Encouraging social interaction in public spaces through interactive light

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Abstract

Interactive light systems create unique opportunities for different kinds of social interactions in public places. This thesis explores movement as the main interaction to discover and create new ways of engaging in social interaction as well as to encourage people of different age groups to come together and participate. To further explore and answer the questions in mind, different field studies such as interviews and user tests were implemented to gather information on how the pedestrian's thoughts and actions were. The outcome of these field studies showed that there is a slight shyness in the Swedish people and that they need to be encouraged to start socially interacting. Which through the presented prototype and its mechanics worked and allowed the participants to express their thoughts and feelings regarding an interactive light system that could encourage social interaction in public spaces.

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Contents

1 Introduction

Sweden has been placing themselves in a situation of being silent and trying to keep a low profile to a higher degree than other parts in the world, which results into it becoming a norm and expectation of how to interact with others (Daun 1998). Having this in mind, the thesis will explore different possibilities with interactive light to create a more comfortable place and encourage Swedes to socially interact with others to help make Värnhemstorget a place where people want to be. The research will describe different thoughts and statements regarding how people in Sweden are and what their own view of people are as well. I will explore different ways of encouraging people to engage in social interaction. There will be different field studies that are used to gain knowledge regarding social behaviour in Sweden, comfort zones and patterns they commonly use while being on Värnhemstorget. After the interviews and observations, there will be a session of creating a prototype that will be used for the pedestrians, testing and see if the research question can be answered after all the conducted field studies.

1.1 Purpose

The aim of this thesis is to discover and explore the possibilities within the social aspect of public interaction in society and public spaces through an interactive installation. Creating a prototype that would allow for further development and exploration to help encourage social interaction in public places as well as being able to get an understanding of people's different thoughts regarding engagement and encouragement.

1.2 Contribution

This thesis will enlighten and focus on the area of social interaction with strangers through interacting with light in an open public space as well as try to encourage strangers to create connections with each other. This project is not a new contribution to the work within interaction design or within the fields of social interaction in public spaces in relation to light since there has been previous work and research around it.

1.3 Delimitations

The work and research conducted in this thesis provide data from two months of fieldwork, which is not enough to get a full view of the people's behaviour and thoughts regarding social interaction in public spaces. Since it currently is summer in Sweden there are more people outside, and the days take longer to turn dark. Which results in the prototype not working to its full potential since the light works better in darkness. During fall and winter, the days are shorter and colder which results in fewer people being outside but the

prototype being easier to display, and user testing could lead to different results.

1.4 Research question

- How do we encourage social interaction in public spaces through interactive light design?
  - o Is there a way to have people of different age groups interact with each other through interactive light?
  - o How can people be encouraged and willing to participate and engage with strangers through the interactive light in public spaces?

1.5 Ethics

This thesis aims at following the ethical standards formulated in Codex rules and guidelines for Artistic sciences (The Swedish Research Council, 2017). Throughout the interviews and user testing, there was an agreement of what type of information would be shared and oral consent on what to include regarding personal information. For the user testing, the whole group of participants had to agree for me to allow the usage of pictures and names if necessary and throughout all the field studies I mentioned that no personal information would be shared and that they were all speaking their thoughts and ideas anonymously

2 Research

This chapter will provide research that is considered related to the project. The research contains fieldwork about social behaviour in Sweden through different ethnology and ethnographical studies that have been made, what public interaction is as well as related work regarding the chosen topic. The research regarding social behaviour in Sweden is to get an understanding on the typical norms and behaviours that occur in Sweden since this thesis is made in Sweden, and to be able to develop an interactive result to encourage social interaction. The thesis is not made to change the Swedish culture, but to encourage and promote a different way of socializing in public spaces.

2.1 Social behaviour in Sweden

Many people react over the Swedish silent social interaction. Part of the explanation for this silence lies in the Swedish ideal of conflict avoidance. Especially in the public sphere. Conflict avoidance is generally limited to the public (Herlitz, 1991). Casual conversations and interactions between strangers are underestimated and can often be ignored, there are a few

implicit interactions that go on throughout the day, such as paying for an object, getting through crowded places, sharing an elevator, etc. In Sweden being silent and keeping a low profile is to a higher degree done more than in other parts of the world, which in themselves gave birth to norms, expectations and regulations (Daun, 1998).

In a SIFO-survey in 1985, where a nationwide selection of people aged between 16-74 was interviewed, the question asked was: "If you were to choose three things that describe the Swedes – what would you chose?" 33 per cent answered "stiff", which was the otherwise second most common answer (Daun, 1998). What this means is that stiffness and contact with other people can often be perceived as a sign of shyness. Having this view of yourself as a Swede results into the norms becoming accurate since the people are too shy to interact with strangers in public places, and it snowballs further and eventually leads to most Swedes becoming shy and not daring to socialize with strangers. Åke Daun (1998) did research on the anxiety disorder and resulted in that the basic theory is that shyness occurs when the individual is exposed to social situations that are new. Interactions with strangers in public area for a Swedish person could result in them becoming shy since they are not comfortable in the situation that is proposed and most likely won't initiate a social interaction.

Herlitz (1991) asked on several occasions, groups of Swedes what they consider to be typically Swedish. This is mostly done to see how Swedes generally begin to describe what they perceive as typically Swedish.

Here are some of the typical answers:

- Quiet

- Reserved

- Moderate

- Obedience to the authorities

- Clever in relationships

- Afraid to get in touch

- Shy

It may be that many, both Swedes and immigrants, may consider that the above list is in some respects consistent with their own view. What is most interesting, however, is not the list itself, but the fact that these are words that many Swedes primarily choose to describe Swedes. It could just as well have been words like equality, solidarity, honesty or the like. So many immigrants would do when describing their own people. Thus, in the first place, describe what one considers positive.

A new social situation is likely to happen for every person sometimes, which then the person is forced to communicate with people whose norms and

grounds he/she does not know. The person that is put in the new situation becomes passive in the unknown and unfamiliar interaction with others and they feel a pressure that they are in need to adapt to. The Swedish people keep in mind on how to act in front of strangers and when they meet new people. They get uncomfortable and sense a feeling of what they said or did something wrong, made a fool of themselves or acted inappropriate, which is a reason to the lack on social interaction in public space with strangers. Åke Daun (1998) refers to Cesarec and Markes (1968) personality schema (CMPS) about shyness. On question 94 "When you meet a new person, are you the one that usually initiates the conversation?" were there 67% of the Swedes that answered "no". Another question (26) was asked: "Do you often think through situations that have been embarrassing for you?" where 42% answered "yes". But many Swedes appear to be much livelier if socializing is "neutral ground" than it is in a home environment. The situation then becomes more informal and many tensions release. The Swede feels freer in such a situation where he does not have to think about hosting and take responsibility for making guests feel comfortable (Herlitz, 1991).

Not only do the Swedes think this way but immigrants sometimes exchange opinions about "the Swedish coolness", if the Swedes really are as "cold" as they seem (Daun 1998). Some argue that this is indeed the case, while others argue that it is a behavioural pattern, an example is that Swedes don't express their feelings clearly as others and it's all about getting to know them well enough. A clear and typical expression of the Swedish quest for loneliness is the expression "to be at peace". Almost all Swedes are a little disturbed by sudden, spontaneous visits. They do not like to exchange words with people they do not know. They not only have their own will to be at peace. They expect others to have it too. And it must be respected (Herlitz, 1991). Even though the behaviour of the Swedes has been normalized and given different norms about how to interact in Sweden and how to behave, there are different factors that implement their behaviour, such as weather. In Sweden, the weather is rapidly changing every season and surprises the citizens each day. Even when weather changes and starts to get how and the temperature rises rapidly, people can react negatively: increased need for sleep, increased depression, slow reactions etc. All of this plays a role in how we behave like humans and can result in a lack of interaction with others in public spaces. The type of weather that is the least annoying for the people are calm, high-pressure weather without disturbing clouds, rain or storms (Daun 1998).

