Inaugural lecture
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The subtle body
Tristano: “E il corpo è l'uomo; perché (lasciando tutto il resto) la magnanimità, il coraggio, le passioni, la potenza di fare, la potenza di godere, tutto ciò che fa nobile e viva la vita, dipende dal vigore del corpo, e senza quello non ha luogo. (…) Ma tra noi già da lunghissimo tempo l’educazione non si degna di pensare al corpo, cosa troppo bassa e abietta: pensa allo spirito: e appunto volendo coltivare lo spirito, rovina il corpo: senza avvedersi che rovinando questo, rovina a vicenda anche lo spirito”.

(G. Leopardi, Dialogo di Tristano e di un amico, 1832)

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Tristano: “And the body is the man; because (apart from all else) high-mindedness, courage, the passions, capacity for action and enjoyment, and all that ennobles and vivifies life, depend on the vigour of the body, without which they cannot exist. (…) But with us, it is very long since education deigned to think of such a base and abject thing as the body. The mind is its sole care. Yet, in its endeavours to cultivate the mind, it destroys the body without perceiving that the former is also necessarily destroyed”.

(G. Leopardi, Dialogue between Tristano and a Friend, 1832), Translated by Charles Edwardes
A few years ago I started practicing Ashtanga Vinyasa Yoga, an ancient discipline involving a deep bodily experience based on the performance of complex and articulated poses, called asanas. The practice combines breathing, postures and gaze with the aim of achieving self-awareness through perception of the body in the world. Through the body and physical activity, yoga aims to unify mind, body. Awareness emerges through asanas and physical movements, directed both to the internal kinesthetic sense and to perception of the external world. The entire discipline is articulated in stages, which have their foundation in a bodily way of knowing and experiencing the self and others, but also extend beyond physical practice. For example, the Yamas and Niyamas stages refer to a set of ethical and moral values that are individually and socially directed. Each asana is a way of exploring our being in the world, and the body actively makes sense of the affordances of the context through poses, balance and flow in movement.

Why am I talking about the practice of yoga? The reason is that yoga emphasizes the centrality of the body as our way of being in and knowing the world. It intertwines the physical, the reflective, the social, the aesthetic and the ethical, which I believe is a challenging prospect also for future technologies. Indeed, the spread of ubiquitous, mobile and wearable technologies has made disciplines like philosophy, anthropology, dance, somatics and performance relevant in design. Most off-the-shelf digital technologies are inherently tangible, gestural and social. They imply close proximity with the human body. However, current interfaces often impose close contact between the body and technology by viewing the body as an executor of actions (Djadjadiningrat, 2007). This underuses our embodied skills and impoverishes our embodiment in the world. For example, touch-based interfaces make it possible for us to manipulate data directly, for example by sliding icons over screens. However, this kind of interaction involves our senses only slightly, and does not permit us to perceive the inherent properties of the objects moved (Marti, 2010).
Theories like Embodied Interaction and related fields such as Tangible Interaction are adopted by a large group of designers and HCI practitioners to analyse interaction with the physical world. Embodied interaction refers to the way our perception of physical and social phenomena develops in interplay with the world around us (Dourish, 2001). Tangible interaction emphasizes the design of the interaction beyond visual interface components, focusing on materiality, physical embodiment of data, bodily interaction and embeddedness in real spaces and contexts, as distinctive features (Hornecker, Buur, 2006).

However, even if some of these theories explicitly refer to phenomenology, often the potential and the subtleties of phenomenology are not fully put into effect in the design of embodied interactions with technological systems and products. Fallman (2011), among others, claims that Human-Computer Interaction needs a philosophy of technology, and recommends adopting phenomenology to inspire the design of future technologies.

