

HOW INDIRECT INTERACTION CONTRIBUTES TO THE FEELING OF CONNECTEDNESS BETWEEN UNFAMILIAR NEIGHBORS?

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ABSTRACT

My project "Social Interaction in Neighborhoods" belongs to the theme "Out of Control". This project is situated in Woensel West in Eindhoven. Designers can build a bridge for collaboration, for mutual understanding by creating a "new language". This new language bypasses differences in background, power or education. We are talking about a language of bodily experience, elicited by interaction through designed Engagement probes. [1]

This report describes the research process in my M12 semester. Before I got to the final result, three round of research were done. Every research had its' own goal and influenced the design decision. The design was made to test residents' social connectedness in order to answer the research question.

CONTENT

6	1. Introduction		
8	2. Learning Approach		
10	3. Visual Research Process		
12	4. Context Exploration		
	4.1 Context overview		
	4.2 Interview Round 1		
	4.3 Case Study		
	4.4 Interview Round 2		
31	5. Research Direction		
	5.1 Research Question		
	5.2 Literature Exploration		
	5.3 Confirmation of the research direction		
39	6. Initial Concept		
	6.1 Storyboard		
	6.2 Problems of this concept		
46	7. New concept		
	7.1 Two Comparing Storyboard		
	7.2 User Test		
57	8. Concept Development		
	8.1 User Test		
65	9. Results		
	9.1 Measure Tools		
	9.2 Analysis		
	9.3 Conclusion		
74	10. Reflection		
77	11. Acknowledgement		
79	12. Reference		
82	13. Appendix		

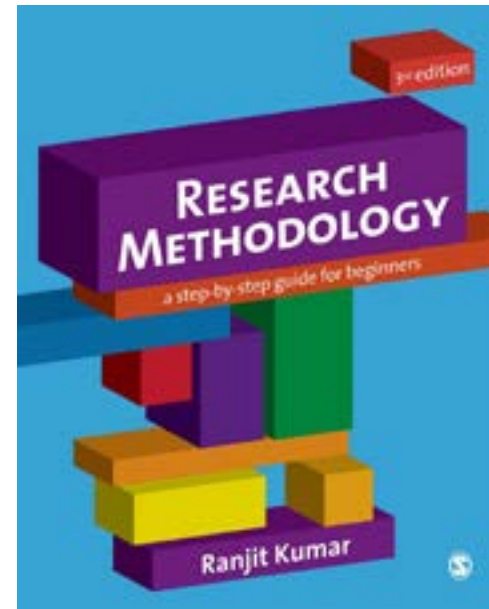
1. INTRODUCTION

It is hard to make friends with a stranger if there is no connection between you. It is even harder to communicate with a person that from a different cultural background with you--let alone if this person doesn't speak the same language with you.

There are lots of residential areas in the Netherlands today are multi-culture area. People from different countries live in the same neighborhood. This can cause a lot of communication problems. For example, people tend to talk to the neighbors that share similar culture with them. So at this point, they narrow their friend circle. They lack a feeling of connectedness with other unfamiliar neighbors. People become more prudent when they are in the public space, especially with an unfamiliar neighbor. It's hard for them to start a conversation or to communicate with an unfamiliar people directly.

So how about interact with unfamiliar ones in an indirect way? This semester, I am trying to find out the answer.

2. LEARNING APPROACH



I never done a research project completely before; so as a beginner, I want to take a step-by-step learning style to gradually develop my capabilities as a researcher. Before conducting a research project, I need to start with reading the book Universal Methods of Design: a research method guide for beginners by Bella Martin and Bruce Hanington [2], which I think is a useful tool book for beginners to learn diverse research methods.

I also read the book Research Methodology: A Step-by- Step Guide for Beginners by Ranjit Kmar [3], as an introduction to the research field. This book gave me an overall idea about what scientific research is and examples of typical research approaches.

3. VISUAL RESEARCH PROCESS

RESEARCH PROCESS

1 Context Exploration

- Interview Round 1 → Basic information of Woensel West
- Interview Round 2 → Explore possible research direction

2 Research Direction

- Findings from interview round 2 → multi-culture, seperation, shy, avoid direct social interaction
- How indirect interaction contributes to the feeling of connectedness between unfamiliar neighbors? →
- Interview Round 3 → Use grounded theory to analyze the result
- Confirm the findings from interview round 2

Initial Concept

3

- Use storyboard to test the concept → 4 elements
- Test (qualitative data) → Use grounded theory to analyze the result

4 Improved Concept

- Test (quantitative data) → Use Social Connectedness Scale - Revised to analyze the result
- Report →

4.CONTEXT EXPLORATION

4.1 CONTEXT OVERVIEW

4.1.1 GOAL & APPROACH

In order to get a holistic view of this neighborhood, I collected information about Woensel West through two round of interview with local people. It contains the geographic information of the area, lives and the cultural backgrounds of the residents and their views of the neighborhood.

4.1.2 WHAT IS WOENSEL WEST?

The name Woensel West is not officially regarded as close as this name in 1986 -for who was familiar with the city- had a pejorative meaning.

The district is characterized as a quarter of the city and has many small houses, rental housing, and a reasonable number of large houses. The center of this district is Edisonstraat, which was the official place for window prostitution.

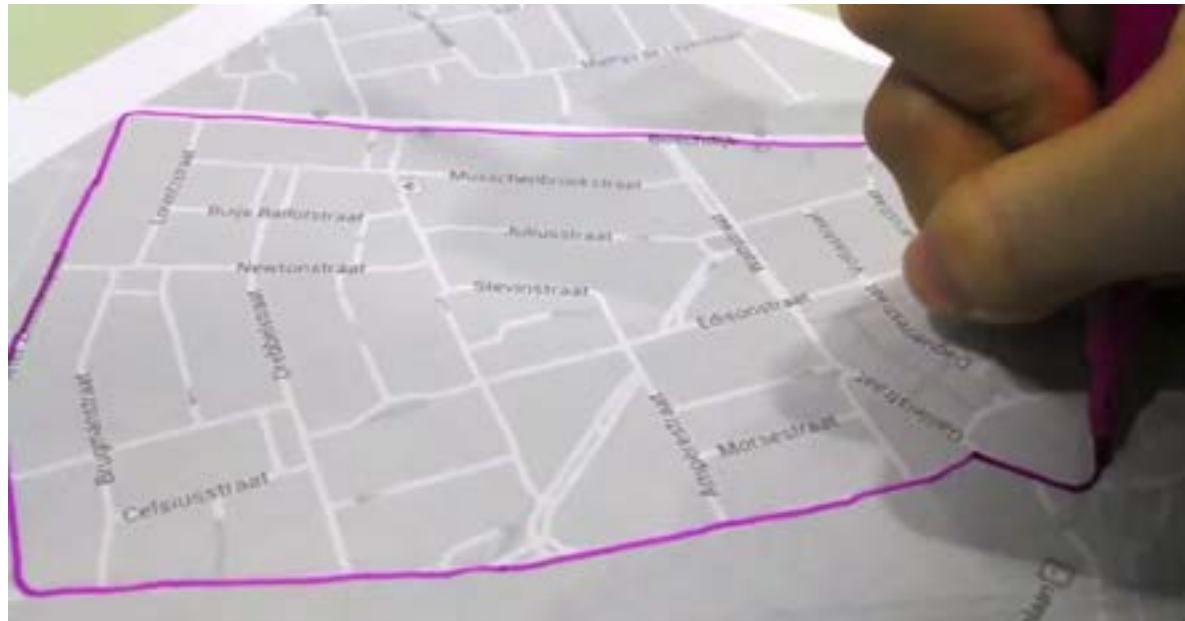
Almost half of the residents in the neighborhood are immigrants.

Woensel West was one of the six Dutch neighborhoods that were portrayed in the SBS 6 program Problem Districts. [4]



4.2 INTERVIEW ROUND 1

4.2.1 GOAL



In the first round of interview, four residents were involved to obtain basic information of the neighborhood. A tool map of Woensel West was prepared to let them draw during the interview.[5]



4.2.2 RESULTS

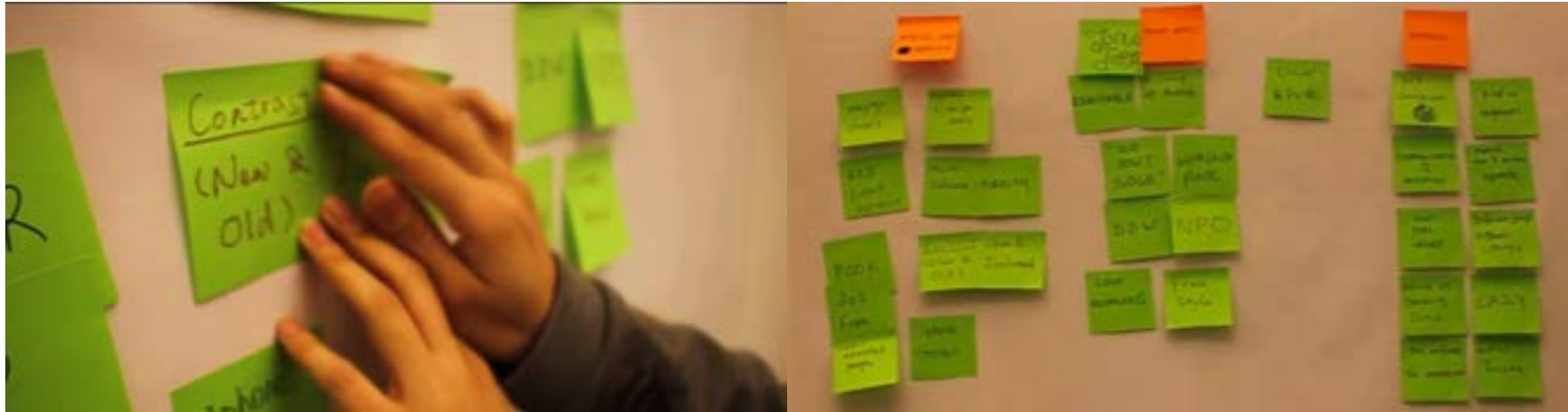
4.2.2.1 THE REGIONALIZATION

(See the map on the right) The red part of the map shows the rental houses of which most of the owners are low educated and don't have a job. The green part of the map shows the selling houses of which most of the owners are government officers and artists. The blue part of the map shows the selling houses of which most of the owners are high educated and work for the company.

