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Becoming-design in corresponding: re/theorising the co- in codesigning

Wolff-Michael Roth^a, David Socha^b and Josh Tenenbergs^c

^aFaculty of Education, University of Victoria, Victoria, Canada; ^bSchool of STEM, University of Washington Bothell, Bothell, WA, USA; ^cInstitute of Technology, University of Washington, Tacoma, WA, USA

ABSTRACT

Codesigning tends to be identified with collaborative endeavours to produce designs. In this study, grounded in an *anthropology of making*, we propose a radically different use of the 'co-' that emphasises the continued becoming and mutual shaping of people-and-materials-becoming-design. An extended case study of a design critique presentation from a graduate course in industrial design is used to exemplify this different perspective. It expands upon the common use of the understanding of codesigning by bringing to the fore not only the back-and-forth movement of people and evolving designs in correspondence with each other but also the transverse movement, which is the intertwining streams of perduring life. Codesign is thus understood as a process of designer, materials and designed objects coming into correspondence while corresponding (conversing) with each other, and all designing is understood as codesigning. The approach decentres common agent-centred notions of designing to focus on the continued becoming-design that shapes designers and their materials alike.

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1. Introduction

Far from being aloof, imposing his designs on a world that is ready and waiting to receive them, the most he [the designer] can do is to intervene in worldly processes that are already going on, and which give rise to the forms of the living world that we see all around us . . . adding his own impetus to the forces and energies in play. (Ingold 2013, 21)

The classical and predominant approach to designing conceives of designing as a process of giving material shape – in words, drawings, concept artefacts or prototypes – to ideas that pre-existed that process (Ingold 2011). The design, in this approach, exists prior to its material articulation; and it does so in the mind of the designer, who can be designated as the originator of the idea. More recently, design theorists have focused on a decentred notion of design where codesigning, involving the coordination of two or more designers, leads to the emergence of designs from interactions that none of the individual contributing

CONTACT Wolff-Michael Roth  mroth@uvic.ca

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agents had in mind before (e.g. Alexiou 2010). The notion of emergence has been used to conceive of the origins of designs as being outside of the designer(s), who perceive in the world inspirations for solutions to problems (e.g. Halskov and Daalsgard 2007). The roles of the human agent and her agency underlie existing conceptions of designing (e.g. Sing, Dong, and Gero 2012); these descriptions of designing constitute the process as the transitive relation between the human agent(s) and the objects of their activity: a movement from the mind of the designer into the objects designed.

There exists, however, a very different approach to thinking about design, which has arisen in anthropological projects concerned with how artefacts take form, the *becoming-design* of things (Ingold 2011, 2013). This perspective is radically different because the direction of the movement of continuous becoming is transverse (orthogonal) to the transitive relation underlying the conceptions of both (co-) making and receiving: it is intransitive. The adjectives 'transitive' and 'intransitive' derive from grammar, where a transitive verb describes the action of the subject upon or resulting in the object (e.g. 'S designs O'); an intransitive verb does not have an object as complement (e.g. 'S breathes'). As the introductory quotation points out, designing is an intervention in the world that is going on and perdures, part of the ongoing stream of life of both the designers and their materials. This leads to the fact that the design, though in the hands of the designer(s), never is completely in their hands, as it is caught up in and is part of a world that is never ceasing to become. In our take on codesigning, the emphasis is on the *corresponding with* that leads to an observable *corresponding to*, both of which relate designed artefacts and designing human being. The purpose of this study is to articulate this different approach. To facilitate communicating this new way of theorising, we begin with empirical materials presented in a case study. We then sketch the theoretical approach before ending with a general discussion.

2. Empirical and analytic background

The empirical materials analysed below derive from a data-set of videotaped design critiques that includes (a) undergraduate and graduate students taking courses in industrial design and (b) professional designers representing the industries in which such designs would be developed commercially (Adams and Siddiqui 2013). The data-set includes (rough) transcriptions of all design critiques. Drawing on the practices of scholarly communities interested in the work that produce social relations, the transcriptions were enhanced to include video offprints, information about gestures, timing, emphases, speech rate, overlaps, prosody and so on (Jefferson 2004). Whereas the professional designers were physically present in the undergraduate class, they were in a remote location with respect to the graduate students where they saw the students' computer displays and talked with them via telephone.

For the analyses, we chose materials from design critique sessions rather than (individual) design sessions, because in the former any relevant issue tends to be *articulated* for the purpose of communicating design. On the other hand, video recordings of individuals working on tasks tend to reveal little; and data collected using think-aloud protocols may interfere with the task (Jordan 1998). A modified think-aloud protocol where pairs solve a task, which forces participants to communicate, has been used as alternative in the cognitive sciences (e.g. Roth and Mavin 2015). Consistent with our theoretical framework of theorising the life of a design as a line (Ingold 2015), the design critique sessions, which are constitutive parts in the life of a design, are taken to be suitable analytic objects.