In my lecture I will show how phenomenology and, in particular, Merleau-Ponty’s phenomenology can provide insight for designing embodied interactions with technology. I will develop the relationship between philosophy and technology using the practice of yoga to exemplify the argument. The reason for doing this is that yoga is close connected to phenomenology: we actively perceive and make sense of the affordances of the environment in relation to our body (Gibson, 1979). Therefore, the world is inherently meaningful for our body and we can gain access to that meaning by moving and assuming postures. There is no distinction between mind and body. In the practice of yoga, the body is, in Merleau-Ponty’s words (Merleau-Ponty, 1962), a “lived body”. It is the body as experienced by the practitioner. This self-awareness arises during the practice in interaction with the body, the physical environment and in the presence of other practitioners. Phenomenology, and Merleau-Ponty’s phenomenology in particular, with its emphasis on the body as our primary tool for perception and knowledge of the world, can shed light on today’s ubiquitous digital technologies and inspire new designs. That’s why my yoga class has become a reflective practice and a serendipitous discovery of my design research.
I will take you on a journey through the subtleties of the body and embodiment, which are fundamental for designing and engineering future systems and technology. As a practitioner of yoga, I’ll use this discipline to reflect on phenomenology and its implications for design. The reason for such an apparently unusual combination is that in order to design embodied interactions, it is fundamental to have a direct experience of embodiment and corporeality. As Hummels et al. (2007) state “if one truly likes to design for movement-based interaction, one has to be an expert in movement, not just theoretically, by imagination or on paper, but by doing and experiencing while designing” [p.677].

The purpose of my research is therefore not to come to a new understanding of yoga, which I hope to gain during my practice, but to explore the extent to which the body and movements are engaged in the practice of yoga. I’m also interested in bodily reflection on and contemplation of the practice, where there is deliberate use of body to direct attention inwards in a continuous dialogue and rapport with the external world.

A similar approach was taken by Larssen et al. (2007), who analysed pilates, yoga and the Brazilian Capoeira martial art to study the experience of learning in these disciplines. By analysing the movements peculiar to each discipline, they collected data that support the prominence of experience and awareness of the body as a means of knowing. They defined the notion of experiential bodily knowing with the aim of obtaining inspiration to design movement-enabled interaction with artefacts and spaces.

Other authors have analysed movement-enabled interactions in different disciplines including HCI, philosophy, cognitive science, dance, somatics. Klooster and Overbeeke (2005) derived knowledge from the field of dance, particularly from choreography, improvisation and movement analysis. From their investigation, they developed “Choreography of Interaction”, a framework for designing embodied interaction with products based on physical involvement, dynamic quality of movement and expressed meaning in interaction. Tecla Schiphorst (2011) took a phenomenological approach in designing a wearable
artistic installation called Whisper. The system allowed users to experience the shift from their everyday awareness oriented toward an outward direction, to an awareness oriented toward their own body-state, which tends towards an inward direction. Kirsh (2011) analysed movements in dance and choreography, finding that choreographers spend much of their time thinking non-propositionally. They use their bodies as a cognitive medium, developing a close coupling with them. The body is therefore used as a medium to think with. This is a cognitive approach to the analysis of body movement that privileges the observers’ view of bodies as objects and the observers’ interpretations of bodily action (Loke and Robertson, 2011). The phenomenological approach sees individual bodies as active initiators and interpreters of their own experiences.

There is also increasing interest in exploring the congruence between yoga and phenomenology in philosophical literature. Some researchers have pointed out that phenomenology can be used as a method of studying yoga, since it addresses the immediacy of experience in a similar way to yoga (Morley, 2001, Morley 2008; Sarukkai, 2002; Smith, 2007). On the other hand, yoga may offer phenomenology a somatic method for articulating the corporeal experience.

Let’s look more deeply into the practice of yoga, in order to highlight elements that may be of use later as insight for designing embodied interactions with technological products and systems. In yoga, the practitioner takes on a posture and stays still for a substantial amount of time, if compared to our spontaneous and natural instincts. For example, in the Plough Pose, the practitioner lies on the floor, lifting her legs above her head until her feet touch the floor. In this position, breathing is constricted. This can cause some people to feel a bit claustrophobic or anxious. The Plough Pose mirrors how we handle various mental and physical restrictions and helps to reveal perceived limitations and push boundaries. Just as in real life, the plough is used to clear a field so that the earth can be cultivated and its bounty reaped; through this pose the practitioner metaphorically plants the seeds that will become new growth.

