

Phenomenology For Empathy

Exploring full-bodily interaction
for evoking empathy

JUDIT KOMAROMI HAQUE

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Supervisor: Susan Kozel

Examiner: Per-Anders Hillgren

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MALMÖ UNIVERSITY
FACULTY OF CULTURE
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ABSTRACT

This thesis project discusses empathy as a fundamental element of human communication, which is significant for well-functioning social relationships. It also investigates bodily movement as a means of perceiving immersive human emotions. A direct link is made between empathy and full bodily movement. Furthermore full-bodily movement and its relevance to interaction design is explored. Building on the knowledge gathered from studies in phenomenology, physiology, psychology and sociology the goal is to find an answer to the question: *“How may we evoke empathy -with the help of an interactive environment - between people in a diverse society through full-bodily movement-based interaction?”* Under the principles of Research Through Design as main methodology, this research relies on methods that are more specific and focused. Thus an array of design activities such as workshops, with different performative and phenomenological methods, are carried out and bodily movement as creative design material is explored. The expected outcome of this thesis project are design suggestions for an interactive environment, that allows empathic connection between people.

TABLE OF CONTENTS

| | |
|--|----|
| ABSTRACT..... | 2 |
| TABLE OF CONTENTS..... | 3 |
| 1. INTRODUCTION..... | 5 |
| GOALS AND CRITERIA | |
| Project Goals | |
| Design Goals & Criteria | |
| 2. RELATED RESEARCH & LITERATURE..... | 7 |
| Diversity, Perspectives & Awareness | |
| Empathy | |
| Kinesthesia & Kinesthetic Empathic Interaction | |
| Choreography & Performance | |
| Phenomenology | |
| Embodied Interaction | |
| Bodily movement, Kinesthesia & Emotions | |
| Movement As Design Material | |
| The Ephemeral | |
| 4. RELATED WORK & INSPIRATION..... | 13 |
| BodyBug | |
| The Machine To Be Another | |
| Paint With Me | |
| Autism Empathy Kit | |
| Dementia Simulator | |
| Unstable Empathy | |
| Augmented Reality | |
| Glittering Machines | |

| | |
|---|----|
| 5. DESIGN METHODOLOGY & ACTIVITIES..... | 26 |
| 5.1 Research Through Design | |
| 5.2 Performative & Phenomenological Methods | |
| 5.3 Workshops | |
| 5.3.1 Mediated vs Co-located | |
| 5.3.2 Experiential Bodily Knowing | |
| 5.3.4 Moving Body As Creative Design Material | |
| 5.4 Process Phenomenology | |
| 6. DESIGN PROCESS..... | 29 |
| 6.1 Design activity 1 in two parts - 'Move & Observe' | |
| 6.1.1 Part One - Digital | |
| 6.1.2 Part 2 - Physical | |
| 6.2 Design activity 2 - 'Observe & Embody' | |
| 6.2.1 Bodyscan | |
| 6.2.2 Posture mimicry | |
| 6.2.3 Movement mimicry | |
| 6.3 Design activity 3 - 'Emotions through movement' | |
| 6.3.1 Smooth line | |
| 6.4 Design activity 4 - 'Bodies & Senses' | |
| 6.4.1 Connecting movement with senses | |
| 6.4.2 Exploring turn taking | |
| 6.5 Summary of design activities | |
| 7. OUTCOMES - design suggestions..... | 46 |
| 7.1 Empathy tunes | |
| 7.1.1 Performance For two | |
| 7.1.2 Performance & Audience | |
| 8. DISCUSSION..... | 49 |
| 9. CONCLUSION..... | 51 |
| REFERENCES..... | 52 |

1. INTRODUCTION

As a result of the globalised world we live in, with more diverse societies than ever, we constantly need to interact with people of different backgrounds. Our individual experiences, the unique things that we all go through shape our perceptions, strongly influence our attitude towards one another and the way we relate to each other. It affects our social interactions by making it more challenging to respond to each other in a satisfying and positive way. Nevertheless as Ingram (2001, p.5) states 'as our communities become increasingly more diverse, understanding the perspectives of diversity will become more important.' The amount of empathy we have for others, the way we empathise for one another crucially influences us in our daily lives. It is significant in order to understand diversity.

Empathy is 'the capacity to place oneself in another's position' (Bellet 1991, p. 1831) and is a fundamental element of human communication. Furthermore it is significant for well-functioning social relationships. As McDonald (2011, p. 19) puts it 'the ability to empathize is important for promoting positive behaviors toward others and facilitating social interactions and relationships'. Empathy is a constant transition of emotions between people. It is dynamic, imperfect, approximate and is like a constantly changing 'fluid'. It's spontaneous, momentarily, dynamic as well as contextual and cultural. Foster (2010) defines empathy as a 'learned response' that is confined differently over time and cultures, where the kinesthetic sense plays a central role. Although empathy is a capacity that is related to all humanity, it's not ascribed to specially established bodies -it's not of genetic origin- but based on individual experience. Foster et al. (2010) points out that empathy is also to simultaneously recognizing and accepting the duality of our differences and sameness.

Movement can serve as a significant channel for transferring emotions that can evoke empathy between people. As De Vignemont (2006, p. 440) explains, imitating other people's postures, movements, gestures, actions, the so called 'in action imitation, the chameleon effect' creates connection and affection. More importantly affective turn-taking is the precursor of empathy that is achievable through mimicry of bodily movement.

In line with the above statements this research is set to explore bodily movements, in the hope of finding ways to enhance people's ability to create empathic connection. In order to fulfil the project's goal, which is to to evoke empathy through bodily movement, this research will dive into the field of movement based interaction. Interaction design encompasses a wide range of topics and issues, among them are embodied interaction and kinesthetics, which are major fields that addresses bodily-movement. (Dourish 2004; Fogtman 2007) Thus this project is conducted based on studies made in phenomenology, physiology, psychology, sociology and carried out in the above mentioned topics. This project also looks into the relation between choreography, performance and empathy and the affective characteristics of bodily-movement is explored. (Foster 2010)

In attempting to answer the main design question: *“How may we evoke empathy -with the help of an interactive environment -between a diversity of people through full-bodily movement-based interaction?”* the following sub-questions guides the research:

1. How do we sense empathy?
2. How may we sense it through movement?
3. How can it be enhanced through an interactive device/space?
4. How can we work with the moving body as creative design material?

Keywords

Empathy, movement-based interaction, phenomenology, performance, embodied interaction, kinesthetics, experiential bodily knowing, process phenomenology

GOALS AND CRITERIA

Project Goals

Through experimental design research method -more specifically by performative and embodied methodologies, working with the moving body as creative design material, the goal is to explore movement-based interaction. Another goal is to apply a first-hand approach i.e. being involved with bodily movements as designer, together with the participants throughout the design process. Furthermore, the aim is to provide a detailed documentation and describe the methodology used during the design process.

Design Goals & Criteria

Diversity enriches us that we should embrace in society, thus the intention is not to create sameness. Instead the goal is to build empathic connections, by bringing people together and promoting awareness of our unique individual characteristics and personalities. Thus the objective is to create an interactive space, where a diverse public may establish empathic connection by ‘moving’ through a positive experience together. The aim of this research is to explore how we may enable perspective taking using bodily movement and thus create empathic connection.

The goal is to focus on full-bodily movement where the interactive technology will function as an ‘aid’ and will play a supportive role. The final design outcome of the project is proposals for an interactive environment or device, that allows an immersive joined ‘moving’ experience between people. The main goal is to enable a moment of positive empathic connection and shared experience between people, through bodily-movement.

3. RELATED RESEARCH & LITERATURE

DIVERSITY, PERSPECTIVES & AWARENESS

'Human diversity means differences among people. It's each of us in our rich and infinite variety.' (Ingram 2010, p.2) With these thoughts in mind, it's important to point out that this project is not promoting social coherence or social sameness. On the contrary, it is advocating the positive effects and the important role diversity plays in our society. Our unique characteristics, the individual perspectives we have may enrich us in many ways. How we may get a glimpse of other's unique perspectives through awareness is addressed. Furthermore how we may work together in order to learn and accept the combination of our uniformity and individualities.

EMPATHY

There have been several different definitions of empathy throughout history. The term originates from the German word 'Einfühlung' which means the deep physical connection that takes place between an artwork and spectator. In the early twentieth century in English it also referred to the physical receptivity between people and objects. (Foster 2010) Later on kinesthesia was defined more as an emotional than physical experience, as it has been extensively studied in psychology.

According to Bellet (1991 p. 1831) empathy is 'the capacity to place oneself in another's position', and is a fundamental element of human communication. Moreover it is significant for well-functioning social relationships. The social role of empathy is seen as the source of encouragement for an efficient social relation, and for a social behavior that is an asset for the community as a whole. (De Vignemont et al. 2006) As McDonald (2011, p. 19) puts it 'the ability to empathize is important for promoting positive behaviors toward others and for facilitating social interactions and relationships'. According to De Vignemont et al. (2006, p. 440) 'the ability to share other people's emotional experiences and to react to them in a fine-tuned manner might facilitate social communication and create social coherence.' Nevertheless it's important to mention that the aim of this project is not to create a social sameness but to help strengthen the understanding of our unique differences.

Some of the most common definitions of the different types of empathy are cognitive, affective and somatic. Cognitive empathy means the ability to understand someone else's mental state. Affective or otherwise called emotional empathy is the ability to react to someone else's mental state with a proper emotion. Our ability to empathize emotionally is based on emotional contagion: being affected by another's emotional or arousal state. (Dziobek et al. 2007; Shamay-Tsoory et al. 2009; deWaal 2008) Somatic empathy is a physical reaction that takes place in the somatic nervous system through the responses of the mirror neurons that are located in the brain. (Rothschild 2006)

According to Levenson (1992 p. 234) there are three significant qualities of empathy, 'knowing what another person is feeling', 'feeling what another person is feeling' and 'responding to another person's distress'. This latter indicates that empathizing may also result in negative and unpleasant experiences. However as mentioned earlier this project will focus on positive empathic connections.

Similarly to the above Foster (2010) refers to the term 'empathy' to the the capacity to feel another person's feelings. She explains that although it's a universal human ability it's highly individual. She asserts that it's related to all humanity and it's not ascribed to specially established bodies, i.e. it's not of genetic origin, but based on individual experience (Foster 2010). She argues, that empathy is based on the way bodies are 'same and different from each other' By that Foster (2017 p. 7) means that by 'simultaneously and distinctly' mimicking other's postures and movements we may learn the feelings of the other. When describing empathy she also asserts that there should be a balance between the individual and universal as well as the shared experience. She explains that 'the nature and practice of empathy is never based on purely physiological processes or neutral abstracts like 'space' and 'time'. (Foster 2010) She also argues that the process of empathy is watching, seeing, reflecting and identifying.

More importantly empathy can also be described as a constant transition of emotions between people. It is dynamic, imperfect, approximate and is like a constantly changing 'fluid'. It's spontaneous, momentarily as well as contextual and cultural. It requires consecutive adjusting of sensibilities between people. Furthermore it demands perspective taking that requires attention and awareness towards each other. Thus conclusively it can be said that empathy is also to simultaneously recognizing and accepting the duality of our differences and sameness (Foster 2010).

Kinesthesia & Kinesthetic Empathy Interaction

Established in 1880 the term kinesthesia indicated the the awareness of the movements and postures of the body that occurs with the help of the nerve sensors that can be found in the muscles and joints. Since then the term has been altered and reformulated many times and different ways. During the mid-century kinesthesia was reframed and redefined, by perceptual psychology, as a system that provides information about joint positioning, activity of the muscles and bodily orientation in relation to space and gravity. Additionally it was postulated, that different sensory information, that is intertwined and originates from other systems, is taking place through kinesthesia. More recently the topic has been explored in neurobiological studies, with the focus on the way bodily movement can be sensed by the human brain. Furthermore the presence and significance of kinesthetic awareness was recognized in dance education and criticism. (Foster 2010).

Theories from the field of dance, such as the theory of John Martin (1965), asserts that by watching a dance performance, the viewer share the kinesthetic experience of the dancer. He also claims that kinesthetic and emotional experience are connected within and in a natural way. The way to empathy is through a mind-body process. As Martin (1939, p. 14) puts it human body is 'the most eloquent and responsive of all instruments'. Foster (2010) asserts, that watching a human body in motion 'we see movement which is potentially produced by any human body, and therefore by our own'. She further explains, that due to kinesthetic sympathy we recreate the movement 'in our present muscular experience and awaken such associational connotations as might have been ours if the original movement had been of our own making'.

One of the main aspects of this project is the focus on the bodily-movement, to maintain the body's central role in interaction where the interaction is the experience itself. Moen (2007, p. 38) points out that by engaging with artifacts and spaces through Kinesthetic Interaction, the 'focus is on the awareness of the body, the perception of the body's movements and how these

interact and influence each other'. She talks about the three types of Kinesthetic Interaction, individual, joint and opposed. Individual Interaction means that the interaction takes place between one person and an artefact or space. The last two categories, joint and opposed, are Kinesthetic Empathic Interaction, both where participants are working towards the same goal. The difference between the two is that in joint interaction the participants are in collaboration, while in the opposed interaction they are in a combat with each other.

CHOREOGRAPHY & PERFORMANCE

For exploring how we may approach movement for interaction design the role of choreography and performance is fundamental. Goffman (2002) defines our bodily movements and gestures as performance. Viewing our movement as a deliberate selection of actions means that not only others may recognize and perceive it but also technology can sense and understand it. Thus with that in mind the possibility to design for movement-based interaction emerges.

Franko (1995) points out the distinctive characteristics of movement that incorporates gender, age, race which is due to the fact that movement depends upon a physical manifestation. In her book 'Choreographing Empathy' Susan Leigh-Foster (2010) examines the relationship between choreography, kinesthesia and empathy and comes to a conclusion that they are material, situational and cultural creation. She defines choreography as a 'theorization of identity - corporeal, individual, and social'. (Foster 2010, p. 4) She looks at dance merely as a physical engagement without any historical or methodological association and conceptualises choreography as 'the hypothetical setting forth of what the body is and what it can be based on the decisions made in...performance about its identity'. (Foster et al. 2010, p. 4) She further expands the term choreography and includes 'all manner of human movement' as well as 'the operations of gender in constructing masculine and feminine roles'. (Foster et al. 2010, p. 5) Choreography is structuring the cultural values that are lasting and performance is an individual interpretation of these values. Since one of the primary goals of this project is to establish a direct link between empathy and full-bodily movement, the explorations are fueled by and grounded on these studies mentioned above.

PHENOMENOLOGY

As stated earlier the goal of this project is to design with a human-centered approach and to focus on bodily movements as our unique bodily abilities. Thus this work is grounded on and informed by theories that are characterized by their acknowledgement of the special individual human bodily abilities that underscore our subjective encounters in a manifold and constantly changing world. One of these theories are phenomenology.

Phenomenology is a study of investigating and describing our perceptual life experiences. It explains 'self', which is the origin of all things. In his work *Phenomenology of Perception* Merleau-Ponty (1962, p. vii) defines it as 'the study of essences' such as the 'essence of perception and consciousness' as he explains. He also calls it a philosophy that attempts to 'give

a direct description of our experience as it is, without taking account of its psychological origin and the causal explanations' as he puts it. Thus it's different from science, history or sociology that considers because in Phenomenology logic alone can't apprehend the world because logic comes from experiencing the world.

Our bodies are constantly being transformed as our need of physical experiences widens as well as the result of the new technologies that we have access to in our daily lives. (Kozel 2007) She means that 'the desire for an expansion of perception, of consciousness, and of bodily experience, and a sense that what currently exists needs to be transformed' and further argues that as our everyday experiences change we need 'new ways of understanding or interpreting them' (Kozel et al. 2007, p. 7) She defines phenomenology as 'something that happens' (Kozel)

Unlike an objective and a deterministic viewpoint Phenomenology places people in the center as individual beings and redeems the human body what is otherwise left out and neglected, in the world of experiences. Furthermore it advocates randomness and the explicit encounters that take place in dynamic environments. Phenomenology places interaction in the center from which the meaning rises, thus the main focus is on the connection between the body and the world.