2.2 Public interaction in public space

Public interaction is hard to understand and when it comes to interacting in public spaces there are different things to keep in mind, such as what type of social situation the person is in, where space is and many different characteristics. The interaction the people do in public space should be designed in a way that it does not make them feel uncomfortable. As well as

the importance of to have knowledge over social filters, such as comfort zone and privacy that are needed in order to figure out the condition of the interactive system in the public space will fit and work accordingly and fit successfully in the environment. Most activities done in public space are not through social interaction but implicit interactions with yourself. An example of that could be when walking and a person is implicitly interacting with their phone, and since you are not aware of the social surroundings you are not able to socially interact and leading to not trying to interact with others. This will try to be debunked through different methods and design possibilities as well as reflect over the participants' insights.

Dix et al., (2000) created a categorization that focuses on providing a much deeper understanding of a place's identity in relation to interactivity. Värnhem is a place that lacks identity, its main usage is to cross over to get to other places in town. It lacks motive for people to stay and appreciate the place as well as it being in a specific part of town that is not as popular as other parts. Such as the social characteristics of adding social layers to a place, and this contributes to defining the place and giving it an identity. The kind of activities that happen in the place and what kind of interaction are implemented will influence the condition of the interactive space. Further, the amount of people in this space and the frequency of their visits determines how the interaction adds characteristics and feels more inviting for the people to discover its purpose, which leads to the encouragement of social interaction in public space.

People are drawn to spaces that offer interest, stimulation, comfort and amenity. These aspects can positively change the reputation and overcome the psychical barriers experienced by some users within the public space (Holland, Clark, Katz, & Peace, 2007). This is an important factor to encourage public interactions in public space, since it requires the person to feel comfortable and not to be outside their comfort zone to engage in it, as previously mentioned in the thesis Swedes are always evaluating their situation and thinking about what they did wrong and do not want to make a fool of themselves. Being outside your own comfort zone can mean a lot of different things, such as anxiety, panic, fear and excitement (Brown, 2008). These feelings and emotions are related to it being unknown experiences which often occur when navigating in public spaces. Behaviours such as jumping or being silly in public spaces could drag people out of their comfort zones which is the opposite intent of the planed prototype. Motivating and encouraging people to interact outside of their comfort zone is a goal trying to be achieved through this thesis, as well as encourage people that it is okay to step out of their own comfort zone. Holland et al., (2007) mentions that there was little interaction between generations, particularly between strangers. Groups of different ages tended to avoid contact, often by occupying different sections of the same space. This minimized the potential for conflict but represented a distinct separation between the public lives of

younger and older. There has been an issue for generations that different age groups tend to avoid to public interact with each other and use the public space as an area to hang out on but only with comfortable people. The persistence and influence of reputation is an important aspect of a place's identity (Holland et al., 2007). Public interactions are not only between the people that interact but as well as the space they are in, which leads to it becoming more engaging and encouraging when the people are in a space they know about and are aware of their surroundings. This will be presented in the design process throughout the interviews, observations and user testing. Not only could it attract more people to interact, but it could turn the spare into something significant to the environment and to the people using it.

2.3 Related work

2.3.1 Responsive lighting: "The city becomes alive"

In "Responsive lighting: 'the city becomes alive'" by Poulsen et al. (2013) much research and testing has been done, relevant for this paper. The focus of their work was to discover new ways of social behaviours through the interactive light system they had set up with the help of personal phones, which has a possibility to provide a stronger ownership to urban places. They explain different ways of gathering research throughout the project and introduce their idea of responsive urban lighting. Their goal is to offer simulating experiences, which afford different types of exchange and participation between social groups within contemporary public spaces. Throughout their project they conducted different field studies that would help them gather different results and insights for their project. They specifically worked with interviews and observations which is key to a project regarding public spaces. A great insight gathered from the discussion is that the user testers felt that the city became alive and their movement was different within the space of interactive lights. A great finding was due to the knowledge requirement level needed to navigate the mobile application, they concluded that everyday users and natural inhabitants of the square might find more value with the mobile interaction, while tourists and passer-by would engage more readily with the adaptive responsive light.

2.3.2 Social interaction in urban public places

Holland et al. (2007) writes about wanting to examine how different people use public spaces and to analyse how social interactions vary by age, gender or place. They talk about how public spaces allows people to meet at neutral grounds in planned or unplanned ways, to interact with others in the context of the whole community. Their field work was based on different types of observations, street surveys and interviews which served as a tool of assistance for this paper. Their great findings regarding how different age groups occupy different types of spaces in public as well as how the different

age groups interact with each other gave aid and a view on what to expect and how to analyse the results from observing and interviewing. A great focus regarding the everyday life in public space is to enhance it in a way. Improving the public space for the citizens to have something "different" to do or to look at, examples being having musical shows or market stalls.

3 Methods

This chapter will present the methods used and applied on the project.

3.1 Field studies

3.1.1 Interviews

Interviews is a method that is used to find out about people's ideas, opinions and attitudes (Muratovski, 2014). During the research phase, it was important and out of interest useful to gather information and understanding of what people think about Värnhemstorget if they visit often and their thoughts on social interaction within public space in Sweden. To gain knowledge of this, semi-structured interviews were made with a few open-ended questions on seven people. There was no intended target group, nor any need for the interviewee to live around Värnhemstorget to get valuable information since the intention of the interviews were to get a better picture of what people think about the place as well as if the statements regarding how Swedes are, are true and what are the possibilities to be able to change that through different types of field studies. And what are the outcomes and how to change the people's ideas regarding shyness, stiffness etc.

3.1.2 Observation

Observation is used in the social sciences as a method for collecting data about people, processes and cultures. Kawulich (2015) brings up that field notes are the record of what you observed and what information should be included in the field notes. Merriam (1988) describes a good way of how to conduct observations. Begin by drawing a map of the setting. Include details like the size of the space and where everything is placed. Write a description of the setting and provide as much detail as possible. When finished with detailing the space begin to describe it with your own words, start to write notes about everything that you see and pay particular attention to those aspects of the social setting that will provide information related to your topic under study. With this in mind there has been information gathered through the observations made on how the people that are moving around Värnhemstorget act when alone, while interacting with others and how they approach the situation of interaction in public space with familiars and

strangers, there is no specific target group since the observation is about gathering information on how the people move around Värnhemstorget as well as how they interact. This method is particularly good for this thesis since I want to discover if the statements regarding how people act in public space are true and to see if there is a way to make it more positive through something interactive. Perhaps the most effective technique for gathering qualitative user data combines interviewing and observation (Cooper, Reimann, Cronin, & Noessel, 2014).

3.1.3 Prototype

The idea of prototypes is to provide fast and easily changed early view of the envisioned interaction (Hartson & Pyla, 2012). For this project, low-fidelity prototypes were made to gather the information needed to get an understanding of how the people feel about it and their thoughts on the interaction. Low-fidelity prototypes are prototypes that are not faithful representations of the details of look, feel, and behaviour, but rather give a high-level, more abstract impression of interaction design (Hartson & Pyla, 2012). With all this in mind, a low-fidelity paper prototyping was created and used because it is quick, simple and informative and provides a cheap way of testing the interaction and giving the user something to work with. Throughout the low-fidelity prototype testing, it will be tested as a Wizard of Oz prototype, to get a full understanding of their thoughts and to easily guide the participants through the user testing. The user can think aloud while interacting with the given prototype since it will be easy to navigate through.

3.1.3.1 Wizard of Oz

Wizard of Oz is a rapid-prototyping method for systems costly to build or requiring new technology (Maulsby, Maulsby, Greenberg, Mander, & Ave, 1993). During the user testing sessions, the Wizard of Oz approach was used to acquire the most realistic feel for the users, as well as being able to ask questions and have a small interview session and get to hear their thoughts about the prototype that will be presented in the design process. The idea of using the Wizard of Oz is to experiment with the viability of some futuristic approach to interface design that currently is unimplementable.