WOENSEL- WEST



4.2.2.2 CONCLUSION



Woensel West was once a “no-go” area, but because of the government’s help since 1986, it became safer these years. Most of the residents living in this area are foreigners. Nearly 90% of them are Turks; others are Poles and Moroccans, only a few of them are Dutch.

Most of the foreigners live in the rental houses. Most of them have language problems so they can only communicate with people that have the same cultural background. People are friendly and feel safe about the neighborhood but they are too shy to play an active role in communication.

4.3 CASE STUDY

4.3.1 GOAL

There is a non-profit organization called “Tante Netty” here in Woensel West. They do project for the community every year. Some of their projects are successful but some of their other projects are failure. The case study is a study of two most successful and most unsuccessful projects they done. The goal is to find the elements of success and failure of a local project and prepare for the interview round 2.



4.3.2 WOENSEL SUPERTOLLI! (A VERY SUCCESSFUL PROJECT)



PHASE 1)

In six months time an immense toll of wooden planks were made. These boards are steamed, bent and installed in the air.

*The information can be found in www.tantenetty.nl.

PHASE 2)

Getting started with residents in Woensel West.

Residents are invited to participate in workshops in order to make their clear motive and capture text or image. All participants are then given a wooden plank on which they record their story. In word, in image, perhaps burned or carved. The organization collects all these boards and they will bend through special steam chests. They then processes them in a swarm of three works in Woensel.





PHASE 3) During 2015 - Super Toll!

A gigantic Super Toll! In the end of 2014, the Montgomery Avenue in Woensel opened the brand new HOV2 station. HOV2 is an innovative and high-quality public transport network for the city of Eindhoven. The Super Toll will (hopefully) be part of the new bus station.

4.3.3 GRAB A CHAIR (A NOT VERY SUCCESSFUL PROJECT)

The Monobloc chair has a dull image. Nowadays the beautiful white garden chair is therefore too often to be exchanged for a clunky beige lounge. But the simplicity and versatility of the Monobloc, however, is not replaced - a timeless icon, that also is delicious!

Tante Netty gave an ode to the most underrated seat - the seat that is so characteristic of her own neighborhood.

While enjoying a snack or drink from neighborhood restaurant in the front yard, visitors can enjoy quirky design of the famous white garden chair. Participating local designers and artists: Thijs Bakker, Joscha Weiand, Tijs Rooijackers Wander Haas, poet Merel Morre, and bicycle enthusiasts of bicycle home 't Resistance.



4.3.4 RESULTS

4.3.4.1 RESIDENTS' OPINION

(1) Woensel Supertoll!

This is a very successful project. A lot of residents participated in this project and the outcome of the project is kind of a landmark of Woensel West.

(2) Grab a Chair

This is a project that showed during the Dutch Design Week. Tante Netty thought the white chair is a symbol of this area. They put the chairs outside the building, hoping to get the residents go out of their houses to communicate with their neighbors. However, the residents didn't get the point and really grab a chair-they grab a chair home. As a result, this project was not very successful due to the misunderstanding of the residents.

4.3.4.2 ELEMENTS

- (1) Long-term project
- (3) Residents contribute

- (2) Local style
- (4) Fits residents' needs

4.4 INTERVIEW ROUND 1

4.4.1 GOAL

In the second round of interview, more residents were involved to obtain basic information of the neighborhood. One of the interviews lasted for more than one hour in order to find more detail problems in this neighborhood. Some questions about Tante Netty's projects were also being asked.

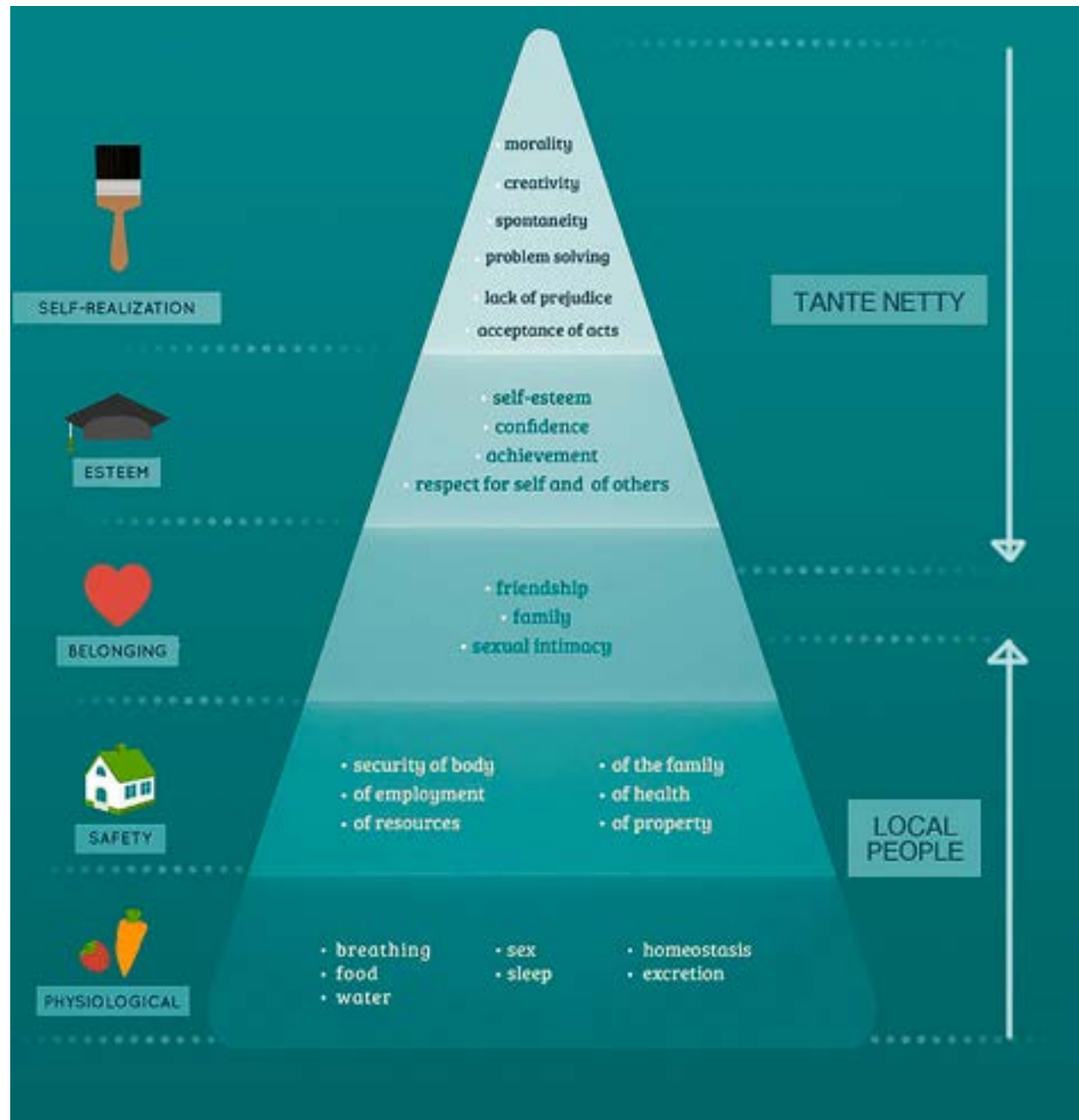
The information of this round of interview was used for inspiration to explore possible research directions.



4.4.2 RESULTS

4.4.2.1 MASLOW'S HIERARCHY OF NEEDS (GAP BETWEEN CURRENT LOCAL PROJECTS AND RESIDENTS' NEEDS)

As it showed in the graph on the right, the local organization (Tante Netty) wants their projects to be reachable, while local residents can't go up. They did some local projects, but the projects they done are in a high level that local people may not understand. They don't know what local people actually need.



4.4.2.2 PROBLEM OF COMMUNICATION

Another information I got from the interview was the communication problem. As interviewees mentioned, residents here are friendly and always keep an eye on other neighbors. However, it's hard for them to really communicate with others, especially the Turks. They keep their culture alive and only spend time in their own cultural circle and seldom communicate with others. Also lots of other residents, they hide in their houses but know a lot of things happen in the neighborhood. They are shy and always avoid having direct interaction with their unfamiliar neighbors but they still desire to have connection with their neighbors as the interviewee said "they always keep an eye on their neighbors but never communicate". They need an icebreaker to start a conversation.

5. RESEARCH DIRECTION

5.1 RESEARCH QUESTION

"How indirect interaction contributes to the feeling of connectedness between unfamiliar neighbors?"