Holding the limbs in this position, the practitioner becomes aware of, and, most importantly, masters her own movements and breath, which no longer depend on the unconscious, but on the voluntary nervous system. This asana, like all asanas, is therefore not a form to be copied, but rather a means of achieving awareness on different levels. The asana offers a chance to plumb muscles and joints, to discover a new relationship with the environment (in balance poses in particular), to appreciate the interplay between conscious and non-conscious movements,
to perceive the aesthetics of a pose in which different parts of the body contribute to a harmonious whole, to experience the values that motivate a specific position (e.g. metaphorical regeneration of soil in the Plough Pose), and to feel emotionally engaged (i.e. from apprehension to pleasure in challenging positions).
The title of my lecture, “The Subtle Body”, is loosely and freely inspired by the phrase “subtle body” as it is used in yoga, meaning a sophisticated, manifold and not obvious body. It is a skilled body that can act on different planes – emotional, perceptual, physical, mental, and value-related. Many other notions of subtle body do exist, as in Taoism or Buddhism, which focus on more spiritual or obscurely symbolic interpretations. This is not the focus of my research.

The body can be conceptualised in countless ways. As my interest lies in designing embodied interactions and determining how the body and movement can be engaged in such interactions, I will elaborate on Merleau-Ponty’s concept of the lived body, which has inspired many designers, as noted by Svanæs (2013) among others.

“The lived body manifests itself mainly as its possibilities of acting in the world. We have a world insofar as we have the capacity to act in that world. The lived body (or phenomenal body), is an active body” (Svanæs, 2013) [p.11].

Merleau-Ponty uses different examples to explain the concept. When a tailor uses scissors to cut cloth, she does not need to look at her hands or guide muscles and nerves to grasp them in the correct way. The potential for action evoked by the perception of the scissors, which are familiar objects, links her to them. What moves and acts in the world is not her physical body but her phenomenal, lived body.

Phenomena that we experience are therefore affected by the body. As our body changes, our sense of the world and of ourselves shifts accordingly. For example, when a woman wears a new pair of high-heeled shoes, she does not need to calculate the height of the stairs to climb without tripping. The height necessary to climb is established in comparison with other familiar objects present in the situation. Like them, the heels are perceived in terms of their potential to demand a certain amount of space necessary to climb the stairs.
Our non-conscious knowledge of the body in space at any given time and in any situation is complemented by a tacit knowledge of the body related to its physical structure (the length of the legs, in the example above). This knowledge is called body schema, and it enables us to walk and climb the stairs in a skilful manner. If we wear high-heeled shoes, our body schema changes to include them as part of our lived body. Even the space around us is experienced as a bodily space. Different bodies perceive the space in different ways, depending on their skilful use of it. A physically impaired person perceives space according to her potential ability to act and move in that space. The same applies to a woman wearing high heels. We therefore change our perception of the world as we acquire new skills and use new tools. The same goes for new technologies. By using them, our body transforms itself as well as our perception of the world.

Phenomenological analysis can also be applied to use of tangible, mobile technologies. Svanæs (2013) examines the experience of reading and turning/scrolling pages on paper and on a digital medium. “If we take the perspective of Merleau-Ponty seriously, we should consider both reading and page turning/scrolling part of an integrated perceptual process. The trained hand turning the pages or dragging the scrollbar is as integrated into the reader’s perceptual process as the eyeballs scanning the text. Hands and eyes are constituent, equally necessary parts of embodied perception” [p.17]. An implication of this statement for design is that the digital reading experience should not be supported by separate controls on a Graphical User Interface (GUI), but by tools tightly coupled to our perceptual apparatus. In this sense, the scrollbar and the “Next” buttons on the left and right sides of the screen are extensions of our senses, while if the same buttons are positioned at the bottom of the screen, de facto separating reading from turning, the entire experience is made less efficient and pleasurable, as shown by O’Hara and Sellen (1997).

Like most off-the-shelf digital technologies, the e-reading technology presented above is decontextualized. The example above highlights the continuity between the Next buttons and our perception of reading, but it does not allow us to reflect on the phenomenological insight of seeing each individual user and each situation of use as a unique context and frame of reference. The following example addresses this point.

Marti et al. (2013) developed a dynamic and context-dependent GUI to be used by older persons at home to control an assistive robot. It was developed following a phenomenological approach that pivots upon the uniqueness of older people’s
skills by providing continuous and expressive opportunities for interaction and meaning to emerge (Stienstra, Marti, 2012). A key point of the design is the uniqueness of the relationship between the user’s lived experience and the environment. This relationship is personal and dynamic. It is affected by the meaning that objects assume for the person making sense of them. This meaning changes as perception changes.

A central idea in the GUI is the concept of action-possibility, that is, the potential for the robot to act in the world and execute tasks for the person. The GUI is dynamic since the potential for action changes according to the interplay between specific configurations of the environment, the person's potential needs and desires, and the likelihood of an action being executed. The action-possibilities are displayed on the GUI as simple icons and are organised by relevance (Figure 1).