In our analyses, we follow philosophy (e.g. Wittgenstein 1997), sociology (Vološinov 1930) and psychology of language (Vygotskij 1934) that do not treat words or ideas as if these were the properties of individuals. In the design critique presentations, the words do not belong to the speaking student designer: they are produced for (being received by) the clients. The designer could not just produce any kind of sequence of words, speaking in tongues; whatever she can say is already prefigured by the intelligibility on the part of the recipients. The words in her mouth have come to her from the other and, in speaking, return to the other (Bakhtin 1986). These words are prefigured by the needs of the recipients, who receive them while the speaker is speaking. Sound-words belong to speaker and recipient or they are not words at all (Vygotskij 1934). Similarly with ideas: the articulation of ideas presupposes their intelligibility on the part of the recipient, and they therefore always and already constitute possibilities that precede any intended design.

3. Becoming-breezer: an exemplifying case study

In this study, we theorise codesign as a process of designer, materials and designed objects coming into *correspondence* while *corresponding* (conversing) with each other. A design – material thing and idea – is a living phenomenon and therefore becoming (changing) can also be studied when design is communicated, for the communicating is part of the becoming. Following dialectical logic (Il'enkov 1977), the theory is made apparent in the analyses and further developed in a subsequent section. In the following, we exemplify how in communicating design, design ideas become concrete and the distinctions between designer and design are not useful. When communicating a design, the designer is becoming (again) together with the becoming of the design. In the performance of the design critique, the design also is becoming for and with the recipients (audience). Here, we draw on fragments from a two-minute presentation of the 'Breezer' design (shown in Figure 1) by

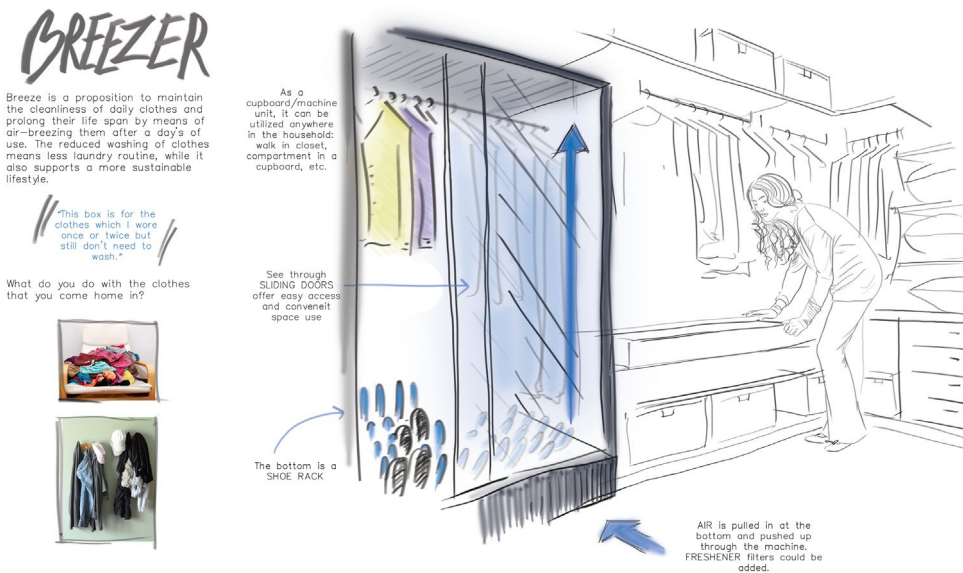


Figure 1. Design board for the 'Breezer'.

the graduate student ‘M’ to professional designers, including ‘P’. (For the full transcript, see the supplementary materials.) The becoming-design shown here is of particular relevance theoretically because the recipients of the presentation could not see the graduate student designer, who nevertheless moved her body as if it were visible to ‘P’ and his colleague. The presentation, therefore, shares similarity with communication by congenitally blind people using gestures in talking to each other (Iverson and Goldin-Meadow 1998).

3.1. Deictic gesture as manifestation of person-environment relation

Our first piece of evidence of the inseparability of designer and design exists in the use of deictic (pointing) gestures of a kind that have been termed symbiotic gestures to mark that two unlike elements are interdependent (Goodwin 2003). With the deictic (pointing) gesture, the designer actually reaches out and makes explicit the relation that exists between person and the environment, which we characterise as the irreducible person-acting-in-environment unit. (Transcription conventions are provided in the Appendix; ‘A>’ marks parts of the transcription discussed in the text.)

Fragment 1

- A> 01 M: sSo: (0.13) it’s [kindof to replace the:(i) the:]
 [((pointing gesture))]
 (0.35) current >mechanismss=that< (0.35) we=em
 (0.31) that we m’understood from the (0.21) from
 our research that >people kind of< (0.31) either
 (0.50) put=our (0.25) put the clozs that they wear on
 a daily ba– (0.65) >on a daily base< b’t don’t yet
want to=wash: (0.51)
- 02 P: Ri[ght].