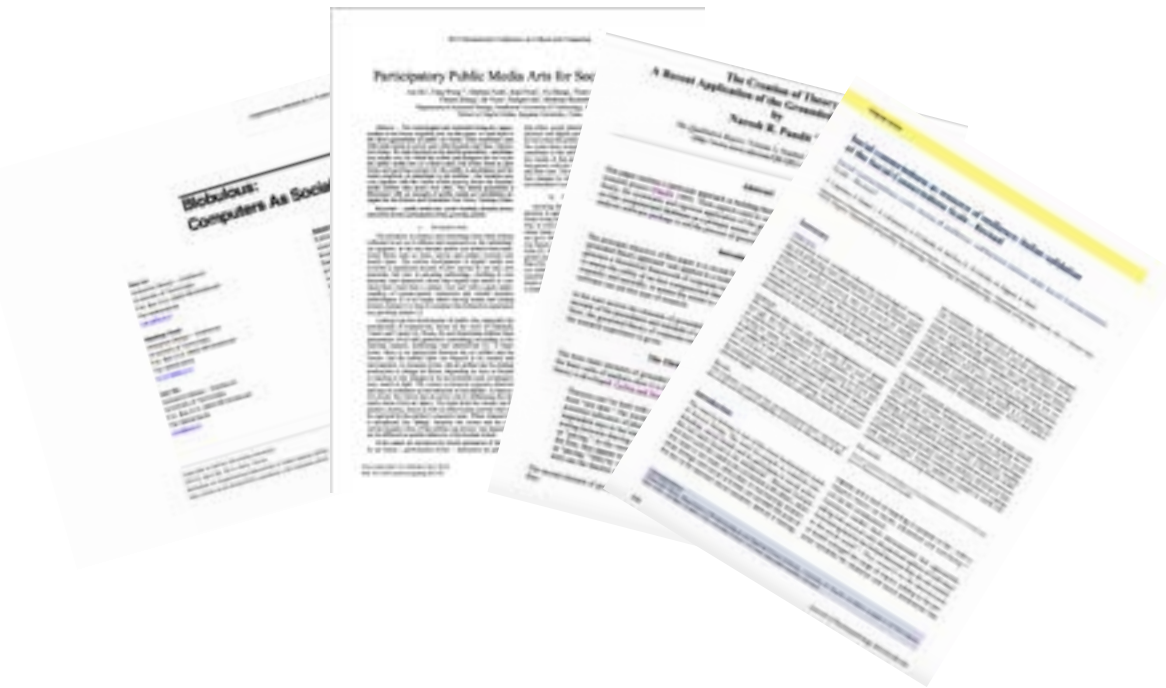
The research question is based on the findings from the first two round of interviews. As it noted in the chapter three, Woensel West is a multi-culture area where lives both low-educated and high-educated, low-income and high-income, active and shy residents. Their lives have a gap but they concern about the neighbors. They don't like direct communication or interaction with others, so it makes me thinking how to design an indirect interaction to let them feel connected with each other.

5.2 LITERATURE EXPLORATION

Three papers about social installations (Participatory Public Media Arts for Social Creativity[6], Design Thinking for Social Innovation[7], Engage Me, Do![8]) are used for inspiration of the concept and the research direction.

Two papers (Blobulous:Computers As Social Actors[9], Social Connectedness and Inclusion by Digital Augmentation in Public Spaces[10]) are used for inspiration of the user test setting.

Two papers (Social connectedness as resource of resilience: Italian validation of the Social Connectedness Scale - Revised[11], The Creation of Theory: A Recent Application of the Grounded Theory Method[12]) are used for inspiration of the research methods.



5.3 CONFIRMATION OF THE RESEARCH DIRECTION

5.3.1 INTERVIEW ROUND 3

5.3.1.1 GOAL

The purpose of this round of interview is to practice a research method called “Grounded Theory” to systematically analyze the qualitative data of the interview and use the result to confirm the findings from the first two round of interviews and the research direction.

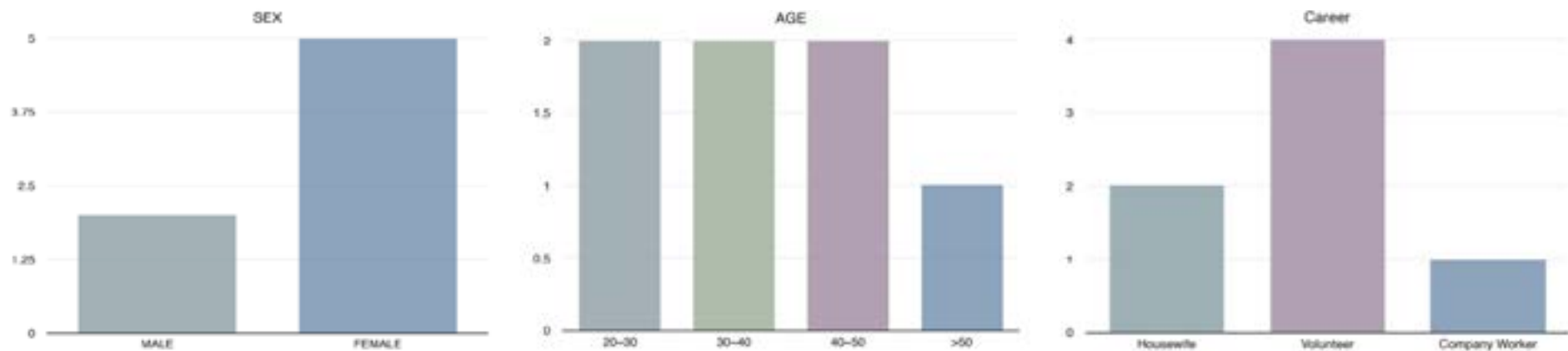
5.3.1.2 METHOD

Grounded theory (GT) is a systematic methodology in the social sciences involving the construction of theory through the analysis of data.

As researchers review the data collected, repeated ideas, concepts or elements become apparent, and are tagged with codes, which have been extracted from the data. As more data is collected, and as data is re-reviewed, codes can be grouped into concepts, and then into categories. [2]

5.3.1.3 THEORETICAL SAMPLING

Seven interviewees were involved in this round of interview, aged from 20 to 60. Two of them are male while others are female. More than half of them do volunteer job in the neighborhood, others are housewives and company employee.



5.3.1.4 OPEN QUESTIONS

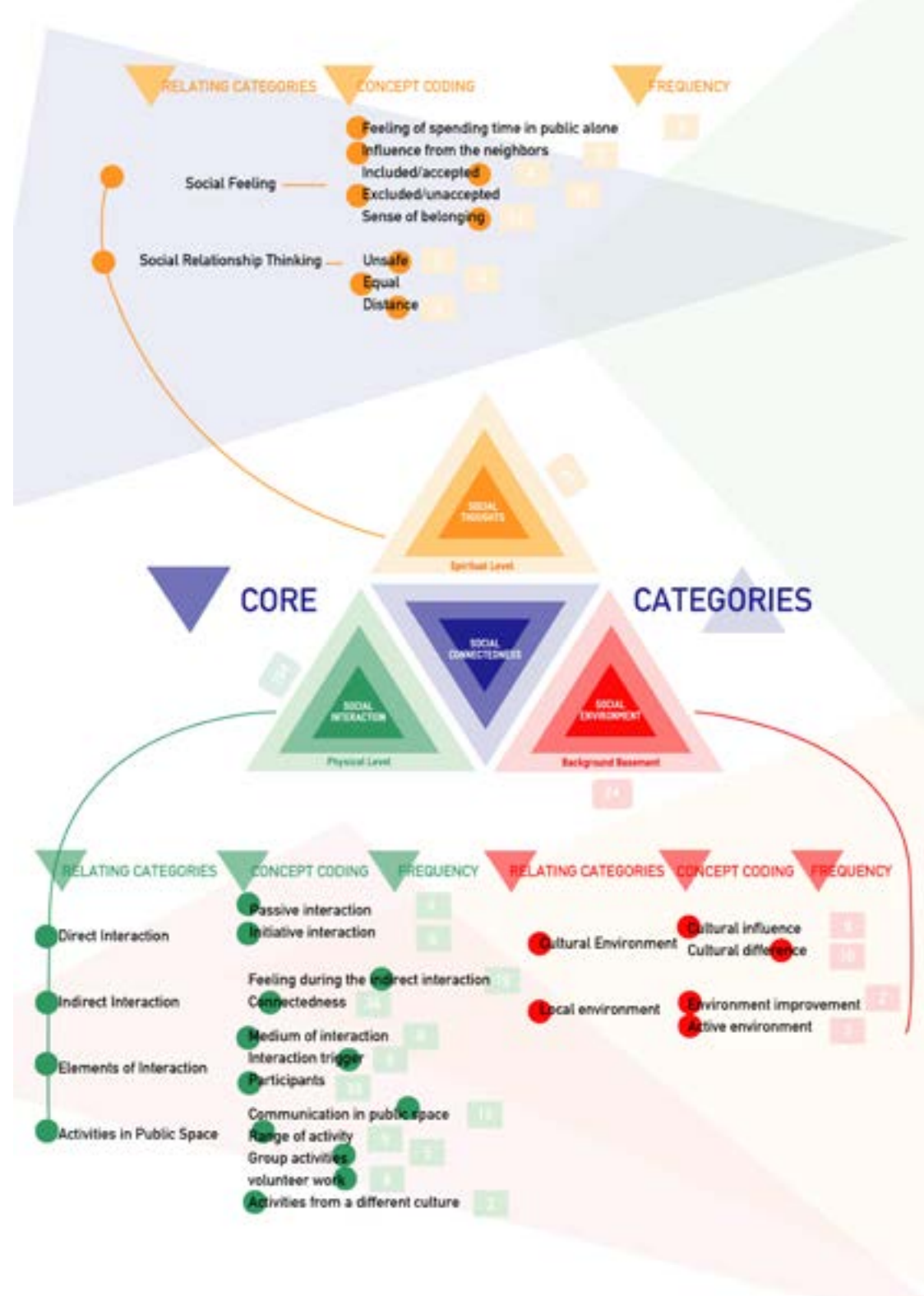
Some open questions about the residents' feeling about the neighborhood and their neighbors were prepared. The trend of the questions was depending on the interviewees' answers.

Details of the interview questions can be found in the appendix.

5.3.1.5 ANALYSIS

I used a software called MaxQDA to analyze the result. 225 quotes and 50 codes were made through 7 interviews.

I did the coding in three steps: open coding, axial coding and selective coding. The frequency statistics is showed in the graph on the next page.



