

Social Interaction in a Public Space: Words of Wisdom

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DP146
FBP B.3.2. Final Report
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Coach: Dr. Jun Hu

I wish to express my sincerest gratitude to my project coach, Dr. Jun Hu, for his advice, guidance and support throughout this project. Support provided by Rene Pare, Eefje Weaver the whole team at MAD Emergent Art Center, Eindhoven, is also appreciated. I would also like to thank my parents for their patience and constant encouragements. Finally, I want to address my thanks to Dr. Joep Frens, Dr Mathias Funk, Yu Zhang and Lucian Reindl for their guidance and support within my project and during the IPoC workshop.

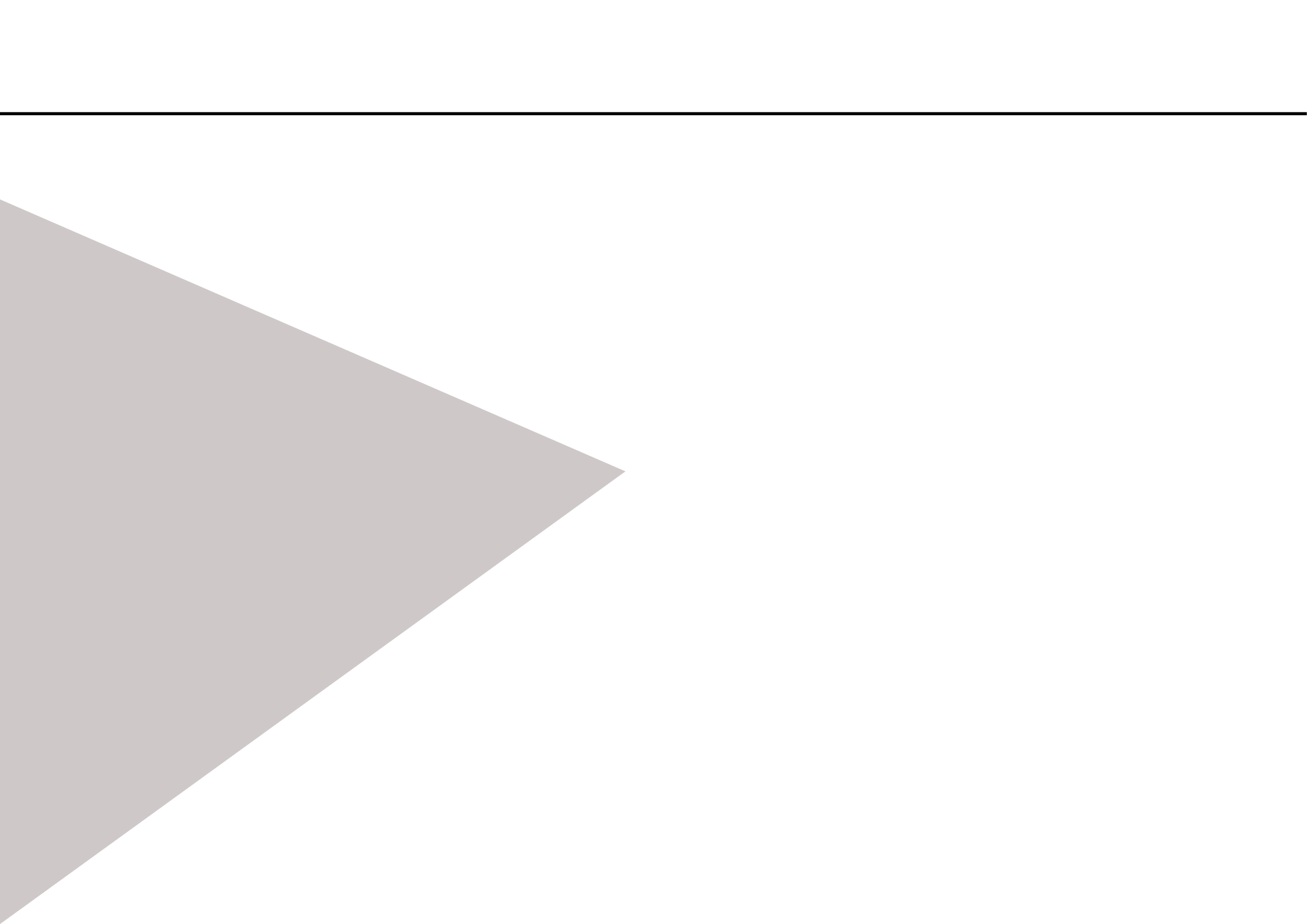
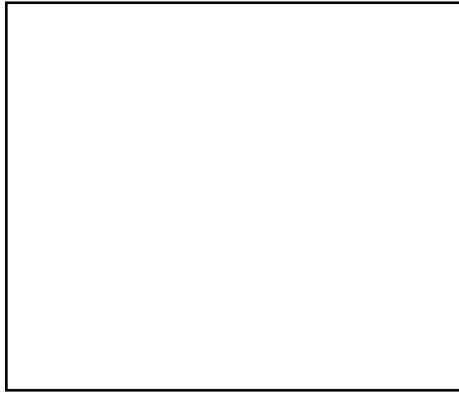


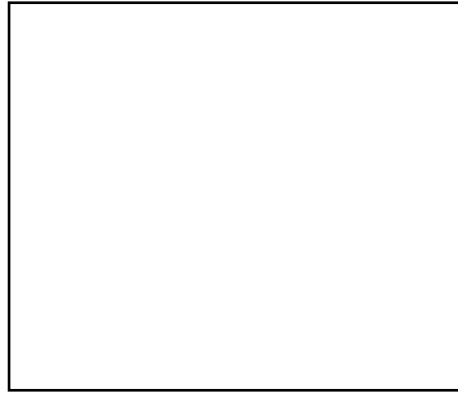
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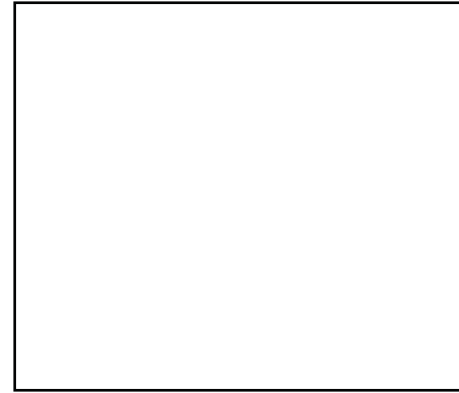
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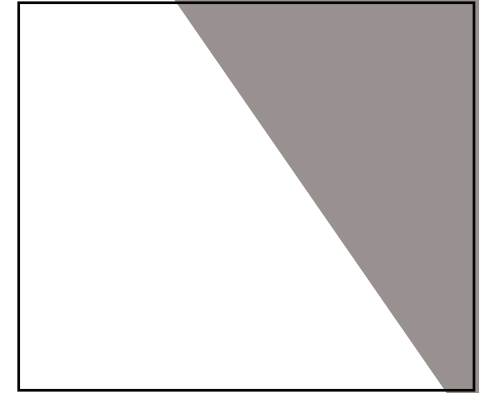
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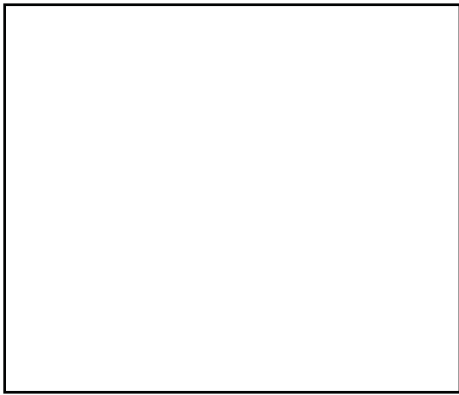
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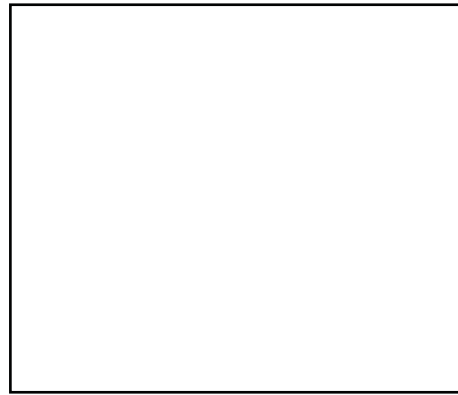
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Design for Social Interaction in a Public Space



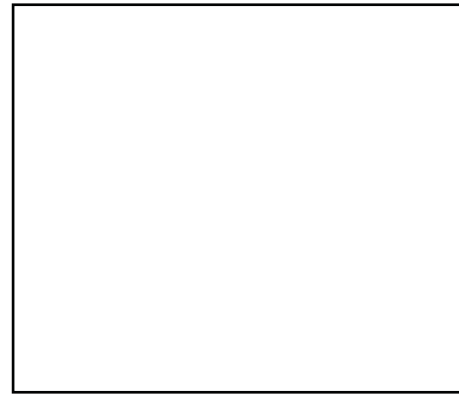
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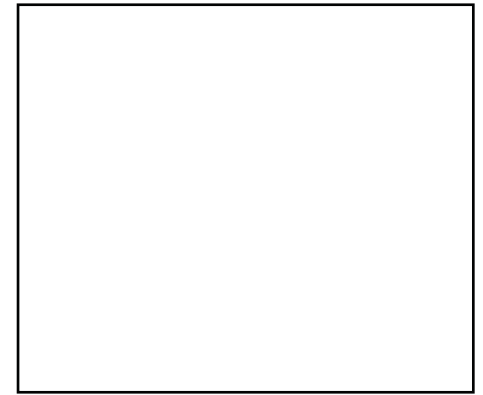
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INTRODUCTION

/Project Description

Clients:

DESIS Lab: <http://desis.id.tue.nl>

Abstract:

The design challenge in this project is to find ways to design a physical locus of interaction, a specific, physical device that opens the 'digital' action possibilities of a city to the physical ones. While the context is the city, it is up to the designer to focus on the design challenge within that context. How to let a 'generic' device grow into different meaningful forms and shapes dependent on the context of use, or the specific location in a city, and how to operationalize the concept of context dependent action possibilities

Main competency development target areas:

IC, IT, SCA, FS

Introduction:

System and service design is a new challenge in the field of Industrial Design. It breaks the 'one person – one product' dictum in favor of a system of (interactive) products consisting of many 'nodes'. The systems under investigation are woven into the social fabric of our lives and form, more than ever before, an integral part of it. Societal relevance is not optional but a necessity for this new field of design.

Currently the cities around us are coming to life in the digital world. How this digital city becomes meaningful to us remains to be seen but the first signs point towards visual solutions that augment the buildings, bridges, statues etc. in the cities with large projections and displays. The augmented layer can be used as decoration, but also as public media where the social interactivity can kick in. The augmentation can happen on existing structures, but also can be an integrated part of design when it is on the drawing board. You are

encouraged to find new areas for this system to grow in, within the limits of the design challenge.

One way to approach is with interactive public art installations. The current development in digital public arts involves a significant amount of new carriers in not only material, but also in technology, resulting in new dynamic and interactive forms that require artists and designers to construct their work from a system view and with a good understanding of human-system interaction and related interface technologies. It is no longer about carving stones and casting bronze; it is time to sculpture the interactive experience.

Design challenges or research questions:

The design challenge in this project is to find ways to design a physical locus of interaction, a specific, physical device that opens the 'digital' action possibilities of a city to the physical. Inspired by the theory of affordances (ecological perception) and phenomenology that identify that the (physical) world is a meaningful place and that focus on the lived experience we want you to focus on meaningful and rich interaction. Think 'morphing' shape rather than changing graphics; think physical controls rather than touch screens; think specific rather than generic.

This project will be executed in cooperation with students from School of Digital Media, Jiangnan University, at the Center for Social and Cultural Computing in Taicang, China. Selected students will be travelling to China during the SDL weeks, working together with their Chinese team members. The travel cost will be partially funded, and the accommodation will be fully covered.

Learning opportunities:

In this project, students will be able develop their attitude, skills and knowledge by taking ideas and concepts to a working prototype with advanced technological means and form giving, working in a special socio-cultural context: China.

Stakeholders:

- Center for Social and Cultural Computing
- Science and Education New Town, Taicang, China
- School of Digital Media, Jiangnan University, Wuxi, China
- DESIS Network. <http://www.desis-network.org>
- TU/e DESIS Lab. <http://desis.id.tue.nl>

Coaches :

Joep Frens is an Assistant Professor in the DQI group. He is interested in designing for growing systems and in design in general. You might know him of the cardboard models that he makes.

Jun Hu is an Associate Professor in the DI group, and a Guest Professor at School of Digital Media, Jiangnan University. His current research activities are directed towards Design Research on Social Computing.

Mathias Funk is an Assistant Professor in the DI group, focusing on remote data collection and adaptive systems, but enjoys working 'out of control' with technologies from sound/video processing to the web.

INTRODUCTION

/Design Brief

Definition and Framing:

The first step undertaken in the whole design process was to create a benchmark of previous projects by reading their reports, along with basic research to more clearly define the project. In order to extract further criteria for the design case and understand what extra research was required, I created a map (Figure A). This map served in order to define various parameters: possible scenarios for application, tools, methodologies, levels of interaction possible etc.

Further reading on my research can be found in Chapter 3 of this report which will clarify and elaborate the theories expressed in figure A.

Debriefing:

Several important factors were defined of which the final design should ideally embody:

- The design is to focus on urban areas.
- The design should merge digital and physical interaction.
- The system should be 'augmenting' reality (increasing, extending).
- The system itself should ideally be able to grow. For example, preference is for a system that can be interactive for both a single person and multiple users. Therefore it is important to consider affordance and levels of user engagement (this is potentially linked to the augmentation).
- The design should enable and encourage social interaction; this can be anti-social or social behaviour.
- The interaction can be experienced directly or indirectly over a period of time.
- The design should make use of some type of technology to create this digital augmented layer.

Importance of a Stakeholder:

Within my personal goals and planning (PDP 3.2.), I set the goal to arrange a stakeholder for this project. This was in order to have more explicit goals for the project, guidance and to involve outside input into the project to ensure the relevance and usefulness of the end result.

By the third week of the project I had gained contact with MAD Emergent Art Center in Eindhoven, a mainly volunteer-driven organization focusing on exploring the potential of various technologies and increasing community involvement. This collaboration was a useful source of input and guidance for my project as well and therefore the project has a further design brief based on MAD's StadsLab initiative, under which this project is categorized.

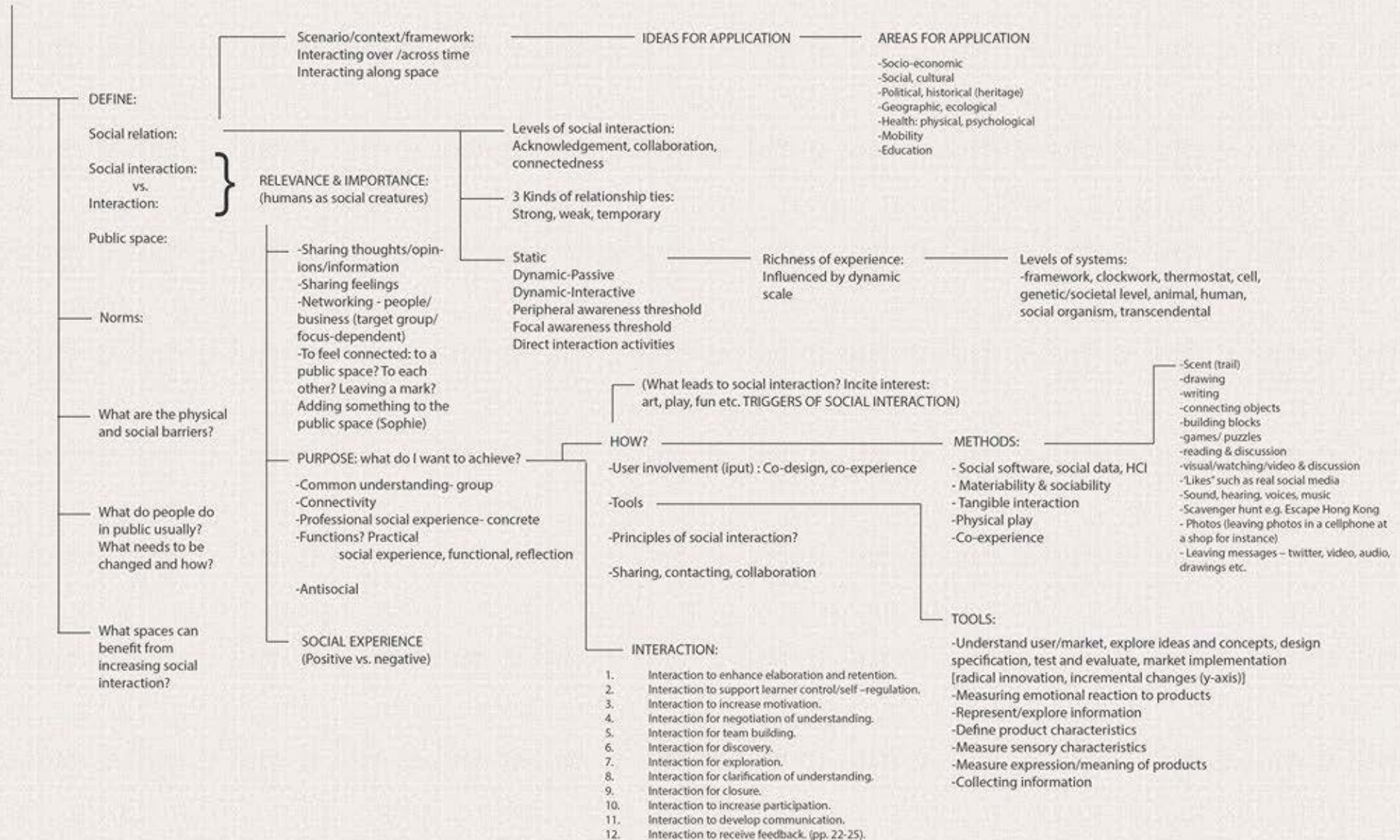
Target Group:

Early on in my design process I had already decided to focus on designing in a green space and design for the elderly. I chose this due to the social importance (as isolation in elderly is a common problem today) and this links to my personal vision for sustainable and responsible design.