Perception is the basis of our experiences that conducts everything that we attentively do. It is a combination of interpretation and sensation. Our consciousness of our surroundings, from which we are inseparable, gives significance to the world. The world is as we perceive it and it is a place of perception, as Merleau-Ponty (1962) explains. According to him phenomenology of perception can not be sufficiently described by neither Empiricism or Rationalism alone. While the first one doesn't provide an explanation of the way our consciousness governs our perceptions, the later is lacking an explanation of the way our perceptions regulates/dictates our consciousness. For Merleau-Ponty et al. (1962) the body receives the central role as he explains perception. He believes that it is due to a pre-reflective ground, which is fundamental for reflection, we are capable of reflecting on our actions.

Perception is the background on which all acts are projected. Merleau-Ponty (1962) also states that perception is a combination of interpretation and sensation. It might be built up by selective effort and aimed by attention. All our performances are projected on perception as a base. While perception is not comprised by attention alone, it might point to a certain angle of a perceptual field. As people are individually unique, therefore it's essential to design with subjectivity and remain respectful for their distinctiveness.

EMBODIED INTERACTION

As computer systems are embedded in our everyday world they manipulate our view of reality, change our thinking and effect our actions. Thus designing for computer interactions requires an approach that addresses the topic not only from a technological but also from social and philosophical angle, and instead of machines it places people in the middle of the design process. As a full-fledged subfield of interaction design embodied interaction approaches the topic of human computer interaction on philosophical bases. (Dourish 2004). Embodied interaction emphasizes the social characteristics of computing which is crucial for designing future interactions that adapt to our needs and abilities. The foundations of embodied interaction originates from Paul Dourish (2004). In his book *Where the Action Is* he defines Embodied interaction as the human computer interaction with computer systems that inhabit our life, 'a world of physical and social reality, and that exploit this fact in how they interact with us' as he puts it. (Dourish 2004, p. 3)

He also, in line with the phenomenological approaches of philosophies, advocates the domination of natural practice. He proposes that design should be about interaction, with an attention on

ubiquity, awareness, emotions etc. Traditionally HCI has been focusing on plans, procedures, tasks and goals. However Dourish et al. (2004, p. 4) proposes that it should take into account 'not only as what is being done, but how it is being done'.

BODILY MOVEMENT, KINESTHESIA & EMOTIONS

We constantly move, we 'move through' as we live our life. Bodily movement is a unique human ability, and a significant communication channel for exchanging affect, that we take for granted. As John Marin (1965 p. 31) puts it 'The movement of the body is so habitual, so continuous, and so largely automatic that we are in the main quite unconscious of its range and potentialities'. Through our movements we may enable a more immersive and personal transfer of emotional experiences between individuals. Despite of some attempts, full-bodily movement has not been explored enough within the field of Interaction Design.

In mind with the above the aim of this research is thus set out to explore the unique characteristic of bodily movement and the relation between movement and emotions. To aid the investigation this research is guided by questions such as '*How do we feel when observing the movement of others?*' and '*How do we sense empathy through movement?*' In her book *Choreographing Empathy* Susan Leigh Foster (2010) raises similar questions, and she also provides useful insights into the way the moving body has been formulated in scientific, aesthetic and sociopolitical context, which guides this investigation.

The instantaneous and the absolute pure connection between dancer and audience has also been examined by others, both dance theorists and neuroscientists.

Movement helps in perspective taking, it is a way to 'step into' or 'move into' other people's' perspectives. Through movement we are able to relive other's experiences and feel others emotions. As dance critic John Martin (1965) argues not only there is a fundamental connection between dancer and spectator but also between bodily-motion and emotion. Moreover he claims that by merely watching, spectators can also feel the movements and the emotions of the dancers, because dance expresses meaning. Neuroscientists share his view who explain that the reason why spectators share the feelings of the dancer is due to mirror neurons in the frontal cortex in the brain. Martin (1965 p. 31) asserts that 'movement is a vigorous medium for both expression and perception'. Similarly to Martin (1965) Foster's (2010) investigation of the relationship between movement and emotions are conducted through her dance studies, with the focus on three terms, choreography, kinesthesia and empathy, which according to her are tightly intertwined. Even unintentional, unconscious movement expresses our inner self and reveals a great deal of who we are, however deliberate, 'choreographed' movement is 'performance'. (Foster 2010)

MOVEMENT AS DESIGN MATERIAL

According to Martin (1965, p. 31) bodily movement is a 'medium a material that is closer to life experience than that employed by any of the other arts, namely, the movement of the body in its reactions to its environment'. He argues that 'This, indeed, is the very stuff of life'. In their work Hansen (2014, p. 29) urge designers to investigate the 'rich, interpersonal' qualities of bodily-movement as design material which they approach as 'embodied communication'. They recommend breaking down movement into components, such as 'Velocity, Position, Repetition and Frequency' when designing for interaction. (Hansen 2014, p. 29)

When we work with traditional design materials we shape, iterate, alter and prototype until achieving a desired 'final form' and the materials turn into some kind of a 'final product' at the end of the design process. Reed (1998, p. 523) acknowledges that 'space is not an inert backdrop for movement, but is integral to it, often providing fundamental orientation and meaning'. An interactive space or device are examples of such 'final product' of this research project.

However the most essential design material of this project is bodily-movement. Working with movement as material differs in many ways and may results in unconventional outcomes. As the final result depends partially on the different qualities of the material used in the process, movement with its wide range of characteristics offers and endless possibilities. Instead of narrowing the process it opens it up, which in turn allows for even more exploration and outcomes. Being the central material of this project, bodily-movement as material is being explored not only through the workshop activities but even after the end of the project.

THE EPHEMERAL

According to Paul Dourish (2011) it's not materials but materiality that matters. It's not the material characteristics of the interaction and not the actual materials that are tentatively relevant. Rather it is the different qualities of the materials, such as visibility durability, etc, that subsidize to the sociocultural is what matters and tentatively interesting. He also suggested that it's not only the tangible that should be considered as design material. Thus looking through the theoretical lenses of Dourish (2011) designers are encouraged explore working with different kind of design materials other than tangible.

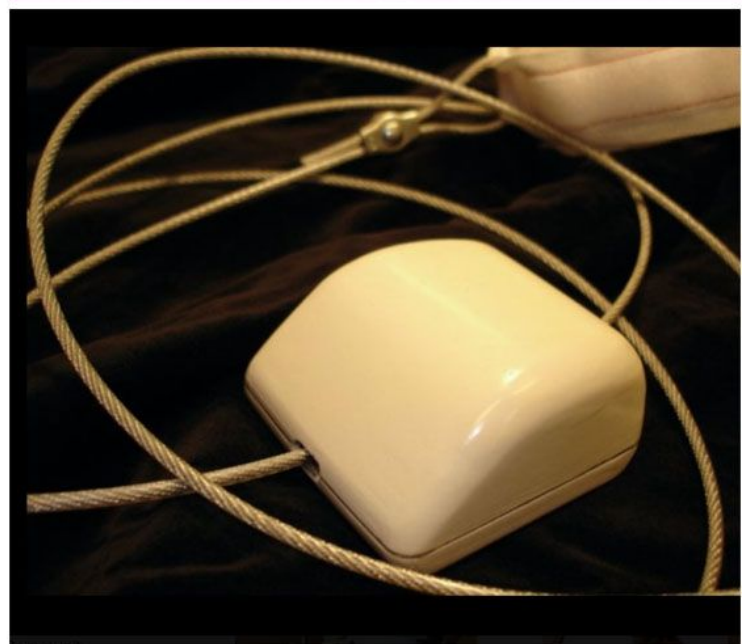
In other design disciplines where the use of physical design materials play a central role, the significance of a thorough familiarity of the design materials is indispensable. Similarly to these looking through the 'material lens' opens up opportunities for the practitioners of interaction design to look beyond traditional design materials. (Wiberg et al. 2013)

4. RELATED WORK & INSPIRATION

In the following section related canonical examples are presented. They selected based on their relevance to the different areas and topics, such as movement-based interaction, empathy, performance, that this project is addressing.

BodyBug

BodyBug by Jin Moen (2007) is one of the related work that approaches the topic of movement based interaction from a human centered view is e.g. where the body plays a central role. The concept of BodyBug, is based on full-body i.e. Kineshtetic Movement Interaction.



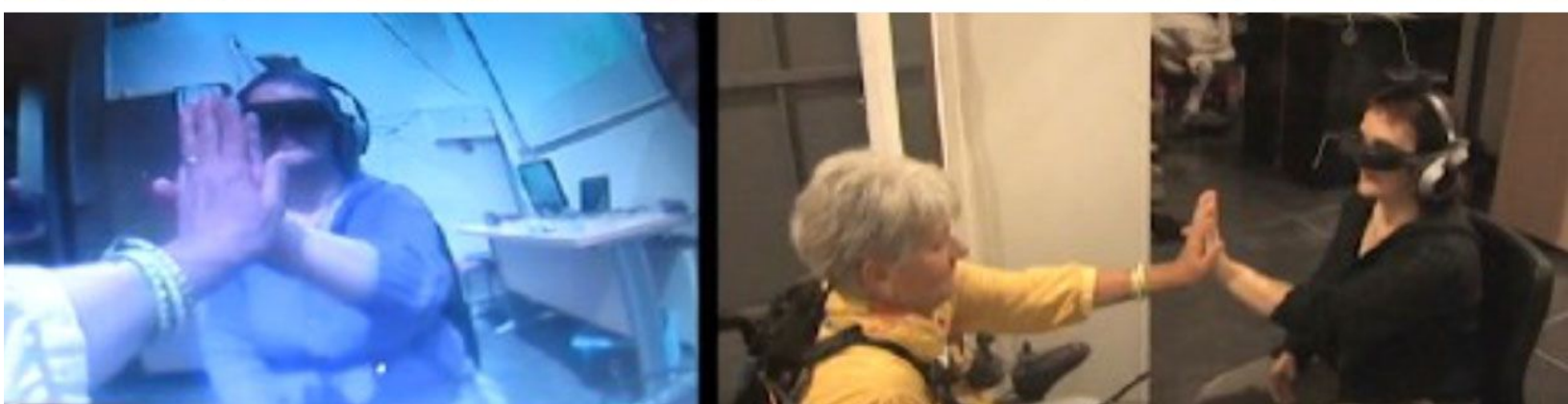
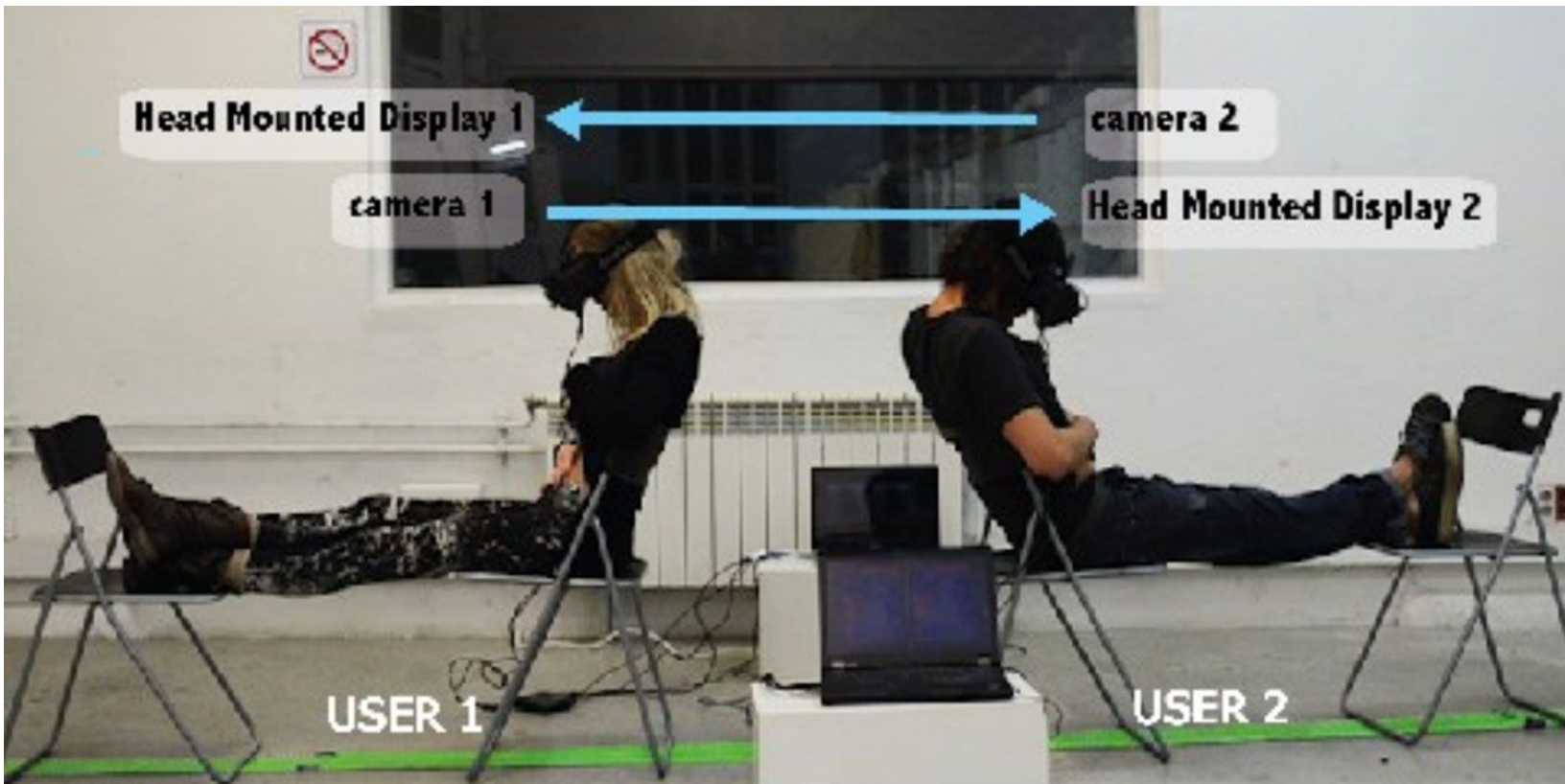
By kinesthetic Moen (2007) refers to the human kinesthetic sense as a significant human ability to sense and experience the body's own movements. When developing the concept of BodyBug her aim was to approach the topic from a people-centered non-technological view. Thus it is a great example of related work that is highly relevant to this research project.

BodyBug is a portable and wearable digital artefact that consists of a small 'robotic unit' that runs on a wire. It can be placed on different parts of the body on a single user or can be spanned between two people. With help of an accelerometer the device moves up and down on the wire in response to the user's movement. The communication between user and system takes place through audio (tunes and noises), through visual (text), through direction (cues from the so called 'eyes'), and through the movement of the device. The device starts to move only when the user starts moving, and its movements depends on the characteristics of the user's movements.

In contrast to other movement-based interactive devices BodyBug allows and generates free movement, therefore the user is unrestricted by the device. Instead of limiting or forcing the users to produce repeated movements, it encourages them to explore new ones. It provides the users a unique encounter as the interaction becomes the experience in itself. Instead of being technology driven like most of the movement-based interactive devices, BodyBug focuses primarily on human behaviour, taking full advantage of the user's natural movement and behavior. It doesn't merely employs the body's cognitive or emotional or physical traits but provides a complete experience of a whole body interaction. The users can explore and sense their body movements through a series of interactions as a dialog between them and the device. From the user perspective BodyBug involves the user individually both in a cognitive and emotional interaction. Although the BodyBug device heavily draws the attention of the users, which this project wants to avoid, it's still an appropriate example to mention here. Since the goal of the project is to attempt to create an interactive system that engages the entire body in movement with a human centered view, BodyBug is closely related to this project.

The Machine To Be Another

The Machine To Be Another: embodiment performance to promote empathy among individuals by BeAnotherLab is an exploratory artistic project that investigates the connection between identity and empathy. It is a system that was created with the aim of carrying out a pilot study on body swapping. This is the first formal experiment that enables people to swap their 'real' bodies. This embodiment system was built with the aim to focus on the connection between identity and empathy. (Bertrand et al. 2014)



With help of virtual reality technology and by combining neuroscience experiments and real life performances the project allows participants to see themselves in the body of another person and thus create an immersive experience.