5.3.1.6 RESULTS

All the valuable codes are separated into three core categories: social thoughts, social environment and social interaction. Social thoughts about the spiritual level of the society, social environment is about the background basement and social interaction is about the physical level of the society. In these three parts, social interaction is mentioned the most. In the social interaction part, indirect interaction is mentioned the most. In the social environment part, cultural background is mentioned the most. In the social thoughts part, social feeling is mentioned the most.

After carefully reviewing these parts of the quotes, a result comes out: The residents' different cultural background and language problem limit their social energy in public space. They feel embarrassed when they need to start a conversation with an unfamiliar neighbor with a different cultural background. Because of this, they avoid direct interactions with unfamiliar neighbors. In their hearts, they feel they belong to this neighborhood and really want to be connected with their neighbors, but the fact is, they need a medium to trigger the interaction, to avoid the embarrassment and to get connected with others.

6.INITIAL CONCEPT

An interactive wall located in the park of Woensel West (the park now is an unpopular place. Local people seldom go there).

Every time a person passes the kinect, a digital tree would grow in the screen of the wall (use projection).

The person can record his/her message by the system (the message could be a personal secret, could be a song, could be an information and so on). When this is done, one of the digital trees on the screen would turn into a special color. Others could check the voice message by clicking the special trees on the wall.

The more people pass the park, the more trees will be on the wall, and eventually it will become a forest.

The more people leave messages, the more colorful the forest will be.

The wall will be refresh everyday.

6.1 STORYBOARD

SCENARIO

Rob is 19 years old. Today he has a bad mood because his best friend quarreled with him.



SCENARIO

He passes the park and sees the interactive wall. He decides to tell the wall about his trouble.



SCENARIO



When he passes the Kinect, a green tree appears.

SCENARIO

When he leaves, one of the trees turns blue.



SCENARIO

Anne is a 6-year-old girl. She is a sweetheart and likes to spend her time in the park beside the wall.



SCENARIO

She passes the wall and notice there is someone leaving a message because one of the trees has a special color.



SCENARIO

She touches the tree and hears a boy's voice. The boy is talking about his trouble with his best friend.



SCENARIO

Anne sings a song,
hoping to comfort the
boy.



SCENARIO

He walks to the wall and
touches that orange tree.



SCENARIO

Rob comes back again.
He finds there is another
tree in a orange color.
He is curious about what
the new message will be.



SCENARIO

That's a girl's voice, a soft
song. Rob sits beside the
wall and enjoy.



6.2 PROBLEMS OF THIS CONCEPT (FEEDBACK FROM THE TEACHERS AND THE FELLOW STUDENTS)

(1) The way of interaction is unnatural. No one will speak to a wall. The message have no directivity—you don't know who it is for and you can't specify a concrete reader.

(2) Language problem. The residents here talk different languages, how to insure that they understand eachother?

6.3 ELEMENTS LIFTING

(1) Show personal identities

(2) Indirect connection

(3) Indirect interaction (between users)

(4) Medium of intercourse

The design direction now should be:

- (1) A medium of intercourse
- (2) An indirect interaction
- (3) The medium of the interaction should be natural in the context
- (4) The interaction itself should be natural
- (5) Related to identity of the user
- (6) Produce feeling of connectedness
- (7) Avoid language problem

7. NEW CONCEPT

Two benches are placed in different places of the neighborhood. These two benches are digitally connected. When one person sits on one of the benches (bench A), the other one (bench B) will have response. And when the person sits on the other bench (bench B) notice the signal, he/she can interact with bench B and by his/her interaction, bench A will response too.

This concept is aim to increase the feeling of connectedness between two unfamiliar neighbors living in different part of the community.

This concept connects two spaces together to let people sit on the bench alone to get a feeling of connectedness with another unfamiliar neighbor who sits on another bench. I want to create a complete interaction for people sit in different spaces to communicate like they are sitting on the same bench (A sit on a bench. B comes, they say hi. B sits down. They enjoy each other's accompany for a while. A leaves. They say goodbye.).

7.1 TWO COMPARING STORYBOARD

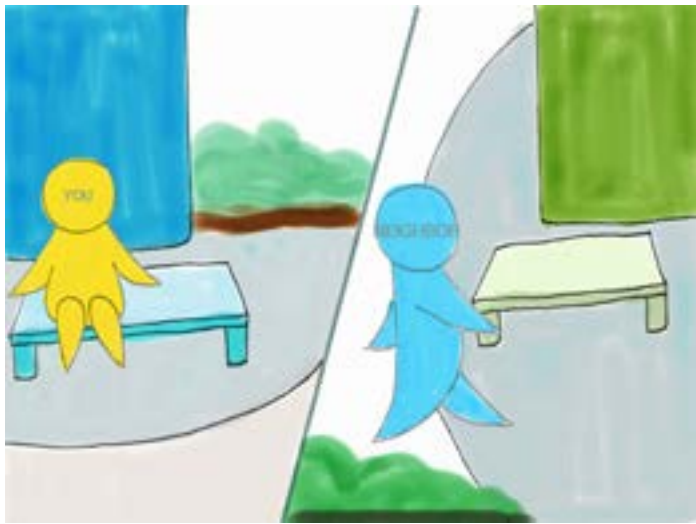
7.1.1 THE BASIC FICTIONAL STORY



Imagine you go out for a walk in a nice afternoon.



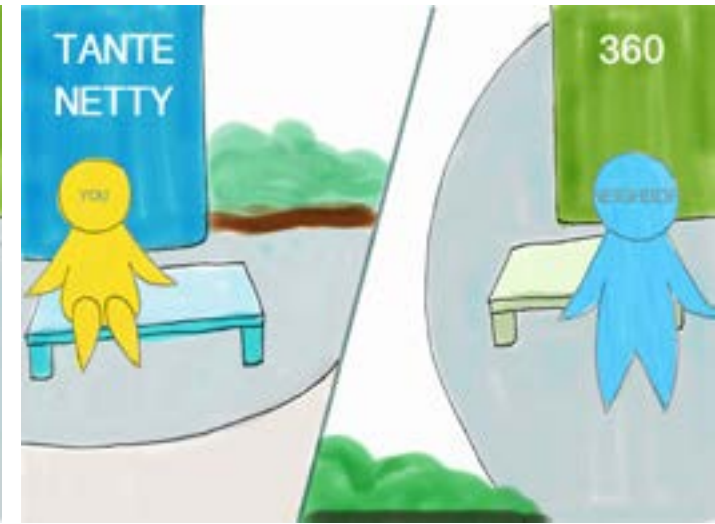
You feel a little bit tired when you notice there is a bench in the front of Tante Netty.



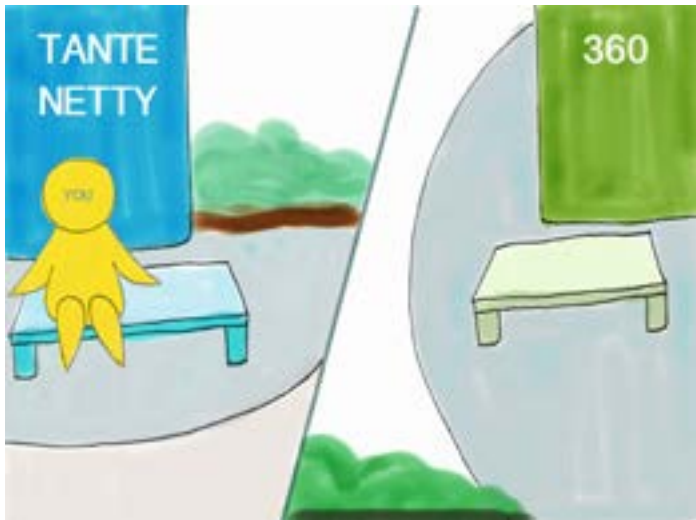
You sit down for a rest. One of your neighbors is also having a walk in the neighborhood. She notice another bench located in the front of 360 building.



She also sits down.



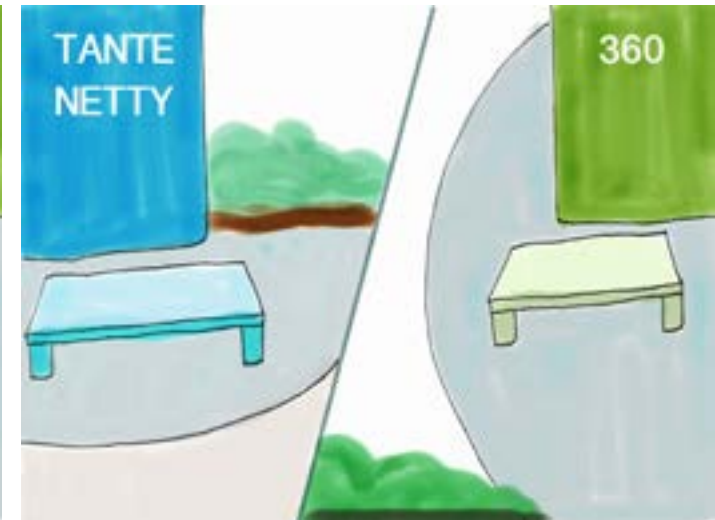
Five minutes later, she stands up and leaves.



Ten minutes later, you feel you have enough rest.



So you stands up and leave.



END.

7.1.2 THE FICTIONAL STORY INVOLVING THE CONCEPT



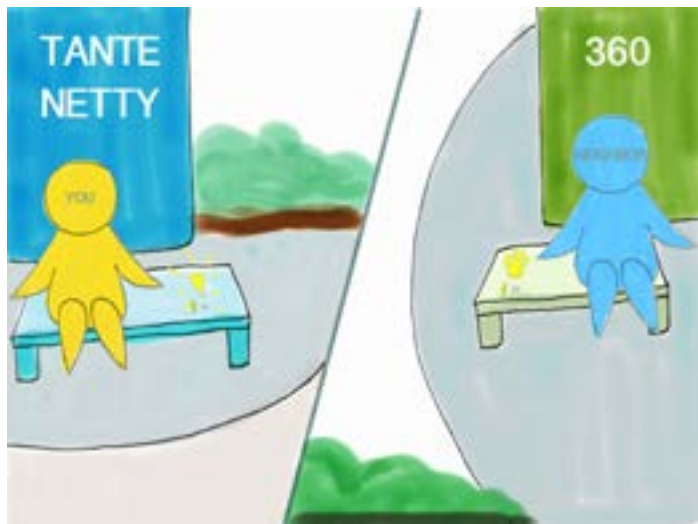
Imagine you go out for a walk in a nice afternoon.