Further on in this report I will elaborate on my process in deciding upon this target group and focus.

DEFINING & FRAMING: "Social Interaction in a Public Space"

PROJECT REQUIREMENTS:
- "Grows" for different meaningful actions
- Must have augmented layer for social interaction
- Changing physical shape



/Project Proposal

Clients:

DESIS Lab: <http://desis.id.tue.nl>

Stakeholder:

MadLab Emergent Art Center, Eindhoven: <http://madlab.nl>

Background:

This design challenge is a collaboration between MadLab Emergent Art Center, Eindhoven and the Social Interaction in Public Spaces project within the industrial design faculty at the Eindhoven University of Technology.

Framed within the StadsLab project, the aim is to create a concept of a public installation based on social interaction.

StadsLab

Global cities are transforming rapidly due to technology. The increasing availability of sensors, data, wireless networks and mobile technologies allows for new approaches in addressing challenges cities face. Technology can be used to engage with the public to share knowledge, support decision-making and come up with local and small-scale solutions. Issues relating to quality of life, sustainability and innovation can therefore be addressed.

StadsLab Eindhoven is an ongoing project to develop a virtual and physical knowledge center for creative and social innovation. The aim is to facilitate regional cooperation between residents, industry and government to create bottom-up initiatives through open-innovation.

StadsLab is an open facility with knowledge, tools and resources freely available. The aim is to encourage intra-disciplinary collaboration, research, learning and development.

Social Interaction in Public Spaces

System and service design is a new challenge in the field of Industrial Design. It breaks the 'one person – one product' dictum in favor of a system of (interactive) products consisting of many 'nodes'. The systems under investigation are woven into the social fabric of our lives and form, more than ever before, an integral part of it. Societal relevance is not optional but a necessity for this new field of design.

The design challenge in this project is to find ways to design a physical locus of interaction, a specific, physical device that opens the 'digital' action possibilities of a city to the physical ones. How to let a 'generic' device grow into different meaningful forms and shapes dependent on the context of use, or the specific location in a city, and how to operationalize the concept of context dependent action possibilities.

Introduction:

Elderly

Situation

It is predicted that by 2050 37% of the EU population will be over 60 years of age*. This current demographic trend of growth in the ageing population brings to light a problem of not only physical health-related concerns but also psychological concerns such as a feeling of social disconnection and loneliness. To support older people who are living independently, it is important to also look at this facet of the problem.

Proposed Solution

In particular, the city of Eindhoven has a large elderly population who are mobile due to innovations in transportation and city infrastructure. The next step to increasing the quality of life for the elderly in this life stage is to decrease social isolation, and enhance a feeling of motivation and meaning.

Designing an interactive system to aid social interaction and a feeling of inclusion in an accessible public space is therefore a possible solution to this. It is important in this case to have a design that is inclusive through low-barrier interactions and interesting for all age-groups to interact with in order to avoid old-age stigma and isolation.

The Digital Community Garden

Situation

Many advances are being made to enhance the experience of various places with technology. However areas like parks and other green areas are often left untouched in this respect.

Proposed Solution

There is an opportunity to make a green space more interesting to the growing technology-orientated culture through augmentation. The aim with this is to encourage more people to visit green spaces, highlight the value of green space and to redefine it in the context of what it could be in a future city.

Motivation:

Many independent elderly people who have already retired suffer from loneliness, and this often leads to other health complications. A combination between increased social interaction and physical outdoor activity is beneficial for many people, including the elderly, in promoting good health.

Project Summary:

The project will look into designing a future art/social installation in a green and accessible public area. The objectives are to increase social interaction and a feeling of inclusion in a public space as well as to encourage visitation to said public space.

PROCESS OVERVIEW

/Design Methodology

User-Focused Design Approach:

Due to the social and interactive nature of the design challenge, a collaborative design approach of co-design/co-creation was used coupled with methodologies of user-centred design. To achieve a user-centred system, the intended users need to be included in the centre of the process. Having the target group, relevant stakeholders and experts involved in the process allows a creative and context-appropriate solution to be achieved. In order to facilitate this process, a variety of ideas were explored, tested and validated/evaluated according to various design methodologies and criteria.

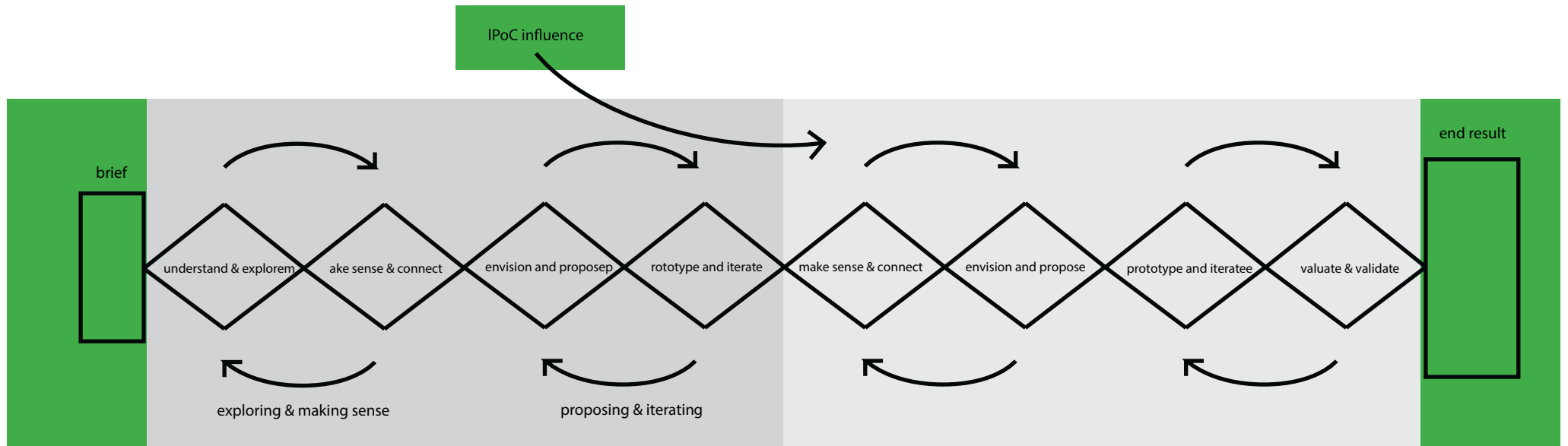
The Double Diamond (Design Council, UK):

Within a co-creative process such as this there is a general loop which is iterated through to achieve a final design; diverging to create choices and converging to make choices. This is called the Double Diamond Approach which was defined by Design Council. I attempted to loop through this process three times in a complete a fashion as possible for this project in order to achieve my final result, as it includes a user-centered approach and also allows for all four design processes outlined in the TU/e design processes model to flow in an organic and logical manner.

Innovation approach model from IDEO: (VENN DIAGRAM- people (desirability), business (viability), technology (feasibility))

Influence of the DESIS Network Workshop:

Of course the workshop in Taicang, which was related to but not exclusively a part of this project, influenced my design process. The workshop was held in the middle of the semester and therefore insights were brought into the workshop and taken out. Therefore the workshop could be seen as one explorative iteration crucial to the development of my final concept and learning new technologies for implementation in my final design.



FINAL DESIGN

/Words of Wisdom

Concept in brief:

Loneliness is a somewhat overlooked problem among the elderly which can seriously impact mental and physical health. This system attempts to emulate a physical social network within a park setting to connect elderly people with the rest of their community. The result is a virtual “quote club” where people can discover quotes and comment on them. The system is designed to be surprising and unobtrusive, but most of all; accessible. Several use scenarios arise from this varying from playing scavenger hunt games together to discussing current political issues. Nestled in the unsuspecting surroundings, these words of wisdom can appear when and where you least expect them.

Scenario:

The system will be dispersed between the park of Anne Frankplantsoen in Eindhoven, and the Van Abbemuseum. As the users walk on the pathways between the gardens and park, certain areas will have distance sensors which will activate a projection. Each projection is coupled with an ambient sound which by engaging the auditory sense will attract further attention and set the atmosphere.

Discretely located projectors display animated, projection-mapped quotes on trees, pathways, the river or over bushes. The quotes are generally curated by the museum and will vary in theme, perhaps linked to a current art exhibition but this can also be concerning local activities or issues.

Adjacent to each quote, there will be one discrete pole with a button and small carbon-paper roll printer integrated. Pressing the button will print out the quote on a piece of paper which the user will be able to collect. Visitors can in this way take a scenic walk through the grounds discovering all of the hidden quotes and collecting them as part of a scavenger hunt.

This opens up the potential for a strategy to encourage visitors into the museum. For example, if all of the quotes are found and collected, users could benefit from a discounted or free coffee within the museum cafe, a free guided tour or even a free printed post card with their preferred quote to

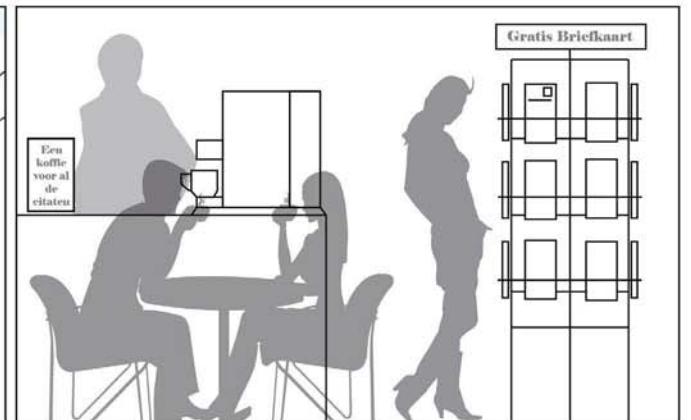
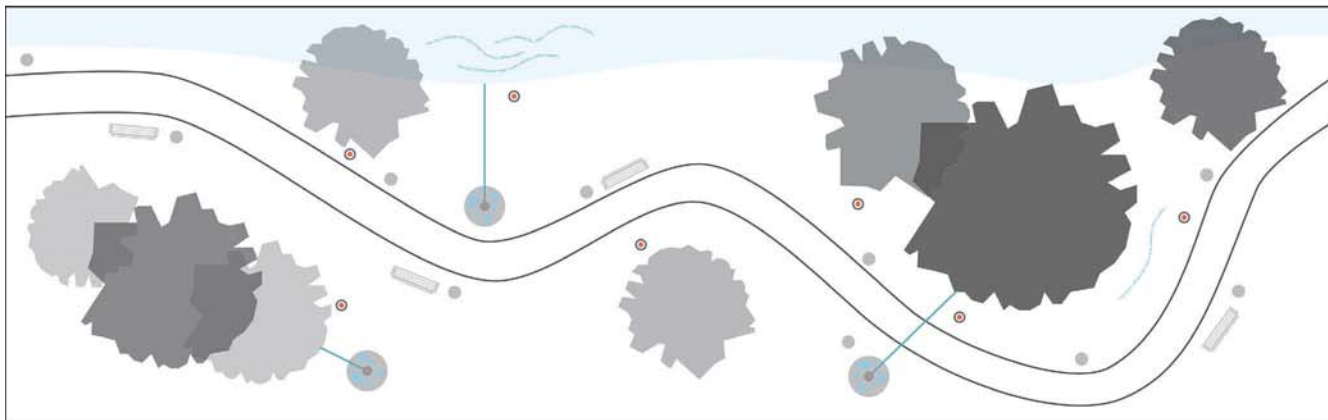
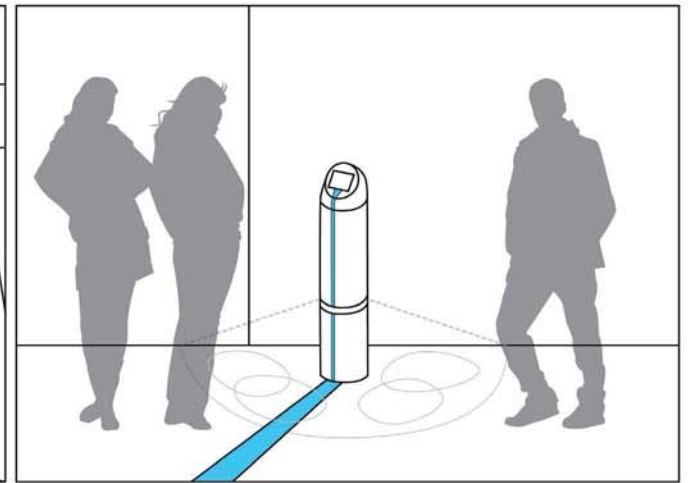
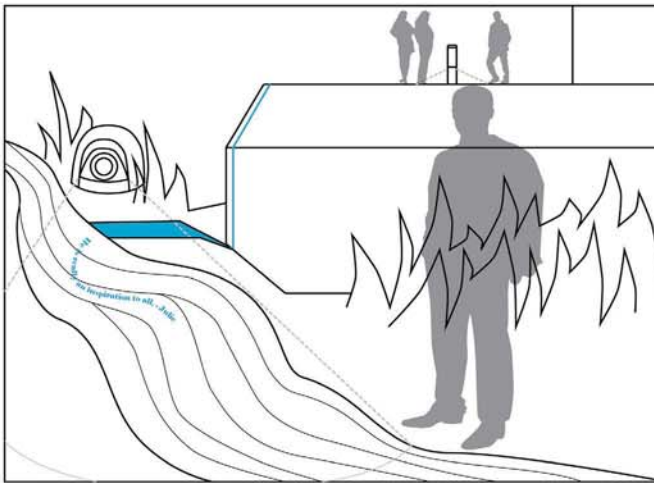
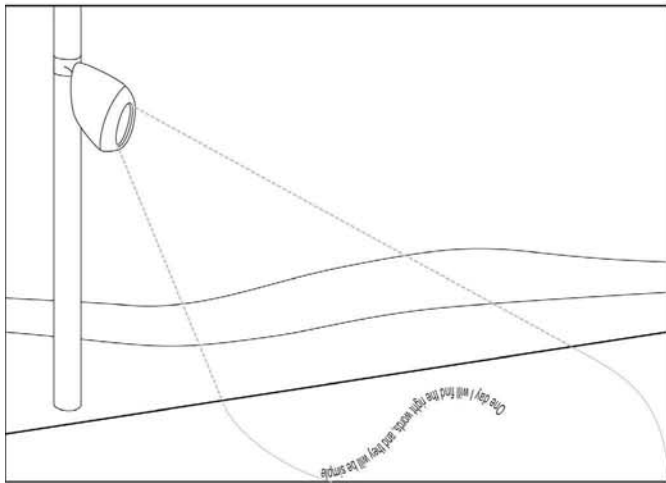
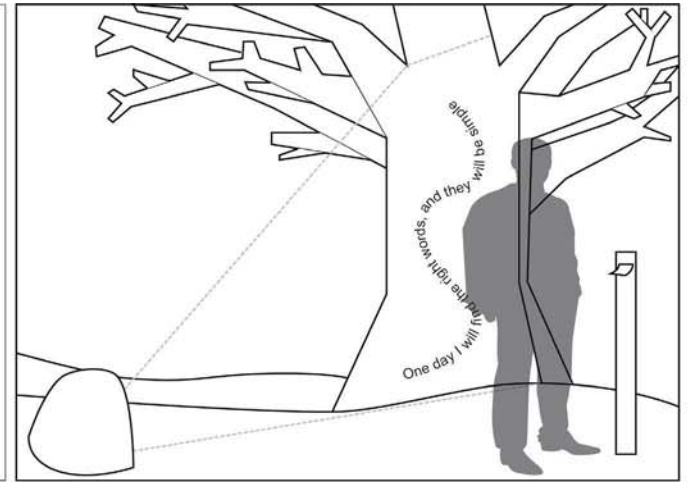
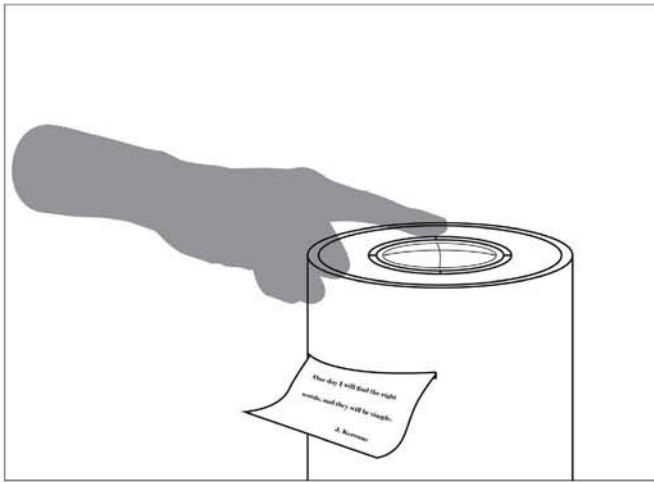
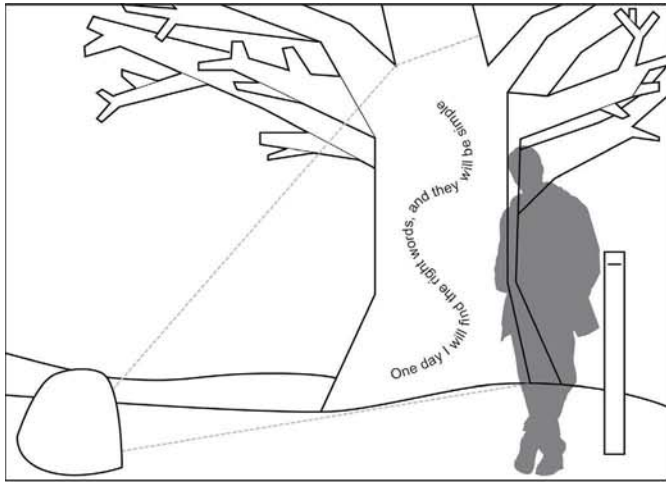
send to a distant loved-one. All of these scenarios in this way encourage an opportunity to increase direct social interaction- either to meet others in the cafe, through the tours or to encourage reaching out to someone who is dear to them but absent.