TMBA is 'an artistic project addressing the perception and understanding of the Self based on the understanding of the Other'. (Bertrand et al. 2014, p. 1) By integrating components of telepresence and performance in order to create the psychophysical experience of being in another's body 'The Machine to Be Another' offers an embodied experience. Bertrand et al. (2014) points out that in order to create a strong illusion portrayed by virtual reality, participants must be able to get into other's perceptions with their own body as they would do it in real life. As he explains it can take place 'when sensorimotor contingencies for perception are similar to those of physical reality' (Bertrand et al. 2014, p. 2)

By merging different mechanisms the system applies multi-sensory stimuli such as visual, tactile, proprioceptive and audio to create the illusion of body swap. Servo controlled cameras capture the performer's first person perspective allowing the user to view the performer's torso, legs, arms, etc. With help of these cameras as well as microphone, head tracking and headphones, the movement of the user and performer are joined. Thus the performer, who replaces a virtual body, is able to repeat the user's movements as accurately as possible. User and performer are in an identical space where both can interact not only with their own body and different objects but also with the performer's thoughts and memories. This enables participants not only to interact with the physical space but also to feel tactile stimuli. In addition to this there is an extra layer, the performer's narrative is played. TMBA focuses on shared movements, physical objects and identical surroundings in order to improve the sensorimotor possibilities and to deepen the illusion of being in another place and body.

Similarly to The Machine To Be Another this project addresses empathy with the focus on the other person's view thus it emphasises perspective taking. Moreover the TMBA system enables participants to interact with physical space and strengthens their immersive experience by with help of an additional audio layer. Although this project doesn't focus on narratives, it does incorporate audio in order to enhance the embodied experience of the other body.

Paint with me

The Painter Project by Lynda Joy Gerry (2017) is a project that explores the possibilities to stimulate empathy and creativity by getting into another person's perspective by letting the users look into the artist's creative process. Participants watch a video from the painter's perspective through virtual reality environment while they paint on a real physical canvas.



Performer (Painter) wearing camera mount and binaural microphones

User (Subject) wearing Oculus DK2 headset and binaural headphones



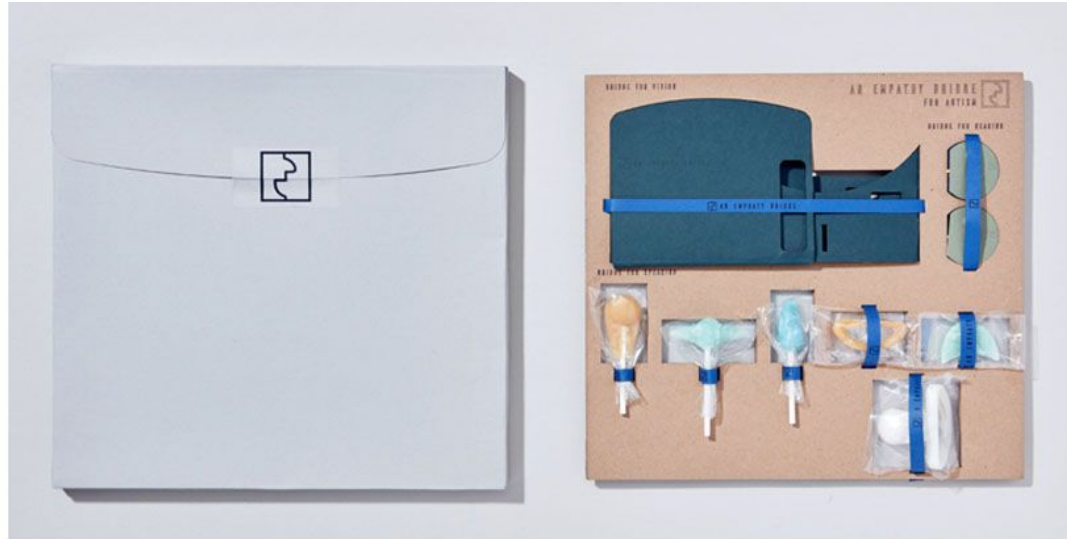
Leap Motion Integration

In a Mixed Reality arrangement the virtual canvas is mapped onto the real physical canvas where the user paints on. With help of Leap Motion integration with Oculus DK2 virtual reality headset the user's hand is rendered, made visible and it's size matched to the painter's hand. Thus the user may paint synchronously on the real canvas by laying his or her hand on top of the painter's virtual hand and thus following each movement of the painter.

Paint With Me is a great example of related work that addresses embodied perspective taking. Likewise, as in this project, the goal is to allow the performers to explore synchronous movements from another person's perspective, through which they may establish empathic connection. As the author puts it 'this explorative study tested this virtual environment on stimulating empathy and creativity'. (Gerry 2017, p.1)

Autism Empathy Kit

The Autism Empathy Kit - Empathy Bridge for Autism (Heeju) is a three part toolkit accompanied by a mobile application. It takes into considerations the sensory abilities, mental processes, bodily movements and communication channels of autistic individuals, that function unlike in any other healthy individuals. The kit was designed focusing on these three areas - sight, hearing and speech- in mind. The set allows users to experience how it is to live with autism by allowing them to experience the world from the perspective of an autistic person. Thus the tool kit contains an augmented-reality headset, pair of headphones, lollipops and supported by a mobile application.

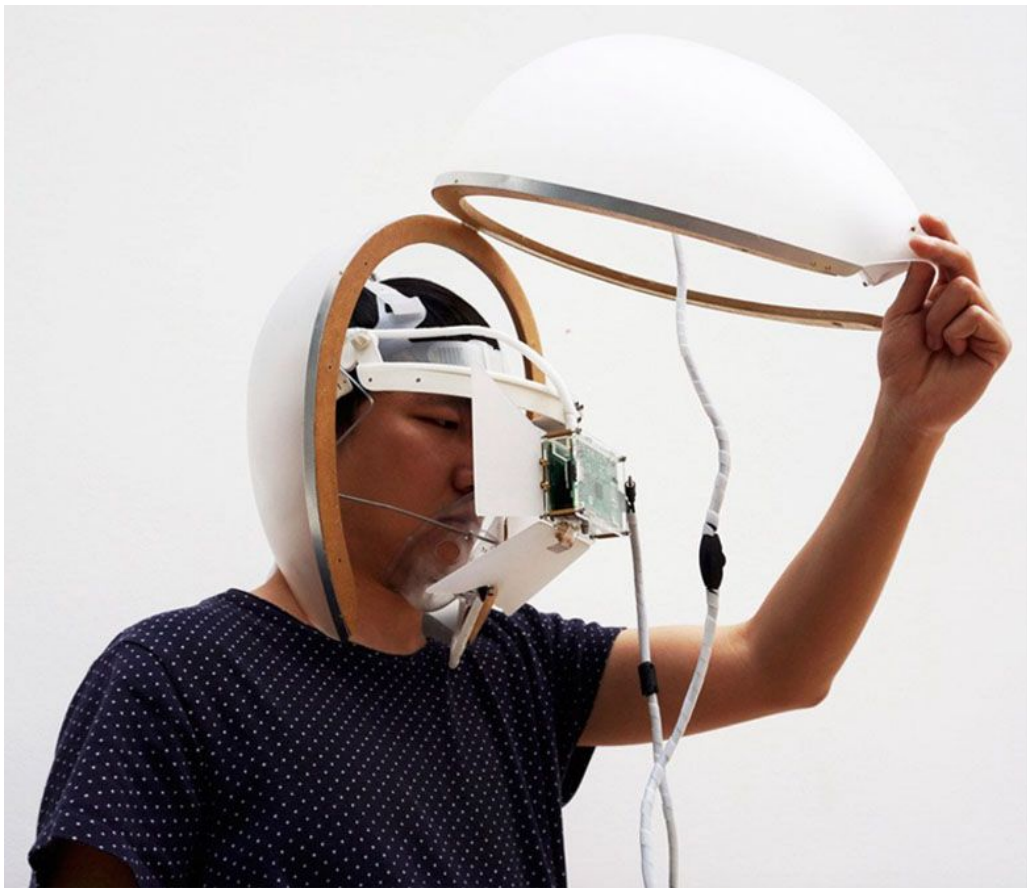


The unique shapes of the lollipops interrupt the tongue, modifying the user's' speech abilities. Thus disabling the user to have a smooth and continuous conversation. The augmented-reality headset modifies the user's' sight by limiting restricting the view of their periphery. It also causes double vision as well as conceals their focus by adding a black spot.

By intensifying sound the headphones simulates the oversensitive hearing of an autistic person. All the nearby sound and noise gets increased, blurred and distorted. Thus obstructs users in talking and engaging in a conversation. The set allows users to better understand the effects autism has on the individuals lives. The goal of both Autism Empathy Kit and this project relies on AR technology to enable perspective taking. However in Autism Empathy Kit a particular condition that is simulated is predetermined. In this project the outcome of AR simulation is determined by the user's' interaction. Thus the outcome is modified directly by the participants' interaction, such as awareness and bodily movements in real-time.

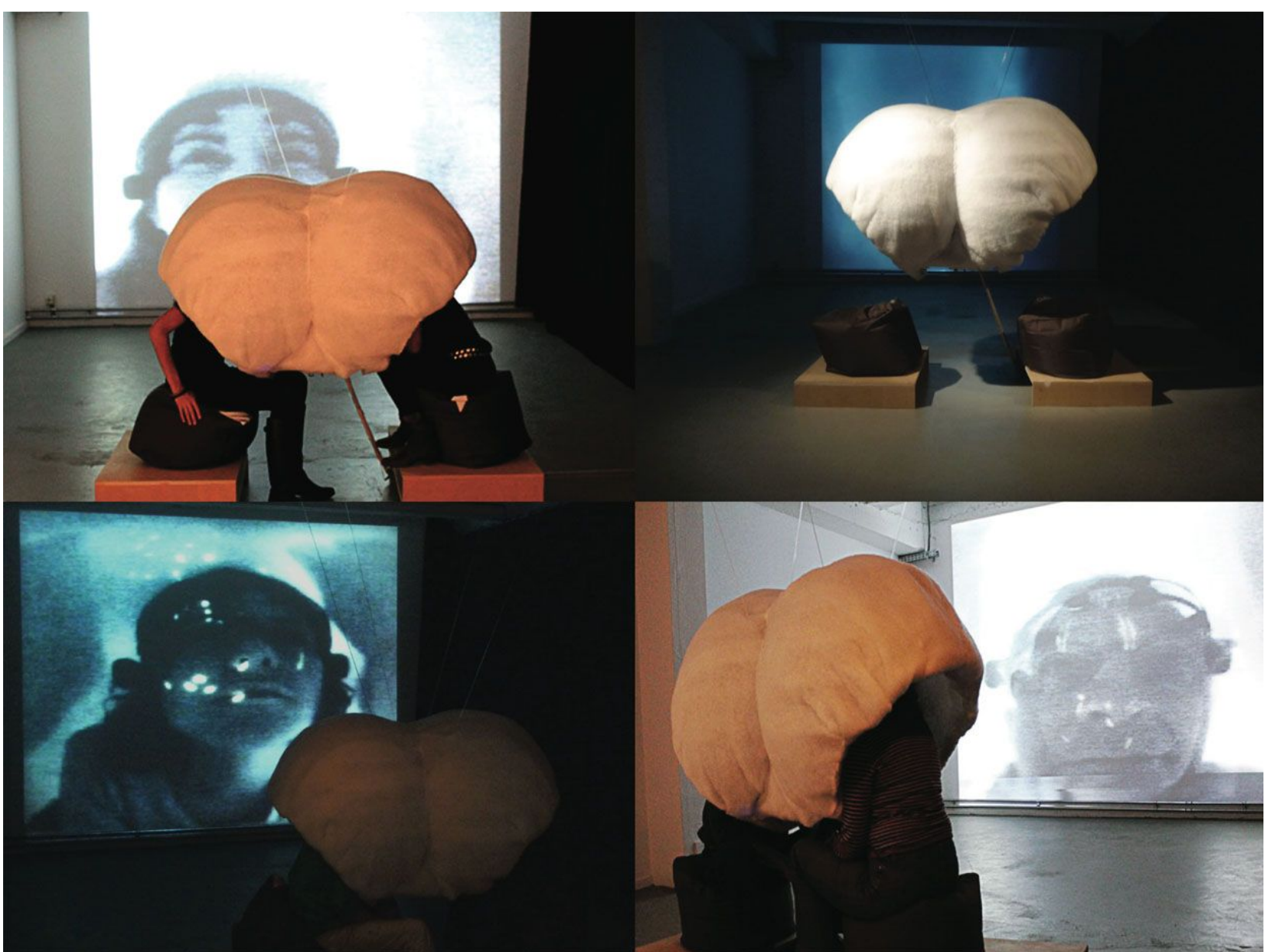
Dementia Simulator

Similarly to the previous related work example, Dementia Simulator by Di Peng (Peng) helps users to take the perspective of another person, those suffering from dementia. The interactive device consists of a transparent oval shape headset that covers the entire head which contains a piece for the ears, for the eyes and for the mouth. By altering the three senses, hearing, sight and taste, the device tries to imitate the obstacles that dementia patients experience. It distorts sounds and simulates auditory hallucinations by playing back hostile comments that are experienced by people suffering from the disease. The headset also contains a mouthpiece which mutes words randomly, hence obstructing the user during their speech. With the help of the helmet's visor the user's vision is blurred thus simulating the difficulties the dementia patient's face while trying to recognise others.



Unstable Empathy

Unstable empathy by Casalegno and Varriale is an interactive installation that is based on the cooperation, consciousness and entangling. The aim is to experience at the physiological level. It allows two participants to achieve a so called 'empathic state of superimposition' (Casalegno and Varriale 2011, p. 1) using only on their brain activity.



The installation consists of a booth-structure interface and a large scale video projection. The interior of the interface is lined with mirrors, pico projectors and speakers. Using EEG headsets the participants' brain activity is tracked and translated into visuals, snapshots, of their faces that are projected on the wall.

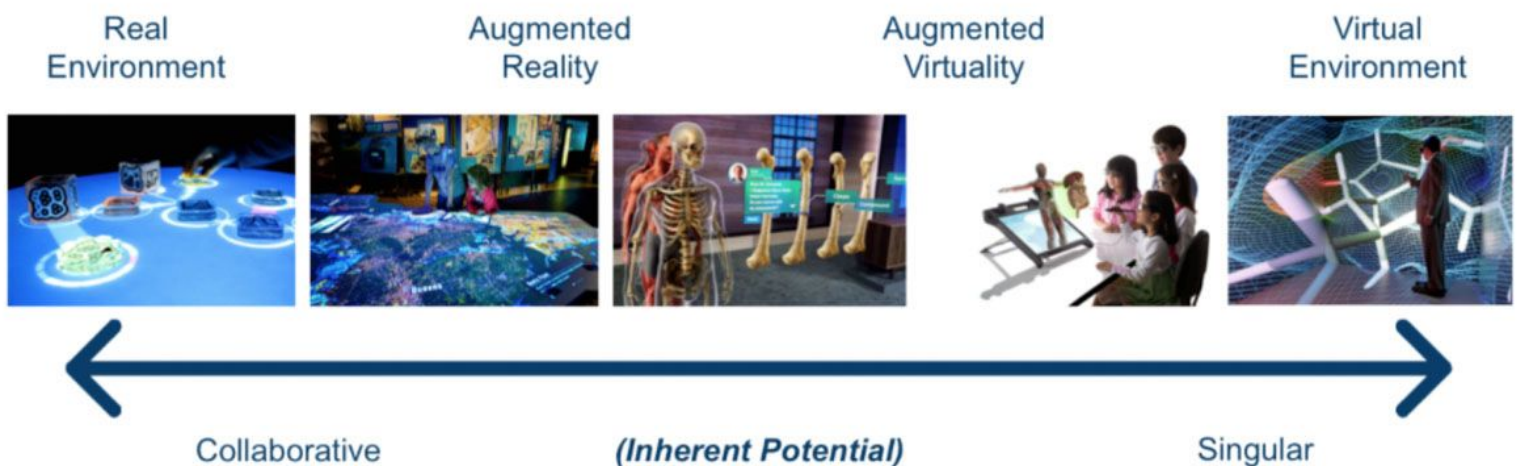
The interactive system captures and renders a deeper sensorial interplay of two people that they may achieve only with continuous cooperation and negotiation. Additionally to the visuals the participants can hear their own and each other's emotional activation levels through the speakers. The participants' are free to improvise and experiment with the way they wish to

interact. Their empathic state relies on what extent they are capable to remain in a particular 'activation range'. Whenever they reach this empathic state their faces are lit up so that they visually overlap. Then a snapshot is taken resulting in a complex visual output, a representation of their mental effort.

As the name of the installation suggests the 'unstable' characteristics of empathy is reinforced. Both Casalegno and Varriale's work and this project addresses empathy similarly, as they both require the performers to constantly engage in and be aware of their own and other's movements. Although Unstable empathy relies only brain activity and some limited face movements, they takes place in a remediated environment in real-time just like this project.