You feel a little bit tired when you notice there is a bench in the front of Tante Netty.



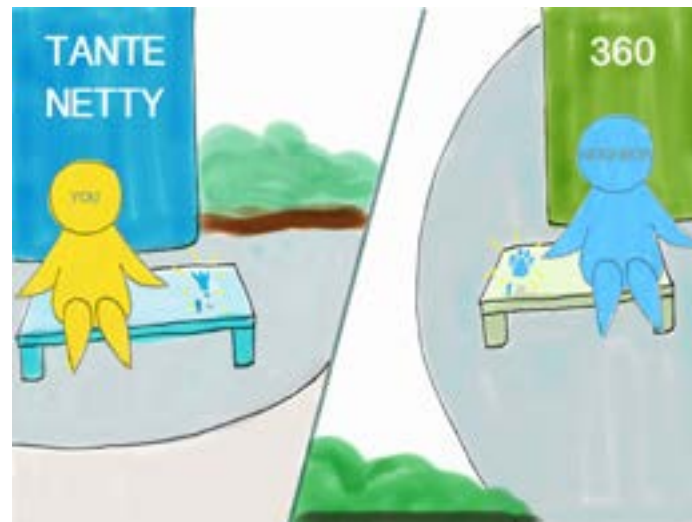
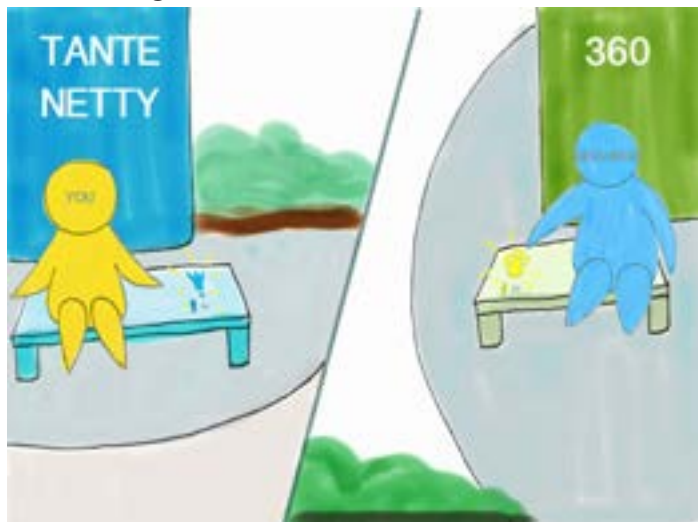
You sit down. Actually this bench is digitally connected with another bench located in the front of 360 building. When you sit down, an image appears on that bench but you don't know.



Your neighbor sits down on the bench located near 360 building. Then an animal footprint appears on your bench with a slight doorbell sound.

It's a chicken's footprint together with a location information. It's twinkling.
What do you think this image might be?

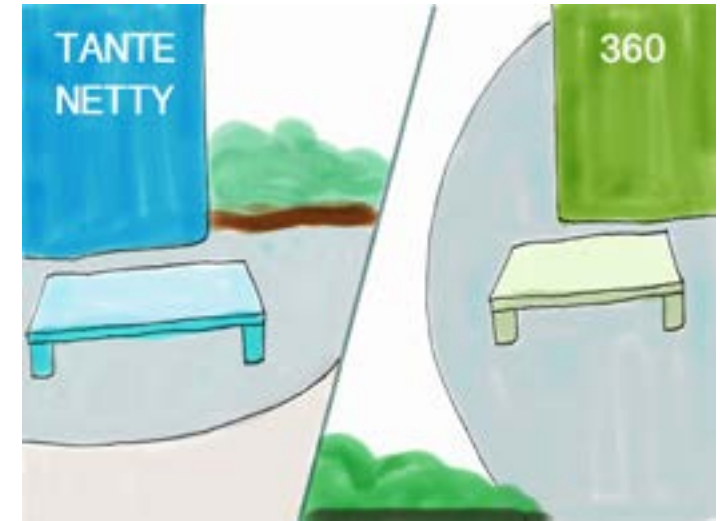
You touch the twinkling footprint. The footprint on your bench turns into blue. In the meantime the footprint on the other bench starts twinkling.



Your neighbor also touches the footprint.

It also turns into blue. You two sit on the bench for a while with a digital footprint's accompany.

Your neighbor stands up to leave. Then the image on your bench changes with a special leaving sound. You notice there is a moving effect of the footprint, just like someone is walking away.



Five minutes later, you also stand up to leave. Before you leave, you notice some other images appears on your bench.

It's an image of cat, together with its' footprint.
What do you think this image might be?

END.

7.2 USER TEST

7.2.1 PROCESS OF THE TEST

The test was divided into four parts. In the first phase a storyboard with basic fictional story was shown to the participants. The goal of this section is to recall them their experience of spending time in the neighborhood alone. The characters in the storyboard have no names. One is called “you” and the other is called “your neighbor”.

In the second phase several questions were asked after they read the storyboard. The questions were about their feelings about their experiences in the situation that the storyboard described. The purpose of this section is to bring them into the character and into the situation so that I can get more valuable feedbacks.

In the third phase another storyboard of the fictional story involving the concept was showed to the interviewees. Unguided sentences were used to describe the storyboard. During the storytelling, when there is something different happens (differ with the basic story) in the story, some questions about these different elements would be immediately asked to the interviewees in order to get their unaffected feelings about the concept. The goal of this section is to let them know what’s the concept look like and to find how they may think if they experience this concept without introduction.

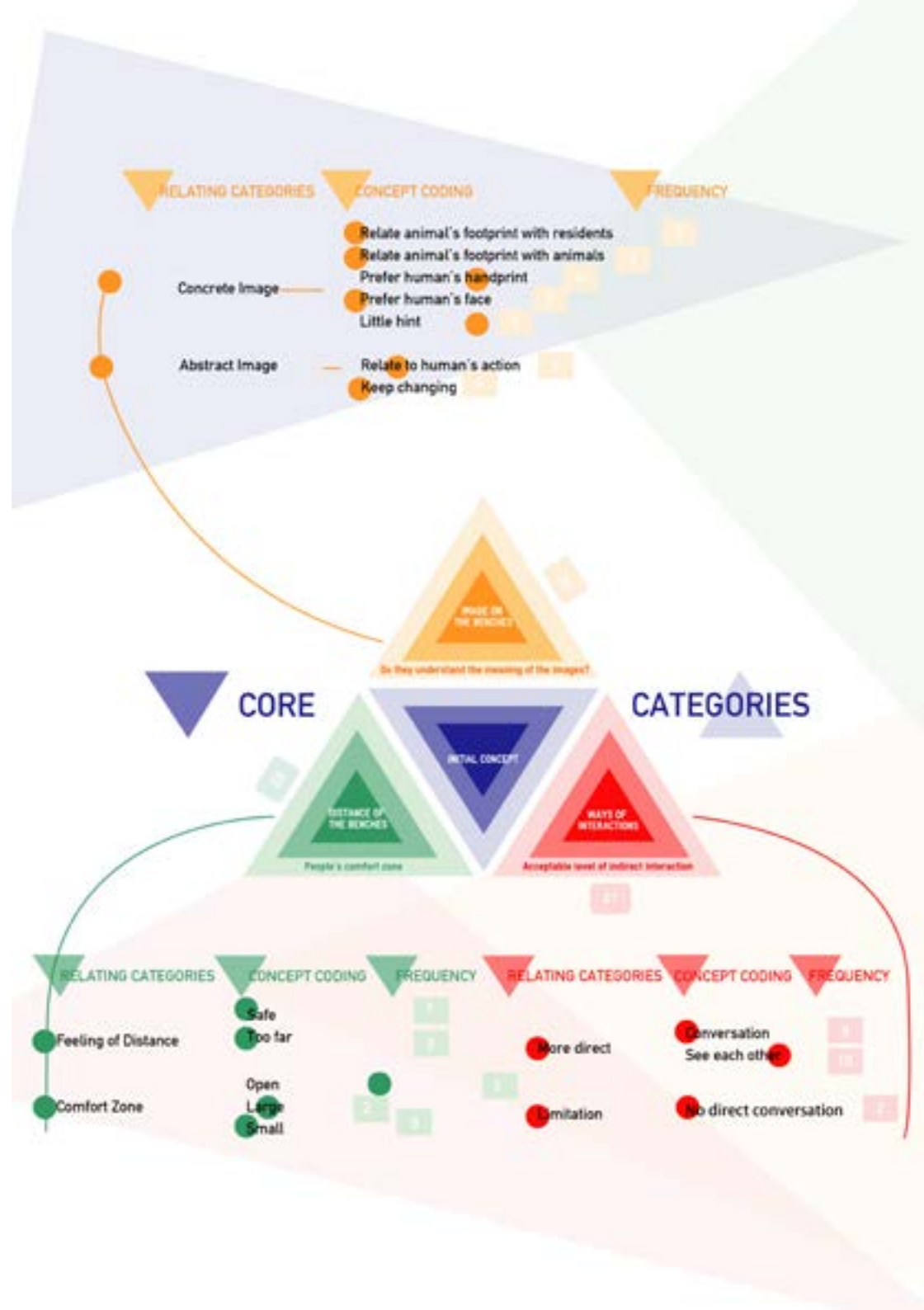
In the last phase more detail questions were asked after the storytelling. The questions are about three main elements of the design and the research question: do the benches contribute to the feeling of connectedness between two unfamiliar neighbors?