Comment poles will also be located around the park and these will have a touch screen interface (for optimal accessibility). Users will be confronted with a question or topic related to the projected quotes nearby and will be asked to comment.

An organically designed interface allows for a melding of physical with digital. The user will type their comment and name (can be a pseudonym) into a bubble. By swiping the bubble downwards, an LED array will begin down the pole and eventually the quote will be projected on a bubble on the floor by the pole. Comments can be analysed and grouped by keywords in order to display the general sentiment. For example, more positive quotes could group together to form a large bubble. A negative quote would form a smaller separate bubble, in this way visualizing the common public opinion and in this way providing a good overview and possibly igniting a debate.* By allowing users to leave a comment of their own in a public space, it is also possible that users will feel more connected to the space.

If the bubbles stay on the floor for a longer period of time, then they will eventually flow through to another section of the park, also visualized by moving with an LED strip and then projected crawling up a tree or flowing down the river and eventually disappearing. In this way the activity in the park is also strongly visualized.

**Note: The comment system is not envisioned to be too-strictly monitored. Therefore it should serve as a dynamic platform to take up the role that the local community most prefers it to be. Perhaps users will prefer to use it to message each other to meet for outings, perhaps to sell a used item or to simply add their own amusing quote. When designing a user interaction, one cannot fully script the use of the system, therefore this aspect should remain flexible and open to the users to define their own experience that meets their needs or desires. With this there are many possible scenarios as well as risks however it is important to keep this open. Two examples that work on a similar premise are those of Wikipedia or the art form of graffiti. Users are able to use these public forums in a negative or positive way. One could argue that Wikipedia is in general used more positively, however perhaps more instances of graffiti are used in a negative way.*



FINAL DESIGN

/Words of Wisdom

Context- Van Abbemuseum:

The final design is envisioned for the Van Abbemuseum, a contemporary art museum in Eindhoven. The museum aims to involve as much of the community as possible and to increase appreciation and awareness of art and culture. Many tours and workshops are often held, including tours for the elderly with dementia.

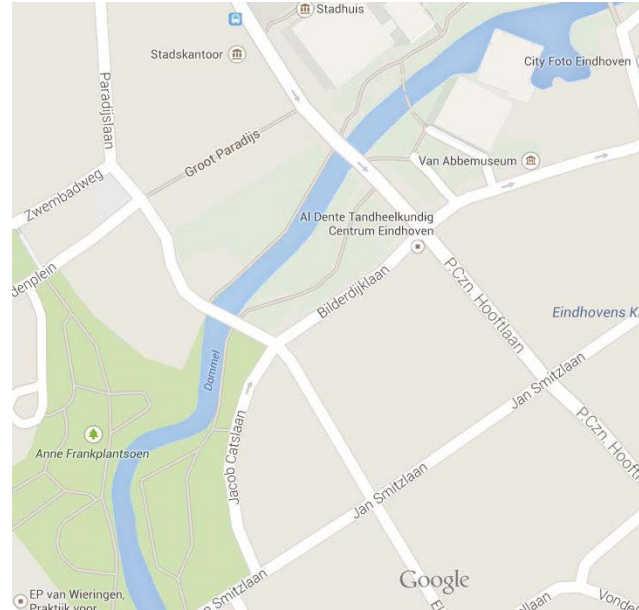
The museum at this moment already has several permanent themes for exhibitions ranging from with civic virtue in Eindhoven in 1936 to globalization.

One of the aspects of the scenario which would benefit the museum is the ability to extend the museum identity further outside in an interactive way and into the park. The route around the museum will be highlighted in this way and will attract more visitors. The museum already makes use of impactful quotes on exhibition walls and quotes from relevant artists on entrance tickets, therefore the inclusion of quotes for the central concept is very appropriate for the identity of Van Abbemuseum.

The social aims of the project concept are appropriate and align well with the aims of Van Abbemuseum. By attracting the elderly population, encouraging discussion, collaboration and social networking, this can in turn also increase the appreciation of art and general public awareness.

Context- StadsLab:

One of the aims of StadsLab are to facilitate and encourage local communication and collaboration. As one of the concept aims are to encourage social debate, giving equal access to all members of the public and giving people a common topic to discuss, this makes the concept appropriate for the context of the StadsLab. The potential to curate, store and encourage members of the local community to discuss a locally relevant topic coupled with the potential to group opinions of comments (thereby encouraging debate) make this concept appropriate for use as a tool for local organization.





FINAL DESIGN

/Words of Wisdom

Due to fact that the ideal envisioned final result in terms of interactions are heavily reliant on technology such as projection mapping, touch screen interfaces, thermal printers and LED-arrays, to implement this would realistically be quite costly. Dependent factors include the scale of implementation, suppliers as well as parties developing the system. In general, developing any individualistic system will be an expensive endeavour. Below, the technical specifications, recommendations as well as alternative options will be discussed.

The following are general technical specifications and guidelines of components recommended to execute the design. Cost price estimates and precise models of components are not included.

Technical Specifications:

Integrating any sort of expensive technology in a public space is a risk due to potential vandalism or theft. Therefore it is important to not only create custom casing which will be able to protect against possible vandalism, but it would be a recommendation to have the inner components of the projectors, screens and other systems to be tailored specifically for this use. Making use of pre-made, multi-use products, such as an i-pad or a projector, increases the risk that someone could see potential in making personal use of said products. If visitors could see no clear way to utilize the components themselves, this decreases the risk of theft. Therefore at the very least, if a commercially available product is integrated in the system, it should be disguised.

Electricity and Wifi Capability:

The installation requires electricity to power the system and wifi in order to curate and update quotes and comments through a database. It is estimated to be safer to have the pillars and projectors permanently located, with underground wiring (much like how it is done currently with street lamps). Proximity sensors (passive infrared sensors) would be installed within the casing of the projectors and pillars to ensure that the system is not running unless there are people around to use it, thereby conserving energy.

Projector Casing and Projectors:

Two designs have been created for permanent installation in a park setting. One design is intended for ground installation while the other is intended for above-ground installation such as a lamp-post or tree.

Considering a traditional projector, projecting only in areas with a lot of shade, it will be necessary of each projector to have at least 2000 to 4000 lumens in order to preserve colour and contrast quality. These projectors can cost from 250 euro per unit upwards. It is also a possibility to incorporate a transparent holographic projection film on top of areas on which one would like to project. In this way colour and contrast quality could be preserved and even in some cases reduce the need for intensive projection mapping- for example- when projecting onto moving water one could place a transparent screen in front of the river so when viewed from a certain angle, it appears as though animations are being projected onto the actual surface of the river.

The ground casing has a plastic insulating layer inside, with a cement layer on the outside both for aesthetic discretion and for its qualities of durability and strength. The front of the casing should be able to be opened by staff for maintenance. Materials used for this are a combination between a steel surface and anti-vandal, impact-resistant glass. Within the casing there is the ability to connect the projector system to the electricity supply and a controller with a pir sensor. The projector is attached to a rotatable and tiltable bracket for positioning.

Elevated casing units are have a titanium, magnesium or aluminium-alloy casing with weather-resistant polyurethane insulating and isolating layers. The ends of the units have adjustable and securable ends to enable attachment to a wide variety of circumferences. Wires in this case will need to be properly insulated and attached to the supporting surface, fed into the case. The front of the casing should be able to be opened by staff for maintenance. Materials used for this are a combination between a steel surface and anti-vandal, impact-resistant glass. Within the casing there is the ability to connect the projector system to the electricity supply and a controller with a pir sensor. The projector is attached to a rotatable and tiltable bracket for positioning.

Speakers:

In order to create an ambient atmosphere with the use of sound, either the projector casings themselves or the pillars will have an embedded speaker system. It is more efficient to incorporate the speakers within the pillars as they will have wifi capability, SD card storage etc. that would make audio applications possible as well as remotely adaptable.

Quote Hunt Pillar:

The quote hunt pillar will consist of a thermal printer enabled by a push-button. Wifi capability will be required as well as a microcontroller to operate the system. Speaker integration requires SD card storage. The pillar itself is envisioned to be created by with a combination of concrete and rotation-moulded recycled plastic.

User Comment Pillar:

The user comment pillar will consist of an embedded tablet or resistive touch screen (as it is cheaper, better for weather resistance and the system does not require the precision of a capacitive screen) with a protective anti-vandal layer. The system will run on android 4.2. jellybean or higher. Wifi capability will be required to operate the system. Speaker integration requires SD card storage. The pillar itself is envisioned to be created by with a combination of concrete and rotation-moulded recycled plastic. The middle of the trunk of the pillar will incorporate two to four mini-projectors of at least 2000 lumens in order to project onto the floor below. An rgb led array strip is embedded in the sides of the pillar running down to the bottom and covered with thick transparent plastic.

Connecting LED arrays:

Optional rgb led array strips can be embedded within a concrete strip with a thick glass top layer in order to visualize the movement of information across the landscape, for example towards trees or rivers.

Some Alternative Systems:

Alternative systems can be implemented in order to replace current costly technology, however each has its pros and cons.

Replacing touch screens with SMS input:

The possibility to take out the interaction with a touch screen in the comment system to simply provide input with SMS exists. Users could be informed of a number on the side of the pillar to which they can SMS their comment in order to input.

Pros: This method is much cheaper and less vulnerable to theft or vandalism.

Cons: Accessibility decreases for users that do not know how to send an sms (some elderly). Motivation could decrease as this increases the amount of effort a user must input in order to interact with the system. The interactive effect of swiping a comment down in a visual way is lost.

Replacing projection with screen displays:

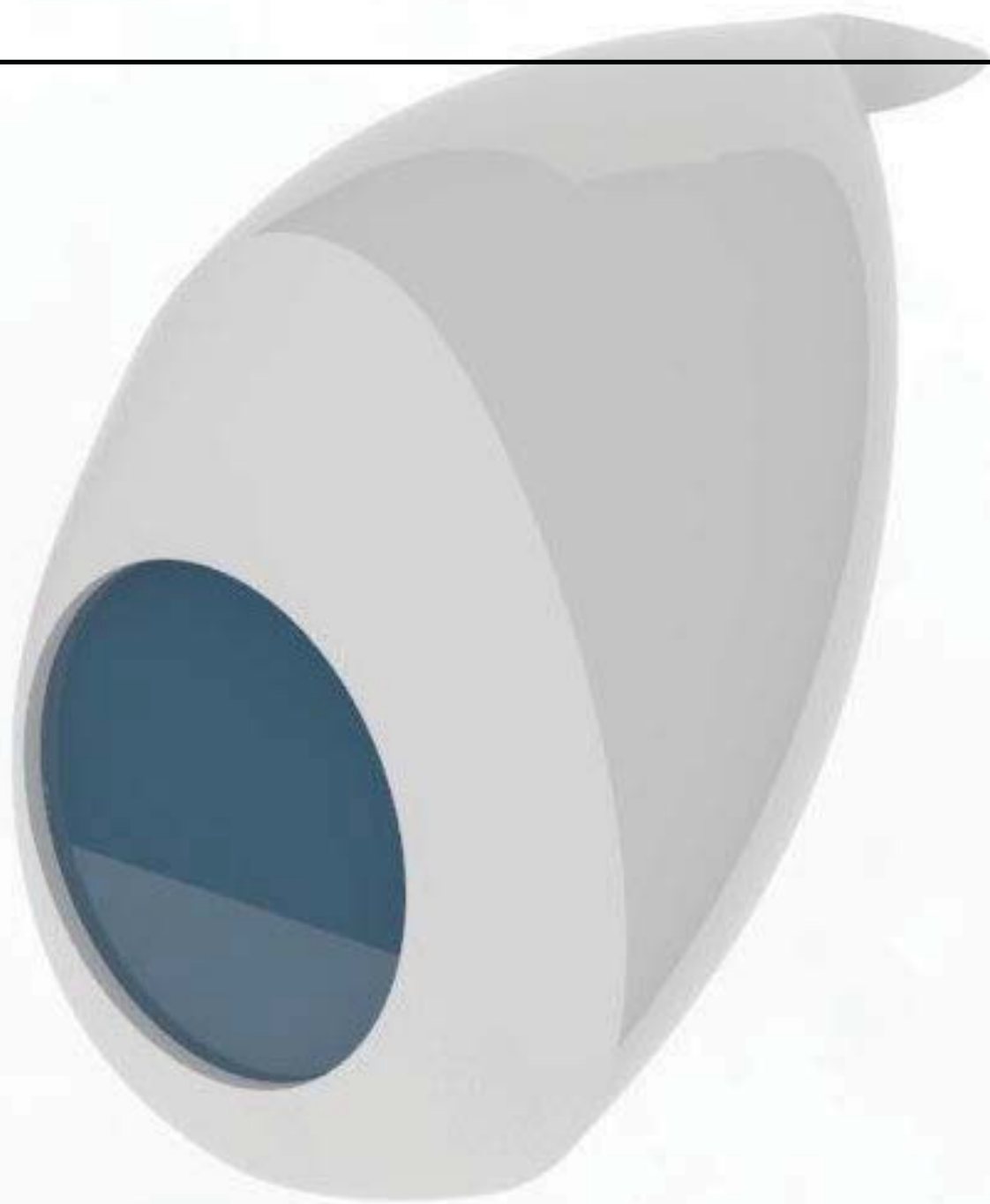
The possibility to replace projections with cheaper screen displays is possible. Although this could increase the visual quality of the animations (colour, contrast etc.) ,this could potentially have a detrimental aesthetic effect and much of the magical effect of the projection mapped animations would be lost.

Fixed vs portable system:

The system could be created to be modular and portable for temporary applications. The materials would need to be changed to be more light-weight and easily transportable. This could be advantageous as routes could be altered and the system could be used in various contexts and areas thereby increasing a sense of novelty and excitement. A potential consequence of this is that it would require more frequent reconfiguration of the projection-mapping. The system would be more vulnerable to theft increasing the need for restricted and chaperoned use which can influence general attitude and interaction frequency and behaviours, commonly known as the Hawthorne effect.

FINAL DESIGN





Process

/Exploring and Making Sense

The design process began with debriefing, benchmarking and reframing (PAGE), followed by in depth research into various levels and methods of interaction. Sway Leung, a fellow peer of mine beginning the same project, and I generated a list of potential concepts and directions, using concepts from the previous Dutch Design Week as a source of inspiration. Taking into consideration how one idea could be translated to the realm of public design, changing the original concept of field was an interesting method to explore and generate concepts and topics. Further research was conducted in order to benchmark existing interactive installations that could serve as inspiration for the project.

Findings from a previous research project conducted at the TU/e Industrial Design faculty by Sophie Brenny were particularly interesting. One of her conclusions was that a simple interaction with a low threshold, involving leaving something behind in a public space increased feelings of belonging and social connectedness. (Brenny, 2013)

Having come across the Stranger Hypothesis Experiments, I became quite intrigued in the power of simple graphic design could have in engaging people and encouraging social interaction. Their hypothesis is that “the use of graphic design through situationist ideas can be impactful in creating ‘situations’ that would first excite social interaction in our environment, in turn allowing us to break away from our normal routine and provide us an avenue to reflect on the people we encounter in our immediate environment.”

I began preparations for an experiment to analyse the frequency and level of social interaction that I could get with graphic design by asking people to share an anonymous note in areas of varying traffic. However, I came across an interesting paper ‘Enticing People to Interact with Large Public Displays in Public Spaces’ by Harry Brignull & Yvonne Rogers, dealing with precisely this problem.