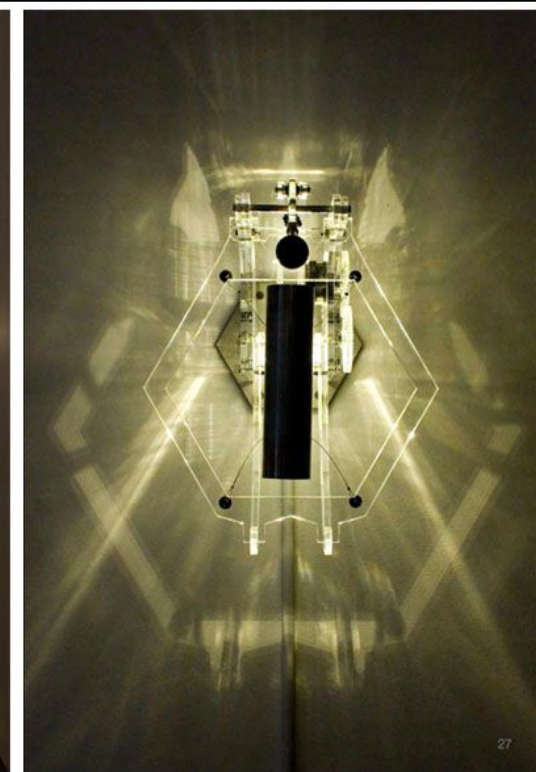
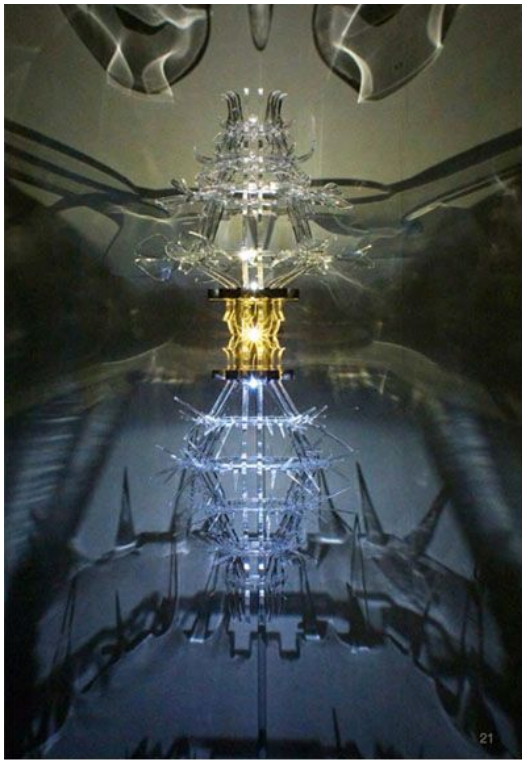
Augmented Reality

Milgram's reality-virtuality continuum is an important related work example for this project because it demonstrates well the scale of different environments from Real Environment to Virtual Environment. This example shows the transition from 'World Unmodelled' to the 'World Completely Modelled' and explains where AR, AV and VE may work.



Glittering Machines

Glittering Machines are the work of Paul Myoda (Myoda, 7-51) and are a series of interactive sculptures that interact with the audience real-time. The physical motion is based on kinetic mechanism where the interaction has surprising effects on the audience, such as 'light effects change based upon the proximity of the viewer' (Myoda, 7-51). The work was inspired by the painting *Twittering Machine* of Paul Klee (1922). Among them are 'Structure & Kinetics' where he combines 'mechanized motion and a sounding element, such as a chime, bell' and uses light effects, such as light and shadow, that are projected on the wall.





5. DESIGN METHODOLOGY & ACTIVITIES

Research Through Design

William Gaver (2012) asserts that Research Through Design is an approach where among the major goal of the designer is to unveil a variety of issues and opportunities, by building up a repertoire of related topic and theory. Building on the knowledge gathered from studies in phenomenology, physiology, psychology and sociology. In order to create a theoretical background, research in psychology, physiology and sociology were conducted on which this thesis built upon. In turn it's conclusively placed it in the context of interaction design. In order to place RtD in the context of interaction design several significant measures must be taken into account. Documenting the research and design process with attention to its delicate details are one of them. The other is that both through the research and the design process should result in a substantial innovation. Another very important measure is that the method of RtD should be applicable to the interaction design community, by presenting a visionary idea or design solution, that will fuel a transformation and cultivate a desirable condition. (Zimmerman, Forlizzi and Everson 2007).

Although the goal with this research is to apply Research Through Design (RtD) as main methodology, performative and phenomenological methods are carried out. More specifically an array of design activities such as workshops, where different performative and embodied methods and are conducted, in order to explore the moving body as creative design material. The goal is to attempt to open up the definition of the body to a materialistic interpretation.

Performative & Phenomenological Methods

Wilde (2011, p. 22) points out that today technology stands in the focus therefore it's important to 'restore the concept of design as bodily activity', and as he further explains 'moving to design and designing to move' is a way of achieving it. Thus he points out the importance of the approach 'designing for, with and through the body in movement' by which he means 'design through movement, rather than through the body', that may entirely affect the design method. (Wilde 2011, p 22) He means creating design activities and involving participants physically, phenomenologically, imaginatively and creatively throughout the entire design process. He points out that movement may advise the design when it is used as an agent to help and stimulate non-verbal reflection.

There is much information, understanding and proficiency that escapes as our bodies engage in a constant movement. It's possible to gain knowledge that is lost in this process by designing for the 'moving, experiential body'. Moreover it's challenging to convey the bodily experiences we go through due to their very distinctive and individual characteristics. The fortitude, feelings and movements are all unique to each person's body that may not only influence the design process but also the end result.

Usually in design education the designer is not expected to include her or his personal perspectives and experiences. Wilde (2011) however argues that the individual encounters may turn into significant element and focal part of the design process. Thus he suggests designing 'for movement' by which he means a 'body-based design as an emergent, phenomenological process'. (Wilde 2011, p. 22) According to him being involved in movement for exploratory purposes throughout the entire design process is a way for designers to exchange 'bodily experiences with the end users, as well as with the design itself'. (p. 22) Thus resulting 'bodily knowledge' turns into a fundamental design material.

Using embodied methods already at the beginning of the design process is suggested by Segura and Vidal et al. (2016). Loke (2013, p. 25) advocates a 'first-person knowledge' approach by which she means 'using our own bodies to acquire understandings of phenomena and practices'. According to her by engaging in movement during the design process, as designers we may not only employ the knowledge of participants, but we may also develop consciousness and 'sensitivity of the internal and external relations of the moving body in space and time' as she further explains.

Workshops

Mediated vs Co-located

Among the main design activities are mediated vs co-located, that allows to compare and contrast digital and physical experiences.

Experiential Bodily Knowing

Other activities in form of workshops are arranged that apply Embodied Ideation Methods. These are appropriate when designing for full-bodily movement-based interaction, such as Bodystorming, based on Experiential Moving Body inspired by the work of Loke. (2013) According to Hummels et al. (2007, p. 677) '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'. In line with the above statement in his work Larssen (2007, p. 1) reassess interaction design method as a 'discipline of movement practice'. They establish a conceptual tool of experiential bodily knowing with the aim to 'present ways of thinking about knowing and understanding in design practice' (p.13). As well as in order to analyse and provide feedback to movement as part of the design process when designing for movement-based interactions.

Movement as Creative Design Material

According to Wilde (2011 p. 22) being involved in movement for exploratory purposes throughout the entire design process is a way for designers to exchange 'bodily experiences with the end users, as well as with the design itself'. Thus the resulting 'bodily knowledge' turns into a fundamental design material. He suggests an approach where 'designing for, with and through the body in movement' means 'design through movement, rather than through the body'. (Wilde 2011, p. 22) He also recommends involving participants physically, phenomenologically, imaginatively and creatively in the entire design process, which in turn may also entirely affect the design method and outcome. Treating movement as design material allows participants to explore their own bodily-movement abilities and investigate it in relation to others.

When body is treated as a creative design material it extends the definition of the body to a materialistic understanding. Consecutively it also extends the fundamental construction of

embodied interaction to new areas. Bodily movement is personal and individual and so is empathy, which is also objective and contextual. Thus bodily-movement is well-suitable material to work with when designing for empathy.

Process Phenomenology

Documenting and reflecting on the design process allows designers to understand, analyse and explore the different features of their design, thus it is significant part of the design process. Representations of design may suggest designers to envision design situations specific ways. Designing for movement based interaction means working with the body-in-motion and the experience that is sensed throughout the movement. It is a challenging to represent in a traditional manner in static form. Although video recording makes it possible to document movement as it takes place in time, however it's unable to register the emotion felt during the stream of movement. (Loke 2013)

Documenting phenomenology is one of the main focal points of this project and in trying to understand how it can be done Merleau-Ponty's (1962, p. viii) is a good starting point. In his work he claims that 'Phenomenology is accessible only through a phenomenological method'. He states that 'It is a matter of describing, not of explaining or analysing'. (p. ix). Although his thoughts may give us an overall idea, but they're too vague since they lack an in depth explanation of how documenting phenomenology can be done. Thus for a more specific definition of the term 'phenomenological method', which Merleau-Ponty (1962) doesn't give us, this project turns to another source. The work of Susan Kozel (2010) provides a detailed explanation by giving concrete examples of Process phenomenology. According to her it's a 'creative and critical methodology' (Kozel) and an alternative and effective way for documenting the design process which allows avoiding the 'gaze of camera'.

Kozel (2007, p. 8) calls her book as a 'a piece of writing...through...and about phenomenology', and she describes process phenomenology as 'writing from our own bodies, from the moment to moment of our own existence'. She points out that although writing is considered as the most common abiding informative form of Phenomenological reflection it can be extended to other forms such as choreography or musical composition. (Kozel 2007) She further asserts that 'The early phase of transposing movement into words frequently requires sketching or drawing'. (Kozel 2015, p. 62) Following her suggestion, during the design process different types of phenomenological reflections were produced with the goal of recording the lived experience. During workshops participants were asked to reflect on their own and other's bodily-movement experiences by creating sketches and producing sound using different objects and a keyboard. Asking workshop participants to take notes following the exercises allowed them to reflect that will in turn 'deepen and enrich' the experience they went through. (Kozel 2015, p. 60) Similar reflections were done from a 'first-person' or designer's view.

6. THE DESIGN PROCESS

6.1 Design activity 1 in two parts - 'Move & Observe'

As mentioned earlier Segura and Vidal et al., (2016) suggest applying embodied methods during the design process. Kozel (2015, p. 55) proposes that ‘phenomenology itself is performed; it is not simply a methodology applied to performance’. In line with these, as first steps of the project two pilot experiments were designed, as a way of framing and initially delve into the core of the research.

Inspiration

Inspired and suggested by Loke (2013) this design activity was carried out with a ‘first-person knowledge’ approach in mind, i.e. involving myself, as the designer, in bodily movements.

Goals

The primary goal with both versions of the exercise was to find answers to the following questions: *How do we perceive others’ movements? What kind of thoughts and emotions are generated in us when we watch the movements of others?* Based on the embodied methods and techniques presented by Segura et al. (2016, p. 59) the first two pilot experiments were created to enable an overall initial exploration of bodily movements, using an ‘activity centered approach’. Additionally the intention, through these activities, was to compare and contrast Mediated vs Co-located or Digital vs Physical experiences of both performer and viewers.

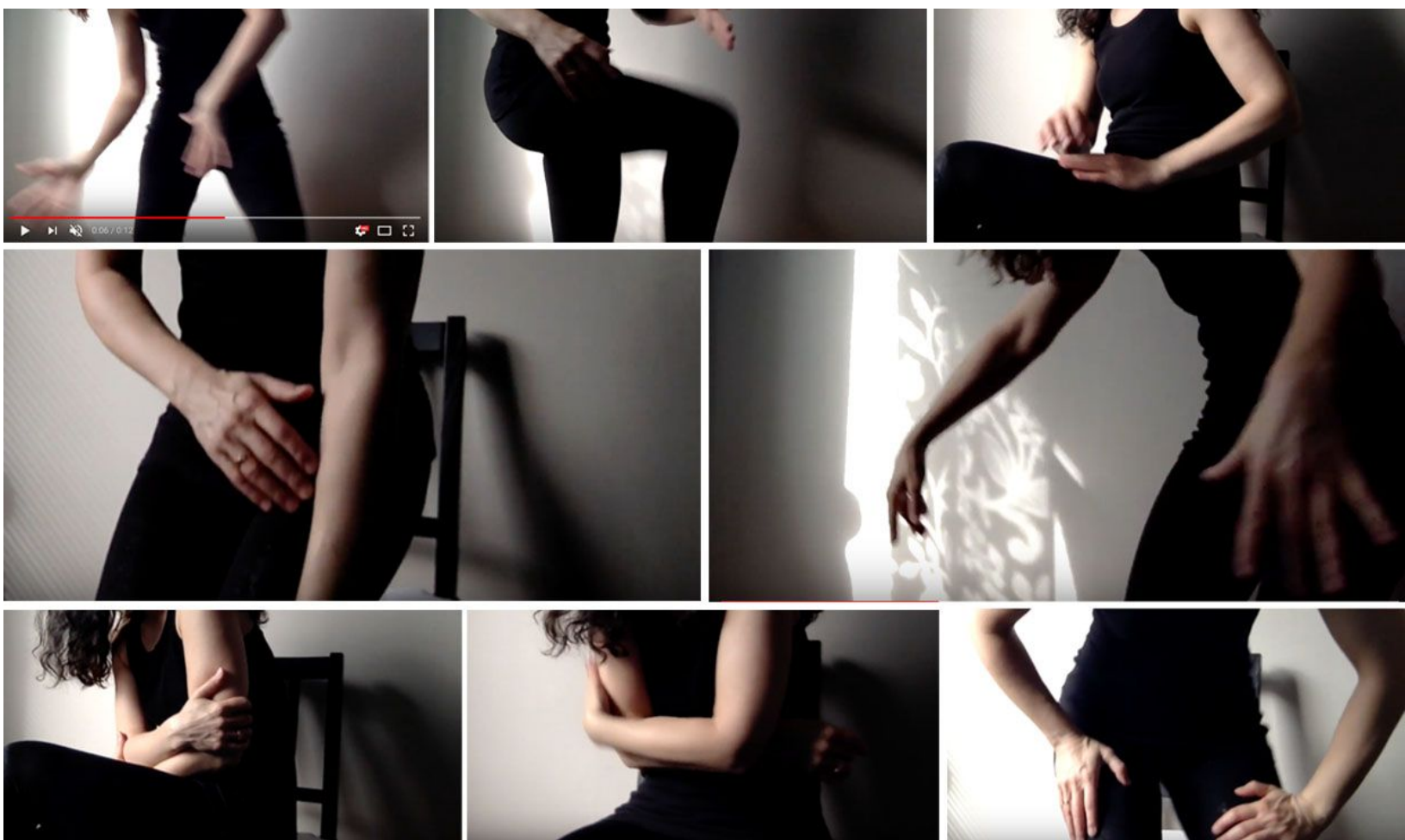
6.1.1 Part One – Digital

The mediated version of the activity

Process

Sixteen people participated in this mediated activity, which consists of four short self-recorded video-clips, each followed by a brief questionnaire. The video-clips show different bodily movements carried out by myself. The intention with performing the movements were to convey different emotions and state of mind by performing so called ‘natural’ or ‘free’ and ‘staged’ movements. The face was cropped off the video clips to maintain the focus on the body. After watching each clip (0:13, 2:14, 0:46, 0:17 long) the participants were asked to answer questions. Additionally to the participants’ feedback ‘first-person’ feedback was done as process phenomenology based on suggestions by Kozel (2015).

The videos were accessible online by the participants who could answer the questions anonymously. The activity was announced to a selected group of friends and acquaintances, from around the world, on facebook. Thus the audience were adults from different countries and continents, backgrounds, ages ranges between 20-56. It was a relatively easy and fast way to reach out to the most diverse audience possible within the given amount of time.



Link to videos and questionnaire <https://judikom.typeform.com/to/CH8QqB>

Assumptions & Expectations

Some of the initial assumptions were, that despite of our unique backgrounds people will be able to understand certain 'common' and 'natural' movements, and their interpretations will be quite similar. Other expectations were that it'll be fairly easy to connect more 'common' or ordinary movements with basic human emotions.