3.1.4 User testing

User testing provides feedback that can both be positive and negative, but most importantly it opens for improvement when the prototype is tested by the users and provides valuable insight of usability problem (Tan, Liu, & Bishu, 2009). The prototypes will focus on encouraging strangers and friends to interact with each other through the prototype, have it encouraged conversation and spark ideas within the groups. Through the Wizard of Oz, they will engage and interact together with others to see if the prototype would promote social interaction between strangers, and to get an

understanding of the Swedish behaviour and if it is the way Daun (1998) described it.

4 Design process

4.1 Interviews

Semi-structured interviews were conducted for this as they are often the first step towards gathering qualitative data from the participants (Muratovski, 2014). The use of semi-structured interviews provides qualitative data and gives the interviewees a chance to speak freely with a few open-ended questions so that the one interviewing does not only gather knowledge that is needed for the project but as well as the free opinion that the interviewee brings. The interviews had no specific goal but more of an aim to gather information regarding the public space the prototype is going to be used on and their view on how they imagine Swedish strangers interact with each other in public spaces. There will be an interview session further into the project after people have tested the prototype to get a more in-depth review of possibilities for social interaction (see section 4.4-4.4.7) in public space and if the presented prototype is something that could change how we interact with others today.

There were seven interviews made throughout the process and each took around 15-20 minutes each and were recorded through notes and there was no specific target group and no intention of finding "specific" people to interview, the only goal was that the person was either walking across Värnhemstorget or is currently walking there. The aim of the interviews was to get a good vision on how they feel about Värnhemstorget and if they think there is anything that could change and what would they like to see there. Muratovski (2014) mentions that to know if you've done the interviews correctly and if they have been enough you can ask questions to yourself such as; Have you heard anything that you find to be surprising or unexpected? Does the interview endorse what you were thinking, or has it gives you some new ideas? Having these questions in mind while conducting my own interview questions for people to answer, I could gather knowledge that could prove to be valuable as well as basing my questions well enough that I could discover findings that would help me answer the research question.

The responses from the seven interviewees were very identical regarding a few of the questions on the Swedish behaviour and their social interaction in public spaces but differed regarding if they encourage it or not. The questions asked were mainly focused on what they think about Värnhemstorget, how often they visit the area, what they think about it, social interaction in public spaces, how they think Swedish people interact with strangers in public

spaces, if they themselves encourage interaction between strangers and if there is a way to change how it is viewed today. To get a full understanding of the outcome from the interviews, they have been split up in different steps or categories for easier reading as well as it is understandable on what each question was about and their goals. The interviews were structured in a specific way to easier analyse and perform them. There were three different important topics discussed in the interviews. They were 1. Värnhemstorget and its current state, 2. Their thoughts on social interaction in public spaces, their view on Swedish norms and thoughts regarding social interaction as well as if they do it, and 3. Thoughts regarding the encouragement of social interaction in public spaces, which got explained to the participants that were not aware of what it meant and the different terms and how the prototype could improve on that and their thoughts about it. The last is more of an open-ended, asking the reasoning why they do/don't interact with strangers and what would they like to change and see for it to become more common for the society.

4.1.1 Results

The interviewees that were questioned had approximately the same thoughts on the current state of Värnhemstorget. A few of them lived close by and visit it frequently enough to give a valid argument to why it is how it currently is and could provide more specific feedback to what they enjoy and dislike about the place. They mentioned that people, mostly visit Värnhemstorget or walk past/across it when they are visiting friends, running errands or just wanting to get across to a different destination or use the public transportation that is close by. The situation of the square is that it is badly designed and hold no real purpose than being a town square. The participants view on how Värnhemstorget looks would be appreciated more if there were some sort of activity or at least something to look at while passing by because it currently feels dull to view at it as well as it has no real meaning. All interviewees mention that there was almost always some sort of activity by the plateau with children and teenagers skating on the smaller area (See Figure 1).

Figure 1. Picture of the plateau

When mentioned a follow up question about their thought of the difference between the plateau and the square, most of the people agreed on creating something that would attract more people to the square just like there are people 'hanging 'out on the plateau, but some didn't think that was a valid solution to its current state and think Värnhemstorget is like this because of its surrounding environment, and that there isn't much to fix and should just leave it be. Most of the answers and thoughts regarding the current state of Värnhemstorget were negative, they would like to see some sort of decoration that would attract more people, or "something" made that sparks interest for people to visit more frequently or at least it gives out a positive vibe when walking across or passing by.

> *"I would like it to be some sort of new design space or at least something to do there. Since not only is Värnhemstorget kind of lame, but the whole of Värnhem is fairly empty and not frequently visited." – Interview with participant from the interviews, 2019.*

When asked about what their thoughts about interacting with strangers they all mentioned that it's not a common thing to do and usually don't do it in public spaces. A few mentioned that when being in a group with friends that they wouldn't mind interacting with other groups of strangers or trying to get to know others. An interviewee brought up their opinion on why she restrains herself from doing it because she is not aware of the situation and does not know the stranger she'd interact with. This brings up the statement that Daun (1998) talks about, Swedes are shy and often overthink a situation and don't want to make a fool of themselves when proposed to an unknown scenario. Asking for directions and assistance is something most of the interviewees do frequently if needed in public spaces and when comparing that to a regular conversation they agree that it doesn't feel the same since it is not a personal matter and if it's not necessary they avoid it for the most part. The same answers occurred regarding the question about what they think of the Swedish society and regarding the social interaction the country stands for and its people. Their view of Sweden was that it's a shy country and majority of the people that they encounter and have met, are introverts, slightly shy or just doesn't want to be bothered. The questions mentioned in the research from Daun (1998), the interviewees were asked as well to see if it is accurate and to find possibilities to change that through interaction design. The questions were "When you meet a new person, are you the one that usually initiates the conversation?" and "Do you often think through situations that have been embarrassing for you?" On the first questions, six out of seven answered "no" and on the second one all seven answered "yes". The question about what word(s) describes a Swede was asked as well. The most common one was shy, followed up by introvert, wanting privacy and conflict avoidance. Few interviewees mentioned that the reasoning behind these norms is that immigration has caused Swedes to be more scared and wanting

to be safe, and Swedes, in general, are scared to get to know strangers, but when they get over that step of recognition, they turn out to be very friendly.

"I feel that social interaction out in public is weird but doable. When I'm out alone I don't think I would interact randomly with strangers without a motive, but when I'm out with friends in town or participating in an event, I feel that it's a bit more normal and something casual that turns out to be fun and could lead to something." –
Anonymous participant 1, 2019.

The question regarding the encouragement of social interaction through interactive space became hard to answer even though the terms got explained to the participants since the interviewees were not knowledgeable enough to give a complete and competent answer. A few of the interviewees thought it would be cool to implement some sort of interactive environment out in the public like they see on television and movies but did not know what it would be or how the interaction would work. But the participants in the user testing enlightened on how to encourage more people to be a part of an interactive environment. Being able to socially interact in open and public space is not something that most people would do, but if they noticed others doing it, it would encourage them and spark some sort of interest. When asked if they would participate in environmental interaction in public space, four out of seven said they wouldn't per se interact but would stop by and appreciate their performance aspect of the installation it would make them happier seeing others interact with each other and have fun. The other answers were that if the scenery was more cheerful and if they would visit the location with a group of friends, they would engage in interacting with the public space depending on the interaction and the results. Formulating the question to fit the interviewees was a difficult task and the answers were sufficient enough but could have brought better result if either more interviews were conducted, or the interviewees had ideas and not just thoughts about creating "something".