- (1) Distance of the two benches (people's comfort zone)
- (2) Images on the benches (do they understand the meaning of the image?)
- (3) Ways of interaction (acceptable level of indirect interaction)

7.2.2 ANALYSIS

The participants of this test are the same as the interviewees of the interview round three. I also used MaxQDA to analyze the result. 80 quotes and 23 codes were made through 7 interviews.

The frequency statistics is showed in the graph on the next page.



7.2.3 RESULTS

The results of the test are mainly focused on the three elements of the design.

- (1) Distance: they have very small comfort zones. When an unfamiliar person sits about 5 meters away from them, they think it is acceptable.
- (2) Image: most of them can't relate the animal footprints to their identity. They can't think of that much in such a short experience. Some suggest the image should relate to the person in a concrete way (human face or human handprint), others suggest it change to a abstract image that relate to the participant's action.
- (3) Ways of interaction: they think the interaction experience is too indirect. They want to see each other's face or hear each other's voice, but in a safe distance.

During the interview, six of seven participants think they do feel more connected with the unfamiliar neighbors with my design than it before. The other person thinks that the image can't convince her that she was interacting with a human but not a dog.

7.2.4 DEVELOPING DIRECTION

- (1) Put the two benches in the same place but in a distance of five meters. This distance allows them to have conversation but also keep them in their own comfort zones.
- (2) Use abstract image that relates to the participants' actions.
- (3) Use the bench as a medium to trigger the communication between two unfamiliar neighbors.

8. CONCEPT DEVELOPMENT

The final concept is based on the rest results before.

Two benches are placed in a distance of 5 meters. When one person sits down, an image of ripple appears on the other bench, just like somebody is floating on the water. When one person touches the bench, some other ripples will appear on the other bench depending on the action of this person.



8.1 USER TEST

8.1.1 GOAL

The test session intends to collect a pool of quantitative and qualitative data. The quantitative part consists of the average scores in the measurement scales (the Social Connectedness Scale-Revised and the Inclusion of Other in Self Scale) in both test group. For the qualitative part, it contains the residents' feedback of the design concept and the reasons related to the quantitative scores.

8.1.2 PARTICIPANTS

In the test session, all the participants are residents from the Cederlaan community.

Why Cederlaan?

(1) Similar population composition with Woensel west. Most of the residents are from other country and have different cultural background. This makes the neighborhood a multi-culture place to live.

(2) It is too hard to find testees that can speak English in Woensel West. But it is much easier to find residents that can speak English in Cederlaan.



(3) Similar social environment with Woensel West. Residents living in Cederlaan also don't communicate much with their neighbors. As one of the residents, I find the social relationships for us are similar with that for them.

8.1.3 TEST GROUPS

The control group A is to collect the comparative data of residents' feeling of connectedness without introducing the design.

And in experiment group B, the data will be gathered after the test by questionnaires.

Each group is divided into three small groups of two people. These small groups will do the test in batches.

Group	A	B
Participants	 6 Residents from Cederlaan	 6 Residents from Cederlaan
Goal	Collect the comparative data without introducing the design	Data collection involving the design

8.1.4 TEST SETTING FOR GROUP A

Group A played the role of the control group in the test. It was conducted among 6 residents from Cederlaan. They would be tested only with the tool of questionnaires.

These 6 residents were divided into three small groups. The participants in the same group didn't know each other.

Test Flow:

- (1) Before the test, the participants were asked to do the IOS test for the first time. (pre-test)
- (2) Two participants were asked to sit on two different benches in the neighborhood for 5 minutes.
- (3) In the meantime I was hiding in the building nearby to observe their movements.
- (4) 5 minutes later, I asked them to do two questionnaires (see in Appendix).(post-test)
- (5) A short interview about the test.



Set up group A

Set up group B



8.1.5 TEST SETTING FOR GROUP B

Group B played the role of the experiment group in the test. Another 6 totally different residents from Cederlaan were invited to participate. They would be tested with the tools of questionnaire and an iPad prototype that simulates the interaction effect.

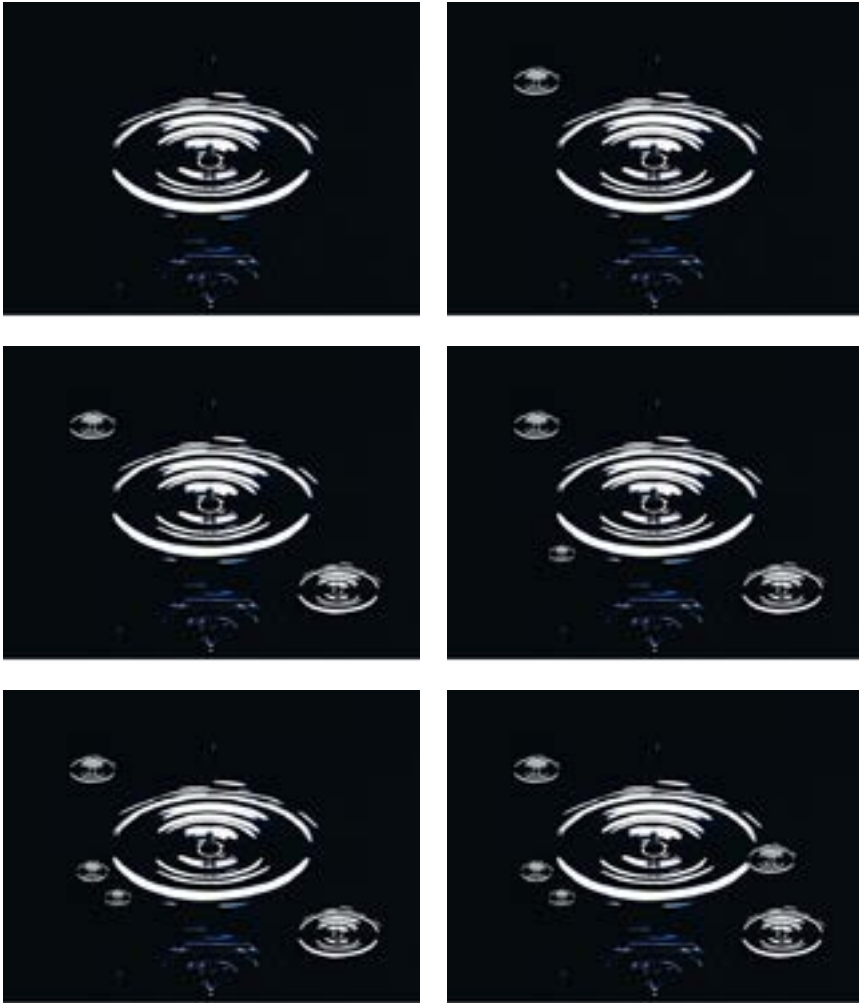
The prototype is actually a keynote document in iPad. I controlled the page-turns by an app called 'Keynote Remote'. This app allows users to control one iOS device by another one.

These 6 residents were divided into three small groups. The participants in the same group didn't know each other.

Test Flow:

- (1) Before the test, the participants were asked to do the IOS test for the first time. (pre-test)
- (2) Two participants were asked to sit on two different benches in the neighborhood for 5 minutes.
- (3) In the meantime I was hiding nearby to control the keynote in the iPad by iPhone according to their movements.
- (4) 5 minutes later, I asked them to do two questionnaires (see in Appendix). (post-test)
- (5) A short interview about the test.

Image changing:



9.RESULTS

9.1 MEASURE TOOLS

Two questionnaires were used in the test. The first one was based on the Social Connectedness Scale-Revised and the second one was based on the Inclusion of Other in Self Scale.

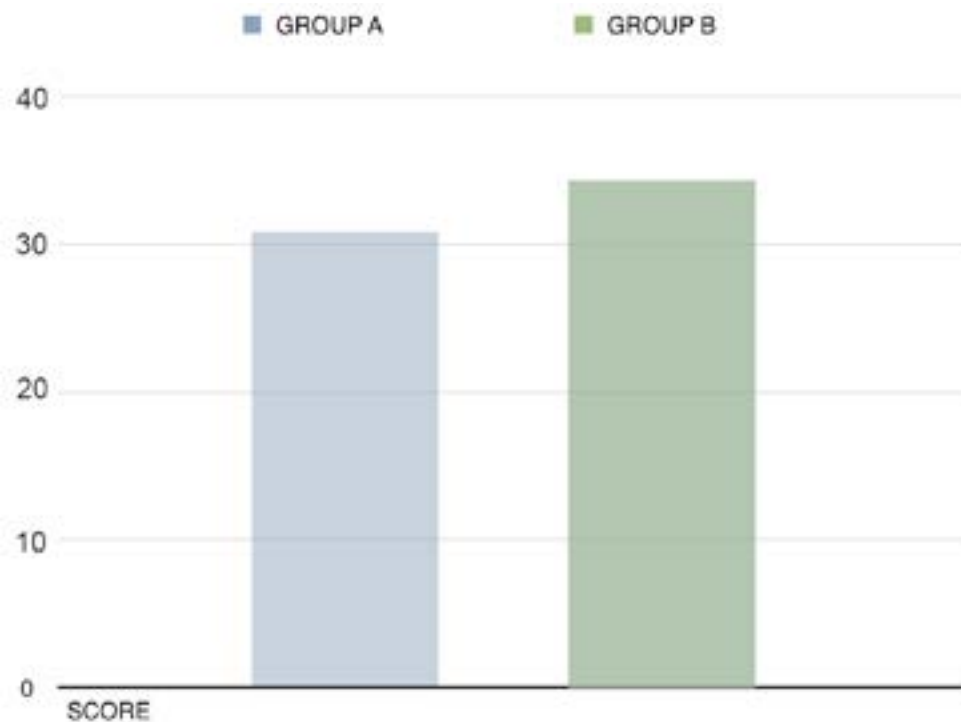
Social Connectedness Scale-Revised (SCS-R):

Originally this scale has 20 questions (10 positive and 10 negative). It has a high internal reliability at a degree of $\alpha=0.86-0.89$ across the scale. I adapted this scale to suit my case. Some questions that irrelevant to the topic were deleted and some words in the questions were changed. Details can be found in the Appendix.