![The GUI with action-possibilities.](image)

The size of the icon indicates the action-possibility that is most likely to be performed. For instance, if the person has not had a drink for a few hours, the action-possibility “Bring me water” pops up to encourage the person to drink and thus avoid dehydration. This scenario is allowed thanks to a smart environment with a complex network of sensors that monitors meaningful objects and activities (Amirabdollahian et al., 2013).
It is important to clarify that the GUI design fundamentally differs from traditional ambient intelligence approaches. In fact, action-possibilities are not pre-given but negotiated and continuously interpreted according to the relations between actors (person and robot) and objects or environment. A number of objects that ‘can be manipulated’ by the robot are traced on several aspects and accessed through layered functionalities (e.g. a cup can be used for coffee or tea). For instance, the action-possibility ‘Bring me the coffee’ requires knowing where the user is located (to bring the coffee to), whether the user is thirsty (not to provide coffee over and over again) as well as information from the environment and the objects involved, whether there are empty and clean cups, sufficient coffee, a clean coffee machine and so on. The likelihood of an action-possibility also depends on previous preferences and rituals between the robot and the person.

The objective of the GUI is to provide the person with the means to access the functionality to be performed by the robot alone or in collaboration. Action-possibilities are thus defined by what the robot can do in a specific context with the objects in the smart environment. Therefore, the GUI requires information about the states of the objects to be handled by the robot, the states of robot itself and the environment, as well as the states of the user and his unique approach to the world. In other words it requires a large and articulated picture of the context. The GUI emphasises the improvisational and situated aspects of human behaviour (Suchman, 1987). It takes a first-person viewpoint; it is dynamic, context-dependant, and reflects the person’s own phenomenal, lived space.

Merleau-Ponty’s philosophy extends beyond embodied perception situated in concrete contexts of use, as illustrated by the two examples above. In particular, he emphasises the fact that we inhabit a world already filled with significance. These meanings pertain to the cultural, social and communicative aspects of human life. They are not artificially superimposed over a natural level of behaviour, but are profoundly integrated with it. The socio-cultural aspects of embodied interaction are the focus of my chair on Culture-based Design at the Industrial Design Department at TU/e.

One of the most important examples of cultural expression debated by Merleau-Ponty is language. He analyses it from the viewpoint of the speaker’s phenomenal personal experience, and not in the form of phonemes and signs encoding spoken words or the relationships that they maintain syntactically. For phenomenology, the meaning of language is not in the words themselves, but in people who express them (Merleau-Ponty, 1963).
Merleau-Ponty distinguishes two types of language: *le langage parlé*, that is, the sedimented, spoken language that *a priori* establishes a relation between the signifier and signified, and *le langage parlant*, that makes itself in its practice. This is not defined by sedimented elements of an already constituted language. Laws, conventions and established meanings do not bind it. The tendency of sedimented language is to formalise and regulate established meanings. *Langage parlant*, or creative language, actively breaks out of the rules and constraints of sedimented language. What emerges from this is a new type of communication, an indirect language that is still not codified and offers alternative modes of expression and meanings.

Poetry enables such indirect language, in which what speaks is not the established meaning but rather a new order of sense and expression. A novel, a poem, a painting or a piece of music are “individuals”. It is impossible to distinguish between the expression and what is expressed; their meaning is only accessible by direct experience. A shout employs our natural body as it was given to us by nature, rather poor in expressivity. Poetry does not dissipate when expressed, as a shout would. It is made lively, persistent and significant by those who experience it.

Below, I will present a student project developed by Trieuvy Luu, Koen Scheltenaar, Sjors Mouthaan and Arvid Jense, in the context of a module on Cultural Sensitivity held in the Master’s Degree Program in Industrial Design at TU/e, which I co-lectured with Ward van der Houwen. Students were encouraged to investigate communicative aspects of Western culture and reflect upon them through design of a working prototype. Contemporary poetry was used as a vehicle of cultural expression. For poems not only tell a story within the context of a specific culture; their language and their way of playing with the subtleties of language unavoidably invite the person reading them to load such stories with values, feelings, beliefs and judgments. The deliverables of this module were designs that somehow transferred and transformed the subtle cultural meaning of poems into a new phenomenological dimension of social interaction through social media.
The dissemination of social media platforms promised a more flexible, widespread and expressive way of communicating and cultivating relationships. However, the more individuals express themselves through these codified, networked, formatted means of constructing a “personal brand identity”, the more they self-assimilate and adopt an impoverished language that eliminates any form of difference and infantilises expressivity. Functional non-aesthetic principles are used in many forms of social media, particularly those that rely on documenting the minutiae of real-life. Today’s social media networks convey a limited iconic sedimented dialect using emoticons.