"I would appreciate it being more 'fun' when being out in public spaces. The interactive environments in movies and futuristic places is really cool and I wouldn't mind interacting with others through it, but I am unsure if everyone thinks like this, since a lot of Swedish people just want to be left alone and go on with their day." –
Anonymous participant 2, 2019.

The last part of the interviews was constructed to be some sort of conclusion and to get an understanding of why they currently feel the way they do and if there is a possibility to change it by implementing an interactive engagement in a public space. Two out of the seven mentioned that they want to engage more in social interaction and think of it to make friends in uncommon

places, but since that is not the norm of how social interaction works, they find it hard to interact with strangers. A common answer was that it would be more motivating to engage in social interaction if there was some sort of reward or accomplishment for it, a lot of examples regarding futuristic screens and interactable environments got brought up, just like in the previous questions and they imagined the future to somewhat implement those features which would lead to interaction with strangers becoming more of a common thing to do. The reasoning behind most of the interviewees regarding why they do not randomly interact with strangers in public places is because they don't feel like there is a use for it, as well as it not being beneficial.

> *"I mean, is there really a point to walk up to strangers and talk to them for a while and then do nothing? I feel that in Sweden you're told to not talk to strangers as a child, and you've been taught to not interact with people you don't know, which follows through adulthood, and makes people become more shy and don't see a reason to interact with others." – Anonymous participant 3, 2019.*

4.1.2 Insights

Seeing that the results and agreement of thoughts regarding Värnhemstorget are mostly negative and in need of improvement, there could be something done with it. As it is not used much and doesn't serve a specific purpose for outdoor entertainment creating a sort of interactive activity for the people that visit the area could prove useful and motivating. Not only for the place but for people to interact and socialize with each other. Creating something that involves multiple people and not something that you can do alone could encourage strangers to spark conversation and interact with each other.

An important factor for the prototype would be that it must be simple to use and not confuse people or take up too much time. Like Poulsen et al. (2013) mentions regarding the mobile application, it feels more designed for people that visit often instead of everyone even if they just pass-by or are tourists. Having in that all types of age groups visit the area, the prototype must be informative and easily accessible for everyone and not be too exhausting to use or engage with.

Having some sort of achievement progression or a way to utilize the already made and upcoming creations would allow for people to feel some sort of pride and accomplishment when interacting with the prototype. Being able to show and display the work that has been done could prove to be more encouraging for others to join in and interact. Making an application or a library with all the drawings that get timed at specific hours could lead to people gathering up at different times and making the best of what they have. To allow social interaction to become easier than they already are, the

prototype allows different people to meet up or just walk next to each other and can start a conversation, kind of like breaking the ice.

4.2 Observations

The observations were made to get a view on how the people that walk around Värnhemstorget act, their body language and their behaviour. There were three observation sessions made at different days and times to get a wider understanding and more qualitative data for this research. Because of the nature of the public space and the dependence on time and whether the observation had limitations and cannot be viewed as the whole picture since warm weather leads to people wanting to be outdoors compared to the cold weather during winter. The observations were held at different days and two of them were conducted at the same hours. The first observation was made during a sunny weekday from 17.00-19.00, these times were picked because that is the average time when people get of work and the city is in a rush hour. In Sweden, the weather plays a big part on how people act and behave, since during this time of the year it is expected to be a certain type of weather and if not followed correctly people tend to get negative and unmotivated (Daun, 1998). The second observation was held during a weekend with the weather being very warm and the skies were clear, leading to a more friendly and inviting outdoors meaning there could be more people outside. The observation was held between 14.00-17.00, these hours, according to the weather report were the hottest which means there could possibly be a bigger crowd outdoors. The last observation was held during a chilly day with clouds and a tiny bit of rain on a weekday between the times 17.00-19.00, this observation was made to see if the weather plays a big part of the behaviour of the people around Värnhemstorget and if there were a change of the number of people being outdoors and if the behaviour would be different from the other days of observing.

4.2.1 Results

Throughout these observations, the main goal was not to see how many people were walking by, but their behaviour and interaction to the environment and if they stumbled upon any interaction with strangers and how they ended up in certain situations. How the people during the observation walked around and across Värnhemstorget was not as relevant as I thought.

For the first observation session, there were a lot of people outdoors, the reasoning for this could be that it was one of the hottest days this year, so people took advantage of being outdoors. Throughout the observation, a lot of the citizens used Värnhemstorget as a random space to walk across when wanting to arrive at their destination. Since Värnhemstorget brings no real meaning to it other than being a square that is not used, people did pay any

attention towards it, as if they were walking anywhere else. Despite it being open space and a lot of areas to walk around, people respected each other's personal space even though they were relatively close to each other when passing by. During the observation some people stumbled upon incidents that resulted in talking to what I believe would be strangers, it is for guidance or assistance. I did not interfere because the goal of this observation was mostly focused on how the people used the space and their behaviour in it. Throughout the rest of the observation, Värnhemstorget was mostly being used to cross over to use the public transportation that is nearby as well as stores, parks and buildings that people reside in. The plateau that is a part of Värnhemstorget but at the edge was occupied for the entirety of the observation by people that were skating and social interaction with each other.

Despite it being the weekend there was not a significant difference in the number of people, but the most noticeable change compared to the first observation was that the average age was lower. There were more groups walking across and being in the vicinity and more families were there. The observation gave knowledge regarding the different patterns and how people behave around Värnhemstorget. The most noticeable difference was that the children during the observation interacted with the flower ornament that was placed at Värnhemstorget by the city. The most noticeable reaction from the interaction was that it provided a creative feeling and happiness to the children. Värnhem, in general, has a reputation of not being fun and feeling grey, leading to it not being a popular area to visit for the citizen and tourists.

The last observation was made to see if the behaviour or specific patterns would change in relation to the weather and if there would be any type of social interaction done through the results of the weather. Notably, there were far fewer people wandering around Värnhemstorget cause of the weather and it not being the ideal temperature for being outside unlike the previous days. The plateau was empty and there were no people skating out hanging out like during the other observation sessions. There were occasionally people crossing the square to get to the public transportations and homes. No unique findings were found during this part of the observation except that the population, engagement and activity at Värnhemstorget can be dependent on the weather.

4.2.2 Insights

Even though the observation did not provide as much insight and results as hoped, it gave a good example on how people navigate and encounter the different spaces the square offers. The most noticeable insight was that the different age groups occupied different types of areas in the square. The elderly usually sat on benches while the younger generation used the plateau for skating or hanging out, and a mix of all ages used the square as a meeting point only. The design would allow everyone to engage and interact with each

other if they felt like, and it would have no restriction of who would be able to use it, which allows everyone to participate and engage, no matter the age group. The plateau had the most activity, but it had a meaning and purpose since it was kind of a hangout area and obstacles for people to skate at. Herlitz (1991), mentions that people don't want to easily discernible in the crowd. And that could be part of the typical shyness people have or social anxiety, he says that a person usually thinks that they should not make themselves "remarkable" or "to be seen", which leads to people mostly being by themselves. Trying to work around that, the design would allow people that have social anxiety to participate and create artwork without having to be the centre of attention and eventually create opportunities for the person to engage with others if wanted to.

And shown by the reaction from the skaters and the children, decoration provides attraction. With that in mind, the colours and the ways of interacting with the prototype could provide attraction and spark interest in bystanders and people that walk by. With all this in mind, being able to create something that does not only attract all age groups but provides attraction and a sort of decoration for the space to be looked at. If Värnhemstorget was more pleasant looking and had a meaning to it when you are there, it could develop into a more noticeable meeting spot for everyone. Considering the amount of space there is and how people navigate, the mechanics of the future prototype could provide different ways of walking across and being in the square, since even though people enjoy staying in their comfort zone, others can help them get out of it and encourage interaction with each other.