“Large displays are increasingly being placed in public places to support community and social activities. However, a major problem that has been observed with this new form of public interaction is the resistance by the public to participate. A main reason is due to the prominence of the affective aspect of the user experience. In particular, feelings of social embarrassment often act as a barrier.” (Rogers, 2002)

In the paper, Rodgers describes three levels of interaction: the peripheral awareness threshold, the focal awareness threshold and the direct interaction activities.

“Key information that needs to be made readily available to the person to decide whether to cross the threshold is:

- How long an interaction takes
- What they will get out of it
- What steps are involved
- If it will be a comfortable experience
- If there is a quick let out, where they can walk away gracefully, without it disturbing the ongoing public activity” (Rogers, 2002)

Following a coach meeting with Dr. Jun Hu and research some insights and conclusions were reached which were very influential throughout the rest of my design process.

-Interaction can be direct interaction, but that it can also be indirect and span across a space, even time.

-Anti-social behaviour is also included in the realm of types of “social” interactions

After the third week I had concentrated on conceptually exploring three problem statements:

- How to decrease feelings of social isolation in the elderly
- Design for innovation: how to encourage more open collaboration within the Brain Port region
- How interactive installations can increase connection with nature.

Research was conducted into the three topics, the problems arising from them and ways the topics had been covered previously both in the field of design and outside of it. Brainstorming of ideas was done to explore possibilities.

Research shows that the benefits of increasing social interaction amongst the elderly include preserving physical and psychological effects. (Freeborn, Donna, PhD, CNM, FNP) A correlation has also been found to suggest that larger social networks could decrease the risk of dementia and potentially maintain cognitive health. (Valerie C. Crooks, 2008 July)

One of the greatest problems for these age groups is loneliness derived from the loss of close family members, friends, a spouse and even displacement of family members. "One of the more surprising findings of the team's analysis is that loneliness does not necessarily correlate with living alone. The study found 43 percent of surveyed older adults felt lonely, yet only 18 percent lived alone.

" (Kim, 2012). What is interesting to note is that often, even small interactions can be meaningful- for example those with neighbours. Other research suggests that another method for the elderly to combat loneliness is to take part in a hobby with other people or do volunteer work. The "baby boomer" generation represents one of the largest population growths in history. "Some of them now are part of the 39.6 million population of people older than 65. That number is expected to more than double to 88.5 million by 2050." (Kim, 2012)

It could be therefore argued that to invest in a publically available installation that would encourage social interaction amongst the elderly and other population groups is a worthy investment to increase general public health and well-being.

The decision was therefore made to focus on the target group of the elderly population due to the high numbers of elderly people within Eindhoven as well as globally and its link to a social responsibility I personally feel. This is linked to my design vision.

A decision was also made to maintain the aim of increasing a connection to nature. Therefore a park was chosen as the main context area for the design problem.

I retained part of the idea for a digital garden which I had developed in my initial brainstorming phase because I felt that it was a space that could be interesting to augment with technology since it is often left on the side-lines with most development, however it is such an important part of the human psyche. [Insert research about green spaces linked to psychological health]. From later observation during user shadowing [reference], I did notice that the parks e.g. Ruimtewandel Park, did seem a little neglected in terms of infrastructure and as a result most commonly attracted older people searching for light exercise or people who needed to walk their dogs regularly.

The second reason for retaining the digital garden was because the act of gardening is enjoyed by many seniors. Furthermore, more colourful floral arrangements could help brighten the aesthetics of the park and provide a simple starting point for interaction.

At this stage it was important to define the purpose of the design, as designs should be meaningful- especially in social design to cross this "social embarrassment barrier" (Rogers, 2002). Potential purposes could be for an experience, to satisfy a practical function or to instigate reflection and greater awareness.

/Benchmarking and Inspiration

The following projects are a selection of interesting examples that served as inspiration for me in the process of this project.



Nimbus: Kinetic Art Sculpture by Reuben Margolin



The Stranger Hypothesis:
Interactive Social
Interaction Experiments



"Flower Power is an interactive installation that creates immersive light atmospheres by capturing the colors of flowers and re-projecting them in the environment. A camera is suspended over a flower bed and its position depends on the positions of the visitors around the installation, which are detected using presence sensors. The image captured by the camera is rendered into the surrounding environment as a suggestive, saturated light scene. The participants can thus give the power to their favorite flower to set the overall light experience. In this paper we describe the motivation and the realization of the installation, and we discuss insights and reactions collected during the 2010 STRP Festival."

Gianluca Monaci, Tommaso Gritti, Fabio Vignoli, Wouter Walmlink, Maarten Hendriks: Flower power. ACM Multimedia 2011: 909-912



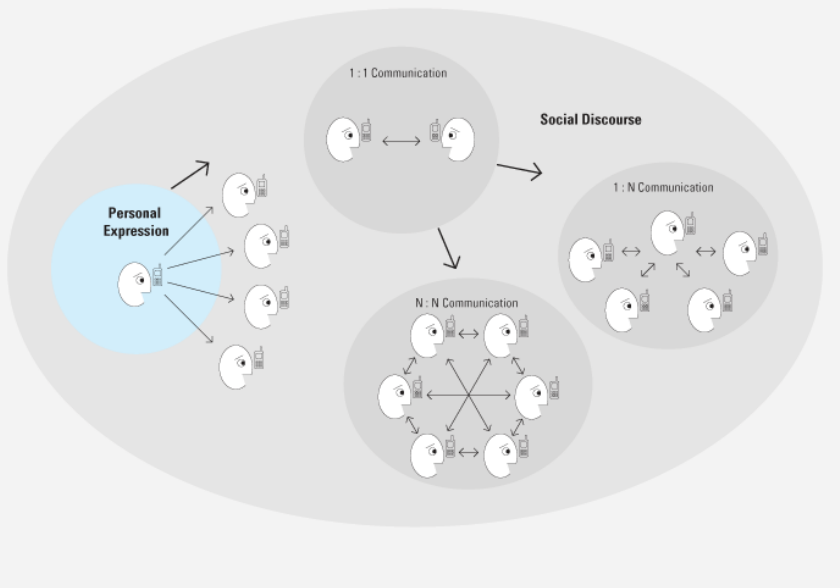
St Horto: Interactive Sound Garden by OFL
Architecture and Federico Giacomarra

21 Balançoires:
Interactive Musical
Swing Set by QUARTIER
DES SPECTACLES DE
MONTRÉAL



Personal Expression → Social Discourse

One to One, 1 : 1 Communication → One to many, 1 : N Communication
 → Many to many, N : N Communication



People	Goal	Content
Actor	Action	Material
Subject	Verb	Object

Sharing

People	Goal	Content
Actor	Action	Material
Subject	Verb	Object
People	share	content

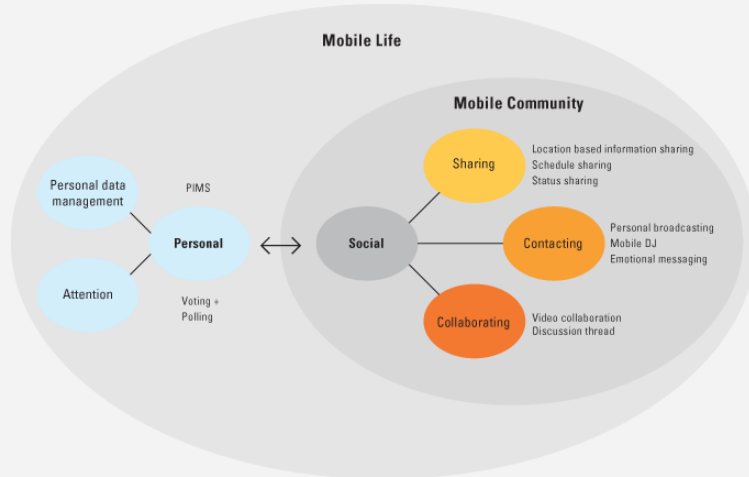
Contacting

People	Goal	Content
Actor	Action	Material
Subject	Verb	Object
People	connect	with others

Collaborating

People	Goal	Content
Actor	Action	Material
Subject	Verb	Object
People	create	content

Mobile Life



	Physical movement	Meaning	Directed towards others	Await response	Unique/rare interaction	Interactions	Accidental, not planned, but repeated interaction	Regular	Interactions described by law, custom or tradition	A scheme of social interactions
Behavior	Yes									
Action	Yes	Yes								
Social behavior	Yes	Yes	Yes							
Social action	Yes	Yes	Yes	Yes						
Social contact	Yes	Yes	Yes	Yes	Yes					
Social interaction	Yes	Yes	Yes	Yes	Yes	Yes				
Repeated interaction	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Regular interaction	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Regulated interaction	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Social relation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Various descriptive models from different research theories which were taken into account when designing for social interaction.
 Source: Dubberly Design Office

Process

/Understanding and Exploring the User

MAD Emergent Art Center was established as a stakeholder for the project and was involved in several points during the design process to validate insights and concepts. An intern at MAD, Eefje Weaver, helped me in the initial steps during user shadowing, first user interviews and questionnaires.

User Shadowing:

The initial context was a park as a public space in general. Benchmarking was conducted at the Stadswandelpark in Eindhoven as well as the Anne Frankplantsoen Park.

My focus was on identifying possible problems, opportunities and needs to be addressed and to build a base of knowledge about my target groups. Although I had defined my target user group as the elderly, the intention was to connect the elderly with other generations; therefore it was also necessary to explore sentiments from the population in general.

User shadowing revealed various activities being enacted in the park setting: reading, playing boules, sitting on benches, walking, having lunch alone, walking dogs.

General open interviews were conducted with people frequenting the parks in order to gauge what the needs of people are.

Comments included:

- More benches were requested by two elderly gentlemen due to health problems
- More park facilities e.g. barbeque facilities, toilets, games, sports facilities
- More colourful and interesting plants
- More interesting sculptures
- Concerns over safety, especially during night time were raised by an elderly woman
- One elderly man openly confessed to being lonely and coming to the park to feel that there are other people around him and sometimes to meet people. He mentioned that he enjoyed sharing photos with

- other people
- A middle aged couple mentioned that generations feel a divide and can be scared to talk to one another because of a prejudiced view

Observations over existing facilities were made:

- few benches
- many sculptures at the Stadswandelpark
- no nearby restrooms
- not many flowers
- lack of facilities for interesting activities
- an interactive augmented reality app by the observatory in Stadswandelpark

Comment over the Ruimte Wandel App:

An augmented reality app was created for the occasion of the 75th anniversary of the Dr. A.F. Philips Observatory. (<http://ruimtewandeleninhetpark.nl/>) However, it was only brought to my attention when Eefje Weavers mentioned that she had heard about it from someone else she had asked for examples of currently existing interactive initiatives around Eindhoven. The explanation and QR code to the application do not draw a lot of attention, even though it is still functional.

It was evident from this that such a method of augmentation is not ideal as a long-term approach as people can easily forget about it. Another problem is that it is not accessible to everyone- only to those with a smart phone and internet.

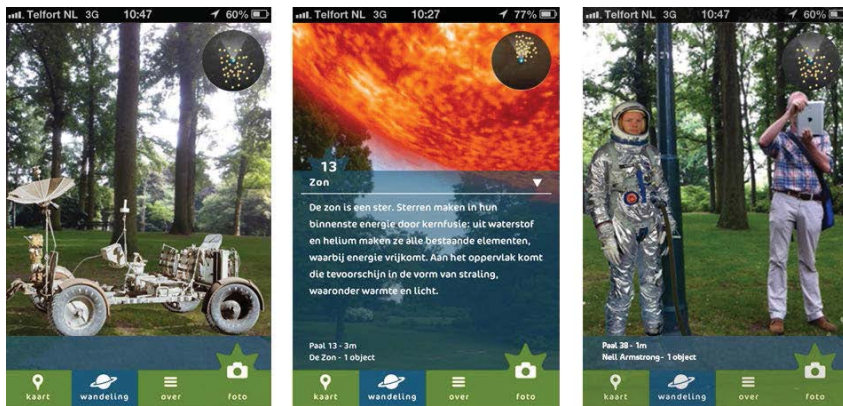
The concepts for a digital community garden were explored. Potential uses of the installation as a knowledge-sharing platform or a platform for sharing of experiences were brainstormed. Interesting interactions based on foundation knowledge on basic gardening fundamentals- the act of planting, symbolising the act of nourishing were looked at.

The ideal concept should be inclusive, dynamic in scale to add a richness of experience and should be engaging.

However when designing a holistic experience, one must take into account the whole user model- their preferences, psychological profile (strengths, weaknesses, skills, interests, potential, disabilities, age, culture, interests, bias), their physical constraints etc. This includes looking at the factor of attention as attention is selective; the capacity for attention is limited as is the ability of a user to maintain attention.

Looking at examples of interactive installations I had researched, it became evident that the role of play was a large factor in the appeal of most of the designs, culminating into options such as physical motion, light, musical elements, strong visualizations. This 'fun factor' is what often grabs attention, draws curiosity and seems to entice users to cross the threshold from the peripheral or focal awareness thresholds, into direct interaction activities. However, once the initial novelty of the interaction wears off, there should be an extra benefit for users to keep their attention, and this is the aspect of a concept that is more difficult to achieve.

It was evident that the best way to attempt to achieve this depth of concept was to start with a somewhat novel interaction and continue with co-creation and co-design methods to develop, test and validate the concepts with users and improve it through feedback.







Process

/Prototyping and Iteration 1

Prototyping and Iteration 1:

My first iteration explored a simple user interaction that would encourage users to create something together. I based my inspiration on the Weave Silk interactive generative art (<http://weavesilk.com/>) (Vishnevsky) and on the principle of Mark Huang's 'Tea for Two'.

I created a sketch in prototyping that would use the two light distance sensors to allow for simple hand gestures to create input. By means of a kaleidoscopic effect, a beautiful visualization would be created.

The interaction was to be part of a larger concept where users could generate a digital garden layer over the existing park and adjust the aesthetics of their physical environment by interacting with the art piece. A richer aesthetic would only be able to be achieved with multiple user input, thereby encouraging direct social collaboration. The interaction was based on the premise that leaving a physical marking or creation provides intrinsic user motivation which can also potentially increase the feelings of inclusion and connectedness as well as inclusion of the citizens of the city to each other and to the public space they are in (Brenny, 2013).

This prototype was tested with a total of three elderly users in the context of a park. All of them found the interaction simple to do, however it was evident that a lack of an explicit added benefit leads to the initial novelty of the interaction wearing off very quickly.