Challenges & Issues

Having to perform bodily-movements for an unknown an invisible audience caused anxiousness during the recording. In absence of a direct feedback or a live and immediate reaction the performance felt a bit dull and made it harder to carry on with the initial plan. Often it felt pointless and I repeatedly had to remind myself of the emotions I wanted to express.

Feedback, Findings & Insights

The results of the experiment were quite similar to the initial assumptions. E.g. participants' interpreted the more 'natural' and 'common' movements similarly and connected them with feelings such as nervousness, anxiety, pain, sadness, etc. The majority thought that in the fourth clip the person is either having cold or feeling uncomfortable. Other more 'staged' movements seemed to cause confusion and seemed more unclear to the observers.

The feedbacks also revealed that a 2:14 min long a video-clip is too long, which is partially due to its content, a mixture of slow and confusing movements. Some people paid more attention to the

background than the movement itself and others noticed even the smallest details such as movement of shadows on the wall. They also pointed out that the absence of the face evoked curiosity in them. These responses generated new thoughts and ideas for the second co-located part of the experiment. Additionally to the viewers feedback a 'first-hand' or designer's feedback was done following process phenomenology as suggested by Kozel (2010).

6.1.2 Part 2 – Physical

The co-located version of the activity

The second part of the 'body movement & emotions' activity was setup as a co-located workshop with seven participants inclusive myself involved. Among the participants were two people who also took part in the mediated version of the activity.

Process

Eight people inclusive myself participated in the workshop. Participants were asked to watch me performing four short movement sequences. The observers could sit or move freely around me in the room. They were asked to take brief notes, which they could do during or after each movement sequence. At the end of the activity they were asked leave a more detailed feedback by filling out a questionnaire. The questions were similar to the ones used in the mediated version.

Feedback, Outcome & Insights

Performing real-time in front of an audience and sharing space with the viewers made a significant difference for both performer and viewers. The performance felt more intimate, lively and purposeful. Comments from the participants revealed that they felt connected with the performer. Among the participants were two who also took part in the digital version of the activity. They noted that unlike during the viewing the video-clips, watching the performance in real-life, with the face of performer now visible, made them feel 'drawn into the movements' and connected to the performer. They, along with other observers also explained that eye contact with the performer made the experience more immersive.

Compare-contrast: online vs co-located versions, their process and outcome

Post-activity discussion with the participants revealed that our own perspectives, imagination etc play an important role in how we perceive other's actions and performance, in this case bodily-movements. (e.g. if i cross my arm when i'm freezing watching someone else doing the same make me think that person is also freezing. etc). There was an emphasis on face-to-face, real-life performance and the importance of eye-contact, that viewers thought were necessary for having a connection between them and the performer.

6.2 Design activity 2 – 'Observe & Embody'

Foster (2012) emphasizes mimicry as an essential step towards achieving an empathic connection. When talking about the connection between bodies she points out that ‘there is an apprehension of how bodies are both same and different from each other’ (Foster 2012). In accordance with the suggestions above, the two main exercises for design activity 2 consisted of posture and movement mimicry. They were designed to help to practice observations of self and other, and to investigate the way we may connect with other bodies, while discovering the differences and similarities between self and other. Furthermore the aim was to explore the possibilities of embodying another person, thus gradually moving into turn-taking or perspective taking.

6.2.1 Bodyscan

Design activity 2 started with a so called ‘bodyscan’ exercise. During the previous design activities participants were only observers. Involving them in this exercise was a way of introducing them to the rest of the movement activities that followed. It was a necessary step before proceeding with the rest of the activities that require more in depth observation of their own and others bodily movements and sensations. Starting from design activity 2 each workshop began with the same ‘*bodyscan*’ exercise.

Inspiration

In her book *Closer* Kozel (2007, p. 52) gives us an example of ‘method for doing a phenomenology of lived experience’, that generated this exercise.

Goal

The aim was to help workshop participants to develop self awareness, and guide them through the way they may bring attention to their bodily sensations. Additionally, as Boal (2002, p. 30) recommends, the goal is also the “‘de-mechanisation’, the retuning (or detuning)” of muscles, movements and senses in order to explore new unknown movements and sensations.

Process

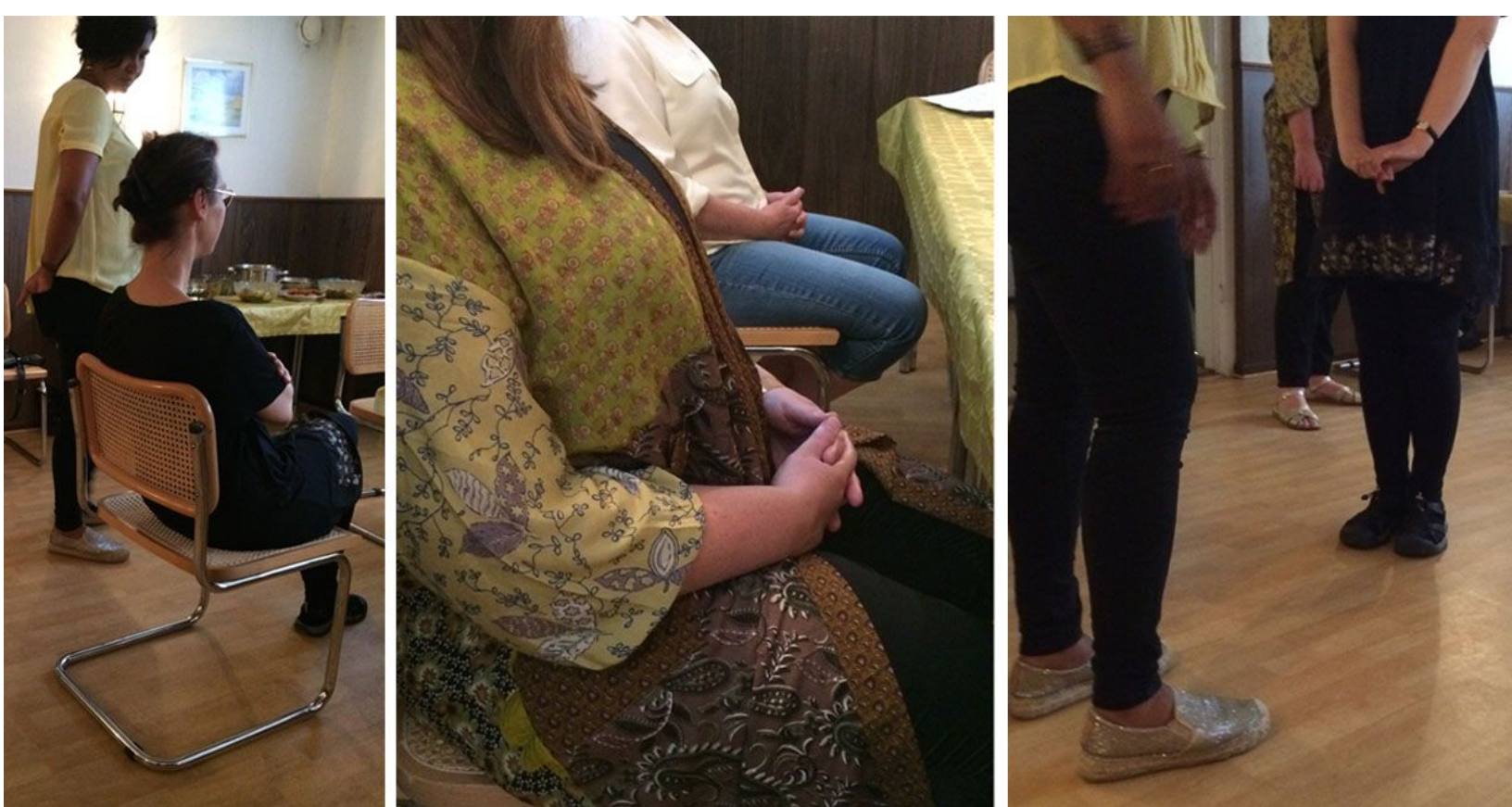
Participants were asked to lie down or sit comfortably on the floor or on a chair and carry out a short self-awareness exercise with help of instructions. After the exercise they were asked to leave comments on feedback-cards.

Feedback, Outcome & Insights

Notes from participants revealed that attention training was relatively complicated, especially because the majority of them were new to it. It seemed to be challenging to observe how they ‘feel’ instead of what they think and focus on the sensations they encountered in their bodies. Despite some difficulties there were a great amount of feedback and insights that participants recorded. Leaving feedback allowed them to ‘relive their experiences’ which in turn further strengthened the sensations they encountered, as commented some participants. They also mentioned that they felt that “they could do better” by practicing regularly, which they might consider doing in the future. Some insights were that through this exercise made them ‘jump from inside to outside’ as they were ‘connecting inside with outside body sensations’.

6.2.2 Posture mimicry

'Posture mimicry' exercise was designed to allow participants to embody others by imitating or 'stepping into' each others postures. This exercise required careful observation of others. Six people participated in this workshop inclusive myself.



Participants are studying and imitating postures during workshop

Goal

The goal with this exercise was not only to practice self-awareness but also establish a connection between self and other, as a small step towards perspective taking.

Process

Working in pairs participants were asked to embody each other by 'stepping into' each others postures. Participant one got to choose one of her/his common posture and the other participant was asked to imitate it after careful observation. This required them paying attention to the smallest details, e.g. angles, muscles, etc. After that they were asked to switch and do the same vice versa. Following the exercise they were asked to leave feedback on printed cards.

Feedback, Outcome & Insights

Through this exercise it can be concluded that in order to observe and recognize elements of the postures of others, it's important to first be aware of the own body. Through the feedbacks and reflections it was also revealed, that in order to mimic another body one must practice awareness of own and other body interchangeably. This is not a one way process but a constant step-taking of observations, back and forth from own body to another.

Participants reported feeling connection and attachment towards the other person they imitated. By mimicking each other's bodily postures, mannerism creates affection and relationship between people. (De Vignemont and Singer 2006)

6.2.3 Movement mimicry

Inspiration

Boel (2002, p. 31) points out the need to explore and understand 'What causes so-and-so to walk in that particular way'. Thus this exercise was inspired by the 'Muscular exercises' where the emphasis is on the importance of 'an understanding, from the inside, of the mechanics of each movement'. (Boal 2002 p. 31)



Exploring 'natural' and 'modified' walk while imitating each other.

Goal

The overall goal of this workshop was to explore the ways we may alter our movement habits. Additionally to investigate the ways we may embody each other through mimicry and to understand the processes that take place.

Process

Four people including myself participated in this workshop. The first part of this exercise was done in group. The first volunteer was asked to perform her 'natural' walk while the others observed and took notes. After everyone performed their own walk they had to pick and imitate someone else's walk, without disclosing their choice. Others had to guess whose walk was being imitated. Finally everyone revealed who imitated whom and discussed their observations.

The second part of the exercise was done in pairs. Participants were asked to alter their 'natural' walk based on a 'state of mind', a feeling or a situation, etc. The other participant had imitate by walking along with the person. Everyone had to take notes directly after the exercise and then discuss their remarks in group.

Feedback, Outcome & Insights

Some of the insights were that the exercises were harder than expected. Imitating both walks were challenging for different reasons. The difficulty with the 'natural' walk was performing it from

memory. The 'altered' walk was a challenge because it was difficult to keep up with the other person's tempo while observing. Walking next to each other also made it harder to pay attention to the other's movements and maintain a steady imitation as they were forced to turn their head aside. Despite these difficulties participants said that it was easier to imitate the 'altered' walk than a 'natural' one because the former was more noticeable with individual characteristics. It could also be concluded that walking like the other created a connection between participants and during the walk they felt like as if there were tuned into the same feeling.

6.3 Design activity 3 – 'Emotions through movement'

According to Fuchs (2014, p. 1) there is a fundamental connection between bodily movement and feelings, he further explains that 'one is moved by movement (perception; impression; affection) and moved to move (action; expression; e-motion)'. Based on these assumptions this workshop was designed to explore the relationship between movement and emotion.

6.3.1 Smooth line

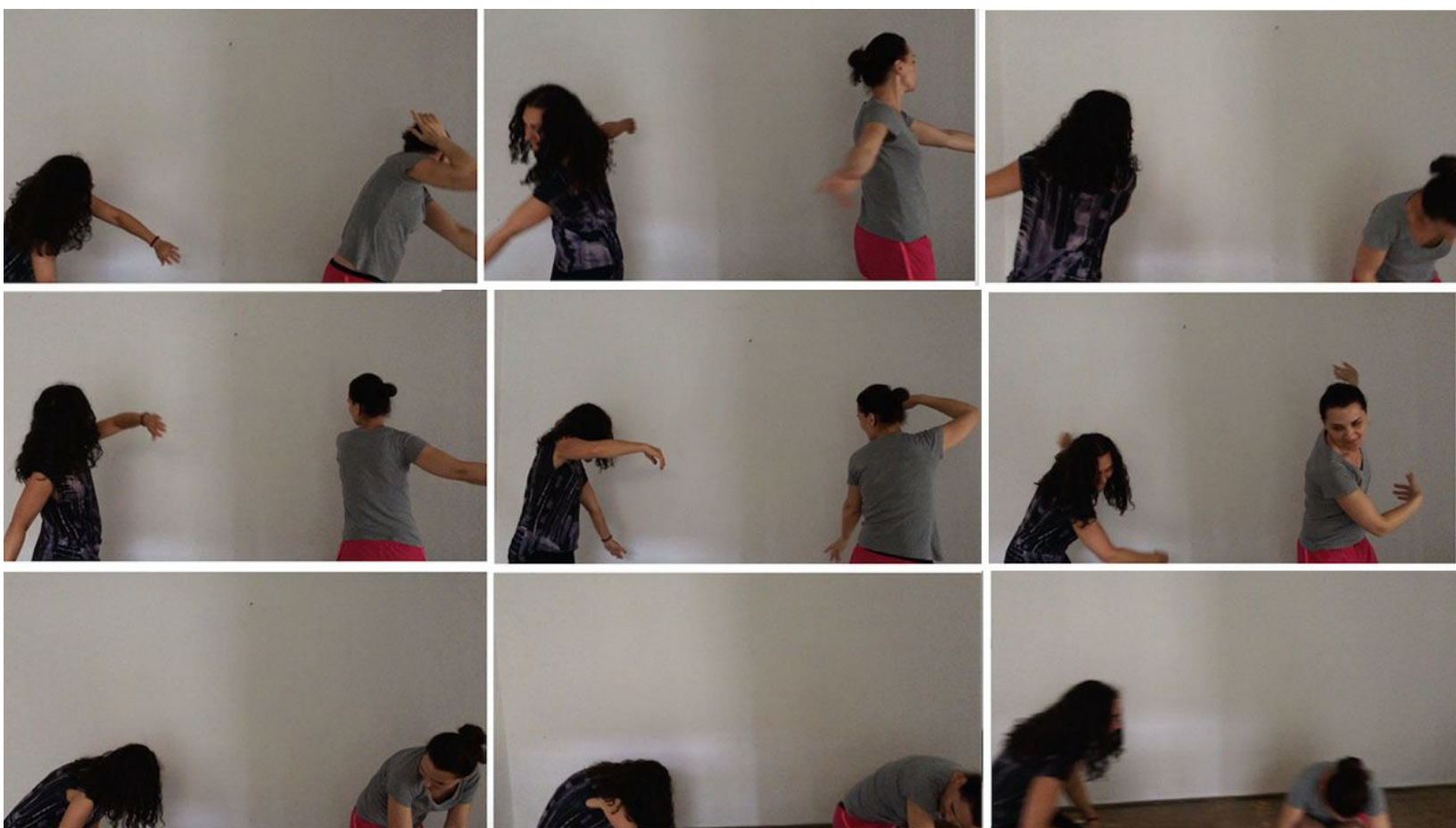
Inspiration

'Movement with over-premeditation' (Boal 2002, p. 69)



Goal

The overall goal with the workshops is to explore how we may express different emotions through full-bodily movement. Moreover to find out if it's possible to pass on emotions by creating a flow of movement between two people and how we may connect mind & body, body & emotions and body with body through movement.



Exploring movements during 'Smooth Lines' workshop

Process

Four people participated in this activity. Working in pairs, participants were asked to perform a movement that express an emotion or a 'state of mind'. After the first person started the other had to continue the movement. The task was to strive to maintain a flow and try to move as if it was one person who performs the movements. The goal was to 'pass on' the movements as if they're creating a smooth 'line' between their bodies. No talking or touching was allowed. The pairs switched and performed more rounds. After the exercise participants were asked to leave feedback on printed cards, and reflect on their experience in details by engaging in discussion.