In A > M’s finger has come to rest on, and thereby point to, a part of the design board that features clothes on a chair and hanging on a door (lower left, Figure 1), while M is saying ‘it’s kind of to replace the, the’, after which the statement continues to articulate ‘current mechanisms’ of putting clothes that are not yet to be washed.

To comprehend *what* is being said here requires a unit of analysis that goes beyond the speaker and takes into account the relationship between design board and the speaker. M points to the images even before verbally describing the problem that the design was to address. This puts at a disadvantage the designers on the other end of the telephone line who did not see M. Here, we are concerned with the origin of the pointing. Some readers might want to argue that the student is pointing because what she is thinking about can be found in the place where she is pointing. But, the photographs can equally be seen as motivating the pointing; pointing arises only following the perception of the photographs that are then the target of the pointing. In a way, the photographs ‘attract’ the finger; in the same way, the student designer (and, equivalently each recipient) ‘sees’ the photographs because these *give themselves* to be seen. Instead of the commonly used dualistic approach to analysis, we take the co-dependence of the photos and the pointing/thought as two manifestations of the same unit: where the communication constitutes an instant of the becoming of the problem that the ultimate design addresses; more generally, this exemplifies becoming-design. There is an intertwining of the world and person, each becoming-other: world-becomes-human when it reveals known and named things, and humans-become-world, as their movements follow the contours and shapes of the world.

Note that the deictic gesture to the photograph precedes the verbal articulation. That mutual shaping of (part of the) design and designer has preceded the verbal account thereof, which includes the findings of the designer's research that people put their clothes in particular places when these are not yet ready to be laundered (e.g. as shown in the photos, on a chair and the door). This situation is the nucleus, the seed of the idea in communication that manifests itself in different ways; it is what in a different context has been called the *growth point* that develops into a full articulation in the course of the communication (McNeill 2002). The design, as it is articulated, is in the process of becoming; and the designer herself is becoming in this process. At this point, the completely specified design – as an ensemble of design board together with description, rationales and explanation – does not yet exist. There is a movement of becoming-design that is transverse to the movement of orientating towards the design board, the eye movements scanning the image and text, any interpretive actions and the movement from thinking to speaking. That the movement of becoming-design is more than simply a verbal articulation is exemplified by the becoming-design occurring *despite* all the malapropisms, stumbles, repetitions or other features of actually occurring speech that researchers tend to remove from transcriptions. The speech and gestures are inseparable manifestations of the becoming-design.

3.2. Body-becomes-thing, thing-becomes-body: iconic gestures

The analogical relations between person and thing are made visible by iconic gestures that become *like* something else that they bring into focus (Goodwin 2003). This can be seen in Fragment 2, which follows Fragment 1, where the 'compartment idea' (B>) is introduced as a way of facilitating what to do with clothes worn but not yet ready to be laundered. There is then a *formulation* that what is to come next is an elaboration or reframing of what was meant (by the 'compartment idea'). What was meant to have been said begins with the temporal marker 'at the moment', and then there are several markers of hesitation accompanied by a pointing gesture to the breezer drawing (C>). In the unit of the person and her lifeworld, the compartment idea is present, and the relation between person and idea in its externalised form is manifested to be perceived. That pausing and use of interjection makes time and prepares for the words to come, those words that are to articulate what the 'compartment idea' was meant to have expressed. Both the 'I mean' and the 'at the moment' are spoken more rapidly than the normal speech with the sounds of the words flowing into each other creating one long flowing sound rather than distinct words – as if the content was parenthetical, to be gotten over with quickly.

Fragment 2

B> 03 So: (0.15) t'kindo (0.85) hh=he(0.12)lp
 facilitate fr=tha:t u::mm (0.60) there's=a::
 (0.30) a=c a=co=compartment=u:: idea
 >i=mean< >at=the=moment=t's<
 C> [kindof =u:m (0.30) u::h (0.30) °like a°]
 [(points to compartment)]
 D> [>c]lo↑set function↓<] so it
 [((gesture; left photo))]
 can=act'ally (0.26) >exist=
 E> [either=in=the< (0.37)] in the
 [((gesture; right photo))]
 ↑hallway↓ °or=in=a in=a°
 walk-in=closet o:r (0.44) >so it
 can be located any<whe:re



The hands then open up so that their palms face each other, in an iconic gesture as if holding a box or entity such as the drawn compartment (D>). The speaking continues in stating that 'it', the compartment, can exist 'in the hallway or in a walk-in closet'. Beginning considerably before the verbal articulation of the hallway, the left hand moves to the shoulder, in fact bringing the body closer to the hand (E>), as if the speaker was walking into the hallway or closet. That closet form gesture is repeated again later in the presentation (see supplementary materials, turn 08). Although the recipient here cannot see the actual gesture, the research showing that blind people gesticulate when communicating with other blind people (Iverson and Goldin-Meadows 1998) suggests that gesturing is integral to articulation. The latter functions not just as communication for others, but it constitutes the becoming reality of thought (Vygotskij 1934; Merleau-Ponty 1945).