The design process began with deep exploration of contemporary poems, some of which were suggested by the lecturers, while others were selected by the students on their own. Jan Glass, a contemporary Dutch poet was invited to kick off the module and to perform his own poems. Glass explained that his approach to poetry was mainly conversion of a feeling or a mental image into words, which in turn left the reader room for interpretation and expression. He used words with nuanced meanings to allow the reader’s imagination to run wild and form a feeling, meaning or image independently. The reader is active in her way of experiencing and making sense of the poem.

The students selected three contemporary poems as a source of inspiration: “Mirror” by Sylvia Plath, “Writing A Curriculum Vitae” by Wislawa Szymborska, and “Interpretations” by Mourid Barghout. The poems shared common themes and values. They were about expressing personal meanings interpreting a situation from different viewpoints. They focused on taking multiple points of view and multiple perspectives to experience life in all its richness, and to express them with a subtle articulation of language. Analysis of the poems made the students aware of the limited expressivity of today’s social media. They extracted values from the poems and translated them into mood boards that, in turn, were the basis for visual design probes. The exploration of design probes was used to build an actual working prototype of a new social media platform, called Mirror.
Mirror is a social networking platform that proposes a new form of digital communication. It consists of a rich typing system to make a conversation expressive. The system uses pressure on the keyboard and the duration, speed and pace of typing as input to vary the typography of the conversation. Pauses in typing are reflected in the final text. All these elements are expressed in the chat, resulting in a landscape of letters and words with clear aesthetic qualities (Figure 2).

The end result is a meaningful visual translation of contents that conveys not just the meaning of words and phrases, but also the expressivity of typing, the pace of thinking and the emphasis put on certain words, which are displayed with a bigger font when typed slowly but firmly. The process of information design includes not simply the text space. The special organisation of elements within it makes sense and it is perceived as a contribution to the meaning of the whole reading and writing experience. Furthermore, the designed timeline deliberately prevents the writer from erasing the text to make the conversation spontaneous. In phenomenological terms, a perception cannot be erased or undone. Indeed, the same happens with feelings and emotions, which cannot be cancelled once perceived.

Of course, one can argue that the platform can limit the creativity of the writer since it is not possible to search for the best expression and improve the text through repeated drafts.

However, Mirror is not a text editor. It is a social network that aims at providing a continuum between expressivity and movement, creating the context for meaning-making in a physical modality. The person uses the platform to express meaning
beyond words and is, in turn, influenced by the platform itself. The objective is to provoke a reflection among people, and to see if they can make sense of and enjoy the physical, sensory aspects of writing.

The platform can be tried out at the following link: http://www.trieuvy.nl/mirror/

An exploratory study on the use of Mirror has started in Siena with a group of five friends and colleagues, including me. We made diary entries over a couple of weeks about the use of the platform, and shared them on a regular basis. Our notes clearly manifest that the platform is used not only to exchange messages but also to convey mixed emotions, empathy, irony, and expectations. The following is an extract of Rosa De Piano's diary: “Not being able to delete the text allows a stream of consciousness in which the words are materialized without filters; personally it is a rather realistic description of the way in which I often communicate my feelings to close friends”. She also reported that during the initial use of the platform, she was hesitant in writing since she knew that the text could not be deleted. However, she had mixed feelings: she was curious about the form that her thoughts and emotions could take, but also frightened to see fears and concerns materialized.
In Mirror, the students were challenged to take a phenomenological stance in designing the system. The content expressed in the text messages and the ways of expressing them are tightly coupled. Expressiveness is embodied in the way people write. The act of writing and the expressiveness of the gesture are not separated. The experience is strong, and sometimes frustrating, since it is not possible to erase content. However, it touches upon the corporeal experience of what people intend to communicate, extending their perceptual and motor skills beyond their physical dimension.