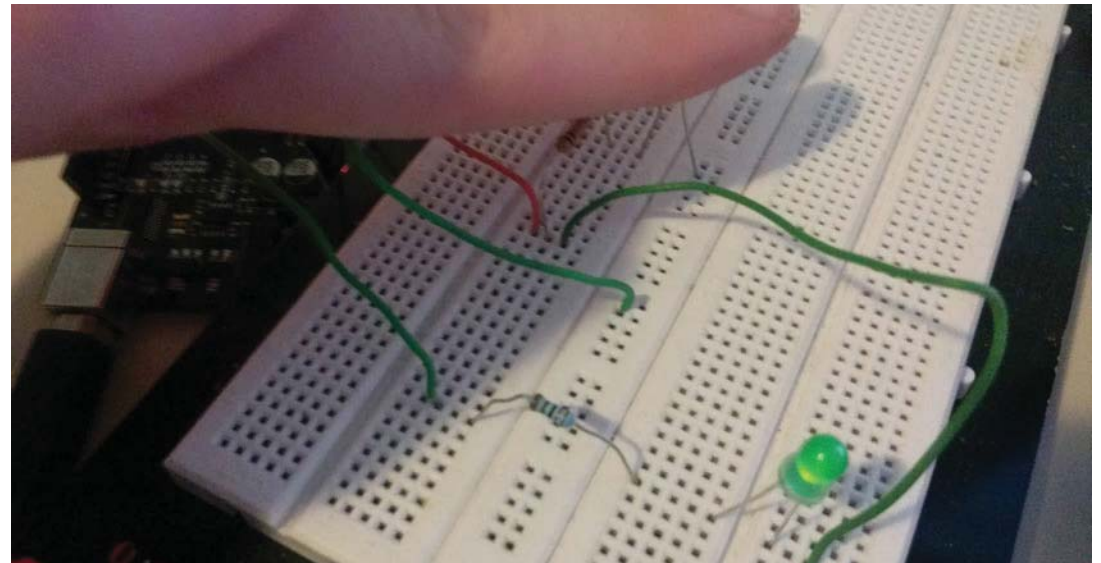
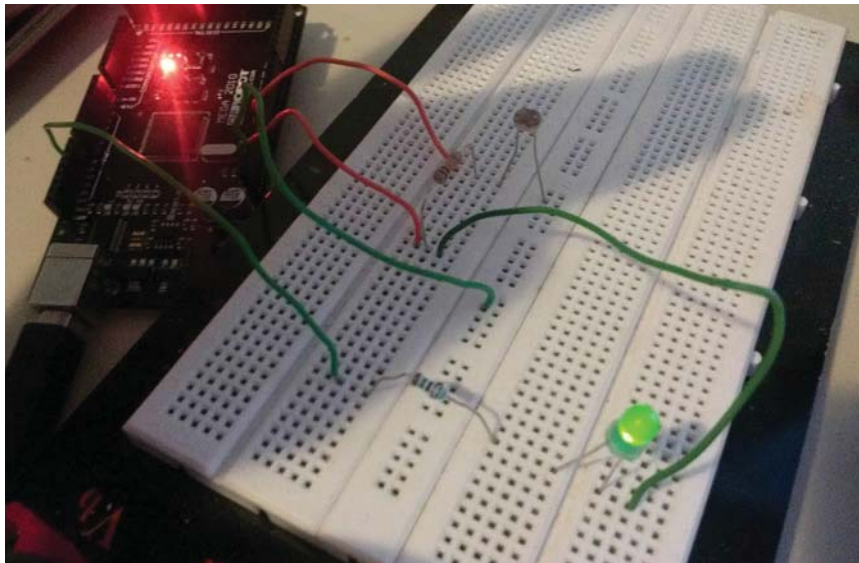
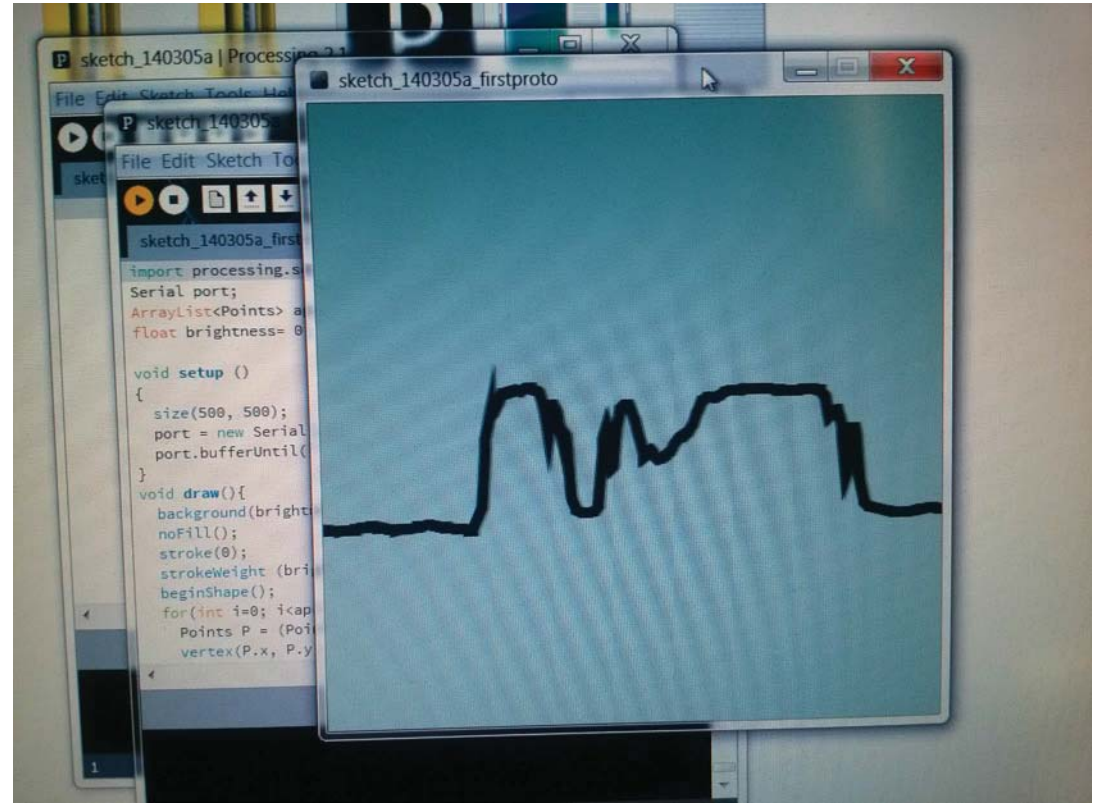
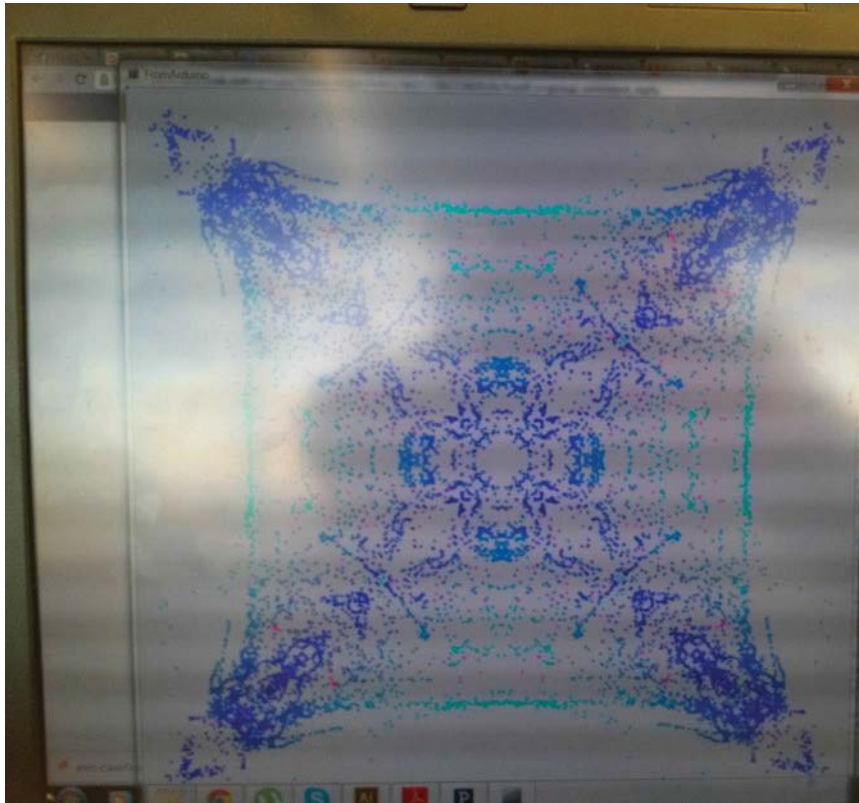
I was approached by a member of the community at MAD, with a proposal to work together on a concept that would increase a flow of people from Kleine Berg into Grote Berg through the creation of a park in one abandoned area between them.

Concluding this, further ideas were generated such as the possibility to add more personal aspects of yourself into the public space to increase user motivation. A concept of scanning items of clothing was suggested by Jun Hu and this evolved into a concept of generating a digital artwork which would represent the style of the community around it. With the Berg area as the new context for the project, this interaction would be quite appropriate as

the park would be much smaller and less isolated than previous parks I had been investigating, and with many boutiques and shops defining the culture of the space, incorporating clothing into the interaction was an interesting idea. Each artwork would also be connected to a story or message that a user would input at the same time. This could evolve into a 'field of dreams' scenario where users should input personal dreams or wishes and can read the wishes of others; a concept similar to that of a Chinese wishing tree or message in a bottle.

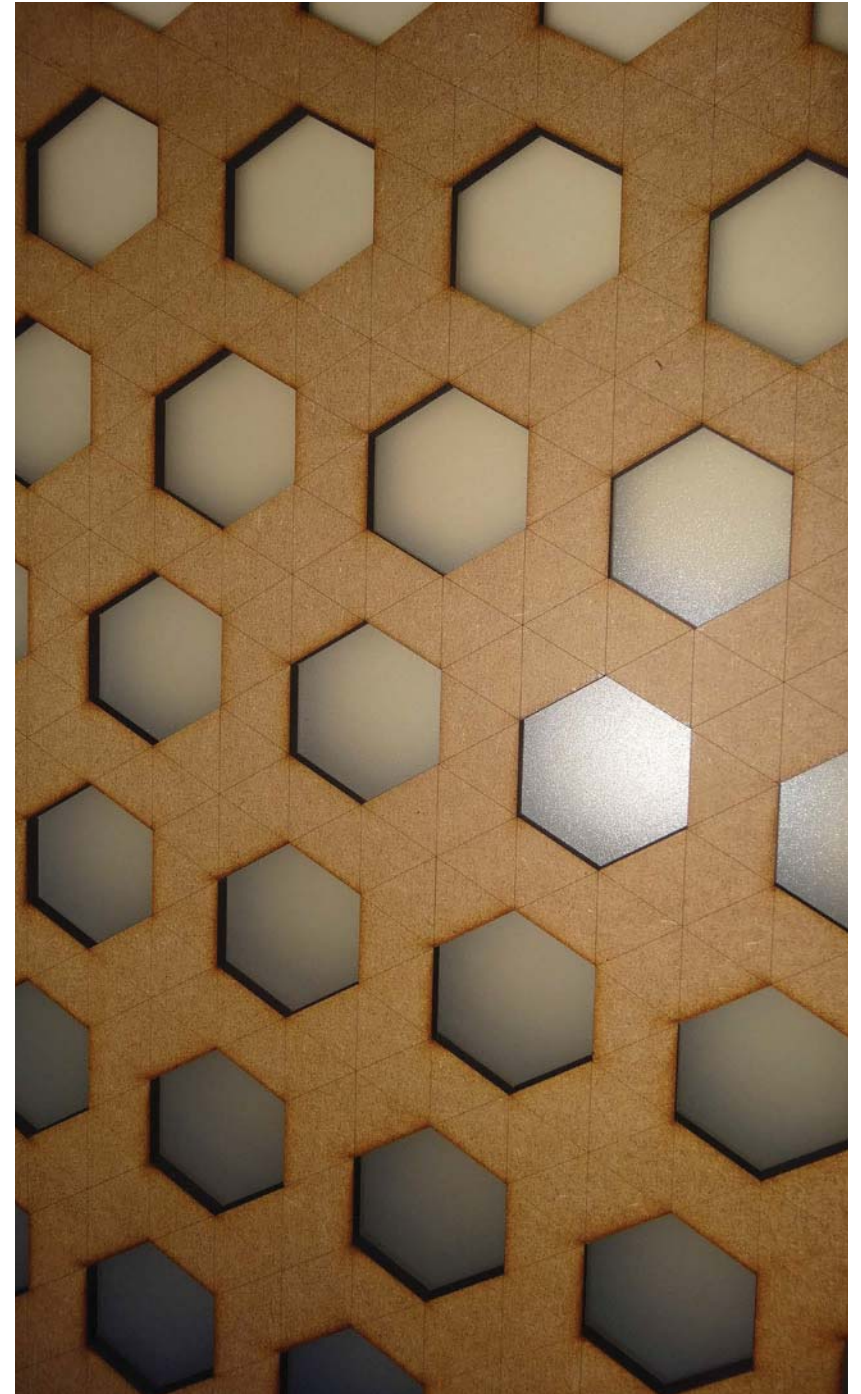
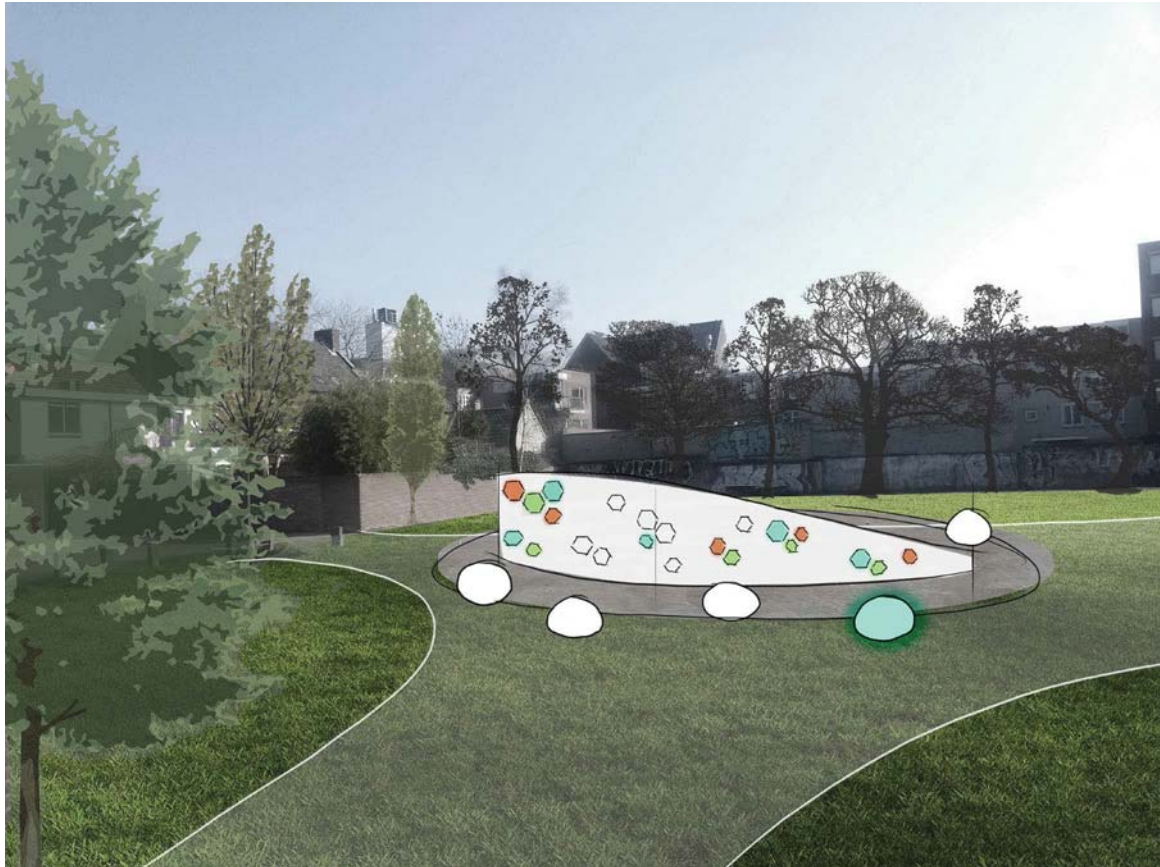
Ideation of a possible physical form for this resulted in an idea for an interactive lattice which would store and display the digital artwork. Unfortunately, I did not have enough time at this point in the process to elaborate and create a second iteration before it was time to take part in the TU/e Desis Network IPoC workshop which took place in Taicang, China.







Mark Huang, 'Tea for Two', shows that effective social interaction is inclusive and intuitive for use.



/International Patina of Culture

I took part in a two-week workshop in Taicang, China which is held in collaboration with Jiangnan University and the Desis-Network TU/e. This is the third year that the program is running.

The focus of the workshop was to design an interactive art installation, looking at patina of culture- and in our case in the end, Chinese culture. In the first few days we attempted to pull our efforts into bonding with our teammates and gaining exposure to the techniques and methods used within performance art in order to shape our design process.

It was difficult at first connecting with my team- three girls studying multimedia design at Jiangnan University (Jiali Tang, Xiaoyun Zhang and Yuyuan Zhou)- resulting from a combination of a language barrier, a sense of power-imbalance stemming from the organizational presence of the two universities and uneven team grouping (one TU/e student and three or four from Jiangnan. The differences, which as a result of the previously mentioned reasons, manifested in the Chinese students in general taking a more passive and accommodating role while it felt to us, the TU/e students, that we were automatically placed in a position of “team leader”. Fortunately, this dynamic was able to be improved by encouraging group discussions and decision-making during the workshop, and by the fact that we were completely dependent on the other students to be our guides around the city during field research and leisure activities.

Although I had been working on creating an interactive installation in Eindhoven, the focus was on social interaction, while in Taicang the focus was on art. In particular, we looked at how elements of performance art could be used as a methodology for creating these installations. This was particularly interesting to me. In a presentation in the first week by Yu Zhang, a PhD student at our faculty, she described a very interesting model of building an artwork or performance around a central theme or ‘drama’. The following steps would include adding layers of a script/ story, then a context/space and then, finally, the performance/artwork. Personally I found that this was a very interesting methodology that could be applied to designing whole concepts and scenarios.

Comparing interactive art or performance art to traditional art forms, she made the distinctions that in the latter; the artist has the power whereas in the former, the performer or spectator has power. Comparing these two also draws attention to the idea of backstage vs. front stage dynamics and action vs. reaction.

The idea that you can ‘throw’ a question or answer to an audience with an art piece, creating an opportunity for reflection and where the meanings or conclusions are entirely personal – resulting in each spectator having a different experience or interpretation- was also an extremely influencing theory in the following two weeks for me as well as later on in my project. With the workshop itself being so condensed, our whole process and methodology was pre-planned, with strict deadlines enforced. Our first step in developing a concept was discovering how to express a concept with only symbols and actions such as in performance art. Field research was also conducted by visiting local museums and traditional gardens, in order to gain insights into Chinese culture- both ancient and modern.

When coming up with a concept, it was initially difficult as my team had a strong language barrier. Often we would have to use the same elements of performance art into explaining and miming to each other our ideas and intentions. I also had an impression that perhaps the other students did not have as much experience in developing complex concepts or were not yet comfortable in speaking completely freely, so in this aspect I tried to encourage and lead them. During brainstorming to choose a drama, I asked my teammates about current issues China is dealing with as well as to list interesting Chinese traditional Chinese culture that could be used to express these. I also listed customs and items which I had been noticing from my brief time there. Together we were able to start making meaningful connections and team communication really improved. I encouraged a discussion around whether Chinese culture is being lost or whether it is retaining important elements and simply evolving. This also encompassed the debate around the fake brand culture of China today. During feedback sessions with other groups and the coaches the ideas were able to develop even further and I took a lot of these other insights into account.