Feedback, Outcome & Insights

Through participant feedbacks and after own observations it can be concluded that in order to carry out continuous and smooth movements negotiation between performers was necessary. This required the participants' constant attentiveness, which was possible by performing the movements facing each other. Participants also pointed out that by using direct eye contact they were able to make somewhat smoother transition of movements. It enabled them to understand when to switch. They affirmed that the give-and-take of movements lead to a more personal inner connection. Insights from the previous workshop revealed that it was difficult to observe and imitate movement of others while e.g. walking next to each other. Participants commented that facing each other would allow them to pay more attention. This exercise was designed addressing this issue.

6.4 Design activity 4 – ‘Bodies & Senses’

Based on conclusions drawn from different studies and from the previous workshop activities we have attempted to find an answer to the research questions ‘How do we sense empathy?’ and ‘How may we sense it through movement?’. However the following issue ‘How can it be enhanced through an interactive device/space?’ was yet to be addressed.

6.4.1 Connecting movement with senses

Goal

With this question in mind this workshop was set up. One of the goals were to explore how we may connect the bodies, senses and space. Another goal was to find a way to enhance the connection made during the movement performances.



Emotions and movement are being explored during ‘Bodies & Senses’ workshop

Inspiration

Inspired by Kozel (2007) who points out that process phenomenology is also content creating. With this in mind this activity was designed involving participants in process phenomenology. This was also inspired by ‘Sensory exercises’ (Boal 2002, p. 31)

Process

This activity was done in group, among them two performers and others as observers. One of the performers were asked to choose an emotion without revealing it to the rest of the group. The task was to express this emotion through movement, which the other performer had to imitate. The rest of the group had to observe and reflect on it.

Kozel (2015) points out that although writing is considered as the most common abiding informative form of Phenomenological reflection it can be extended to other forms such as musical composition. Going from that observers were asked to create sketches as well as sound, using objects and a keyboard. One observer made sketches based on the first performer's movements. Two observers made sketches and another created sound, based on the second performer's (imitator) movements. The exercise was repeated similarly by different participants, trying different emotions. Some of the sound was recorded. After the exercise participants reviewed the notes and discuss the outcome.



Feedback, Outcome & Insights

As a result of the a variety of sketches and sound were created. Some of the sketches that were made by two different observers, who were recording the same performer, showed a great deal of similarities. From this it can be concluded that they perceived the movements similarly. It can also be said that among the reflective methods tried in this workshop are worth further exploration, e.g. a variety of sound effects.

6.4.2 Exploring turn taking

Goal

The previous exercise was slightly altered the following way with the aim to explore possibilities of turn taking. Another goal was to find out how two different people express the same emotion while having to imitate each other by taking turns continuously.



While some participants are performing others are taking notes by creating sketches and music.

Link to video: <https://www.youtube.com/playlist?list=PLIPS47NjzUrUgH9uQTko8qe4sb5OETWw>

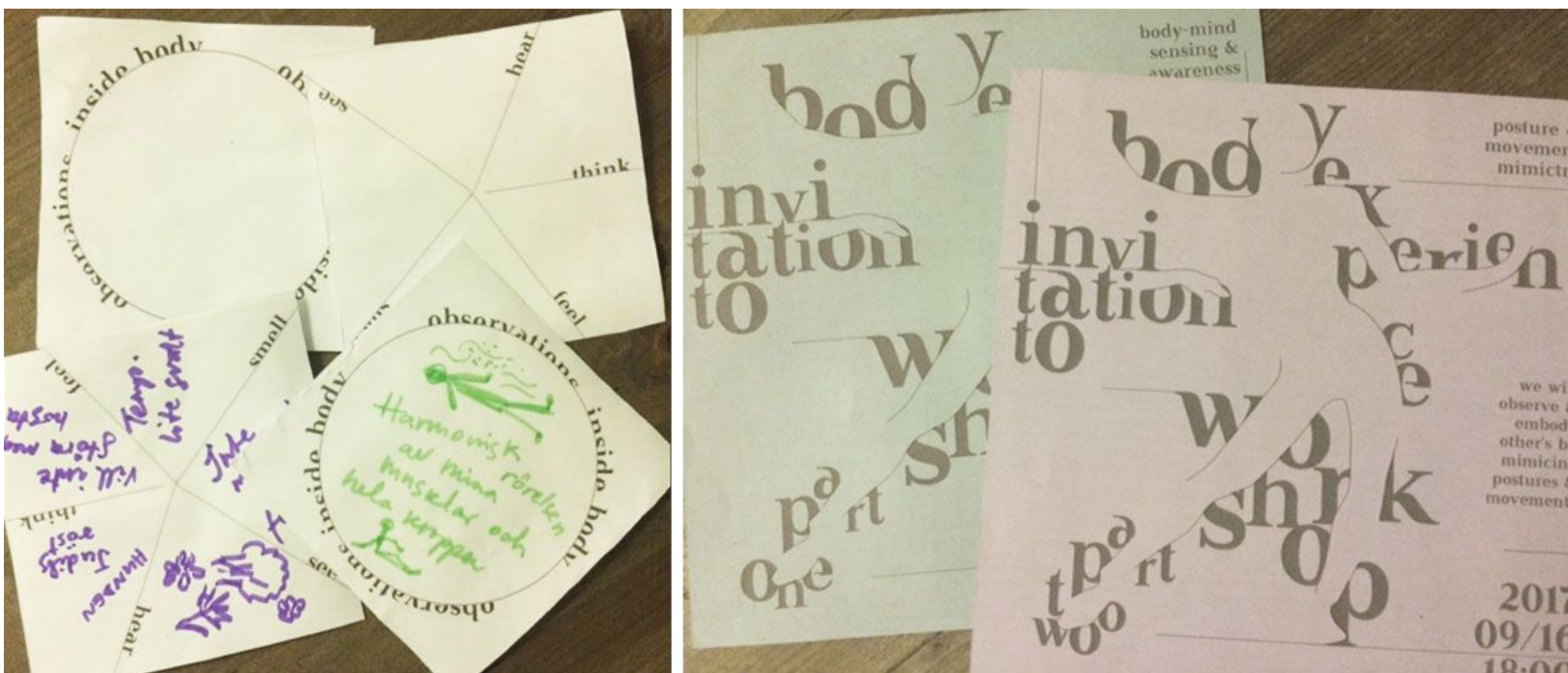
Process

This time the two participants who carried out the movements were both performers and imitators. Their task was to imitate each other consecutively by taking turns, without pausing. It was up to them how and when they switch tasks. Talking and touching was not allowed. They chose an emotion together, without revealing it to the observers.

Observations and note taking was done similarly to the previous exercise. However the difference here was that the observers' task was to record the mimicry that took place between the two performers. Note takers had to recognize when the turns were taken.

Feedback, Outcome & Insights

One of the insights of the workshop was that the performers influenced each other's movements as they were imitating each other's movements. They reported stronger connection which they claim was due to a more intense cooperation. More engagement and a deeper understanding of each other's movements and emotions were also mentioned.



Feedback and invitation cards for workshops where the in-, and outwards observations were in focus.

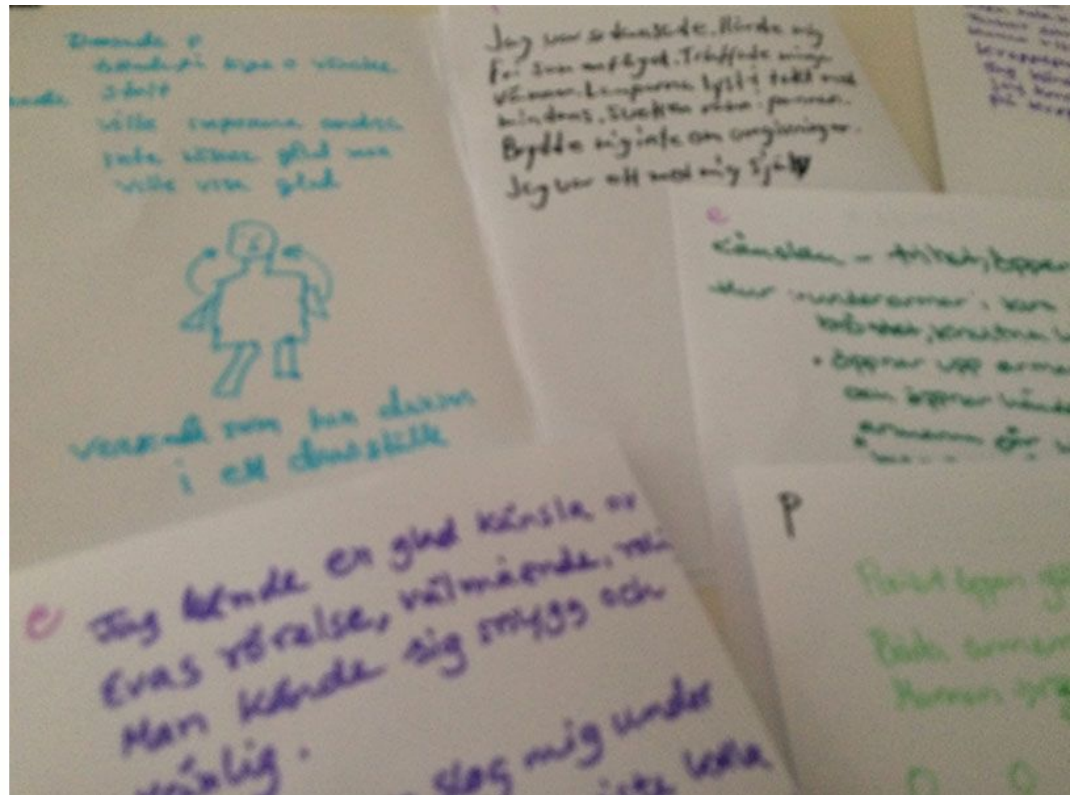
6.5 Summary of design activities

As an overall overview of the design activities the following conclusions can be drawn. The workshops were planned and came about through an iterative process. Conclusions and outcomes of the first two design activities helped in framing the focal points of the third activity. Following that the after-workshop discussions, among them coordinated debates and free conversations, were beneficial for constructing the next design activities. Likewise the rest of the workshops were born also through an iterative process, by one activity leading to the next.

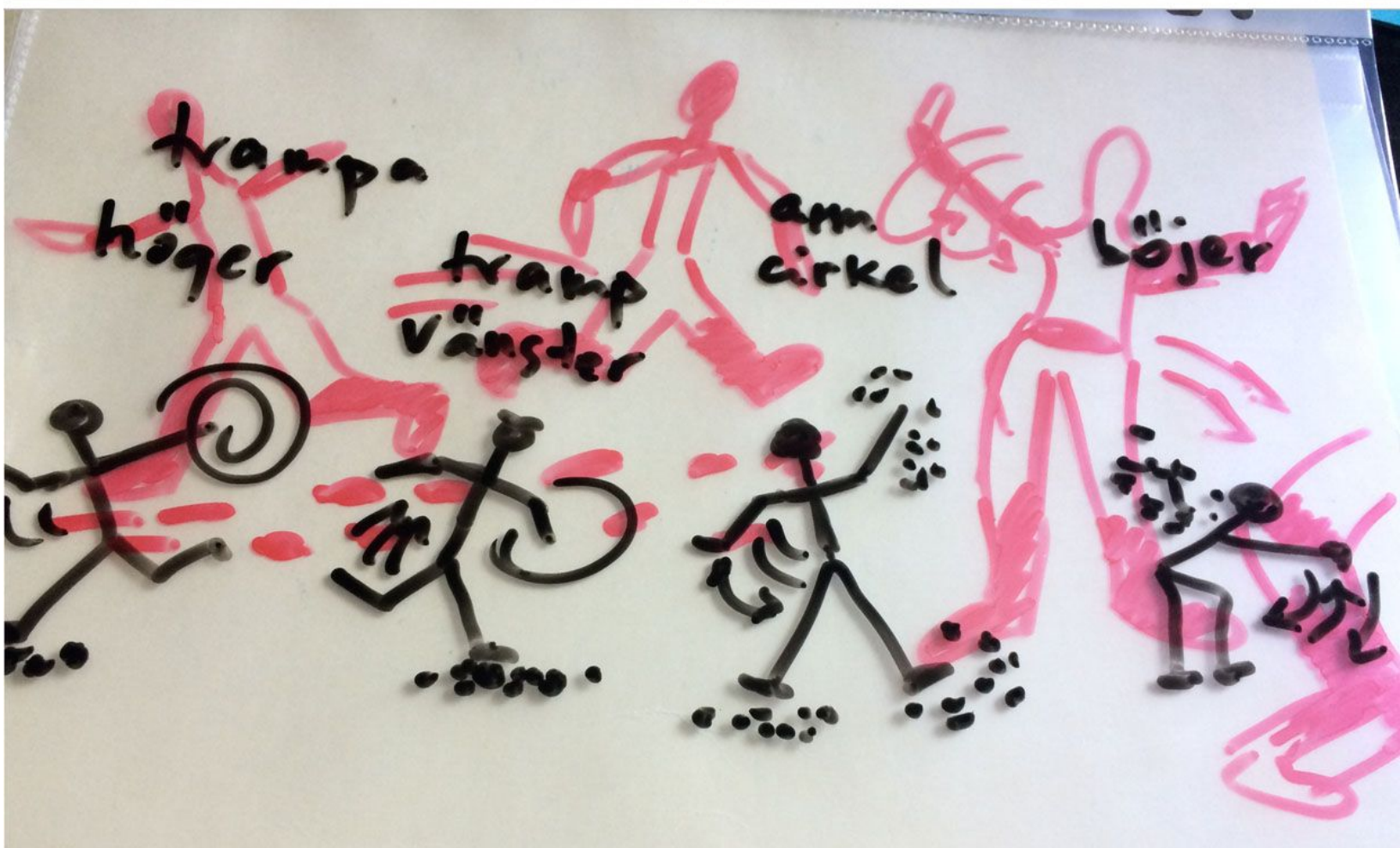
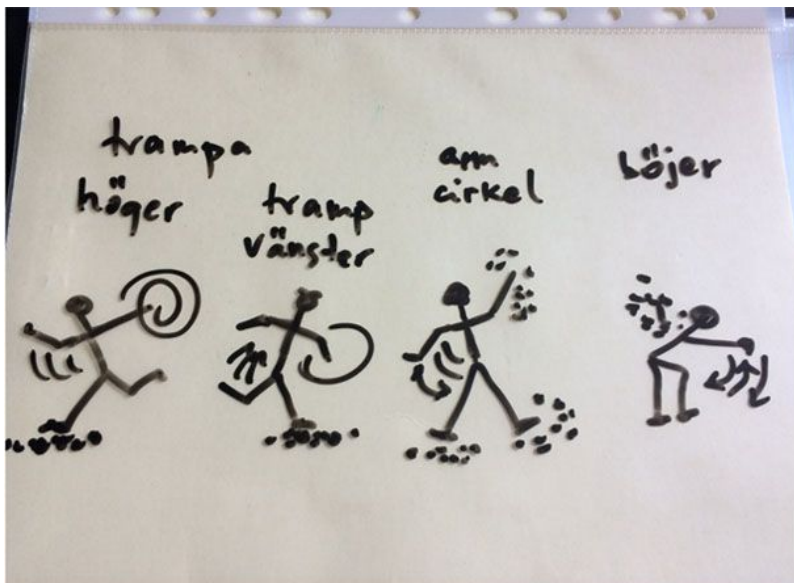
The design activities carried out during the project addressed the topic of empathy in diversity different ways. The aim was to target a diverse audience, thus with that in mind, the workshop participants were from a range of backgrounds, geographical locations, interests, occupations, ages, genders and physical upbuilding, etc. Among them were who have never met before and didn't know each other at all. Thus the construction of the workshops reflected well the diverse societies we live in today.

To address empathy the workshops were designed to allow participants to engage in activities that were based on performative and phenomenological methodologies. These exercises enabled them to practice body-awareness, movement mimicry, affective turn-taking as well as to explore the relationship between bodily-movement and emotion. Through full-bodily movement exercises they were able to discover and experience the restrictions and circumstances where empathic connection may emerge. The awareness exercises in particular helped to foster alertness of own and others bodies. Furthermore a deeper understanding of the transfer of immersive and personal experiences has emerged. Consecutively the duality of 'sameness and otherness' were emphasised. Overall these exercises helped to foster an understanding of how to establish empathic connection between people.