As already stated, Merleau-Ponty's philosophy extends the embodied perception to the cultural, social and communicative aspects of human life. The design of Mirror reflects phenomenological approach regarding language. The following example focuses on the realm of art.

Painting is understood by Merleau-Ponty (1964) as a creation that does not represent the world (the Cartesian view of painting) but presents it and, in so doing, constantly re-creates it. The painting, while not representing but presenting the world, does not do this once and for all. The world is constantly being created each time the painter works the canvas, and each time the beholder is immersed in the contemplation of the artwork. The artistic process demands the subject-object paradigm to be overcome: a person looks at the artwork, and it “looks back”. In this process the beholder enters into communication with the artwork itself. A whole is created encompassing both the beholder and the painting. Voiceless things of the world speak through the artist, the form and the aesthetics that she gives them.

In Eye and Mind, Merleau-Ponty (1964), referring to an idea of Valery, states: “The painter ‘takes his body with him’. It is by lending his body to the world that the artist changes the world into paintings. To understand these transubstantiations we must go back to the working, actual body – not a body as a chunk of space or a bundle of functions, but that body that is an intertwining of vision and movement”. So what distinguishes Merleau-Ponty's phenomenological investigations from those of other philosophers is his insistence on the body as the centre of perception and the medium of consciousness. His research on vision as an extension of the corporal shows that in order for consciousness to unfold in the world it must be embodied. To perceive the world and be shaped by it, one must be in and of its flesh.
The next example is an artistic installation that attempts to embrace the philosophical insight of Merleau-Ponty on art and the dialogue between paintings and beholders. The installation aims to encourage debate on women’s rights by eliciting reflection through bodily engagement with the topic. It is a joint effort of a group of designers including myself, Ambra Trotto, Nigel Papworth, Jeroen Peteers, Caroline Hummels, Michele Tittarelli, Stoffel Kuenen, Nicholas True, Iolanda Iacono, Matteo Sirizzotti, Ernesto di Iorio, Marcello Flores, Daniel Fallman, Bjorn Yttergren, Fredrik Nilbrink.
Women's rights are human rights. Numerous international instruments have drawn attention to gender-related dimensions of human rights issues but contemporary society still lacks full awareness of these themes, with consequences that are often dramatic. Even today, there is disagreement about what constitutes women's rights. Do women have the right to control family size? Do they have equality of treatment and salary in the workplace? Do they have equal opportunities to men for advancement in their career? Do they have equal access to political, military or religious posts?

In most cases, the phrase “women’s rights” refers to whether women have equality with the rights of men. Sometimes, “women's rights” includes protection of women where they are subject to special circumstances such as maternity or more susceptible to mistreatment such as rape. The empowerment and autonomy of women and the improvement of their political, social, economic and health status are highly important ends, essential for the development of an ethical and sustainable society.

This is the topic addressed by Ballade of Women, an exhibition in Palazzo Sansedoni, a historical building owned by Fondazione Monte dé Paschi di Siena, which contains a noteworthy art collection (Papworth et al., 2014). Three paintings from this collection were selected for the purpose of introducing visitors to the topic of women’s rights through the presentation of masterpieces of art. The paintings depict three women whose lives were emblematic of the themes of emancipation, self-determination and violence (Figure 4).

Cleopatra was painted by Marco Pino in the 16th century, portrayed as a woman of great beauty and charm who used her sexual appeal as a means of political power. The painting supported the theme of emancipation.

Mary Magdalene was painted in the act of reading by Rutilio Manetti in the 17th century. She symbolised a woman who changed her life to embrace the Christian religion; for this reason this painting embodied the theme of self-determination.

Lucy of Syracuse was painted by the painter known as the Maestro dell'Osservanza in the 15th century. Lucy was a young Christian martyr who was
killed during the persecution of the Christians in 304 AD. She had refused to marry a young man of a wealthy pagan family, and the man retaliated by denouncing her to the emperor Diocletian, who issued a ferocious repression against Christians. She was killed on account of her religious beliefs. For this reason this painting represented the theme of violence.
The installation was conceived as a dynamic space (Marti, et al. submitted). Digital acquisitions of the paintings were fragmented and floated in the space, projected on moving panels. The panels were suspended from motors controlled by an Arduino processor which could turn them to deny or reward the viewer with a view of the full painting when projected. The fragmentation was used to evoke the information that we have about the subject, which has been fragmented by history, politics and the speed of our world. The projections of the paintings also had graphic overlays containing information streamed directly from the Internet and social media, together with facts, statistics and graphs pertaining to the issues highlighted (Figure 5).