In this fragment, we observe a movement whereby what is being pointed at, the breezer-as-compartment, is present in the form of an iconic hand gesture (D>). That hand gesture, however, is more than the articulation of some idea in the mind of the speaker that some of the classical research on gesturing suggests (e.g. Hadar and Butterworth 1997). Instead, the hand position and the image of the breezer-as-compartment are mutually constitutive. The hands first follow the breezer as drawn on the design board (C>). Next, the hand configuration is the configuration of the breezer-as-compartment (D>). And then the hand configuration points back to the breezer drawing (E>). Each aspect, the drawing and the hand configuration, is taking on aspects of the other, pointing to the other. Thus, the iconic gesture hand configuration is significant because it literally points to the closet function of the breezer, and the breezer drawing is significant because it motivates the hand configuration. In that unfolding (material) communication, becoming-design is a movement in a direction that is transverse to the direction of the alignment between drawing and person. The idea is coming to exist for the audience, who has never encountered this design before, via the process of communication. The idea is unfolding together with the speaking and gesturing. And that gesturing, and the associated words that often lag behind, are themselves following the design board and what has been said and gestured before.

Now that the closet function has been articulated, the possibility offers itself to address the location (E>). In the drawing on the design board, the unit is incorporated in a walk-in closet. Before this walk-in closet is verbally articulated, and immediately following the possibility of its existence, we observe a movement of the left hand from the closet function position to the shoulder, the palm having turned from facing its complement in the other hand to pointing backward. It brings the body of the speaker closer to the hand that up to this instant was making present the breezer unit. The audience cannot see the hand movement, but it exists for the speaker, who, literally, approaches the object in the way she would if she were walking into the hallway or closet where the unit is located. In this way, the designed artifact now exists not as a thing in itself, but as an object in actual, everyday use in the settings that the potential user would inhabit. The designer is herself inhabiting the virtual space of the future use, as she walks into that space, bringing the breezer closer to her to be used for hanging the clothes that had been worn. That future use is not fully determined, because, as the presenter stated later (see supplementary materials, I>), 'if it was developed further it could transform more into like a rack'. We see that design comes to life when the object is set into relation with the person moving about the spaces where it is to be located, not as an isolated object of the mind but something that comes into being in its communication.

3.3. *Becoming-wind, being entwined: body movements*

To feel the wind and breathe the air is rather to ride on the wave of the world's ongoing formation – to be forever present at the 'continued birth', as Merleau-Ponty called it, of both persons and things. (Ingold 2007, 532)

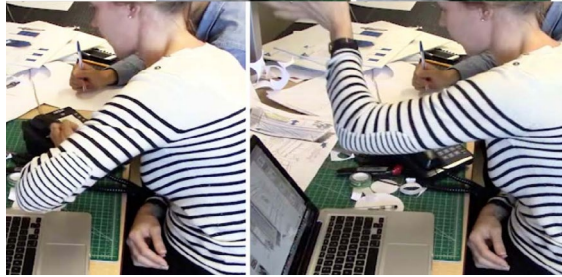
In this section, we show how the body manifests shapes that have shaped and are shaping the body. In Fragment 3 and Fragment 4, we observe this aspect in the movement of air implied in the breezer design. The breezer is not simply a static drawing on paper, an abstract form. The breezer idea is continuously becoming, being born in its articulation, taking shape in the shaping of the designer's body.

Fragment 3

03 >so it can be located any<whe:re
(0.75) but th'function i:s (0.13) u:h
effectively (0.25) that=it (0.16)
F> [pulls (0.20) air=in]
[((left-right gesture))]
(0.36) an:d (0.22)



G> [slides=it=through the::]
[((down-up gesture))]
(0.11) u::h um (0.52)
>through the closet>
(0.12) an:d out* (0.12)
u:h=>at=the=top< (0.37)
(repeats through and
out at top)



M's verbal description (E>) has just articulated the placement of the breezer unit when her presentation turns to the breezer function. The index finger of the left hand already points to an arrow in the drawing, associated with a text stating 'air is pulled in at the bottom and pushed up through the machine'. As the words 'pulls air in' unfurl from M's mouth, M's finger, hand and arm move in the direction prefigured by the arrow and toward the bottom of the drawing, which looks like the grill in the front of a car (F>). There is pausing and a drawn-out 'and', followed by the descriptive verb 'slide through' (G>) that the 'it' (the breezer) does to the air previously pulled in. Simultaneously, the hand moves from the table surface up to a position above the eyes. There is pausing again and more drawn-out interjections ('uh', 'um') before the 'through' is repeated followed by 'the closet' on the inside of which that 'sliding through' occurs before making it (the air) 'out at the top'.