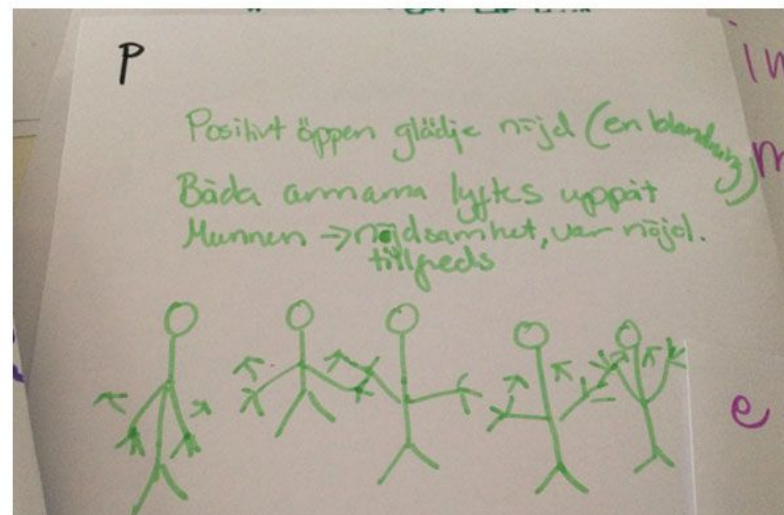
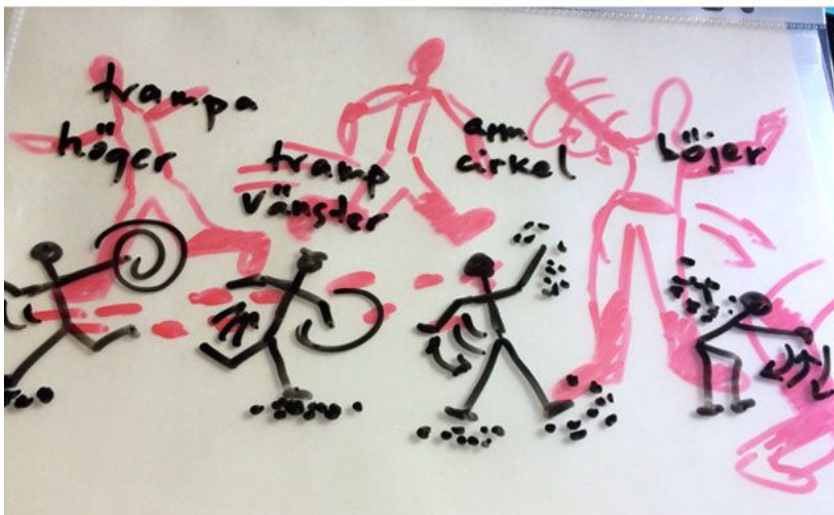
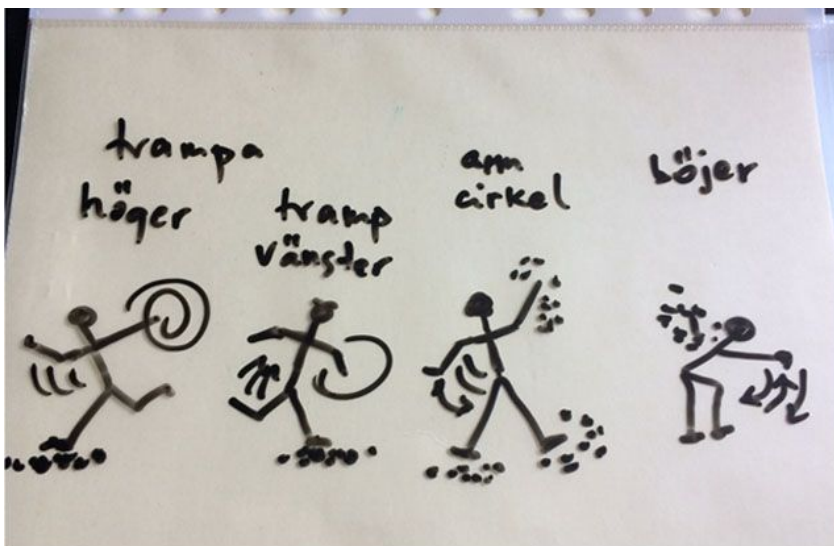
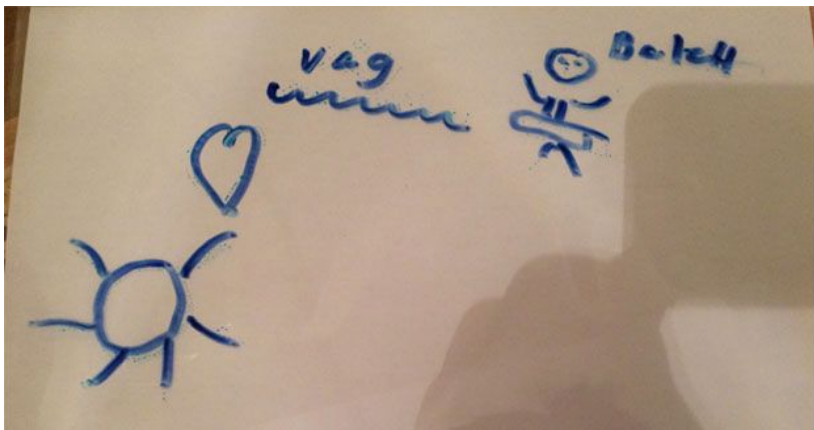
Insights to the workshop activities revealed that mimicry of bodily postures and movements, which can be achieved through careful observations, lead to immersive connections between people. The workshop activities also reinforced what the studies and theory suggested, that in order to experience an 'isomorphic' effect of the other person, practicing affective turn taking through bodily-movement is essential. Conclusively it can be said, that when two people are being involved in a physical, real-life movement mimicry they 'go through' a shared experience together. Empathic connection takes place when shared 'life-experience' occurs.



Blurry photo of notes created by participants during workshop.



Sketches, showing similarities, created by two different participants while observing the same performer. Transparent plastic sheets were used which could be used as layers during group discussion.



More sketches done by participants during the Body & Senses workshop.

7. OUTCOMES

As pointed out earlier phenomenology is about randomness and the explicit encounters that take place in dynamic environments. It also places interaction in the center from which the meaning rises, thus the main focus is on the connection between the body and the world. With these in mind followed are the design suggestions.

Design suggestions

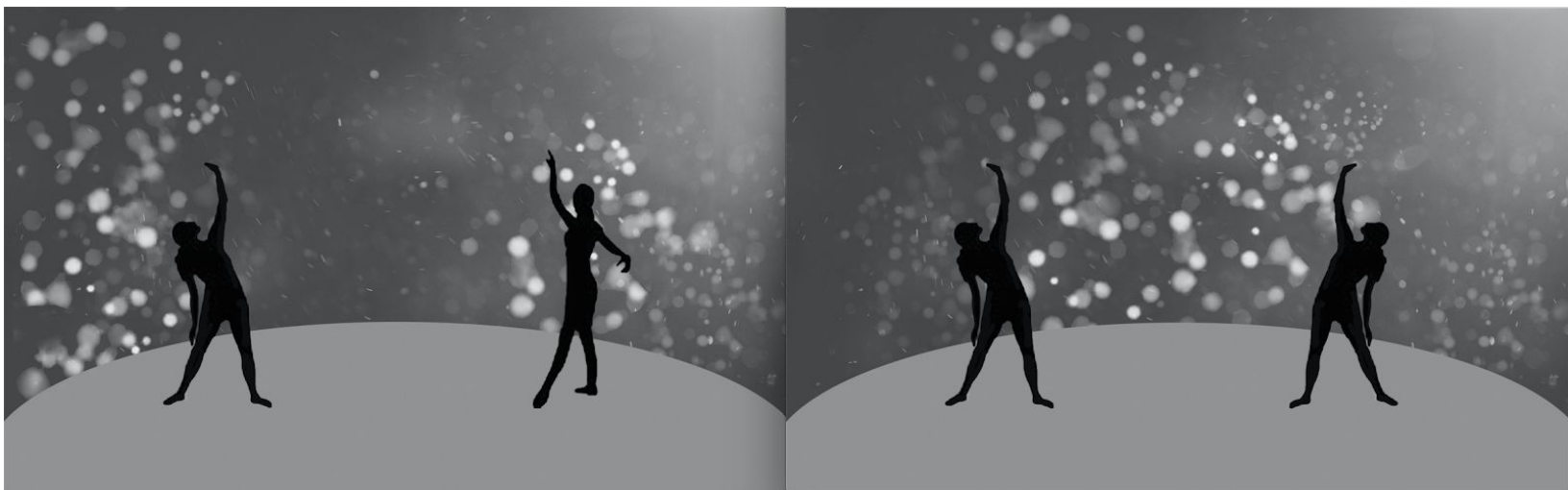
7.1 'Empathy tunes'

That allows users to tune in to other's emotions and empathize.

7.1.1 Performance for two

Concept

An interactive space that supports and enhances empathic connection, by enabling participants to tune into each other's emotions through perspective taking. Empathic connection is achieved through awareness, approximation and mimicry. The imitation of the other's bodily-movements takes place in form of a 'real-life' collaborative performance and empathy manifests in form of sound and light. Ephemeral elements, such as the movement, energy, sensibilities and affective expressions of two people are captured and represented by sound and light.



Sketches of *Empathy Tunes*, Performance for two. *Image 1* shows the performances and the resulting light effects on the wall, which appears behind the performers due to their distinct movements.

Image 2 illustrates movement mimicry carried out by the two performers. The light effects appear the wall, now between the performers as they establish empathic connection.

How it works

Sensors of motion-capture system in the room captures the bodily-movements of the participants. Identical movement produce sound that are played out loud. The outcome are tunes that are 'composed' by the bodily-movement of participants or 'performers', as well as light that is displayed on the wall around them. As a result of their collective effort their affect and empathic connection is conveyed. The person being imitated can hear the sound of her/his own movement through another person's performance. The affect that is expressed by one person is perceived and returned through the other's bodily-movements. Thus connecting participants the space around them.

Interaction

The multi-user, full-bodily movement-based interaction is twofold: 1. Real-time physical interaction between users, which allows users to adjust the interaction between themselves. 2. movement controlled interaction between users and technology -participants are required to negotiate in order to create sound using their bodily-movement. The interaction takes place between the two performer. The identical movements produce sound, which is played during their performance. The flow of sound depends on the flow of their empathic connection that arises through their bodily-movement. Certain amount threshold allows some delay and quality of the imitative movement.

The 'performer's' and 'empathizer's' bodily movements are the origin and control of the sound behavior. The performance is a loop of bodily-movements and affective emotions. The music that is produced during each performance resembles the unique, individual and imperfect characteristics of human empathy. In order to achieve empathic connection participants need to immerse in each other's emotions through maintaining a continuous awareness of self and other's movements. It requires sensibility from the performers towards each other's bodily expressions, flow, rhythm and intensity of movement so that the music will be played, which is the expression of their empathy.

Performers

The 'performers' will perform a movement based on the emotions they want to express. The movement is captured by sensors. The other performer attempts to imitate the 'performer's' movements through careful observation. Only the 'identical' melody will be captured by the device, i.e. if and when the second performer

Input

Ephemeral, affect, gestures, full-bodily movement, kinesthetics.

Output

Sound and light.

Multimodality: Sound & Light

Physiological studies that explored the relationship between bodily movement and music. They shown that an innate movement is aroused as a result of listening to expressive sounds, due to the 'sensory-motor interaction' and the acoustic sensibility of the vestibular system. (Wöllner, 2017) Sound is a medium that doesn't interfere with visuals. While listening participants can focus on the movements without interruption. Sound is also a medium for "expressing of emotions", which in this case expresses the affect, the sensibilities that are conveyed towards each other through the bodily-movements. Here the sound is also the representation of the participants collaborative effort. Conveying the ephemeral through movement and representing with sound. Through sound we are also able to strengthen the affect, the sensibilities that the human body expresses through its movement. Moreover sound becomes an extension of the body into space and towards the other. (Wöllner 2017)

7.1.2 Performing for audience

This is a modified version of the previous design suggestion where the performance takes place in front of an audience in the same interactive space. Performers and audience can hear the same audio effects. While the performers are experiencing the same thing as previously, the audience can also be part of their experience by watching them through an AR glasses. The purpose of it is to provide the viewers unique visual effects. With help of AR they are exposed to an intense sensory experience that reveals the empathic connection established through the performer's movements, which are manifested in a variety density of moving light. Both performers and audience hears the same audio effects.

The audience members who are wearing the AR glasses can't see the lights on the wall that is visible for the performers. The kind of movements manifested through the AR depends on which performer the viewer is looking at. Turning towards and watching one performer separately shows that particular performer's movements. When watching both their empathic connection is shown (if there is any). Since the audience members can see the performers through their AR glasses they may move around in the interactive space. In turn their proximity to the performers influences the visual effects of the AR. Adding audience to this performance creates an extra layer of empathic connection.

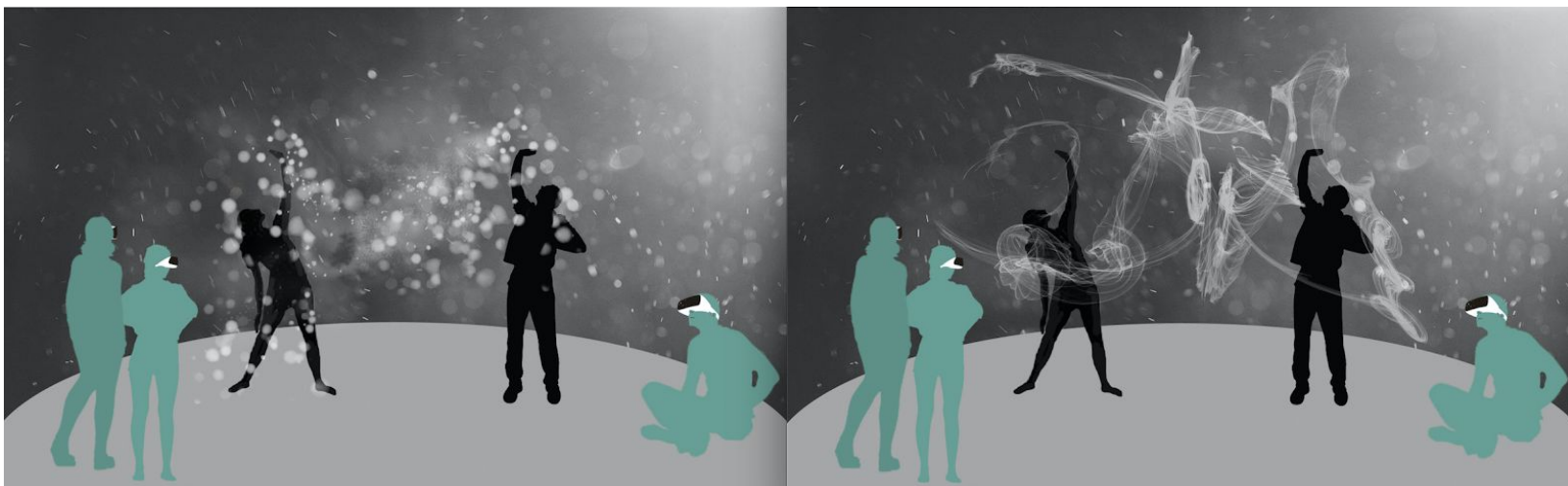


Illustration of *Empathy Tunes*, Performing for audience. *Image 1* shows participants performing distinct movements. For the audience the light effect appear around the performers bodies in space, not on the wall. *Image 2* illustrates the performer's successful movement mimicry and the special light effects, indicating successful empathic connection. This is only visible for the audience with the AR glasses. Both performers and audience can hear the same sound effects.

8. DISCUSSION

8.1 Review of the design questions

In order to find answer to the main question *“How may we evoke empathy -with the help of an interactive environment - between people in a diverse society through full-bodily movement-based interaction?”* this research was set out and was guided by other sub-questions. Building on the knowledge that are gathered from the theory as a foundation, a series of relevant workshop activities were designed. As a result of the first workshop activities, among others, the importance of observation, awareness and physical presence were concluded. Thus these two activities provided answers to the first question *“How may we sense empathy?”*.