This information flow was enabled by the software crawler WhatsOn, developed by QuestIt, which continuously monitored news regarding the topics of self-determination, emancipation and violence. The number of discussions generated on the Internet served as input for the structure, determining both its movement and its visual content. The movement of the panels was sensitive to online discussions, quotes and social media sources, which were continuously overlaid onto the projected paintings. This combination of embodied interaction with social computing fits with certain views of embodiment (e.g. Dourish, 2001).
Tweets and other posts related to the subject, detected by the crawler, were used to move the motors handling the panels and modify the content projected on them. The theme that gathered the biggest number of new posts determined a slight movement of the servos; in principle, visitors could send a tweet and experience the impact of their opinion on the structure in real time. The visual fragmentation was also reflected in the audio experience. By means of directional speakers, sound was projected on the rotating panels, bouncing according to their movement. This gave listeners the impression that sound was whispered in their ears. The sound consisted of a selection of poems recited in different languages, related to the three themes of the exhibition. The sound design resulted in an ethereal, enveloping experience.

Visitors entering the space were able to move around and explore the installation (Figure 6). The movements of the panels and the projected content were influenced by the physical presence of the observers as well as by the virtual presence of online discussion groups debating the themes of the exhibition.

A video of the installation can be viewed at https://vimeo.com/71131822 .

Figure 6
A visitor in the exhibition space.

A video of the installation can be viewed at https://vimeo.com/71131822 .
Ballade of Women offered a space for bodily reflection for visitors and designers on the relationship between gender and human rights. It examined some of the myths that persist about women and their capability to emancipate and self-determine their lives. Visitors had to take an active stance in the exhibition. Their movement in the space influenced the aesthetics of the installation, and different choreographies were produced by the online debates occurring in real time. The ambiguity of interpretation elicited by the interactive installation was connected to the ambiguity of information and its controversial nature, offering different points of view and suggesting the need for a clearer understanding and embodiment of these issues.

In phenomenological terms, the installation displayed the act of viewing the world with openness and immersion evocative of the continuum of existence. It intertwined the act of viewing with the way the artwork unfolded before visitors. The entire experience was embodied and enacted through the beholders' physical movement.

Visitors were lived bodies perceiving themselves in relation to others either physically or remotely present. Because it is through the body that consciousness extends itself and is affected, perception became the means through which awareness of women's rights developed as an integral part of the installation. This perception was not a channel that simply collected or filtered the information displayed on the panels. It was a kind of interconnectedness that simultaneously allowed the beholder to perceive the physical world through observation/contemplation and interaction, but also to experience a world of significance to reflect upon and transform.
Getting back into the pose

I started my lecture with yoga, and I wish to conclude it going back to it, offering a final reflection on the use of body and movements.

Merleau-Ponty identifies two forms of movement: abstract and concrete. Concrete movements are those performed in the course of everyday activity, responding to actual and immediate needs, whilst abstract movements involve a certain stepping back from such concerns, putting one’s body into imagined, potential situations. Abstract movements can also occur when we take on a position or move, as the body would be the object or the aim of an action. For example, a person can stand still as part of the process of waiting at the bus stop. In the yoga Mountain pose (Tadasana), the practitioner apparently takes the same position, standing on the mat. Considered in terms of the physically describable behaviour involved, the muscular movements and the external stimuli, there are no significant differences between instances of the two types of positions and potentially related movements.

However, Tadasana is an active pose that helps improve posture, balance and calm focus. It is the fundamental pose for all standing yoga postures and full inversions. The practitioner stands on her feet with her arms at her sides. She presses her weight evenly across the balls and arches of her feet while breathing steadily and rhythmically. In doing so she draws her awareness inward, focusing on the present moment and letting all worries and concerns fade away. She then presses her big toes together, lifting and spreading them apart. She perceptually retraces her body, lifting her ankles and the arches of her feet. She draws the top of her thighs up and back, engaging the quadriceps and widening the seat bones. The pelvis is in a neutral position. As she inhales, she elongates her torso. While exhaling, she releases the shoulder blades away from the head, toward the back of her waist. She broadens across the collarbones, keeping the arms straight, fingers extended, and triceps firm. She elongates her neck, maintaining the ears, shoulders, hips, and ankles all in one line. With each exhalation, she feels the elongation of the spine.
A correctly executed Tadasana will use every muscle in the body. Tadasana steadies and balances mind and body, bringing a calm focus to the practitioner while perceiving the engagement of the body.