In this fragment, the hand is moving like the air will move, first being pulled toward the grill in the lower part of the drawing. The movement is parallel to the design board drawing lying on the table and, therefore, also parallel to the table and the ground. The next movement is up and away from the table, as it would if the breezer compartment were actually placed on the table, rather than along the breezer drawing and the long arrow drawn inside the breezer (Figure 1). The movement here is different from that which has been described as occurring in the presence of inscriptions (drawings, photographs, graphs) in which gestures tend to follow the inscription in a plane above it, independent of the inscription,

or extend the inscription into a virtual space spanning before and behind the surface on which it appears (Roth and Lawless 2002). Such an inscriptional anchoring of gesture has been described in the back-and-forth movement of an architect's hand above the image of a sliding door on a drawing, and in the hand moving as a truck might move above a gate that is drawn on the plan parallel to the hand motion (Murphy 2005). In this fragment, instead, the hand-arm movement erects the design from the drawing as its base (G>), and is repeated a second time as if to emphasise the movement of air in, through, and out.

The arrow on the paper is an instruction for the movement, and the hand follows it in moving such that after the fact we may be able to say that the hand has done what the arrow projected. But that movement is not along the paper, only coincidentally in its initial part. Instead, the relationship between the arrow on the paper, as an instruction for movement, and the moving hand is of the same type as the relationship between the drawings for mounting (e.g. IKEA) furniture and what the person mounting actually does with and through her body. In these relations between the hand movements and the arrows, we find again a mutually constitutive nature. The hand moves in a way that *follows* the arrow, and this movement makes the arrow salient. After the fact, the arrow also is an account of how the hand has moved. The relationship is even closer with the arrow that appears on the monitor of the laptop, which, with the laptop display's nearly vertical orientation, does indeed make the arrow point in the direction of the actual hand movement. The result is a relative movement of hand and surrounding air coming into correspondence with each other.

We see two movements that are co-articulated in the design: breathing and breezing. The hand/air movement, as seen here, is one of breathing because the unit, like a lung, pulls air in, slides it through the closet (lungs, body) and out. In the way that the human body has a lung, the unit has 'a Dyson-like fan mechanism' (see supplementary materials) responsible for air movement. That Dyson-like fan mechanism comes to life at a later point in the presentation featured in Fragment 4. After the offer of a query of whether the recipients are familiar with the mechanism remains without acceptance, the fan comes to exist in the movement of the right hand, which, with fingers positioned as if of the ring of a Dyson (bladeless) fan, rotates five times at the wrist around an axis defined by the forearm (turn 10, J>).

Fragment 4

J> 10 [>That the< fā:] [ns that are
[((gesture))] [((4 times
quite (.) >sseamless=n=thin?<]
the same gesture))]
11 (0.49)
12 So it can als- (0.14)



The movement gives shape to the components of a Dyson fan, which blows air from a ring put in movement by the hidden blades in the base of the device. In this case, the hand is following the shapes and movements of a device not actually present but constituting a conceivable part of the breezer unit. In the fan, there is the part responsible for a breeze.

Fragment 5 shows how the clothes come to be exposed to the fan's breeze. The air moving in, through and out on top of the unit leads to the clothes not merely being subject to a flow of air but indeed 'getting a *strong* air flow', which allows the clothes to 'breeze out' (H>). M's left hand moves along the upper body and sweater, as if these were exposed to the movement of the air flowing 'through and out at the top'. As the transcription of turn

03 shows, the same hand arm movement repeats itself three times (H>). That gesture is repeated later following the statement about the air power of the Dyson-like mechanism and without accompanying verbal description (see supplementary materials in turn 14, K>). Exposed to the breeze, the clothes (here the sweater) breathe out (any signs of having been worn): The breezer, in breathing, generates a breeze, allowing the clothes to breathe as they are immersed in the breeze. These complex relations are indeed available to those who see the speaker, and to the speaker herself. In the same movement, breezing and breathing are made present simultaneously, and the traditional distinction between cause (here, breeze) and effect (here, breathe) has disappeared.

Fragment 5

03 s:o=tha:t thë'cloz would=get (0.38) a
 H> [strong air flow:] (0.15) a:nd=uh help
 [((gesture))]
 [them kinda]
 [((gesture))]
 [breeze out.] (0.39) And the
 [((gesture))]
 bottom=would (0.19) would be: a rack
 for shoes (0.13) u:h whilst >the



In Fragment 5, the different parts of the functionality and function of the breezer come to life in the body. The hands move along the sweater suspended over the shoulders and upper body as if on a clothes hanger. As this body is breathing, so is the sweater bathed in the breeze doubly made present in the hand/arm movement and, less saliently, in the airflow that the body movement creates. If there is an essence of the breezer, then it lives here in the multiple movements of hand/arms, air and in the breathing of the sweater symbolised by the movements of the heaving chest. But that idea vanishes as soon as the movements stop, leaving but an ephemeral trace in memory; however, it may come to life again 'if [the breezer] was to be developed further so that it could transform more into a rack that has a Dyson-like fan mechanism'.