4.3 Prototype

The chosen prototype for this user testing was made through the results, insights and findings gathered from the interviews and observations. To create something that could answer my research question and further develop the encouragement of social interaction it had to be easily accessible for the user testers as well as be easy to understand. Since their thoughts and view on the prototype and its interaction was important to figure out if it was a successful user testing or not and if it was in the right direction towards answering the research question. The decision to create this paper prototype was to explore different behaviours in different types of people and to see if behaviours are alike or different from each other depending on if they are alone or with friends. Choosing to create a paper prototype was because they are easy to create, and useful to test initial ideas early to get a good answer on if you're on the right path as well as it focuses on the important things. For this thesis, the point is not the prototype itself, but the interaction it creates and if it could encourage social interaction. Having that in mind, the results from the user testing was crucial and the looks and feel of the low-fi paper prototype was not a priority, but only to have one ready for availability as early as possible. Another good feature about paper prototyping is that it's

easy to adjust, manoeuvre through and explore different perspectives through user testing. The prototype is explained and done through the Wizard of Oz since the accessibility of technology to create a real-life prototype was not available.
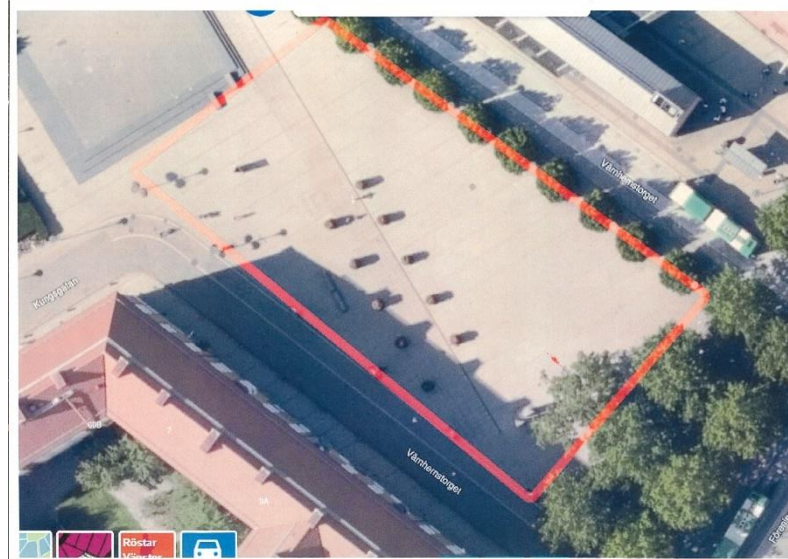

Figure 2. The paper-prototype used in the user testing

The making of the prototype was to print out pictures of Värnhemstorget and where the prototype was intended to work through the lines displayed in Figure 2. The reasoning behind creating this sort of prototype was that it provided the most realistic way of seeing people's movement and talk to them at the same time, as well as see if they would interact with others. Trying to implement something that uses realistic technology and size would not be possible with the time given and economy. There wouldn't be possibilities to interact with all the participants at the same time either to get their feedback and discuss the findings and discoveries that were made in the user testing. For the user testing, there was a video made (see Appendix A) that would describe the prototype and its functions to the participants, so that they could get an understanding of what to expect and how it works. They got introduced to different terms that describe what type of interactions there are, what social interaction in public space is and other common questions relating to the prototype. It was important for the prototype to be easy to use and understand since the data gathered from the interviews showed that not everyone is aware of what social interaction in public spaces are and how they happen. The intentions of the prototype are not only to encourage social interaction but to notice if specific patterns change in the participants while manoeuvring the square and how it affects them. They each got to pick a colour pencil and act as if they were walking on the square with the pencil on the paper, as well as a video on how the prototype would work and how to would look like after a session.
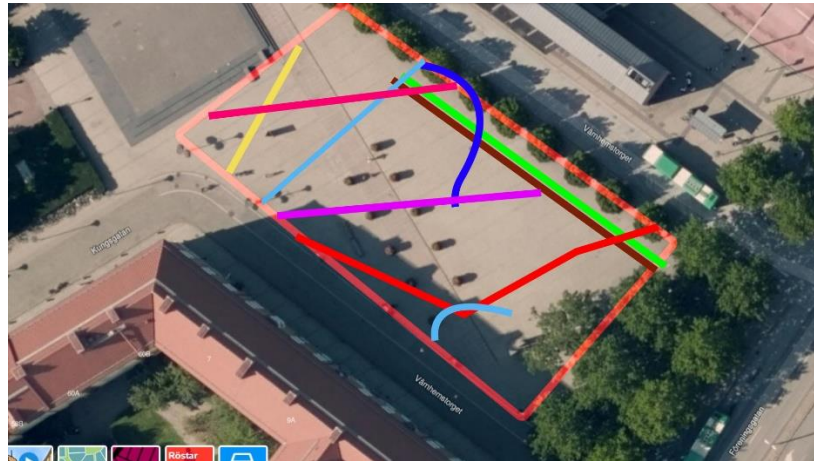
3. Picture from the video used for user testing

4.4 User testing

The user testing was done at Värnhemstorget during a warm sunny day to try to get the most pedestrians to participate while there being some sort of activity or citizens passing by at the same time, for them to get a feel for the surroundings and how the prototype would work in an everyday situation. The user tests were made with six different types of groups with six members in each. They were made to get an understanding of how the people would manoeuvre, communicate and interact with other testers whilst at the same time navigate through Värnhemstorget (see Figure 4). Each test took about 20 minutes including questions about their train of thought, decision making both during and after the user test, how they felt about the prototype and what can be changed or improved. The goal for each user test session was to discover different behaviours depending on what type of people are around you as well as if a person can change their behaviour by others influence.

Figure 4. Picture of ongoing user testing

Each of the user test sessions started by explaining the prototype, the idea behind it and its functions so that the users could get an understanding of what they were participating in. Each user test sessions started with showing

the video (see Appendix A) on how the interaction is supposed to work then each participant got to pick a pencil to represent themselves and were supposed to draw their walking pattern across Värnhemstorget on an A3 paper (refer to the blank paper) as if they were casually walking like any other time. The pencils consisted of five different colours, and there being two of each, allowing the participants to pick any colour that was available. Throughout the session, there were questions asked about their thoughts on the interaction and how it made them feel relating to personal space if it's within their comfort zone and how it looks. Questions relating to social interaction in public space, what their opinion on Värnhemstorget and the prototype. After the testing, the users got to express their thoughts about the interaction, why they walked the specific pattern if they enjoyed the implementation and their thoughts on the looks as well as if this would somehow encourage them to change their behaviour or be willing to let go of their comfort zone to interact with others.

4.4.1 Test 1: Six strangers

This was the first user test sessions and it was done with six strangers that were picked out with no specific intention, except them being on Värnhemstorget or walking across it. Since this was the first user test, it did not have a certain schedule or specific routes on how it was going to be done, the user test was mostly a try-out for the next user testing sessions.

At the beginning of the user testing session, they got asked questions regarding Värnhemstorget and its current state (see Appendix B). They were in an agreement that it looks dull as well as it had no purpose, and it could use some sort of improvement to attract more people not only to the square but to Värnhem in general. The participants had an open discussion on how they view social interaction in public space and had different opinions for it. Two of the participants agreed that they would not mind socially interacting in public spaces but highlighted that it mostly occurs in social settings more than open spaces. Discovering such finding regarding social settings, the prototype could be further developed and more engaging if it turned out to be some sort of event-based encounter at Värnhemstorget. Since then people would have a common interest to participate, which could lead to socially interacting with others. While the rest of the testers thought that it felt weird to walk up to random strangers out in the open and start a conversation in general. When it came to the user testing, they hesitated on what to draw and how to draw it since they were not completely aware of how it worked. The result of the patterns was that every user walked their own way and continued their everyday routine without interacting with the other testers through the square, even though they had open discussions and debates regarding social interaction and how Värnhemstorget looks.