This yoga pose helps me to appreciate the nuances of abstract and bodily (concrete) movements. However, I would make a fundamental mistake if I were to interpret the difference between these two types of movement on the basis of the respective absence and presence of some kind of consciousness, so that concrete movements are regarded as non-conscious, automatic routines, whereas abstract movements are guided by conscious aims, and by a knowledge of the body, of the location and spatial inter-relationships of its parts. According to Merleau-Ponty, neither concrete nor abstract movement can be understood either as physical motility or as this same motility combined with consciousness (the Cartesian dualism). Both kinds of movement involve what he calls ‘motor intentionality’. The differences between them rely on the specific form of intentionality they involve, the different attitudes towards the world. These attitudes are embodied and situated, and this implies a subjective perception of phenomena, and a different way of grasping their meaning.

“A normal person enjoys the use of his body not only insofar as it is involved in a concrete setting, he is in a situation not only in relation to the tasks imposed by a particular job, he is not open merely to real situations; for, over and above all this, his body is correlated with pure stimuli devoid of any practical bearing; he is open to those verbal and imaginary situations which he can choose for himself or which may be suggested to him in the course of an experiment”. (Merleau-Ponty 1962) [p. 108].

In Ballade of Women, visitors entering the space exhibit different kinds of movements. Some walk around the structure erratically, most likely making sense of their being there. Visitors who perceive that their movement influences the behaviour of the fragments start performing concrete movements to actively and intentionally make the panels turn. It is an immersive experience, involving body and perception, beliefs and knowledge, social confrontation and participation, and emotional sensitivity to the topic at hand.

From a different perspective, Mirror addresses social interaction by leveraging the writer’s perceptual-motor skills in relation to the pace, effort and duration of typing, emotional skills for emphatic writing and improvised aesthetic outcomes, and intentional skills to reflect on content through unexpected epigraphic
visualisations. Typing on Mirror can be a routine, non-conscious movement or a motoric, intentional one. Technology does not interrupt the experience, making perception flow on different planes.

The cases illustrated in my lecture show that phenomenology opens up a plethora of new directions for design research, some of which I have touched upon here, some others I hope to develop with colleagues and students in the years ahead. I hope that by illustrating phenomenology through the practice of yoga, I have stimulated a reflection on some core elements of Merleau-Ponty’s phenomenology of perception that are relevant for a theory of embodied interaction. The focus of my research is on the way bodily skills extend their sensory apparatus through digital technology. More research is necessary to embrace the significance that pertains not just to the physical, but also to the cultural, social, and communicative aspects of human life. This is a challenge for the students in industrial design who will develop future systems and products designing for and with the lived body.
Extraordinary people

In my personal and professional life I have met extraordinary people who have shaped the path that brought me here. I am sincerely grateful to them for their support, love, respect, patience, thoughts, criticisms, endless discussions and friendship.

My first thought goes to Kees Overbeeke, who is no longer with us. Kees trusted me, supported me and transformed my way of doing research by sharing his profound culture and knowledge of music, history and art. We had a great time together, we dreamed together and did beautiful things in Siena. Thank you Kees, from the bottom of my heart – it would not have been possible without you.

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References


Curriculum Vitae

Prof. Patrizia Marti was appointed part-time professor of Culture-based Design in the Department of Industrial Design at Eindhoven University of Technology (TU/e) on 1 March, 2013.

Patrizia Marti received her Master’s degree (cum laude) in Philosophy at Sapienza University of Rome in 1987, after which she worked for several years as independent consultant for different companies including IBM Nordic Laboratorier in Sweden. In 2001, she co-founded Deep Blue s.r.l. In 2002 she started working as Assistant Professor in Interaction Design at the University of Siena. She gained her PhD in 2012 at Eindhoven University of Technology. In 2013, she received an honorary professorship at the Seogang College University, Seoul, Korea. She is Director of the Laboratory of Robotic and Learning Technologies and Rector’s delegate for technological innovation in the humanities at the University of Siena. She has been an invited keynote speaker at various international conferences. Her research activity concerns designing systems facing cultural, aesthetic and social issues through embodied experiences.

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