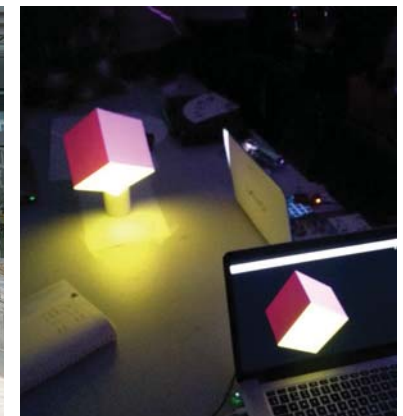
Eventually the theory for the drama of replication was agreed upon. This was one of our concepts that stemmed from noticing aspects of Chinese culture such as that of the profuse use of fake brand names in society. From discussion with my teammates it became evident that the reasons for this were because of a result of globalisation and economic ties with the west. The drama revolves around the idea that China is replicating the West, in particular America. This is based on the assumptions that the western way is the best way because being western means that you are developed. Therefore copying the western way means a greater amount of wealth. By doing this, the western culture is creating a new patina on top of Chinese culture.

Everyone found that the way the drama links to the theory of patina was especially strong, with the drama being quite provocative.

We had some problems expressing such an abstract idea in a physical way with our interaction and implementation ideas being rejected on day of the concept freeze.

Luckily Jiali Tang had come up with an idea of representing the concept of replication with a delay which we presented on the Monday in the second week. Combining input from Mathias Funk, Lucian Reindl and Yu Zhang especially, we were able to come up with the final interaction together, with the rest of the week focused on building the interaction. For the coding of the processing sketches, I had a lot of help from Mathias Funk, for which we were all very grateful due to the short amount of time that we had to complete the installations.

Concluding our trip to China, Jun Hu succeeded in obtaining sponsorship of 2 500 euro from Design United to exhibit one of the 9 installations. Our final installation was chosen to be made and we agreed on a common aim to work towards exhibiting during Dutch Design Week 2014. Therefore after this point, I would be working on elaborating and improving this design in conjunction with the process of my final project back in the Netherlands.



Process

/Prototyping and Iteration 2

I decided not to scrap the progress that I had made in my process before the China trip; however to simply use some of the insights and skills I had gained from the workshop into my design

I began creating a second prototype to test the interaction of the interactive lattice which would store the generative artwork. I lasercut a small lattice structure and created an Arduino sketch which would use input from LDR sensors behind semi-opaque plastic which would turn on a network of RGB leds behind it which could be used to generate art in this low-fidelity way. However, upon validating the idea of the lattice artwork concept with friends and family, I realized that the same problem of lack of motivation of users to read stories of anonymous people unrelated to themselves would lead to a loss of attention and interest over a period of time. Another problem is that it did not provide an appropriate solution to the problem statement of increasing social interaction amongst the elderly since it only provided the opportunity of interaction through time with people, but did not necessarily encourage further social interaction.

I decided to abandon this concept, and as a result, the second iteration prototype as well due to a diminishing time.

I returned to the process of envisioning and proposing an idea which began with a very direct interaction and inspiration of an interactive connected community bulletin board in order to facilitate ideas of hobbies that people could do together and to leave messages for others.

The realization then came that perhaps the best way to encourage social interaction is through highlighting a common hobby for people to share. The idea for an interactive book club developed from this as reading is a hobby that spans generations and is an activity that some people already enjoy to do in the park. After meetings with Rene Pare and Yu Zhang, this had evolved into a platform for people to share their favourite passages from books and perhaps also encourage a community library of borrowing and sharing books. Concluding a coach meeting with Jun Hu, he reminded me that my concept should include a digital layer and suggested projections to map the quotes from books around the park.

The idea for a quote and book sharing network with the aid of projection mapping was created.

In order to validate whether users would feel motivated to share a quote from a book, I made a simple paper prototype test. I placed a poster with text and empty space asking people to share a quote they love and put this up in the coffee shop in Polare, a book store in Eindhoven. Unfortunately, there was no interaction with the paper. From observation I realized that the main reason for this is that in the busy atmosphere of the book store, no one noticed the experiment. Another element that could also influence this was a lack of motivation and a large “social embarrassment barrier” (Rogers, 2002).

A second test was conducted shortly after by placing papers with various book quotes on them in the Anne Frankplantsoen Park, following a certain path. At the end of a path, the same paper was placed with a pen asking people to share a quote that they love.

Results:

In the two hours that this experiment was up, one person interacted with the paper and added a quote even though the motivation was low. This was promising. Another observation I made was of an elderly man walking his dog. Once noticing the quotes he changed his direction and began following the path, reading each quote. I spoke to him afterwards and explained the concept to him without mentioning that my target group was for the elderly. He mentioned that he believed the concept would be interesting for elderly people.

Limitations of the test: This test was limited as unembellished graphics and visuals can easily go unnoticed to passers-by and there is a low motivation for interaction. However, the results were promising.

The initial design of the system included the requirement to scan a particular text from a book in order for it to be projected. By pressing a button on a pole by the projection of a quote, the projection would transform into a simple user interface which would be navigated by rotating this button and pressing it.







Process

/Prototyping and Iteration 3

Test 3:

I created print outs to illustrate the user interface and conducted 5 interviews with 2 males and 3 females aged 56- 78.

The interface would allow people to scan in handwritten quotes and comments. It provides options to share a quote, browse and comment on quotes as well as to discover the origin of the quote. Motivation for interaction with the system was attempted to be created through a concept of discounts on mentioned books.

I made use of a walkthrough of the concept and interface as well as a questionnaire and unscripted interview.

Results:

- 4/5 could use and understand the interface.
- 4/5 said that they would try the system dependent on amount of time and feeling of safety.
- 2/5 suggested that the concept would work better by a museum.
- 1/5 suggested the system to be portable and to be used in a home for the elderly.
- 1/5 suggested that it would be more interesting for the quotes to be animated.
- 4/5 expressed that they liked the idea of sharing quotes although 2/5 users mentioned that they would not add their own as they do not know any off by heart.
- 3/5 expressed an interest to comment on the quotes
- 1/5 expressed an interest in sharing books
- When asked about input methods, the most popular method to add quotes or text was through typing.
- The one elderly man that I interviewed was actively involved with sharing poetry and he was the most negative about the concept, expressing that he prefers to speak his poems to people.

Taking into consideration the results and the technical feasibility of scanning as input I decided to change the interaction to that of typing on a touch screen interface. Scanning poses problems for text recognition. The possibility

exists to simply use a snap shot of text as the input, however this input cannot then be further utilized or edited. Through observation I noticed that most elderly Dutch people seem to be capable of using basic technology such as touch screens or sms, however most were not confident enough to use the internet beyond a basic level.

Concluding this I reached the point of my final prototype for the final Demo Days. I simplified the user interface into a web app that would be interacted on through a cellphone integrated in a pole by the projection. The reason I decided to integrate the cellphones is because most elderly people do not have a smart phone and I wanted to ensure that the threshold for user interaction remained low. I created the web app using html and php, linking it to a database and processing which would update the processing animation- to be projection-mapped on a cardboard tree.

Users had the option to take part in a scavenger hunt, add quotes, browse quotes and comment on them.

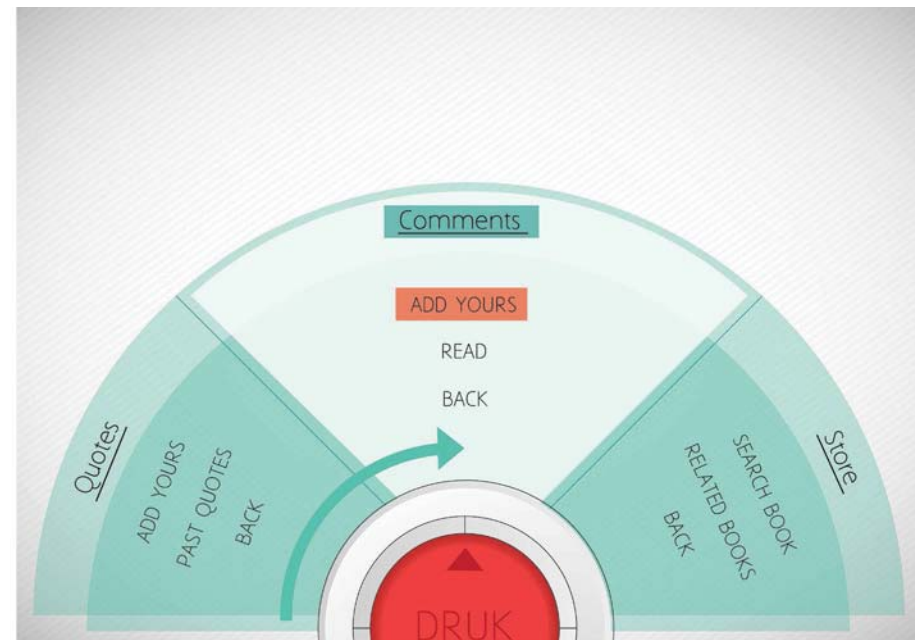
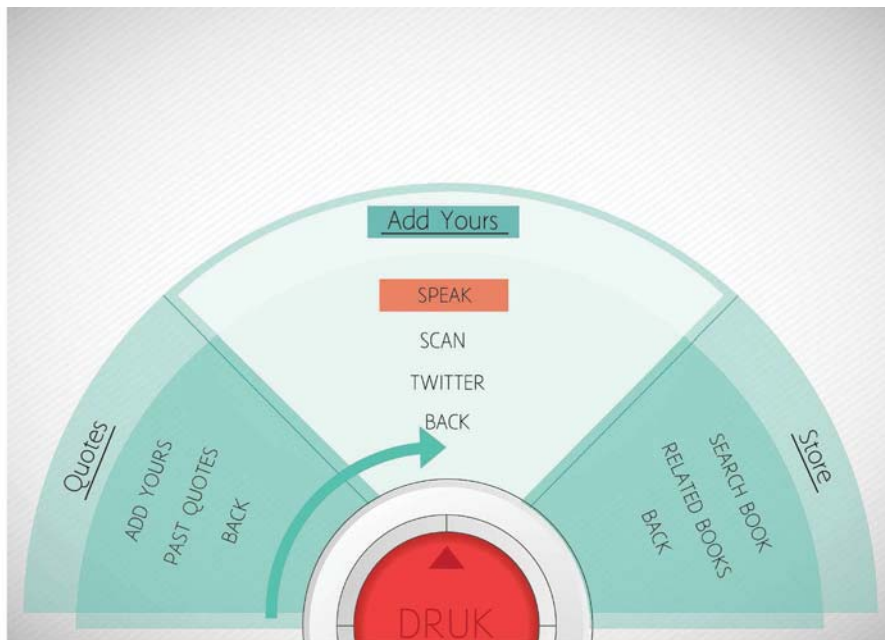
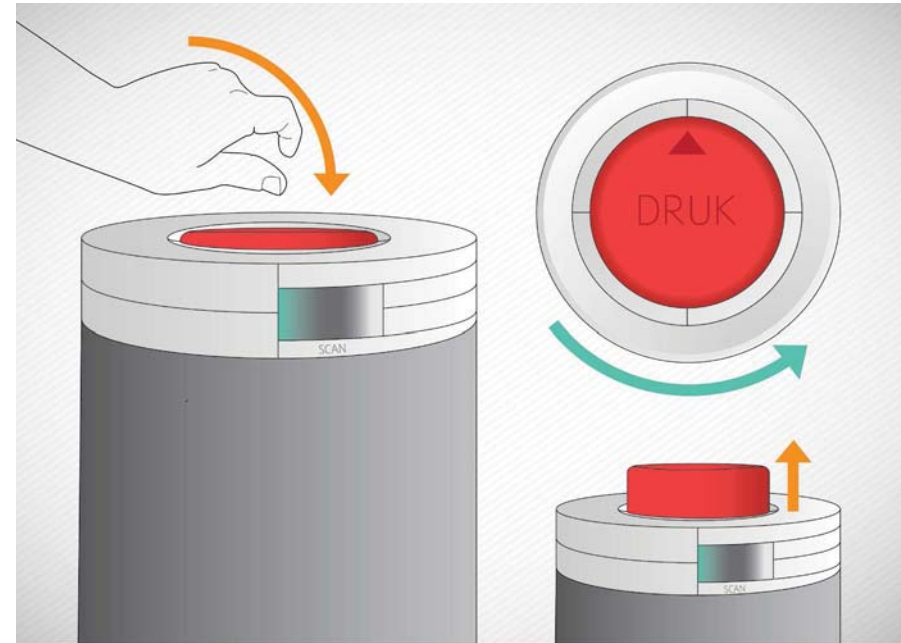
I wanted to design the exhibition in a way that would give visitors a general feeling of what the system might look like and to experience it. For this I created a backdrop for the exhibition, laser cut casing for a projector and built the interaction point which housed the cellphone. For this I used a concrete block middle and simulated concrete for all the other components in the system since I envisioned a discrete concrete finish. Although the construction appeared quite rugged and large, it served its purpose to illustrate the idea. I was quite unsatisfied with the end result of the application as it was not as responsive as I had hoped, despite spending countless hours programming it due to this being the first app I had programmed.

Unfortunately during the first demo day I had some technical difficulties with the projectors connecting to the computer as well, however this was remedied on the second demo day with changing the projector. Feedback I received on the day of the demo day was that the system was too complicated and that it appeared too much like point of service. The user interface appearance was modelled too much on existing apps. I also found that the interaction was not simple enough.

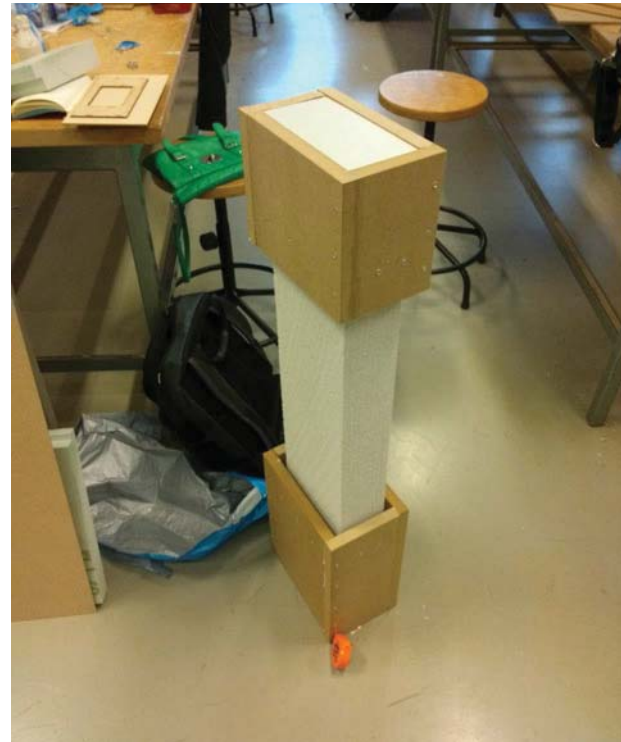
Redesign:

The interaction of the system was redesigned following the demo days. I decided to eliminate some less popular functionalities such as inputting your own quote and browsing quotes in favour of a more simple and fluid user interface and interaction of swiping a quote down. I also split the function of the scavenger hunt and the quotes to be located on two separate interfaces in order to make the design even more understandable and easy to use at first sight.

Discussion with Anouk van Ranst resulted in ideas to incorporate grouping based on key words in the comments, allowing people to more visibly see a debate. An expert meeting with Dr. Joep Frens resulted in ideas to make the scavenger hunt more physical and simple to understand with the method of printing the quotes as well as to link the more fluid interface with the projections with LED strips. A coach meeting with Jun Hu after this further improved the concept when the suggestion to use the LED arrays as a way to describe the movement of quotes from one projection area to another. Another suggestion of Jun Hu was to make use of free postcards displaying your favourite quote as a reward for the scavenger hunt.







