ambience music to stimulate milk production.

The act of drawing artefacts that deal with bodily fluids with the messy fluidity of watercolour produced reflections about the leakiness of the body [44] and prompted questions about its boundaries. Examinations about whether fluids are part of the body once they are outside of it have been explored by Woytuk et al. [9] and by Søndergaard et al. [46] in their designs that address bodily knowledge and curiosity towards the menstruating body, and by other researchers who have engaged with fluids such as saliva [22; 39], urine [6; 21; 32] and sweat [28; 34; 36]. During my research explorations, engaging with the wet materiality of watercolour, as it bled and trickled on paper, facilitated a closer understanding of the items I was drawing and fed an inquiry process of thought and reflection. The material I used for representing fluidity became fluidity itself. It enabled me to play with representations of fluids, while speculating with actual bodily fluids - mine or otherwise - might have involved practical and/or ethical implications. It also prompted reflections about the complex nature of machines that capture, measure, monitor or extract bodily fluids, which can be quantifiable, and the associated intimate and subjective experiences that are more difficult to define with precision [53].



Image 7: Drawings of artefacts for bodily fluids. ©P.Yurman

DRAWING CONVERSATIONS

While drawing can be a solitary activity of sense making only needing to make sense to the person drawing [40], drawing with others can facilitate a form of visual dialogue [29] that can invite collaborative engagement with the unknown in the inquiry process, and offer greater opportunities for developing connections between previously unrelated ideas. *Drawing Conversations* is an exercise developed for speculating about artefacts through drawing in partnership with others. The exercise was partly inspired by the ‘*so I made this thing*’ correspondence between Devendorf and Andersen [11], exquisite corpse surrealist games and by ideational drawing exercises. As a trial, the first exercise was with industrial designer Jon Marshall [57], who regularly uses drawing in his work. Although he chose to use a pen (his regular drawing tool) the exercise served as a template that was later repeated when I invited design/HCI researchers Marie Louise Juul Søndergaard, James Pierce and Nadia Campo Woytuk to individually join me in a *Drawing Conversation* online during the lockdown period of 2020. My invitation did not ask about their particular drawing skills, although it later became evident that they had some degree of familiarity with drawing and with watercolour.

The instructions given were intentionally vague and open to interpretation and in some cases they were given verbally rather than in written form.

We each draw an artefact of our choice

We show each other our drawings

We both create evolutions that go from your drawing into my drawing, or from my drawing into yours. Ideally, one of these drawings is very strange

We make stories about what the newly drawn artefacts would do

Image 8: Instructions for Drawing Conversations. ©P.Yurman



Image 9: First Drawing Conversation, with designer Jon Marshall. We first drew an artefact of our choice, in this case a pair of shoes and a printer. What followed was a number of drawings that evolved from one artefact into the other. The result was a range of strange in-between drawings that invited new stories that we discussed: digital shoes that could print images of the places they walked over, or printers that might walk. The exercise also enabled an appreciation of differences in drawing approaches and used media.

©P.Yurman



Image 10: Drawing Conversations in watercolour with Marie Louise Juul Søndergaard. Evolutions from a weighing scale into a tap and sink. Image credits P.Yurman and M.L.J. Søndergaard.



Image 11: Drawing Conversations with Marie Louise Juul Søndergaard. Evolutions from a vacuum cleaner into a syringe. Image credits P.Yurman and M.L.J. Søndergaard.