Designs would be dead if they existed in the metaphysical world of pure ideas. In part, (design) ideas begin their life when they take on body (in talk or drawing) in a germ form (Vygotskij 1934) or, as shown here, in gestures and body movements. Living means moving air, both into and out of our bodies and against our bodies, experienced as wind, draught or breeze (Ingold 2015). Breathing the air and feeling the wind are part of everyday human experience in the world even for toddlers without words to think as adults do. The experienced is captured in the poets words: 'My respiration and inspiration...the beating of my heart...the passing of blood and air through my lungs,/.../ The sound of the belched words of my voice...words loosed to the eddies of the wind' (Whitman 1855, 13). Breath and wind may be made present for communicative purpose, through actual breathing or hand and body movements, and, in this way, manifest the ongoing formation of persons (designer) and things (breezer). It is not, as Ingold (2011) points out, that the wind and moving air are embodied; instead, we are encouraged to think of the body as *enwinded*. That enwinded body may, when the occasion presents itself, come to give itself to making present a wind (a breeze).

4. Corresponding or an intransitive conception of designing

In the preceding section, we provide an analysis of a design presentation during a design critique session. The aspects of designing made apparent allow us to re/theorise the ‘co’ in codesigning, such that it transcends existing (transitive, agential) notions of designing by adding intransitive features. This alternative is *corresponding*, which has transitive and intransitive aspects. (in words derived from Latin, the letter ‘r’, or ‘m’ or ‘n’, is doubled up if the root verb following the ‘co’ starts with ‘r’, or ‘m’ or ‘n’ – e.g. correlation, communication and connotation.)

In *Making: Anthropology, Archaeology, Art and Architecture*, Ingold (2013) is concerned with the emergence of form (i.e. design) in a variety of fields. He frames designing as one mode in which making expresses itself, and concludes that designing, as an aspect or modality of making, tends to be thought of in terms of ideas or conceptions of a designer that are externalised onto design boards, 3D models and prototypes (Figure 2(a)). In the classic view, the designer is the active agent, who presses, shapes, sculpts, scrapes or draws otherwise passive materials according to the designer’s preconceived forms in the same way that the voice for Aristotle gives material shape to the state of the soul (Derrida 1972). In this view, materials are inert until, and only when, a human agent, the designer, puts them into motion. Under this view, M above makes manifest her (pre-existing) breezer design on her concept board. By contrast, Ingold asserts that designing and making are processes in life that continue to go on nevertheless: life, the ‘worldly processes that are already going on’, continues despite the designers’ or makers’ specific orientation on producing something. In their very orientation towards producing things, human beings are becoming; they are living a form of life, which, though coinciding with production, must not confused with it (Marx and Engels 1978). Designers get better at sketching, not because they intentionally orient towards getting better at it but while intentionally designing things. This aspect, changing and being changed while intentionally orienting towards something else, is transverse to the transitive relation between mind and design; however, it is not part of traditional conceptions of designing (therefore drawn in dotted lines in Figure 2(a)).

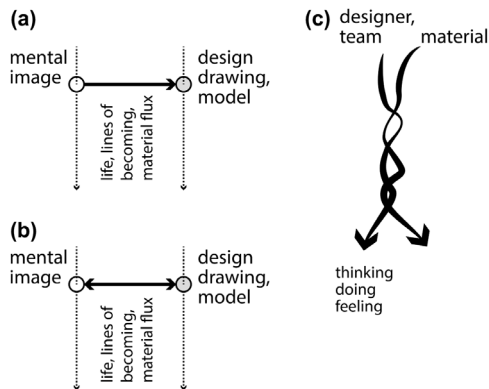


Figure 2. Three ways of conceiving design as a modality of making. (a) Designing as the externalization of already conceived ideas (non-theorized aspects are dotted). (b) Design as conversation between design object and designer (non-theorized aspects are dotted). (c) Designing as becoming of lines of flight that correspond.

Design as conversation has a precedent in the literature on the design process as reflection-in-action (Schön 1987). Here, the designer finds out what impact some move has on the overall design, and she might resist or give into the consequences that she perceives: there is a back-and-forth, bidirectional movement (Figure 2(b)). In this conception of design, the agent monitors the effects of her actions in the world, and then acts again, in a ‘cognitive loop’ of thinking, acting and perceiving (Clark 2008). Schön forgets that life does not stop for the designer to finish cogitating (Roth et al. 2001); his view remains transitive because there is an agent-centred back-and-forth movement, as in ideas of evolution where organism and environment mutually shape each other. Schön’s reflection-in-action is still the designer drawing inspiration from the environment and then articulating the design in an act resembling exhalation. However, the intransitive dimension of life going on is missing from this conception of design.