Process

/Concept Evaluation:

Meeting with Van Abbemuseum:

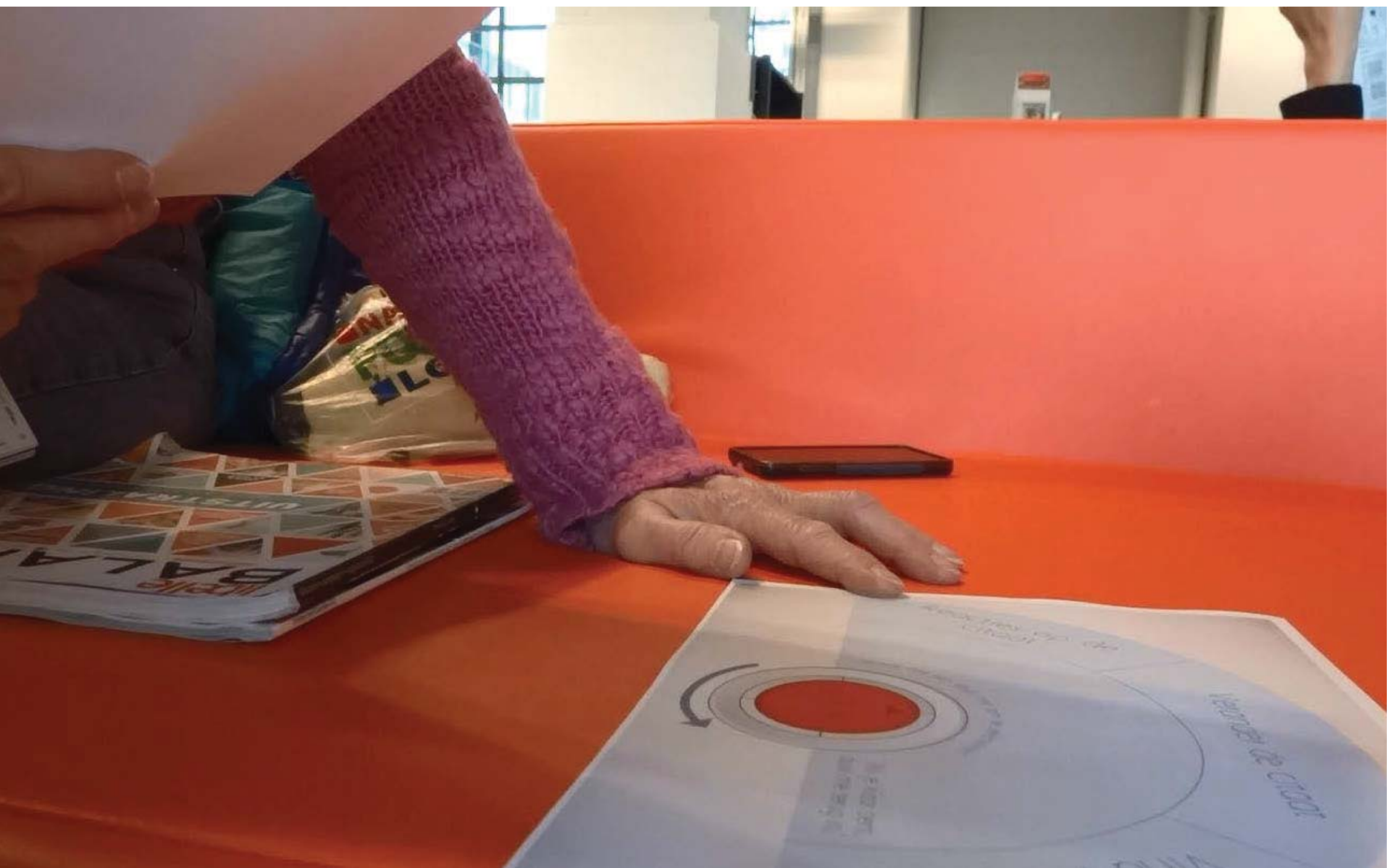
I met with one of the curators of Van Abbemuseum, Daniel Neugebauer, to discuss and evaluate my concept. He was extremely positive about the concept mentioning that they were looking for something of this nature to activate the area around the museum and make it more accessible. His initial thought is that “it beautifully connects to the hospitality strategy that the museum is currently working on” and that of including senior citizens with the museum. He expressed interest to implement the design.

Meeting with Rene Pare:

During my final meeting with Rene he mentioned that he liked the concept and found it poetic. The only problems would be those of implementation as the system would be very expensive.

Final User Evaluations:

Due to it being difficult to simulate the true reactions to the final design as it includes multiple user interaction points, projections etc., I opted to conduct a final user evaluation through conducting open-ended interviews within the context of the Anne Frankplantsoen Park, this time with people of a variety of ages to gain qualitative feedback in reaction to the concept.



Evaluation

/Final User Evaluation

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Planning the interviews with the DECIDE network:

Goals:

To evaluate final concept. Do people like it? Would people use this system? Do they think it would help them connect with their community?

Questions:

The first section of questions were designed to evaluate the user model: (Age, culture, interests, bias, level of loneliness/integration in community, and lifestyle.)

- General background information- name, age, gender

In order to discover level of integration in community and level of loneliness:

- How well do you get along with your neighbours? How well do you know them?
- Which groups do you spend the majority of your time with? E.g. University friends, family members, hobby groups?
- Is there someone that you miss currently? E.g. Family members etc.
- In order to understand lifestyle and interests and culture:
- Describe in brief your hobbies.
- Do you enjoy quotes or art?

The second part of the interview consisted of explaining the concept with the aid of a storyboard and video. Users were then asked to evaluate the concept.

- What is your first impression of the concept?
- Do you think this could help you meet your neighbours?
- Would you recommend using this to a family member or friend? If yes, why? If no, why not?
- Is there any part of this that you would recommend for your friends not to try? What and why?
- Do you have other suggestions or remarks?

Limitations:

Practical issues regarding this method are that there can be some influence in subject behaviour and response as well as the fact that the amount of users interviewed represents a small pool of people. It is also still quite difficult to really give an impression of what the final experience using the concept would be like.

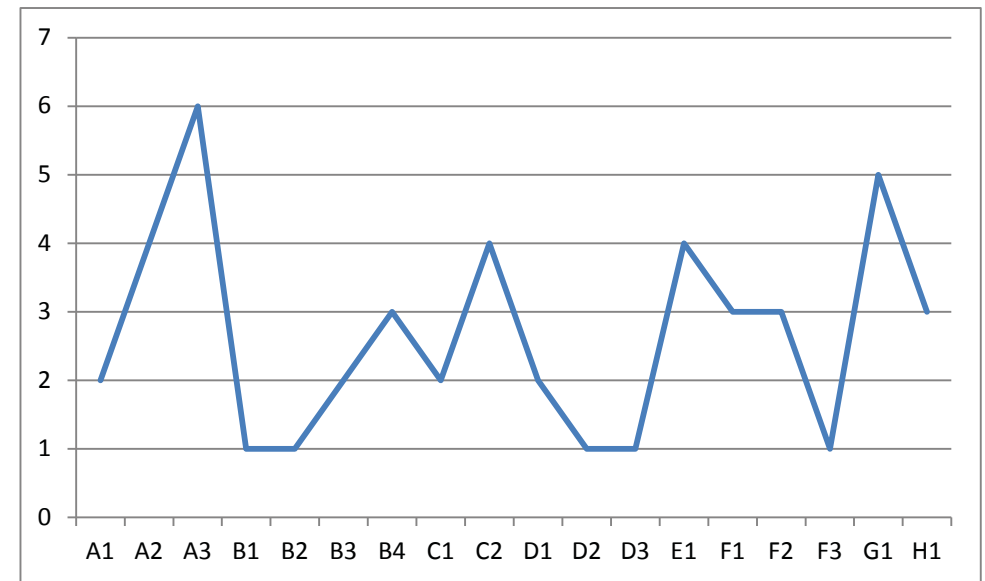
Issues that I experienced during these interviews included my limited knowledge of the Dutch language and vocabulary when having to explain the concept and interview people who mainly spoke Dutch which could also cause a barrier. One incident during occurred where a mentally unwell local approached during an interview with a woman. He shouted a lot of profanities at us and as a result we moved to a safer location, however this also impacted the interview because both she and I were less focused and engaged in the rest of the interview and a fluid conversation was not possible anymore.

The size and makeup of the test group was fairly limited although there were some interesting correlations and conclusions. In future it would be highly advisable to continue with more user evaluations, preferably with more women and more elderly users.

Test Group:

A total of 7 interviews were conducted at the Anne Frankplantsoen Park in Eindhoven. A total of 6 males and 1 female ranging from the ages of 17 to 85 were interviewed.

	1	2	3	4	5	6	7
beautiful, creative	x			x			
exciting, fun, amazing			x		x	x	
new/modern/future				x			
misuse			x		x		
sport	x		x		x		x
art		x		x	x	x	x
reading	x					x	x
Needs to look professional, otherwise feel cheated		x					
don't like being told what to do		x					
skeptical/ doubtful		x					
prefer tradition		x					
music				x	x		
lonely							x
disconnected				x			x
big problem		x					
outings							
no contact/ cut contact		x		x			x
travel							
sharing ideas	x			x			
mainly for young	x						
active social life	x		x		x	x	
active work life						x	
don't like art- not part of me	x		x				
family together	x	x				x	
timing			x	x		x	
prefer real connection/click				x			x
tech fusing with nature				x			
distance				x	x		
connect young and old					x		



Finding correlations between groupings

Coding and Grouping the Data:

	1	2	3	4	5	6	7
A1	x			x			
A2			x		x		
A3	x	x	x	x	x	x	
B1		x					
B2		x					
B3		x					x
B4			x	x	x		
C1		x				x	
C2	x		x		x	x	
D1				x			x
D2		x		x			x
D3		x					
E1	x	x		x			
F1		x				F	F
F2				x			
F3					x		
G1	x	x		x	x		x
H1			x	x		x	

A	positive	creative	1
		fun	2
		would recommend	3
B	negative	don't like being told what to do	1
		skeptical	2
		wouldn't use it	3
		misuse	4
C	active social life	family orientated	1
		friends orientated	2
D	poor social life	lonely/disconnected	1
		cut contact with people	2
		big problem	3
E	good for sharing ideas/meeting people		1
F	likes some form of art	prefers traditional	1
		prefers modern	2
		music	3
G	hobbies/ active extra curricular		1
H	timing		1

Evaluation

/Final User Evaluation

Findings and Conclusions:

Most subjects were quite positive about the concept with only one person not willing to recommend it.

The main concern over the concept was the possibility of misuse or vandalism.

There appeared to be a correlation between young generations and a hesitation to appreciate traditional art forms. Often they would prefer music, dance or some contemporary art form. This tendency seems to correlate with being more enthusiastic and positive about the project, using words such as 'creative' and 'beautiful'.

Most subjects had active social lives. Younger subjects seem to be more focused on friend groups while older subjects are more family-orientated.

Most subjects reported having friendly to very involved relations with their neighbours.

I would describe three of the users having negative/ anti-social tendencies. One user in particular mentioned that he does not want any contact with his neighbours/ community, deeming them too different from himself. Another user who mentioned being disconnected also mentioned that he actively cut friends or family members out of his life. Only one of these personality types would actively want to try and use the system or connect to members of the community.

An interesting link is that one elderly gentleman who mentioned that he would not use the system himself saying, "I don't want to be told what to do or kept busy." mentioned that he would recommend the system to another person as he believes they would enjoy it and benefit from it to meet people.



Final Reflection on Project and Conclusion

The process to end at a suitable solution was a long and challenging one. Undertaking a user-centered approach and iterative design plan, and validating in context with users, experts and stakeholders has brought a greater depth and meaning to my final design.

To design a holistic and meaningful experience was my aim and I believe it has been achieved, although there are many more aspects that could be further worked out for implementation, which I would certainly like to visit in the future. I am eternally grateful for all of the inputs and insights others have contributed on the way to creating this experience. The fact that I was able to conduct user tests in Dutch has perhaps been one of my greatest surprises.

This semester as a whole has been a huge learning curve. I think that my largest pitfall during this project has been my planning. For the first time I am finding that I was constantly overestimating the amount of work I can get done in a short amount of time. However, on the other side of the coin, it has pushed me to learn a lot, especially about myself and about my design process, but also about new technologies and methodology. I find that one of the problems for this was that I was still too insecure in my design decisions, yet this semester I found that if I set the goals and take a chance to try attain them, it is possible. If anything, this is one thing I would like to take away with me from this experience.

I

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Appendices

/Context Proposal

Area:

Area accessible through Grote Berg, Kleine Berg and Bergstraat in Eindhoven.

Problem:

For many years there has been a lack of consumers venturing out of the main shopping district in the center of the city. This has led to many smaller shops, cafés and businesses opening up around the 'Berg' area, and subsequently being closed due to high rent and low business.

For the past two years, the area of Kleine Berg, with its many cafés and restaurants has seen a lot of growing interest from people, which is as a result good for other businesses in the area. However, still not enough people are attracted to explore the area of Grote Berg which also has a lot of potential.

Proposed Solution:

Park

Developing our proposed area into a park could help further increase visitation to the Berg area, and create a more unified community.

The type of businesses in this area includes small boutiques, design/ art shops, restaurants and cafés. Because of this we believe that the area could also be complementary

Challenges

This area as we know it has been under discussion for some type of development for the past 30 years, however there has never been a strong agreement on what to do with it. As a result, the area is now simply a large area of cemented land that is closed off to the greater community.

The Digital Community Garden

Situation

Many advances are being made to enhance the experience of various places with technology. However areas like parks and other green areas are often left untouched in this respect.

Proposed Solution

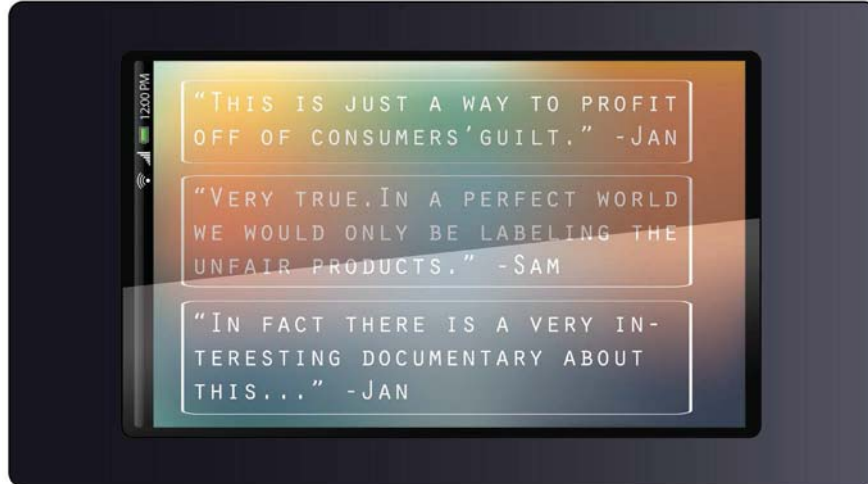
There is an opportunity to make a green space more interesting to the growing technology-orientated culture through augmentation. The aim with this is to encourage more people to visit green spaces, highlight the value of green space and to redefine it in the context of what it could be in a future city.

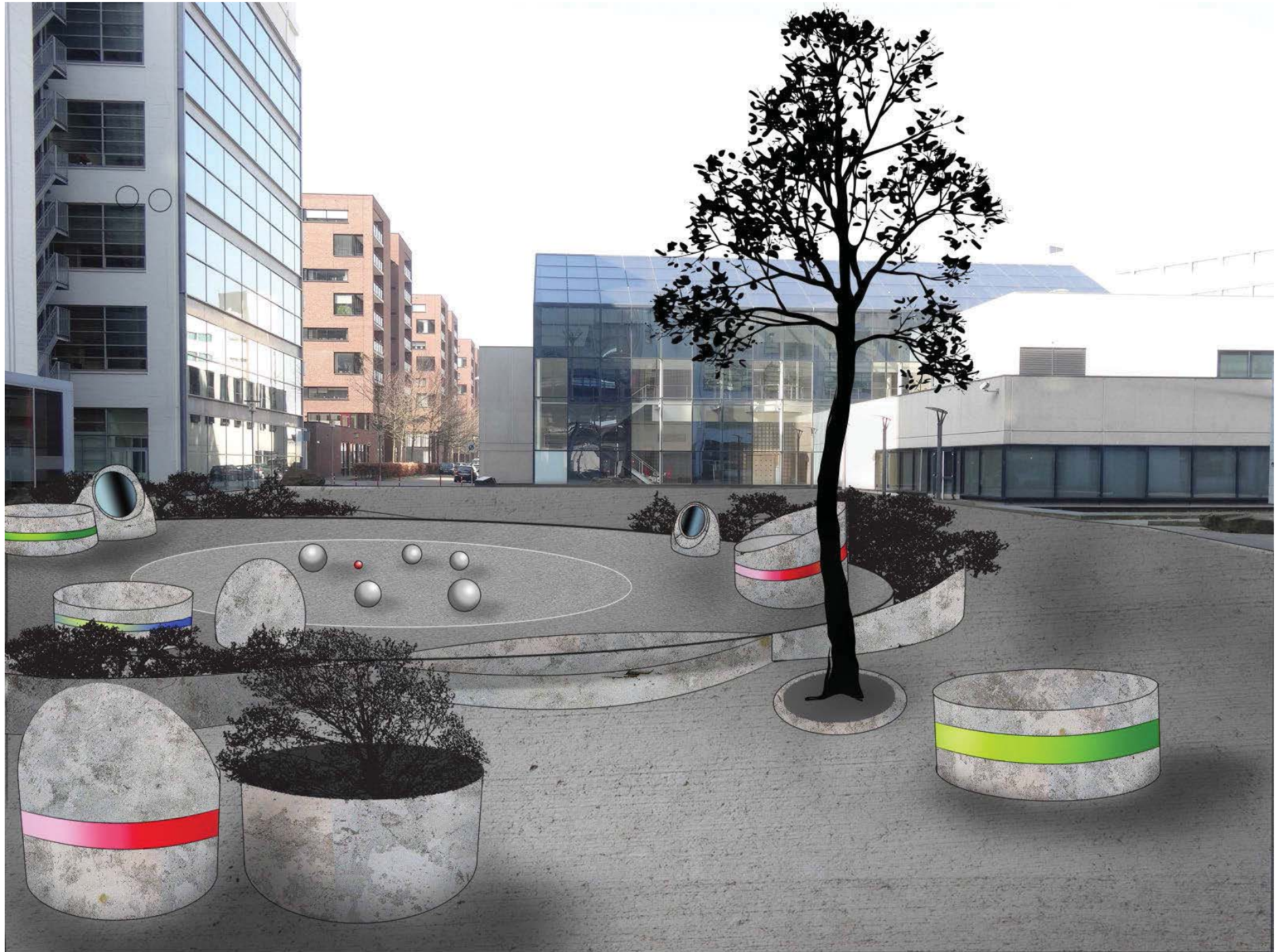
Motivation:

Many independent elderly people who have already retired suffer from loneliness, and this often leads to other health complications. A combination between increased social interaction and physical outdoor activity is beneficial for many people, including the elderly, in promoting good health.