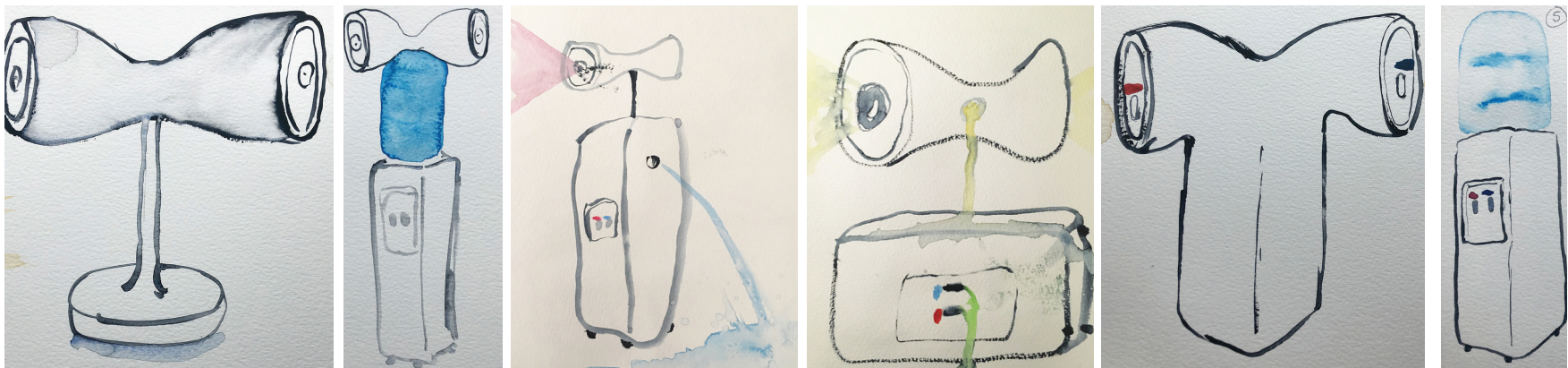


Image 12: Drawing Conversations with James Pierce. Evolutions from a water dispenser into a surveillance camera. The diluted quality of watercolour was useful for illustrating the invisible scopes of surveillance cameras. Image credits P.Yurman and J. Pierce

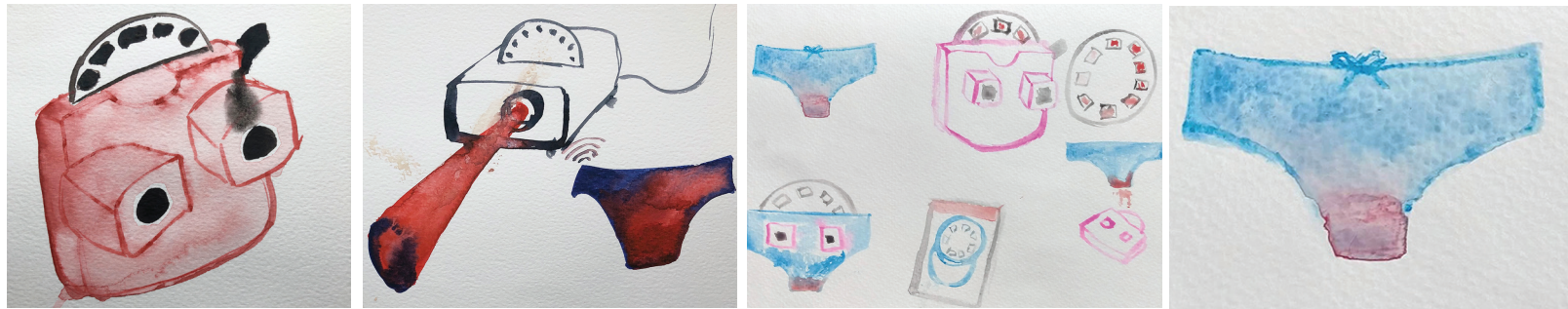


Image 13: Drawing conversation with Nadia Campo Woytuk. Evolution from a viewmaster into an intimate garment suggested ideas about potential designs for encouraging bodily curiosity [9, 46]. Image credits P.Yurman and N.C. Woytuk



Image 14: Drawing conversation with Nadia Campo Woytuk. Evolutions from plant seedling, toilet and menstrual cup suggested ideas about the toilet as a lab and about menstrual blood as fertiliser. Image credits P.Yurman and N.C. Woytuk

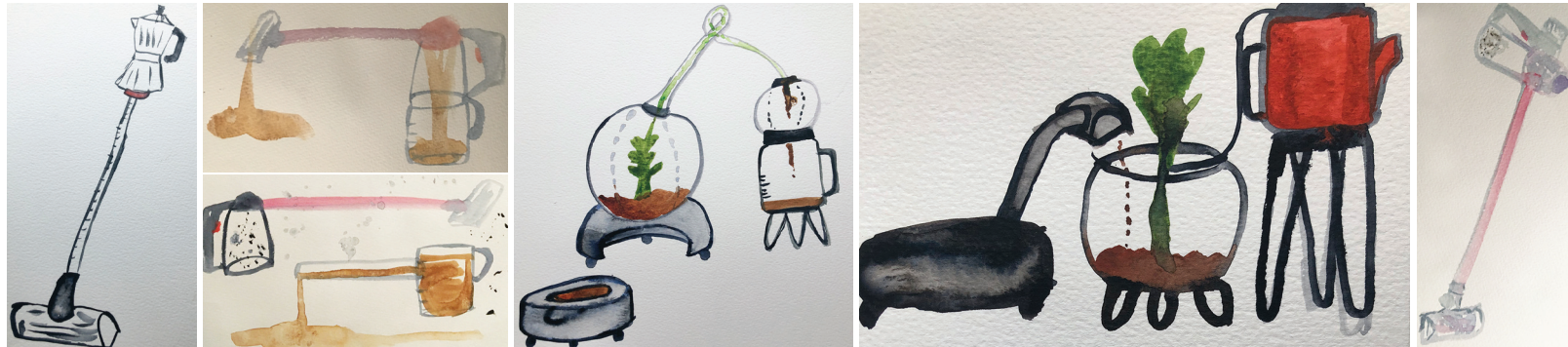


Image 15: Drawing conversation with James Pierce. In some cases the drawings invited us to draw other related artefacts. In this case the original drawings were a coffee maker and a vacuum cleaner, which later included a roomba, coffee grounds and a plant. These prompted us to speculate about using coffee grounds and dirt collected by the roomba to feed plants. Image credits P.Yurman and J. Pierce