A different approach to designing as a modality of making things takes the flux of matter and life as its point of departure. In the common approach, movement (flux) is thought of as the difference between some beginning and some end in space and in time. Movement thereby is reduced to states and the differences therein; as a consequence, movement itself is lost in the theory. In the dialectical approach, the minimum unit for theorising movement is a unit of movement (Il’ënkov 1977), which inherently lies between the points that movement connects. The movement of becoming, therefore, ‘is always in the middle...is neither one nor two, nor the relation of the two, but is the in-between...running perpendicular to both’ (Deleuze and Guattari 1980, 360). The line of (continued) becoming allows us to make present, in our theorising, design as a modality of the never-ending flux of life. When a number of such lines of becoming come together in a particular way to make a bundle, a new form is created – like a thread formed when fibres of wool are spun. After the creative process has ended, life undoes the form, as it discolours, is worn or breaks returning the pieces to a more indistinct material flux. There is only continued becoming, ‘materials-becoming-things’ (Ingold 2011, 179) in designing and things-becoming-materials in the undoing/unmaking of form that follows once the things made are released into the world (Ingold 2013).

A ‘line of becoming’ is transverse to intentional engagement, for any material persists despite how the designer uses it in the design, much like the potter’s clay persists despite her shaping it into a vase. The vase will exist while withering in time or until the shards of its broken remains return to the ground. This perspective is well-suited to describe producers generally and designers specifically, because along the lines of becoming, ‘lives are lived, skills developed, observations made and understandings grown’ (Ingold 2011, 12). Designing, conceived as a modality of growing, has both transitive and intransitive aspects: lines of becoming are corresponding *with* each other and, in this, come to correspond *to* each other.

In designing, the ‘lines of becoming’ of particular segmentations of the material flux – designers, their world (desk, computers and tools), and materials – come to *correspond* (Figure 2(c)). The *co-* in this verb encapsulates the *re/theorising* proposed here. ‘To correspond’ transcends the transitive relation between designed artifact and designer, here in the form of design as conversation, by emphasising the continuing flux of life that leads to the correspondence between designers and design. Each is becoming (a bit) like the other as the ‘thinking body...actively builds (constructs) the shape (trajectory) of its own movement in space in conformity with the shape (configuration and position) *of the other body*’

(Il'enkov 1977, 46). This leads to a coordination of the shape of the body's own movement 'with the shape of the other body, *whatever it is*' (46). Thus, in following where the materials take her, the designer's doing and thinking are shaped; and in the shaping of materials, the realised designs shape the world. Thus, as producers generally and designers specifically are '[g]rowing into the world, the world grows in them' (Ingold 2011, 6). They become the design so that the development of the designer is one of *becoming-design*. This unfolding *becoming-design* can be reduced neither to the human designer nor to the thing-designed. Becoming-design highlights the correspondence of designers and the designs-made. This mutual implication can be observed, for example, when the woodworker's movements increasingly *follow* the wood in its overall shape and its grain rather than going against and across the grain; over a lifetime, the woodworker's movements increasingly correspond *with* and *to* the wood-become-things. M draws the line on her inscription that later structures her hand movement while describing this design to her critics. The hand that does not follow but works against the material never will produce a masterpiece.

Some readers may find it difficult to overcome thinking about designing in terms of a producer's externalisation of a finished idea that is interpreted differently by consumers (e.g. Crilly et al. 2008a; Crilly, Maier, and John Clarkson 2008b). The present study goes beyond the metaphysics of the 'meaning of design' and 'designer intents' apparent in those approaches. Rather than focusing on fixed artefacts that only differ in 'meaning' to producers and consumers, this study focuses on the continued becoming of designs, which, because of this, never are identical with themselves. There exists indeed a precedence of thinking about ideas (thoughts) as developing in the very process of communication. Communication, as suggested by social psychologists (e.g. Vygotskij 1934) and philosophers alike (e.g. Merleau-Ponty 1945), is not, as often theorized, the externalisation of thought; instead, thought is *becoming* itself in communication – and this is so even when a person is asked repeatedly to retell a particular story (e.g. McNeill 2002). We may therefore say that design *becomes* (itself) while it is communicated. As those lecturing the same courses year after year have experienced, the way they lecture the 'same content' changes, and so does their understanding. We suspect that the same happens to the graduate student while she presents 'the Breezer' and that the design is changing as a consequence.

In paraphrasing Vygotskij (1934) on the relation between thinking and speaking, we might say that when a design drawing or artefact is identified with the design idea, then the question about their relation can no longer be posed because they are the same, one existing in the head the other outside. This makes the problem of the relation unsolvable, because the design drawing or artefact is now an inherent part of the design. If thinking and articulating design are theorised as processes external to each other, the articulating simply realising what the thinking has already accomplished, then not only does the relation become mechanical (an *interaction* of independent entities) but also the living life has been expurgated from the continuously becoming unit of which thinking and articulating design are but manifestations. The mind is not a storehouse of design ideas; instead, design ideas live in their continued re/making. In the mind, design ideas become in the unfolding back-and-forth between thinking and communicating; and that back-and-forth itself changes in the course of becoming. Thinking design only becomes itself in the expressive movement where the design takes shape in material form. In that back and forth between communicating design and thinking, each contributing to the modification of the other, there is a transverse movement of becoming: thinking design *becomes* while it tends towards

articulating design. But as thinking design becomes so does the speaker; and each act of communicating design, even of a design idea already articulated before, is a creative act again as long as the design idea is alive and living (therefore inherently changing). We may consider designing as another modality of communicating, in which case the work of Vygotskij and Merleau-Ponty directly apply.