At the end of the session, the participants got asked if the interaction would encourage them to socially interact with strangers or not, and they mentioned

that it would not encourage social interaction but they feel that it would be nice to walk past it and see what others have done through the creativity. Which leads to the part about feeling some sort of accomplishment for other that are participating whilst other pedestrians are watching.
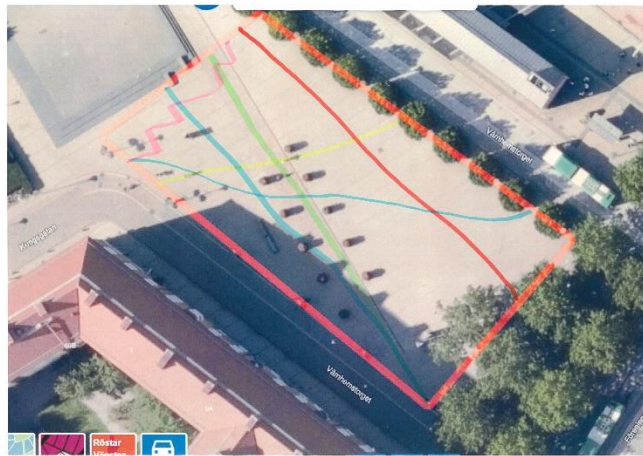

Figure 5. Results of user testing

"I am certain I would not walk up to a stranger and socially interact with them out in the open, even with the design presented to be a type of icebreaker. But without noticing I've 'hung out' with all of you [6 strangers] and it didn't feel weird or embarrassing. I guess when asked to interact with others I wouldn't mind depending on the situation, but I don't feel like being the one that engages it." - Anonymous participant from the first group, 2019.

4.4.2 Test 2: Two friends and four strangers

The second test included two friends and four strangers that were in the vicinity of Värnhemstorget. The user testing started off like the previous one with asking what their opinion on Värnhemstorget are. The first thing that came to one of the stranger's mind was that it felt like Värnhemstorget has potential to become something, but currently is just a meeting point for people and a square that's located close to what used to be a successful shopping mall. The other participants came to an agreement that Värnhemstorget is currently nothing and just a "place" that has no use. Regarding interacting in public spaces, the two friends mentioned that their thought on social interaction was positive and they wouldn't mind interacting with strangers in public but stated that it would mostly happen when together with each other or other friends. Most of the strangers that participated agreed on being too shy to interact with others that they don't know. When mentioning the quote from the first test to the user testers they all agreed on it not feeling like the same as walking to up a stranger. After all, this session

didn't feel like they were being awkward and since it was made in a group and not them being alone to interact with someone else.

Figure 6. Showcasing the prototype and its functions on the video

For the user testing, the two friends made a pattern by walking a specific way to "draw" something on the square. The four other strangers saw their intentions and decided to find a fun way to participate. By either making something cool or just a drawing. When asked if they would follow up and do this if it was implemented in real life, they all answered yes. Since it felt refreshing to not just walk but somehow made a "change" to how Värnhemstoget current looks. When asking what their thought process behind each "drawing" was, and the most common answer was that they saw the intentions of what the two friends were doing and wanted to make something artistic like they did which would encourage stepping out of their comfort zone to create something in the public space.

Rounding up the session with the question regarding encouraging social interaction in public space through this light interaction was brought up and their answers did not differ much from each other. The two friends agreed that if they were together and this implementation was real, they would try to make something fun with it. While three of the strangers just went with the flow and decided to walk this specific pattern because others were already doing the same and it made them feel like a part of something. The last stranger mentioned that even though it could provide some sort of activity or connection with others, that it would take too long and might not be as real as shown on the paper-prototype.

Figure 7. Results of user testing

"I think that it's an interesting idea and could somehow promote social interaction if a lot of more people visit this area. When seeing them [two friends] I got pretty excited to join and do something fun. But if there was no one there or nothing made, I probably would completely ignore it." – Anonymous participant from second group, 2019.

4.4.3 Test 3: Six friends

This user testing session was made with six people that were familiar with each other, the goal was to get an understanding and notice different behaviours within the group relating to the prototype. The discussions were more heated and took longer than the previous ones since they disagreed and debated about what to answer. The reasoning behind this could be that they were friends and did not mind talking openly and discussing what is right, wrong and what it can become. The first question regarding Värnhemstorget got a different answer from each of the participants. Their thoughts on Värnhemstoget was that it looks dull, not interesting, barely used for anything, has the potential to become something and is in a neighbourhood that is not visited a lot. Regarding social interaction in public spaces, they all agreed on not being the type of people that would randomly walk up to strangers, but if they were on their way to social gatherings, outdoor parties or events, they would certainly do it. They mentioned that it can be dependent on not having a certain goal when interacting with strangers in public spaces unlike when trying to flirt or meet someone at a gathering or event. Two out of the six participants brought up that it may be a reason that Swedes are not used to randomly interact with others unlike the USA or other countries, which leads to people not wanting to take the first step.

After showing the prototype video the participants got to pretend and draw their walking pattern as if they were going to walk somewhere together. The results were very positive as seen in Figure 8, the participants wanted to

create a DNA pattern with what they had, but they were unsure what it looked like. Meanwhile one of the friends ran across to try to make lines throughout the square. When asking their reasoning behind each of their movement and interaction they mentioned that if you're with a group of friends or people, that you have more possibilities to make something fun. When asked their thoughts on this encouraging social interaction in public spaces they agreed on it being doable and positive, but dependant on the people that visited as well as the condition of the public space. Having some sort of connection through the interactive light without knowing could somehow break the awkward starting conversation you have to do with a stranger. At the end of the user testing session, each of the participants got asked what they think can be better or improved to encourage the social aspect thought interactive light in public places. The group of friends thought of the idea to maybe create some sort of application that would set up meetings for strangers to meet up and create something amazing and fun with the interaction, which leads to strangers socially interacting.
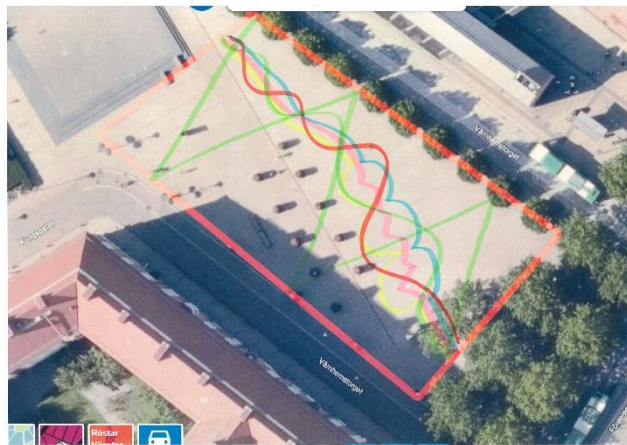

Figure 8. Results of user testing

"Just like a flash mob, you can arrange meetings to create something, but I guess after you just don't disappear but actually talk to the strangers about the artistic or silly design you've all made. Having this in more crowded places in Malmö could probably be more successful." – Filip, 21, Male, participant from the third group, 2019.

4.4.4 Test 4: Six strangers

This test is the second with six people that were not familiar with each other and had no connection, the main goal was to see if there is any different reaction or behaviour compared to the first test made. Since there have been a few user test sessions before the first encounter with six strangers, this session is more in-depth as in the questions and user testing part is more

accurate and the discussions could prompt to become more reasonable. The user testing session started by asking questions regarding Värnhemstorget and its current state. Most of the participants agreed on that it should stay the way it is, just being a square that has decoration and benches where people walk across and hang out. While the other disagreed and thought that Värnhemstorget is empty at its current state and they wouldn't mind seeing an improvement to it. The question about social interaction in public spaces got a lot of different thoughts and answers. One of the user testers thought that everyone should mind their own business in a way that open spaces like Värnhemstorget is not a place to meet strangers and should leave them be. While two other participants thought that socially interacting in public spaces such as Värnhemstorget is not an inspiring thing to do since the place is not attractive and there is not much to do. The others thought that Värnhemstorget is how it is because of a reason, and nothing happens to it is because it could probably attract too much traffic with people. Interacting with strangers openly was not a thing they would encourage or do.