Drawing Conversations facilitated reinterpretations of artefacts through the merging of drawings created by two different people, inviting joint speculations that crossed our various research interests. For example, the drawings created by the merging of James' drawing of a surveillance camera, a topic he has researched [38] and my drawing of a water dispenser, facilitated reflections about ways in which the invisible scopes of cameras could be illustrated as liquid flow. The crossing between my drawing of a viewmaster and Nadia's drawing of an intimate garment invited thoughts about ways in which bodily fluids such as menstrual blood or cervical discharge could be observed through artefacts that encourage bodily curiosity, which Nadia has researched [9]. The drawings Marie Louise and I created, first resulting from the merging of a weight scale with a tap and sink and later of a vacuum cleaner with a syringe, brought ideas about ways in which fluids could be measured and about possible interrelations between domestic artefacts and technologies for bodily experiences that might result in the troubling and expanding of their current design understandings. These are topics Marie Louise and I have both explored: she through speculative design of intimate technologies [46; 47], and myself through the work that I present in this pictorial as well as in previous speculative design work [52].

Through *Drawing Conversations*, we discussed the functionalities suggested through our drawings and the potential artefacts these could be developed into. We shared a moment of play that mutually fed each other's speculations: what each drawing partner drew became jointly interrelated and formed the same unfinished conversation. The activity enabled us to appreciate our differences in thinking through drawing, but also to share the strangeness we encountered in the mergings of our drawings, relying on an openness to experimentation and ambiguity. It must be acknowledged that being able to playfully draw ideas that at times felt silly required an element of trust, to be comfortable with each other while collaboratively not knowing, and watercolour's messy and wet mutability facilitated that shared experience. Our conversations and silences as we drew together became as fluid as the drawings themselves and offered us the possibility to connect and collaborate at a time of isolation caused by the global pandemic.

DISCUSSION AND NEXT STEPS

Drawing gained a particular significance during the lockdown of 2020, when many designers, researchers, design educators and students had to work from home, with limited access to workshops and making facilities. Drawing in watercolour enabled a process of creative imagination and speculation that was both graphic and materially engaging, and that could be easily done from home. While this pictorial paper only shows some of the speculative watercolour drawings of this ongoing research, it is primarily an account of my explorations with drawing and with the materiality of drawing as forms of speculation, when used for troubling understandings of artefacts and for suggesting reinterpretations of the functionalities and experiences they stand for.

Following these watercolour drawing speculations, the incorporation of petri dishes, Ph test strips, conductive paint, bedwetting alarms and sensors that activate as paint drips

and moves on the paper is one next step of exploration. Although at very early stages, such experiments can bridge the gap between two and three dimensional explorations around artefacts that can open space for new inquiries, that I hope will inspire those interested in experimental design and research approaches.

Drawing Conversations is an ongoing initiative that I continue to use as a method for engaging in speculative conversations with other scholars and practitioners, who may or may not use drawing in their work, but who might be interested to collaboratively explore ideas in non-verbal forms. I have engaged in *Drawing Conversations* with other design and HCI researchers as well as with scholars from engineering, quantum physics, medicine and mathematics. It has become a valuable method for creating bridges with others during the pandemic and for learning about each other's work. The resulting drawings are mutations that truly reflect where our minds and disciplines met.

More speculative watercolour drawings can be found at

www.instagram.com/fluid_speculations

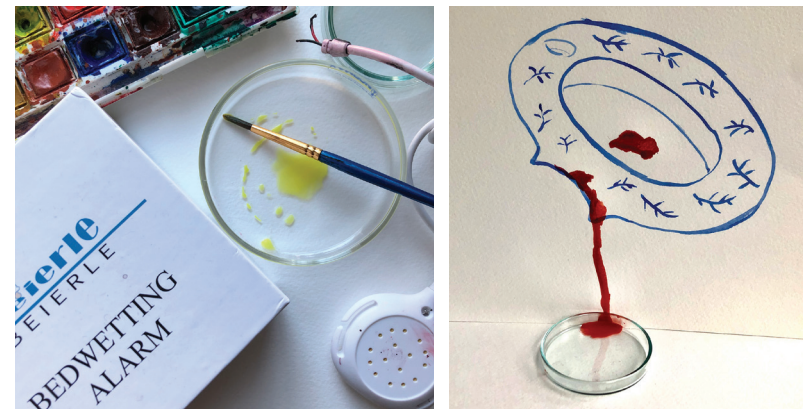


Image 16: Next steps: experiments with watercolour, sensors, petri dishes and conductive paint.

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