Inclusion of Other in Self Scale (IOS):

The scale consists of seven Venn diagram-like pairs of circles that vary on the level of overlap between the self and the other. Respondents are asked to select the pair of circles that best represents their current close relationship. [13]

9.2 ANALYSIS



It can be easily found in the graph that there is a 9.84% increase of the data.

The SCS-R (adaption) have 10 questions (5 positive and 5 negative).

A higher score on the SCS-R indicates a stronger feeling of social connectedness.

The scores of Group A: 31,30,29,32,31,30.
The average score is 30.5.

The scores of Group B: 35,34,35,31,33,33.
The average score is 33.5.

In order to compare two kind of data of the two groups, I used t-test to analyze the results.

$$\text{In this case, } t = \frac{\bar{X} - \mu_0}{s / \sqrt{n}} = \frac{33.5 - 30.5}{1.52 / \sqrt{6}} \approx 4.84$$

$$df = 6 - 1 = 5$$

According to the T Distribution Critical Values Table,

$$t > t(5)_{0.01} = 4.032; P < 0.01$$

which means, there is a huge difference between the two kind of data.

Thus, the result is obvious:

Group B (experiment group) has more feeling of connectedness than Group A (control group).

Reason behind?

"Maybe because I am not very outgoing so it's hard for me to start a conversation with a person I don't know."

"It was kind of embarrassing when I sat there with a stranger and did nothing..."

---- participants from group A

"When the other person sat down, a ripple appeared beside me...I think this is neutral and it could be a good start of a conversation."

"When the image appeared, it was like that person was saying hello to me, then I felt like 'oh I have to talk to him' so we started to talk about this crazy bench."

----participants from group B



For group A, there is a 25.6% increase of the data from pre-test to post-test.

The IOS consists of seven Venn diagram-like pairs of circles that vary on the level of overlap between the self and the other.

I scored each pair from 1 to 7. The higher the score is, the more connected the participants are.

The scores of group A's pre-test: 1,2,1,1,2,1.

The average score is 1.33.

The scores of group A's post-test: 2,2,1,1,2,2.

The average score is 1.67.

The scores of group B's pre-test: 1,1,2,1,2,2.

The average score is 1.5.

The scores of group B's post-test: 3,4,4,4,3,5.

The average score is 3.83.

In order to compare two kind of data of the two groups, I used t-test to analyze the results.

For Group A, comparing the two data of the pre-test and the post-test,

$$t(\text{Group A}) = \frac{\bar{X} - \mu_0}{s/\sqrt{n}} = \frac{1.67 - 1.33}{0.52/\sqrt{6}} \approx 1.62$$

$$df(\text{Group A}) = 6 - 1 = 5$$

According to the T Distribution Critical Values Table,

$$t(\text{Group A}) < t(5)_{0.10} = 2.015; P > 0.10$$

which means, there is only a slight difference between the two kind of data.

For Group B, comparing the two data of the pre-test and the post-test,

$$t(\text{Group B}) = \frac{\bar{X} - \mu_0}{s/\sqrt{n}} = \frac{3.83 - 1.5}{0.75/\sqrt{6}} \approx 7.52$$

$$df(\text{Group B}) = 6 - 1 = 5$$

According to the T Distribution Critical Values Table,

$$t(\text{Group B}) > t(5)_{0.01} = 4.032; P < 0.01$$

which means, there is a huge difference between the two kind of data.

Thus, the result is obvious:

Group B (experiment group) has more feeling of connectedness than Group A (control group).

Reason behind?

"We said hi to each other and spent a short time in the neighborhood together. I think this made us closer."

"We didn't talk a lot. For me, it was more like relaxing by myself."

---- participants from group A

"I think with this design it is easier to talk to an unfamiliar neighbor. And when you start a conversation you will definately feel closer to that person."

"This design will make you less awkward when you have to spend time with a stranger. In normal case, when I have to talk to a stranger, I would talk about the weather or something like that, but this design offered me much more topic to talk."

----participants from group B

9.3 CONCLUSION

Overall comments on the design:

The final concept is an ice-breaker for the residents to communicate with an unfamiliar neighbor.

With this design, there is a lower threshold to take the first step to talk to an unfamiliar neighbor. It provides a natural possible easier way for the residents to communicate with the neighbors in the same area in public place.

It seems to be an appropriate solution to design a public digital installation to increase people's feeling of connectedness.

Answer the research question:

In summary, the two statistic charts of experiment group B show the overall result that the feeling of connectedness of the residents has a rise from pre-test to post-test, with the intervention of the design of the interactive bench as a medium.

Therefore, it can be concluded that the indirect interaction (interact through a medium) could have possible contribution to the rise of the feeling of connectedness between unfamiliar neighbors, based on the analyzed reasons of the increase.

10. REFLECTION

Design and Research Process:

For me, it is a most challenging new semester because I need to conduct a research project individually and I have no experience in research before. By studying and trying, I got to understand how important a research is.

In my past education, I did research and design separately, so I didn't realize how research can influence design. Through this project, I realized that research is closely related to design. It can support the design purpose and can influence the design decision. Design can be a tool to gather data in order to answer the research questions. The results of the research can be used in a future design. I realized research is a way of thinking and finding answers to the question more than a set of skills.

The most exciting aspect for me is the integration of user experience design and research. I have obtained the experience of testing with the tool of my design in a real user context.

User Focus and Perspective:

In order to get in depth feedback from residents about the concept and their feeling of connectedness and collect the high quality data for analyzing, I organized several rounds of interview and user tests.

During the process, I practiced my skills in interviewing users and inviting people to participate in the test. As I invited the residents in facebook and I had no idea of what the person actually would be, so the participants are unpredictable. In this case, I need to flexibly reply to the extreme situations and change questions as soon as possible depends on the situation.

Integrated Technology:

It is always hard for me to make a working prototype by technology. However, I do think I have some growth in this competency area compared to last semester. I developed a working prototype to show the interaction in one week. Although some parts of it broken down before the demo day, but in consideration of the time I used to make it, I am satisfied.

Communication:

I never been to a local neighborhood in the Netherlands before. This project needs me to spend a great deal of time in the neighborhood, which is a huge challenge for me.

As I mentioned in the report, Woensel West is a multi-cultural area, and this brought me a lot of difficulties. In the beginning, I searched for interviewees on the streets of that area, but most of people didn't speak English. For several days I couldn't find enough interviewees and that made me despairing (but I cheered up soon).

During this experience I kept on asking people to have an interview and being rejected----this was really a tough experience but I know I have to do it and now I get used to it.

After these interviews I found my communication skill developed a lot.

Future Plan:

Firstly, I would take this research project as the first step for a formal research considering the time, design development and participants, etc., because in some parts of the process, there are still a few steps need to be improved. This is not a perfect research project, but I practice several research methods and learned about what is research and how to conduct a research. This would be very helpful for my future projects.

Secondly, I realized Arduino is unreliable when part of my prototype broke down just before the demo day. I do want to design digital products in my future projects, but I would like to explore more possibilities next semester.

11. ACKNOWLEDGEMENT

First of all, I want to thank my coach Jun Hu. In the whole process of the research, his constant feedback supported me to proceed in the appropriate direction. His timely materials related to the topics discussed in the coach meeting gave me various insights and also helped to broaden my mind about research.

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Also, I want to thank the local organization Tante Netty. They gave me suggestions and feedbacks about my project and offer me help in the exploration session.

Last but not least, I want to express thanks to all the residents participated in the context exploration and evaluation session in Woensel West and Cederlaan. I really appreciated their willingness to spend time and offer help to my project.

12. REFERENCE

- [1] TU/e Industrial Design: Project Description----DPI52: Design for Social interaction in Neighbourhoods (2015)
- [2] Bella Martin and Bruce Hanington: Universal Methods of Design: a research method guide for beginners (2012)
- [3] Ranjit Kmar: Research Methodology: A Step-by- Step Guide for Beginners (2010)
- [4] From Internet: [https://nl.wikipedia.org/wiki/Groenewoud_\(Eindhoven\)](https://nl.wikipedia.org/wiki/Groenewoud_(Eindhoven))
- [5] The tool map is from Google map
- [6] Hu, J., Wang, F., Funk, M., Frens, J., Zhang, Y., Boheemen, T. Van, ... Rauterberg, M. (2013). Participatory Public Media Arts for Social Creativity. 2013 International Conference on Culture and Computing, 1, 179-180. doi:10.1109/CultureComputing.2013.54
- [7] Brown, B. T., & Wyatt, J. (2010). Design Thinking for Social Innovation. Stanford Social Innovation Review, Winter(Winter 2010), 30-35. doi:10.1108/10878571011042050
- [8] Trotto, a, & Hummels, C. (2013). Engage me, do! Engagement catalysers to ignite a (design) conversation. 6th International Conference on Designing Pleasurable Products and Interfaces, DPPI 2013, 136-145. doi:10.1145/2513506.2513521

- [9] Le, D., Funk, M., & Hu, J. (2013). Blobulous: Computers As Social Actors. Workshop on Experiencing Interactivity in Public Spaces, 62-66.
- [10] Brenny, S., & Hu, J. (n.d.). Social Connectedness and Inclusion by Digital Augmentation in Public Spaces.
- [11] Capanna, C., Stratta, P., Collazzoni, A., Pacifico, R., Emidio, G. Di, Ragusa, M., & Rossi, A. (2013). Social connectedness as resource of resilience : Italian validation of the Social Connectedness Scale - Revised, 320-326.
- [12] Pandit, N. R. (1996). The creation of theory: A practical examination of the grounded theory method, no. 327(4).
- [13] Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of Other in the Self Scale and the structure of interpersonal closeness. Journal of Personality and Social Psychology. doi:10.1037/0022-3514.63.4.596

13. APPENDIX

13.1 INTERVIEW QUESTIONS

1) Could you tell me your overall feeling of Woensel West?