During the prototyping two of the strangers were walking decided to walk the same pattern because they were headed in the same direction. When asked why one of them decided to follow the exact same pattern as the other one, he said that it just felt natural and kind of tempting to make it look alike. The other testers did not have a specific interest in the interaction and just replicated how they would walk normally. When questioned about their intentions the four strangers said that it did not attract them but was a cool feature for others, they mentioned that it could cause irritation between bystanders and people that live in the neighbourhood as well. When the participants finished with their user testing, they got asked questions regarding encouragement to the social interaction with the prototype. Most of the participants felt like this would just be an implicit interaction such as just walking past if not forced by others to participate. What the prototype could bring would be some sort of safety system since the lights in Värnhemstorget during the night is not that bright. As well as the different colours and lightning could make the place more pleasing to look at.
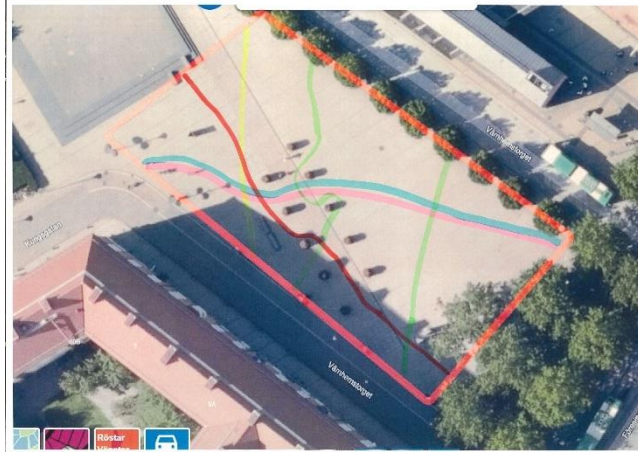
Figure 9. Results of user testing

"This system could look good during the night and be some sort of museum of movement from the day. The benches could turn into a more common place to be since the light around it makes it look good. But I am unsure of how it would encourage people to interact with each other, instead I would see groups gather and do stuff." – Anonymous participant from the fourth group, 2019.

4.4.5 Test 5: Three friends, two friends and two friends

During the observation phase, one of the biggest findings was that the plateau next to Värnhemstorget was almost always busy with people skating. So, to get the most out of the user testing, a group of skaters that visited the area were asked to participate to get an understanding of how the people that visit the most feel about the prototype and the chosen place. The question regarding Värnhemstorget and its current state got brought up and the participants all agreed on it being a boring place to be at, and that the plateau is fairly crowded during spring, summer and autumn before it gets too cold. Their idea was to have something engage both the platform and the square so that visitors could either stay around or do some sort of activity. The question about social interaction in public spaces was relatively smooth. The skaters don't mind talking to strangers in public places, but it's mostly focused on talking to other skaters in a skating park or around the vicinity. Since they all had a common interest the approach was easy, and they did not feel a certain shyness or conflict to interact with others. When questioned about their thoughts on interacting with people in spaces that did not include skating parks, two of the friend groups agreed on it being weird to walk up to random strangers and engage in conversation. While the other group of friends thought that it could be healthy to try to make new friends or just have a friendly conversation for a few minutes.

For the user testing, the participants didn't get a full understanding of the prototype or did not want to be creative in their work, since they replicated

their walking pattern only and did not think about doing something together. One group of two friends tried to replicate each other which lead to believe that when being with friends or people you know, there is an easier chance of being creative and stepping out of your comfort zone. When asked what their thoughts of the prototype and interaction were like, they all agreed on it being a cool feature that the square would have to encourage more people to visit and to stay in the area, and not just use it as a place to cross. The last question regarding the encouragement of social interaction in public spaces got a few different answers and proved to be very important for the conclusion and moving on with the work. The group of three thought that being able to use them to express yourself to others could prove to be a way of interacting with others, such as walking a specific pattern to create something. Which could attract more visitors and make people want to engage themselves. The two other groups of friends came up with the idea to implement a way of linking this to the plateau or having the interaction be able to work there. In that way, the plateau would attract more skaters and could create a community which could spread to other parks and town squares.

Figure 10. Results of user testing

"I would bring my friends here to make something funny and wouldn't mind inviting strangers to join us if they were close by. But if this was able to work on the Plateau, I think the attraction would be more interesting and could bring forth people that have never been here before to enjoy it." – Anonymous participant from the fifth group, 2019.

4.4.6 Test 6: Three friends and tree strangers

The last group of testers included a group of three friends and three strangers. At the start of the user test session, each of the members got to express their thoughts about Värnhemstorget and what it is and how it could change. One of the strangers, which was an elderly woman explained that Värnhemstorget was not always like this. It used to be more popular and crowded, but since

there are other places in Malmö that have everything Värnhem has and more, it is barely visited. The other participants concluded together that it's mostly just an empty space that people cross and sometimes meet to go to a different place. Observing the environment, the users thought that not only is Värnhemstorget grey and outdated, but the whole of Värnhem needs more stores or something to attract people. The questions regarding different behaviours and social interaction with strangers in public places got the same answers from most of the participants. The group of friends and one of the strangers thought that social interaction is starting to become common the more into the future we go, unlike 5-10 years ago when it barely happened. The two other users thought that it feels inappropriate to randomly walk up to strangers and interrupt them or try to talk to them without the proper intention.

During the testing of the prototype, two of the strangers did not feel that it encouraged them to walk a specific pattern or to engage with the other users. The elderly woman spoke up and said that it is more focused on younger people since she did not have the energy to move around as much. She mentioned that it would be enjoyable to watch others act together as they were interacting with the prototype. The friends tried to create something without having to move around too much since it felt like it would be too much or too annoying to walk around and look crazy. And the last stranger wanted to participate but did not want to interrupt the friends, so he tried to walk in a way that would not be too much of a hassle but still feel like he was a part of something. A big question got up during the testing regarding vandalizing and how the interactive lights would cope with it. The question got brought up by one of the strangers, and the whole group agreed on it being vulnerable for easy vandalizing and it is easy to draw and manoeuvre in inappropriate patterns to create inappropriate drawings.

After the finishing of the prototype, they got to answer and discuss the question regarding the encouragement of social interaction through interactive light. The friends in the user test group thought that it was a cool initiative and would probably participate if they were in the area but would not go there voluntarily. They thought that it could help people that are there alone to interact with people that are there in a group since the group could take the initiative. The elderly woman enjoyed the user testing and prototype, she mentioned that maybe during the summer it would be too bright for it to influence Värnhemstorget and mentioned that during winter it would be more useful. She elaborated and said that during winter when people walk past, there could be snow that brightens up the light, such as the Christmas trees. The group came to an agreement on her idea and further elaborated it and mentioned that the benches and lights that were in Värnhemstorget could be a part of the interaction and further enhance the experience.

Figure 11. Results of user testing

"Imagine having lights reflect under the snow during winter, and the lights/benches having a dim colour on dark nights. That type of environment would at least attract me to come by, and I think people could engage together as well. The only negative part is that it's easy to vandalize and do inappropriate things." – Stefan, 26, Male, participant from the sixth group, 2019.

4.4.7 Results

The main goal during the user testing was to identify and discover different behaviours from people through an interactive light system as well as if the prototype could encourage social interaction in public spaces. The user testing gave a lot of result and sparked interesting discussions between the groups that were participating. It also displayed the difference between the test groups, while the six friends were more explicit and creative with their drawing the six strangers were being more careful. This shows that while being with friends and people you know give the person an easier time to relax and be comfortable to step outside their comfort zone. Compared to the strangers who are not aware of who is watching and wanted to be safe and casual with their interaction.