5. Discussion

In this study, we describe an alternative to theorising codesign: not as an activity in which multiple human beings – multiple designers, or designers and users as in participatory design (Ehn and Kyng 2003) – come together to cooperatively design. Instead, we take all designing to be social because of its inherent intelligibility. If it is not already intelligible (the designer's equivalent to speaking in tongues), then it is not designing. In our approach, the *co-* of codesigning refers to the process of *corresponding*. There is an exchange between designers and users, on the one side, and materials-becoming-things, on the other side. And there is a correspondence: becoming-human of materials-become-things, and becoming-thing of humans-using-materials. As exemplified in the materials presented here, the design is becoming (again) in and through the student designer. The act of presenting changes the presenter – as the continuing becoming of understanding even in seasoned lecturers shows, captured in Lucius Annæus Seneca's expression 'Homines dum docent discunt' [humans learn while teaching]. And the design idea persists on its way of continued becoming along a sheaf of lines of becoming. The coming together of these lines of becoming gives the designed object its form.

From the fact that the recipients of the presentation were absent, we can conclude that gestures and body movements are more than simple signals for others. We observe gestures and body movements also among the practicing designers, recipients of the design presentations in the undergraduate design critiques (Socha et al. 2016). If simple externalisation of a finished product were all that there is to designing and communicating design, then the body movements are unnecessary. Designers could just present everything in talk and inscriptions. But when they use gestures related to designing, these often have their origin in movements that have contributed to the design: these are work-related movements (*gestes ergotiques*, Cadoz 1994) that have taken on symbolic dimensions.

In this study, we theorise the 'co' in codesigning in terms of the verb to *correspond with* and *to*. That resulting correspondence is signalled in the drawing of corresponding lines of becoming (Figure 2(c)), which bears resemblance with the drawing of an 'active line on a walk, moving freely, a walk for its own sake without goal... accompanied by complementary forms' (Klee [1925] 2014, 6). That active line may curl up upon itself thereby 'circumscribing itself' (7) and it may be imaginary with only secondary lines remaining visible. That view of designing includes the traditional view of codesigning, implying the becoming-other of the participants who work towards a common goal, as already described by Ehn and Kyng (2003) in the late 1980s. Klee's lines as lines of becoming are useful for thinking about codesigning generally and about the relation between humans and materials more specifically (Roth and Maheux 2015): these lines come into relation, correspond *with* and *to* each other, only to separate in their continuation each marked by traces from the encounter.

The position articulated here works against the notion of designing that goes on in the head of individual designers working alone or in cooperation with others and their

customers, and against the notion of agency and the emphasis on human ingenuity. Both aspects are present of course, but designing, in the presented view, goes beyond these in that it recognises the material world as process, and designing as a way of ‘meddling’ therein rather than controlling it, or, as Ingold points out in the introductory quotation, ‘adding his own impetus to the forces and energies in play’. In the proposed approach, all designing then is understood as codesigning. Our theoretical perspective incorporates the future of the designed object, whose line of becoming its form might disaggregate into the lines of becoming of matter. Readers may recognise here the similarity with the age-old wisdom embodied in the biblical statement, ‘from dust you are and to dust you will return’. Some of the designs, conglomerates of lines of becoming in the material flux, last longer, losing their form only slowly (e.g. Egyptian pyramids), whereas others quickly return into the material flux in the paper shredders and recycle facilities where most of design attempts (of students and professional designers alike) tend to end up. The human designers, too, change, some continuing to work in ways that a particular design process has shaped, whereas others may come to design in ways that contradict their earlier work (e.g. ‘youthful thinking’), though this too is a form of corresponding.

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Appendix

Transcription conventions follow standards developed in the conversation analytic literature (e.g. Jefferson 2004).

(0.5)	Pauses, in tenth of seconds	((gesture))	Double brackets: comments and observations
Kind of	Underline: emphasis	AND	Capitals: louder than normal speech
=	Equal sign: latching between utterances	°or in a way°	Degree signs: enclose quieter than normal speech
[kind of]	Square brackets in consecutive lines:	>faster<	Encompassing more, less signs: faster than normal
[[(points)]]	overlapping features	<slower>	Encompassing less, more signs: slower than normal
↑↓	Up and down arrow: audible jump in pitch range	out*	Asterisk: hardening of the sound, here 't'
:	Colon: lengthening of sound, about 0.1 s per colon	–	Dash: sudden stop
,?;	Punctuation: indication of pitch movement towards end slightly rising, strongly rising, slightly falling, strongly falling		
ï, ë	Dots: very short vowel		