To answer the second question *“How may we sense it through movement?”* this project looked into studies on bodily-movement, kinesthesia, dance and performance. When describing empathy Foster (2010) talks about politics of tolerance and inclusion. Insights of her work reveals, that through the process of reciprocal movement we may get a glimpse of the feelings of others, at the same time we may identify our unique individualities. Guided by the knowledge extracted from these studies workshops were designed with the goal of exploring bodily-movement. Explorations together with participants revealed that, while it's not possible to know and feel exactly what the other feels, through imitation of movement we get a glimpse of the other sensations of the other. As Foster (2010) pointed out while we can never perfectly reproduce the other's movements and performance, it's possible to “create mutual awareness through the willingness of two differentiated bodies laboring together at the impossible task of approximating one another”. This is possible by sharing the ‘other's living moments in motion’ (Foster 2010). Through these design activities it was concluded that awareness, mimicry and approximation are key to sensing empathy through movement.

In answering the third question *“How can it be enhanced through an interactive device or space?”* this project turned to some feedbacks of previous workshops. These insights suggested that imitation of movement in co-located setting real-time is crucial for enabling empathic connection. It was also understood, that a space where participants may interact freely with no interruption in their interaction is needed. Thus a new questions such as *“What role this device or space should play?”* and *“How to strengthen the sensory experience that the participants receive during their performance?”* emerged. These questions guided a following brainstorming session. From that suggestions for the following key aspects, such as mutual awareness, mimicry and approximation, that enables empathic connection, emerged. Hence the final the design concept of an interactive space and a device were born, where participants can to tune into each other's emotions through perspective taking through a ‘real-life’ collaborative performance. Ephemeral elements, such as the movement, energy, sensibilities and affective expressions of two people are captured and represented by sound and light.

8.2 Empathy in the final design concept

Empathy is dynamic, imperfect, approximate and is like a constantly changing 'fluid'. It's spontaneous, momentarily, dynamic and it is a constant transition of emotions between people. The design concept *Empathy Tunes* addresses these qualities of empathy as it doesn't require perfection and accuracy but a constant negotiation by participants. It requires steady observation, mimicry and turn-taking of the performers.

This interactive space allows a diverse audience to engage in real-time physical interaction which takes place between two performers. Through movement mimicry users carry out affective turn-taking which in turn enables them to establish empathic connection. As Foster (2010) advocates empathy is a 'learned response' that is confined differently over time and cultures, where the kinesthetic sense plays a central role. Although this capacity is shared by all humanity, it's based on individual experience. Bodily experiences the movement of the body constitutes the restrictions and conditions within which empathic connection can rise. *Empathy Tunes* allows the users to practice empathic responses through free individual expression of movement. By carrying out short performances users train their empathic responses. During each performance a great variety of empathic encounters take place due to the diversity and the combinations of the participants. The uniqueness of participants are reflected in their movement performance and results in an infinite varieties of outcome.

Foster et al. (2010) points out that empathy is also to simultaneously recognizing and accepting the duality of our differences and sameness. This design concept addresses this by requiring performers to constantly shift perspectives through which they may experience their 'differences and sameness'. Thus *Empathy Tunes* enables users to get a glimpse of each other's unique perspectives through awareness. It instigates them to work together in order to learn and appreciate the duality of our uniformity and individualities.

This project emphasises that it's not possible to know exactly what and how the other feels. Neither is it possible to perfectly mimic the other. However, as Foster (2010) puts it we may 'create mutual awareness through the willingness of two differentiated bodies laboring together at the impossible task of approximating one another'. This is how the process of empathic connection is defined by this project. The workshop exercises addressed these issues and enabled participants to practice these steps that lead to empathic connection. This is also applied in the final design concept addresses empathy because it's a place of performance practice where connections are made. *Empathy Tunes* is for users to practice their performance that will lead to empathic connections.

9. CONCLUSION

Fueled by studies in psychology, physiology, sociology, phenomenology, art and dance and by raising the question “*How may we evoke empathy -with the help of an interactive environment -between a diversity of people through full-bodily movement-based interaction?*” a design space was created, where bodily-movement, empathy as the fundamental element of human communication and interaction design are integrated. The aim with answering the design question was in the hope of finding ways, by utilizing bodily-movement, to enhance people’s ability to create empathic connection in a diverse society.

Under the principles of Research Through Design as main methodology, an array of design activities were carried out where different performative and phenomenological methods were applied. Among them are the first-hand approach, which meant being involved with bodily movements as designer, together with the participants throughout the design process. Moreover bodily movement as creative design material is explored, and a direct link between movement and empathy was made. This thesis project examined empathy as a central element of human communication by looking into studies in psychology, physiology, sociology, dance and performance. Furthermore process phenomenology, a ‘creative and critical methodology’ (Kozel), was used to gain insight to and provide a detailed and very personal documentation of the experiences during the activities.

It is proposed through the research findings that full-bodily movement can serve as a significant channel for transferring emotions. Through observation, mimicry and affective turn taking empathic connection can be achieved. Furthermore the findings also indicate that establishing empathy requires consecutive adjusting of sensibilities between people. It requires our attention and awareness towards each other. For creating empathic connection in a diverse society, simultaneously recognizing and accepting the duality of our differences and sameness is necessary. Finally it can be concluded, that the final design concept *Empathy Tunes* demonstrates the way the knowledge extracted from theory can be used practically, i.e. applied, executed and actualized in the design process.

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| | | | |
|---|---|---|--|
| The hands were very expressive | Expressive | Curious and intrigued | That she is artistic and open minded. |
| The movements. I assumed that's where the communication of what was going on would be made clearer. | Feeling free, happy and maybe like she'd just achieved a personal goal. | | She is very artistic because the waves are very creative. |
| Hands, the body leaning forward and backward. They showed the person's feelings. | I feel that she is happy be the movements | Free | That the person in liberated to express with their body. |
| On her hands and body how she moved it time to time to make healed understood. | I would guess relaxed & free. | Confused. | I saw these movements as a dance and not as a realistic movement. I mean, it is "fake" movements and not spontaneous movements so I really can't know. |
| | It is difficult without seeing her face so I really don't know | Intrigued, I wanted to see more to understand the message. | |
| Agitated | Calm | The person seems to be arguing about something | Arm movements |
| She lost someone or someone hurt her. Later I felt that she was in a meeting. | I felt happiness for that person. | That she leaves her problems at home when she goes to work. A strong woman. | Her hands and arms |
| She is not very happy and want to relax. Her arms were crossed which indicates that she is not in the mood to go out today. | I felt the movements were very peaceful because her hands and feet were moving like waves. | She wants to be left alone. She seems to move very slow and she may have felt drawstring. | Her hand gestures because her arms crossed shows she is not is a good mood. |
| Nervousness, agitation or slight discomfort. | Curious about the situation. | They can't sit still. | How the shadows moved and the changes in light. I found it beautiful. |
| She seems anxious (she touches her hairs and move her legs and hands. She moves a lot) She looks like waiting for something | Curious and intrigued | These movements show kind of anxiety | On the hands (crossing and moving) |
| Light, opening | Arms, because they were elegant | A soft person because soft movements | I thought "This person is graceful!" and "Does this dance make sense?" "Why she uses her hands and after her legs?" |
| No. | The motion, and the shadows. If it was a dance, why wasn't it obvious to me that it was a dance? Was there another message? That's what stuck in my mind. | No, it tells me more about myself, and my assumptions. | Intrigued, trying to understand the kind of dance it was |
| No. I wish I could see the face reaction. | The direction of the hands, the lifting of the foot. I wanted to see if they express something particular. | She is quite athletic, feminine. | I thought that this person must be a dancer. Or possibly drunk. |
| the environment, the wall the chair, her clothes, the shadows of curtains, her ring. I think the clip was way longer than the first and that is why I was focusing on details | On her hands mostly and how he blended and straightened her body. | I got the feeling that this is a person who is trying to work with her soul that has been hurt. | Flow, ballet, curiosity |

A collection of participants feedback from the first design activity.

WHAT IF
 Instead of linear like on a piano
 MUSIC NOTES DISTRIBUTED AROUND THE BODY IN SPACE & OUR BODY PARTS COULD PLAY THROUGH (JOINT, MUSCLE, POSTURE) MOVEMENT

Can we PLAY PLAY BACK RECORDS?
 only the 'shared notes' - to see how big empathy it was between two people
 they could listen to melody of their own body

"your melody from deep down"
 Here it would work just like on a piano, the key we hit will give the corresponding sound.
 They keys are 'hit' by body parts w/ help of

COLLABORATIVE EMBODIED PERFORMATIVE KINESIESTIC EMPATHY PLAYFUL! AFFECTIVE

HOW IT COULD WORK FINALLY
 - place a net over the body e.g.
 - each dot will activate a key, this way playing a melody

HOW TO PLAY THE NOTES/A MELODY
 Each tag will have hair net of notes to activate
 One space, 2 tags device
 2 belts that are activated when used

HOW TO TEST IN WORKSHOP
 - place chimney-like objects on the body to play sound by moving certain parts of the body

WHAT WE NEED
 • spaces
 • wearable:
 - suit
 - tag
 - belt bracelet

two identical spaces or VS
 'perform' 'empathizer'

HOW TO SEE THE OUTCOME IN THE WORKSHOP
 SEPARATELY Record both movement, performer & empathizer, then play the two simultaneously like two layers over each other
 Record the sound they produce (through the chimies like instruments)
 Must record the 'performer's' movement & melody first
 then separately the 'empathizer's' movement & melody

HOW TO VISUALLY DEMONSTRATE THE FINAL DESIGN IDEA
 OBS! These recordings & visual outputs were kept only for demonstrating purposes so that it could be explained in the class
 However it's debatable if the final design should allow to keep a record of these sessions?

Each 'empathy session' comes with a sound recording and a visual

HOW TO REPRESENT THE MOVEMENT THROUGH SOUND
 each movement type => certain melody
 e.g. lifting arm => la-la-la

'hitting keys' - exactly those notes will be played which you 'hit' through space with your body-part
 'hitting keys' - 'activating keys'

Everyone will produce the same note (e.g. la) but with different intensity
 individually like in empathy

This demonstrates more the 'body in space' - embodiment

Final outcome options
 Device records the performer's notes empathizer's notes matching notes

The two people can listen back their melody (only listen)

The device produces an "image" mapping their melody e.g.
 The filled dots are the matching notes

What if we could play music through our body movement on the piano?

matching (sensibilities) that is why the resonator

+ they can hear the melody
 Empathy = overlapping of emotions (I feel what you feel) through observing the other

CHALLENGES / ISSUES **QUESTIONS**

Can the 'performer' hear the sound she/he produces during the movement (performance) or not?
 Yes No
 Why? The performer is the one 'telling' her/his story/emotions!

Can the 'empathizer' hear the melody she/he is producing during the movement?
 Yes No
 Why? The 'empathizer' is the listener/observer, just like when we hear the performer's melody is her emotion she/he expresses

The layout/placement of two users?
 Facing each other?

BOTH THE PERFORMER & EMPATHIZER CAN HEAR THE PERFORMER'S MELODY
 Why?
 The performer's melody is her emotion she/he expresses

Sketches and notes.

TUNES OF EMPATHY

Focus on the momentary emotions

PERFORMER

1. Think of an experience & the emotions you felt
Your emotions at the moment
2. Express your emotions by performing movement.
You are free to move anyway you like

EMPATHIZER

1. By paying close attention to the performer follow the movements (in this way 'move through her/his emotions') of the P
2. Imitate the movements as accurately as possible.

LISTEN TO THE times of your empathy

CHALLENGES ISSUES

Hear the melody or not

- The performer moves BUT it produces a sound only if the empathizer can imitate the movement. Those parts that the "e" is missing will not sound

YES NO

Challenges

- How to capture the moment without the 'gaze of camera' instead: Capture the core activities by the body movements. It's like capturing the affect instead of the visuals.
- Participants will take roles of the movements: Draw/mark the body movements of the performer & imitate separately. 1 person notes the 1 person notes the "o" other like layers

USE: MISSING EMPATHIZING by participants how to record the melody in the structure?

VARIATIONS OF HOW THE SOUND WILL BE HEARD?

(P) moves → the sound it produces can be heard
(e) imitates → no sound

Finally they listen to their "overlapping" sound/melody (ONLY THE IDENTICAL NOTES/MELODY & PLAYS BACK) when they read the belts. It can be heard once the draper

(P) moves → doesn't produce sound
(e) imitates → the identical notes will produce the sound

No final playback, the melody could be heard only once while (e) is imitating the (P)

In order to produce sound (e) must imitate (P) well enough to get "hit" (identical) notes

! Is the sound disturbing for (P) because the sound comes later than the performer's movement?

QUESTIONS

Closed or open "performance"?

only the two participants can see each other (INTIMATE)

the space is open like an outdoor stage → there can be audience → this in turn can create another layer of "empathic relation" (they're watching a performance) (FREE/OPEN)

INTIMATE/PRIVATE closed space 2 uses

OPEN PERFORMANCE open space could be all move sound/dance together 3 uses

2 layers of empathic connect

VARIATIONS

Sound/music

movement

SENSORS outside the body

Color changes on the body - Body as screen? WEARABLE ON THE BODY

movement

we exercise ropes that we share

'empathy lines' showing the 'identical' movements + hear the sound of their empathic (visual + audio)

Q Where are these lines displayed?

A Affective turn-taking > both participants are equally imitators & are performers: - There is a constant negotiation, collaboration,

The device or space creates a dialogue between the person who is seeking & the one giving empathy

Transformation eg. "color of smell" between senses

sound
color of movement
smell

How could we 'take perspectives'?

walk in someone's footprint
angle dynamics } quality of walk that is individual

a.g. it's "unstraining" to step too small or too big, it takes us out of our own comfort-zone

climbing, etc. try other body movements

WHAT IF? By walking in someone else's footprints we could get access to their way of seeing something? Each step/movement would 'clear up a blurry movie or something'

'Performing' another person's movements would give us access to their "inner" world?

Continuous adjusting (remediating) between two people

using their bodily movement

- muscle construction
- posture
- movement

IT REQUIRES collective sensibility/affection

PERSPECTIVE TAKING happens

GOAL? To reveal the other person's current affective state of mind through bodily movement

take perspective of the other => empathize

own movement

other's bodily movement

WHAT IT IS NOT

equating out sameness

What if through AR we could reveal another person's 'affective' bodily activities that are produced by their bodily movement?

APP This could help in perspective taking - "Empathy scan"

extension with sound

performer

issue: screen? why?

play back somebody's emotions based on their movement

repeat their movement to acknowledge their feelings

kanon

imitate movement

Music = Language of empathy

MELODY; MELODY OF OUR SOULS

"Composer" (performer) - "player" (observer)

composes her/his music

play it back

follows the performer

WHAT IF OUR MOVEMENTS WERE

continuous movement by both people

sensibility towards each other

Visual vs Emotional perspective

(feather) (bulb)

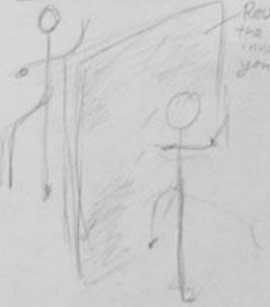
Body-extension particles

(it can never be perfect it's objective & contextual so is empathy)

music "written"/composed by person 1 is played back by person 2
 only the sound/notes that has been 'activated' by the composer can be played
 ↓
 melody is her/his own perspective
 Empathy - tunes
 Tones of Empathy
 Melody of Empathy

Inspiration
 • GAGA dance movement
 free body moves
 • Workshop exercise "continue the movement"

Screen → blurry → clear
 Revise the image you



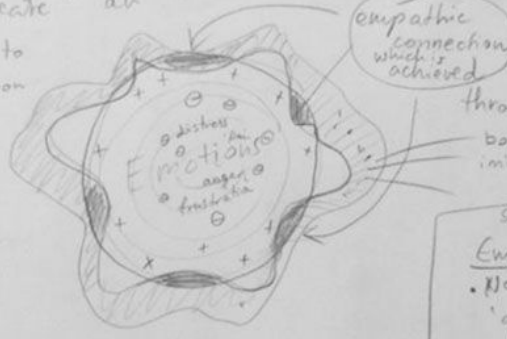
The better the imitation of movement the clearer the screen becomes between the two people

We do not ^{wish to} empathize deeply but try to create an

We try to touch upon the 'lighter' & positive emotions

empathic connection which is achieved through bodily movement imitation

See Susan Foster & add more!
 Empathy is
 • NOT the 'absolute truth'
 • temporal



Sketches and notes of early design ideas.