Project Summary:


The project will look into designing a future art/social installation in a green and accessible public area. The objectives are to increase social interaction and a feeling of inclusion in a public space as well as to encourage visitation to said public space.







paper cardboard



SUCH A SHAME THAT PEOPLE
SAVE THEIR FREEDOM OF
SPEECH FOR THE TOILET
WALL.


LOESJE



Do you want to create your own **quote hunt**?
You can also set up a fun game for your neighbours or family!

SHOW ME HOW!

TAKE ME BACK TO THE TOP!



Find and collect all the codes from the Alice in
Wonderland quotes and redeem them for a:
FREE Donald Duck magazine at Bruna!

FIND OUT MORE

```

int ledDigitalOne[] = {22,23,24};

int LDR = A0;
int sensorValue = 0;

const boolean ON = LOW;
const boolean OFF = HIGH;

const boolean RED[] = {ON, OFF, OFF};
const boolean GREEN[] = {OFF, ON, ON};
const boolean BLUE[] = {OFF, OFF, ON};
const boolean YELLOW[] = {ON, ON, OFF};
const boolean CYAN[] = {OFF, ON, ON};
const boolean MAGENTA[] = {ON, OFF, ON};
const boolean WHITE[] = {ON, ON, ON};
const boolean BLACK[] = {OFF, OFF, OFF};

const boolean* COLORS[] = {RED, GREEN, BLUE,
                             YELLOW, CYAN, MAGENTA, WHITE, BLACK};

void setup(){
    Serial.begin(9600);

    for (int i = 0; i < 3; i++){
        pinMode(ledDigitalOne[i], OUTPUT);
    }
}

void loop(){
    sensorValue= analogRead(LDR);
    Serial.print("LDR1:");
    Serial.println(sensorValue);

    if(sensorValue<20){
        setColor(ledDigitalOne, RED);
    }

    delay(50);
}

void setColor(int*led, const boolean* color){
    for (int i=0; i<3; i++){
        digitalWrite(led[i], color[i]);}
}

```

```
int AnalogPin0 = A0; //Declare an integer variable,
hooked up to analog pin 0
int AnalogPin1 = A1; //Declare an integer variable,
hooked up to analog pin 1
```

```
void setup() {
  Serial.begin(9600); //Begin Serial Communication
with a baud rate of 9600
}
```

```
void loop() {
  //New variables are declared to store the readings
of the respective pins
  int Value1 = analogRead(AnalogPin0);
  int Value2 = analogRead(AnalogPin1);
```

/*The Serial.print() function does not execute a "return" or a space
Also, the "," character is essential for parsing the values,
The comma is not necessary after the last variable.*/

```
Serial.print(Value1, DEC);
Serial.print(",");
Serial.print(Value2, DEC);
Serial.println();
delay(500); // For illustration purposes only. This
will slow down your program if not removed
}
```

```
import processing.serial.*;
Serial port;
ArrayList<Points> apricot= new ArrayList();
float sensor= 0;
float dirX = 2.7;
float dirY = 1.5;
float drunkFactor = random(0.5, 2); //increment to
twirl
```

```
void setup() {
  size(1024, 1024); //set window size
  smooth(); //smooth out the lines
  frameRate (50);
  println(Serial.list());
  port = new Serial(this, "COM7", 9600);
  port.bufferUntil('\n');
}
```

```
void draw(){
  background(255);
  noFill();
  stroke(0);

  beginShape();
  for(int i=0; i<apricot.size(); i++){
    Points P = (Points)apricot.get(i);
    vertex(P.x, P.y);
    if (P.x<0) apricot.remove(i);
    P.x--;
  }
  endShape();
}
```

```
}
```

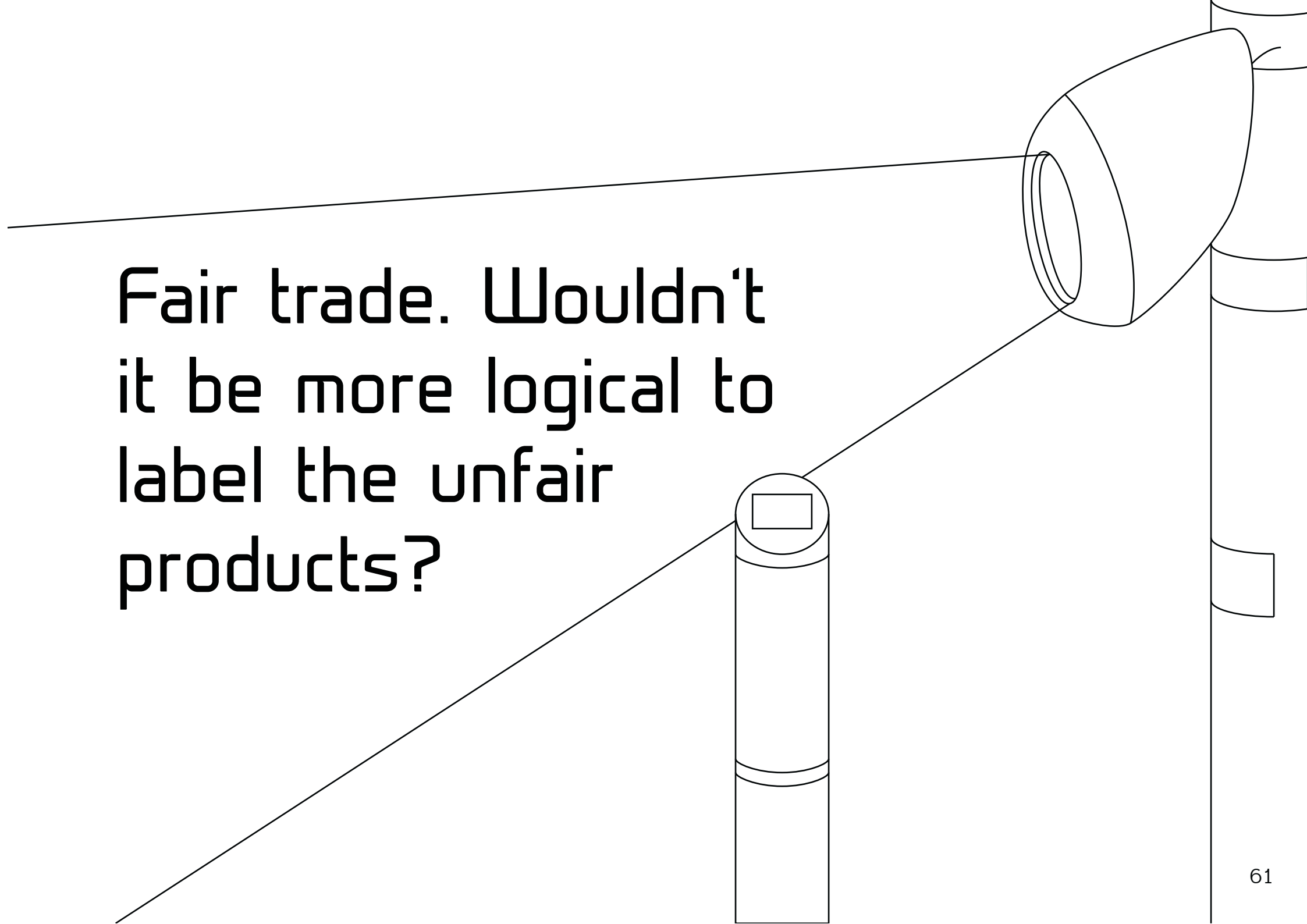
```
void serialEvent (Serial port)
{
  sensor = float(port.readStringUntil('\n'));

  Points P= new Points (sensor, 0);
  apricot.add(P);
}
```

```
class Points {
  float x, y;
  Points (float x , float y) {
    this.x = random(50)+250;
    this.y = 2*sensor+random(50)-500 ;
  }
}
```


STAKEHOLDER	CATEGORY	INTERESTS	PARTICIPATION/ ROLE
MadLab	Organizers/ Partners	StadsLab R&D Increasing communication in community	Help in maintaining system
Van Abbemuseum	Organizers/ Partners	Supporting artistic routes/ expression. Increasing visitation/culture in Eindhoven	Organizing/ maintaining system: Quotes and routes- scavenger hunt Monitoring responses
Gemeente Eindhoven	Funding	Elderly population care, Increasing communication & culture in city	Funding, curating opinions of area - public opinion
ZuidZorg	Organizer/ Partner	Elderly population care, Increasing activity and communication	Organizing scavenger hunts/ routes and outings

<div>Key partners</div> <div>MadLab- StadsLab</div> <div>Gemeente Eindhoven</div> <div>ZuidZorg</div> <div>Van Abbemuseum</div>	<div>Key activities</div> <div>Maintenance of system</div> <div>Organizing quotes and scavenger hunts</div>	<div>Value Proposition</div> <div>Increased social life of elderly</div> <div>Increased communication of area/ community</div> <div>Increase in culture</div> <div>Increased physical exercise in elderly</div>	<div>Customer relationships</div> <div>How to engage and keep people interested?</div>	<div>Customer Segments</div> <div>Elderly population</div> <div>Other people in area- children, adults etc.</div>
	<div>Key resources</div>		<div>Channels</div> <div>How to reach people?</div>	
<div>Cost Structure</div> <div>Cost of set up, cost of maintenance</div>			<div>Revenue Streams</div> <div>Funding</div>	



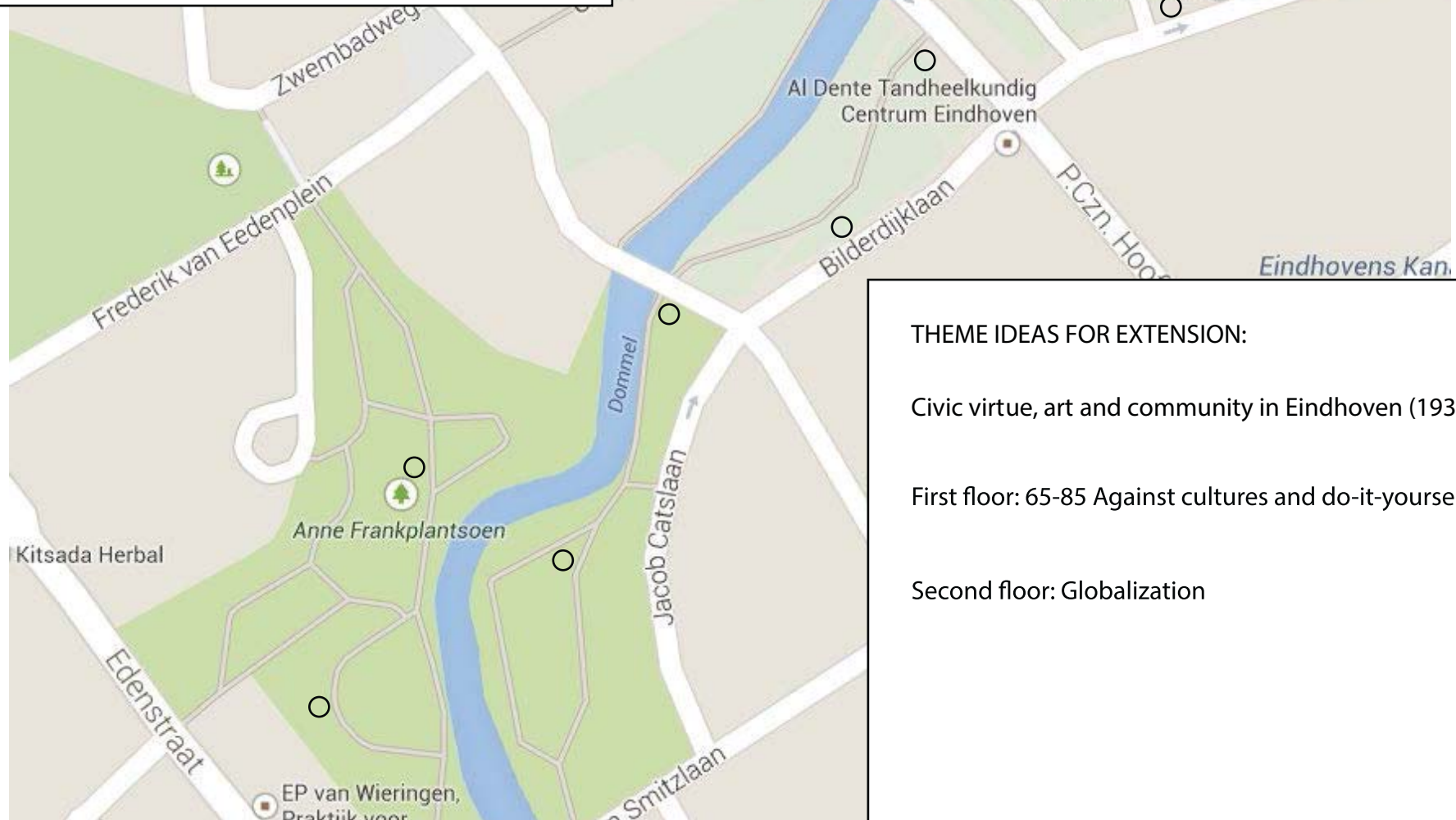
Fair trade. Wouldn't
it be more logical to
label the unfair
products?

Interesting for Van Abbemuseum

- Highlight route around and towards museum (channel)
- Increase appreciation of art/ increase awareness
- Increase collaboration and communication of community in area

Project Aims

- To increase socialization of elderly populations
- Give equal access to communication and give people something to discuss
- Increase awareness in communities, increase local communication



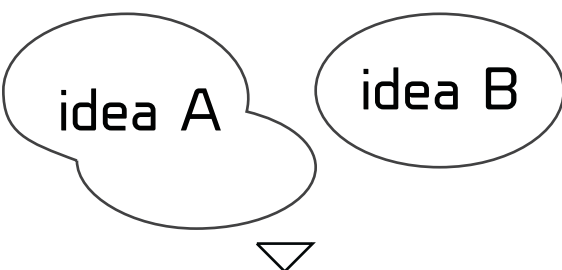
THEME IDEAS FOR EXTENSION:

Civic virtue, art and community in Eindhoven (1936)

First floor: 65-85 Against cultures and do-it-yourself store

Second floor: Globalization

Discussion



idea A

idea B

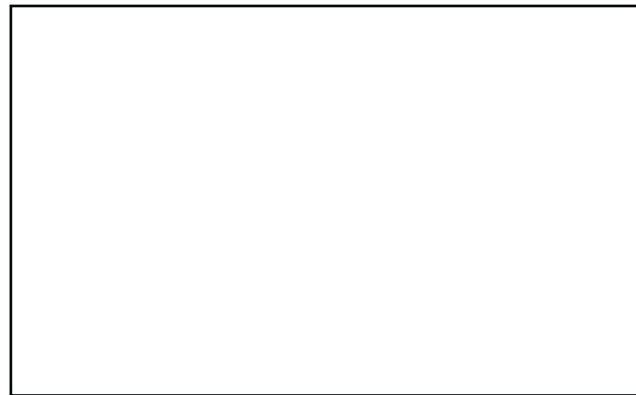
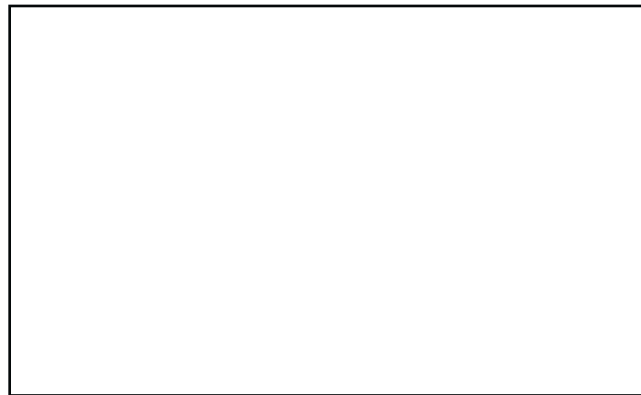
△

Add your
Thoughts

▽

△

The next clue
is:



△

The code is
xa76hsl

Grouping responses based on common opinion- aiding debate.

Encouraging people to add their own thoughts.

Scavenger hunt- encouraging to follow whole route, encouraging activity. Reward? Perhaps free visit/ coffee.