2) How do contribute to that feeling?

a) Friends

b) Strangers

3) What do you usually do if you feel uncomfortable in a public space of Woensel West?

4) Describe a particularly good experience where you truly felt included in Woensel West.

a) How did it make you feel?

b) What influenced this feeling the most?

5) Describe a situation where you felt particularly comfortable in a public space.

a) How did it make you feel?

b) What influenced this feeling the most?

6) Do you usually spend time in the public space of this area (I mean Woensel West)?

a) Yes.

When?

With who?

What activity do you do?

Do you ever spend time (share this time) with a stranger or an unfamiliar neighbor?

aa) Yes.

Is it usual?

How did it make you feel?

What influenced this feeling the most?

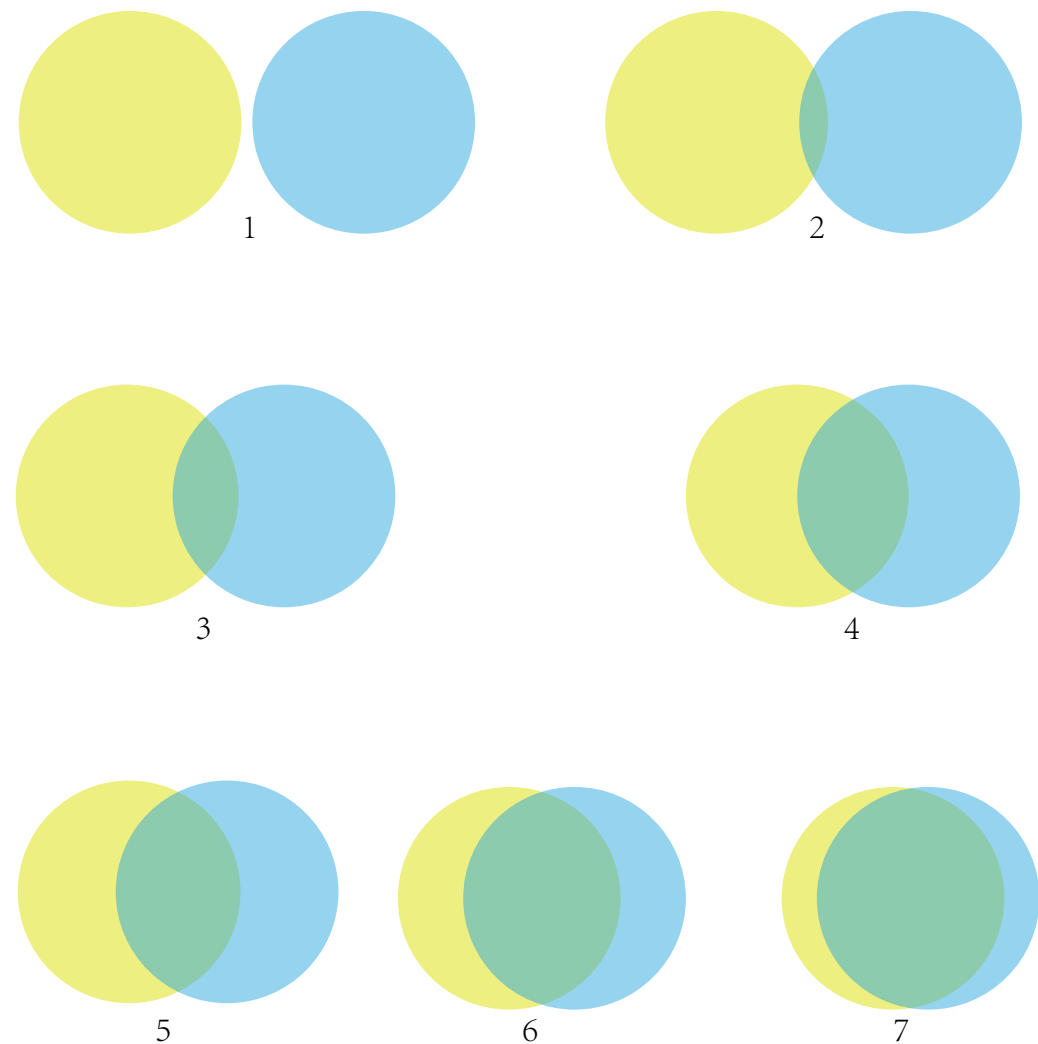
ab) No.

Why?

13.2 MEASUREMENT TOOLS



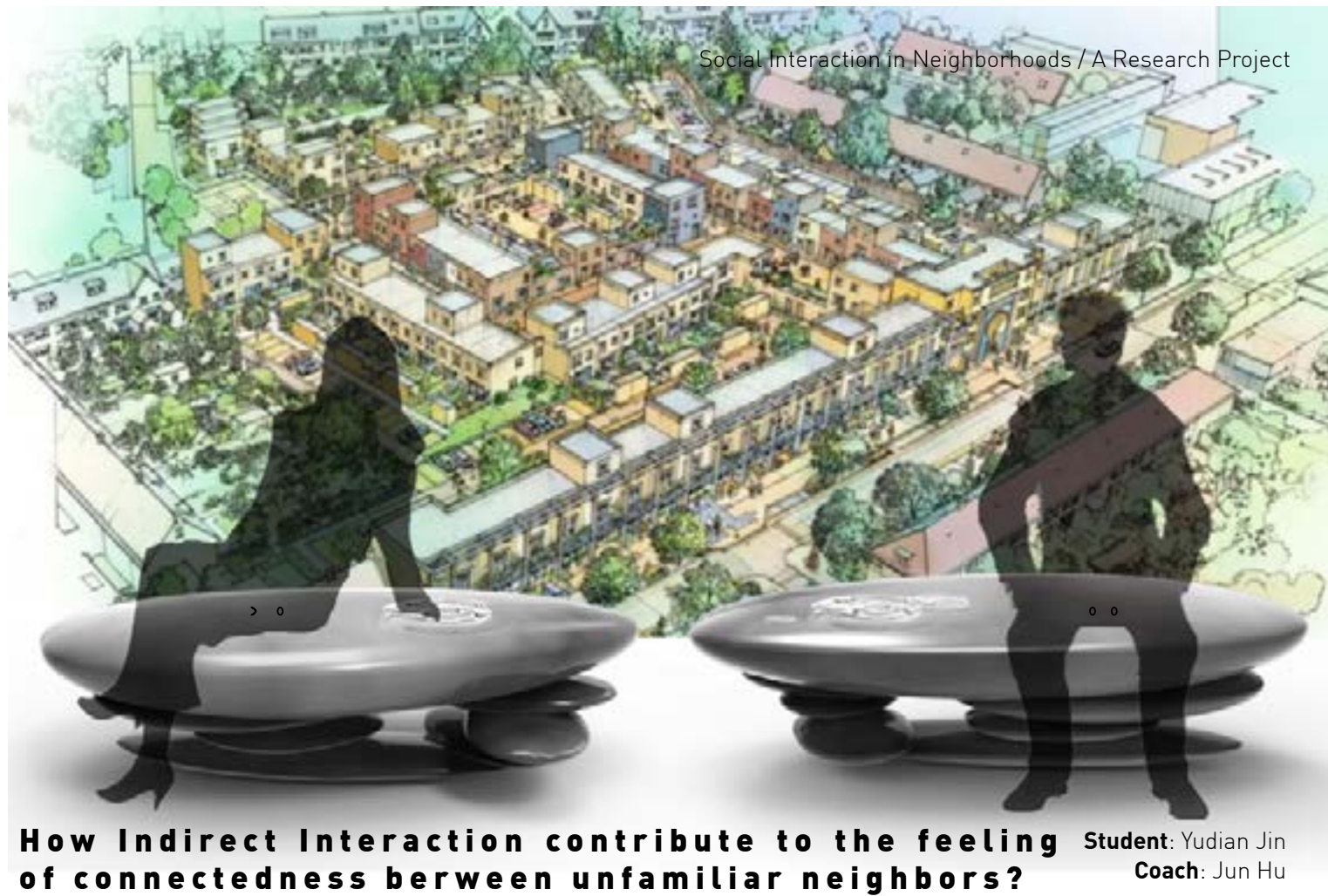
1. I feel comfortable in the presence of the person sits on the other bench in my neighborhood	Strongly Agree 1	2	3	4	5	Strongly Disagree 6
2. I am in tune with the person sits on the other bench	Strongly Agree 1	2	3	4	5	Strongly Disagree 6
3. I feel close to the person sits on the other bench	Strongly Agree 1	2	3	4	5	Strongly Disagree 6
4. I see the person sits on the other bench as friendly and approachable	Strongly Agree 1	2	3	4	5	Strongly Disagree 6
5. I feel distant from the person sits on the other bench	Strongly Agree 1	2	3	4	5	Strongly Disagree 6
6. I am able to relate to the person sits on the other bench	Strongly Agree 1	2	3	4	5	Strongly Disagree 6
7. I catch myself losing a sense of connectedness with the neighborhood	Strongly Agree 1	2	3	4	5	Strongly Disagree 6
8. I am unable to connect with my neighbors	Strongly Agree 1	2	3	4	5	Strongly Disagree 6
9. I see myself as a loner	Strongly Agree 1	2	3	4	5	Strongly Disagree 6
10. My neighbors don't feel like family	Strongly Agree 1	2	3	4	5	Strongly Disagree 6



Please circle how you would position yourself in relation to the person sits on the other bench.

Thank you for your time!

13.3 POSTERS





THANKS.