Värnhemstorget in its current state consists of benches, decorative flower statues and serves as a meeting point for some. The square per se provides shortcuts to public transportation and as a place where you can walk across and hang out. The plateau that connects to Värnhemstorget serves as a meeting point, a place to hang out and has decorative sculptures that serve skaters a place to skate. The results from the user testing regarding Värnhemstorget provided insight on how to further improve and adapt the prototype to encourage more social interaction in public places. Currently, Värnhemstorget looks boring, doesn't serve a real purpose other than being a town square, lacks something that could attract more people to it and is grey. With the prototype, Värnhemstorget could turn into a meeting point for

communities, friends and others to visit and be creative together through the interactive light system. A big finding during the user testing was to include the plateau and have the prototype work there as well. Compared to other town squares in Malmö, Värnhemstorget is not visited as often since it's in a place that does not attract people and has a shopping mall that does not exist anymore.

Regarding social interaction in public spaces, the most common answer was that it feels weird and not necessary to engage in it. The main reasoning behind these answers was that people do not feel the need to do it as well as there is no need to interrupt people without an intention in mind. A word used to describe themselves and why they wouldn't engage in social interaction was "shy", they see themselves as people that rather not go through the hassle of interacting with strangers. When sharing a common interest, social interaction in public spaces is not as awkward or boring, like seeing other skaters at a skating park. The participants that were skating mentioned that if there is a common interest or activity, that they would find it easier to engage in social interaction. While being in a group rather than alone, people would encourage and participate in socially interacting with strangers to get to know them and create bonds. Social activities, events and such promotes social interaction in public locations and serves as an icebreaker to start up different conversations. The participants thought that Sweden, compared to other countries such as the USA has different cultures and standards for social interaction which leads to it being more common elsewhere. Socially interacting with strangers has become more common throughout the years when comparing with how it was 5-10 years ago which leads to believe that in the future it will become easier and simpler to engage.

Compiling the results and key findings regarding the prototype and if interactive light could encourage social interaction turned into an insightful process, ideas for future development and answers to the research question. The feedback in relation to the prototype was that it looked nice, it sparked interest in people that were not fully into interacting with the prototype but would stop by and spectate others participate. It makes people feel like they are a part of something, sort of a museum of movement. This could cause communities, new types of friendships and interactions with people that feel like participating. Even though the more positive feedback came from younger generations they did not mind encouraging others to participate and interact with them, which connects multiple target groups such as elderly, middle-aged and younger people through this interaction. The prototype proved to inspire different participants with ideas and fun movement patterns they could engage in and highlighted that it could be a fun thing to engage in and not care too much about what others think. Turns into some sort of activity to let loose sometimes and not worry about their comfort zones, which could encourage strangers that walk by to engage with them and create interactions. Like mentioned in one of the tests, the prototype and

interaction could be some sort of common connection, get the feeling of being a part of something and could make the first step of approaching a stranger much easier and the person could be more relieved. There were still a lot of participants that were unsure about if they would participate with other strangers in this type of interaction but mentioned that they would not mind encouraging others to do it and would enjoy watching others engage in it. Others thought that it would be amazing and fun to do with people that you don't know on a personal level and that if they would engage in the interaction, they would not like to be the initiator but rather invited to join.

There was negative feedback as well regarding the prototype but not the interaction itself. Downsides to it could be that it was easier to engage with the paper-prototype and in real life, the participants would not maybe be so explicit with their movement. The light from the prototype could cause irritations and annoyances to others, people that live nearby could be disturbed by the light and people in traffic could get distracted. The prototype itself could be easy to vandalise due to inappropriate use of the mechanics it brings, promotes negativity through the light made by some. So, it is important to implement some sort of timer or the lights power fade depending on usage and how long ago it was made. But a further improvement to the prototype was discussed and the participants in all user test groups mentioned different findings that improve social interaction through the prototype. It did not only promote artistic feels but as well as some sort of safety during dark nights where the drawings kind of shine and provide light and makes it more pleasing to pass by. The benches and streetlights could be a part of the prototype and react depending on the interaction. Since this user testing was made during summer times, the user did not get the experience to see how it could've looked during darker days and nights. But they mentioned that during winter it could look more beautiful with all the dark times and snow, just like a Christmas tree, which per se could make Värnhemstorget a more attractive place to visit.
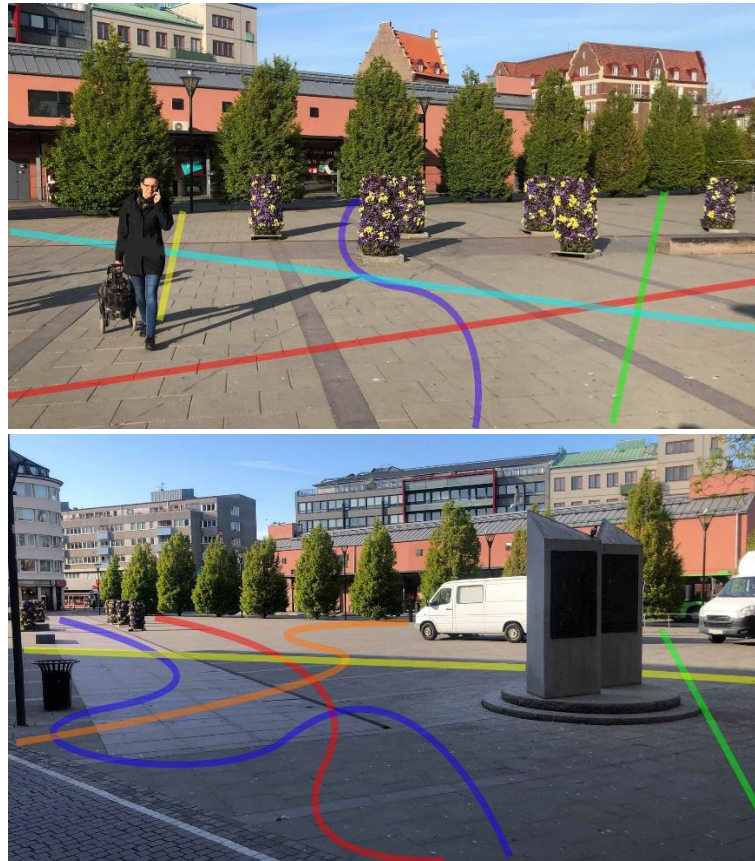
Figure 12. View from eye-level and how it could look like

4.4.8 Insights

The main insights gathered from the results of the user testing was to develop and create something that allows people to come together. Since the results from the group of friends were so different from the rest, in the ways of their movement and encouragement. A lot of the feedback concluded that even though the design is in action people would still not take part explicitly and just use the square as its meant to be used, such as walking across and having it as a meeting point. Being able to encourage the people that think that way is a challenge but through the different ideas regarding event creation and different achievements for engaging and participating could get the pedestrians that don't feel like participating, to engage. Public interaction is not mandatory and does not have to be forced, but with this design idea it can turn the view of public interaction in social spaces to something more positive and encouraging for the people. The idea for the final prototype could include some sort of application or a Facebook site for people that want to be silly together and want to express themselves more explicit than others, to be able to promote such behaviour should get rewarded somehow and in the long run encourage more people to participate and interact with each other. Since the majority of all mentioned that if partaking in group it would be much better than doing it with strangers, the focus for implementation could be to have an app that displays different times or events made by people for the people.

Allowing each pedestrian to promote and create events for everyone else. The aim of the work that has been made is to encourage different age groups and people in general to participate in social interaction in public spaces through this interactive light system. Focusing on the behaviour of the local people and trying to figure out how to make them feel more comfortable and find enjoyment in this prototype is the goal. While having the prototype and designated space be in Värmhemstorget proved to be a slight failure since it is not visited as much as other town squares, but that gives it room for improvement and a good start on how the mechanics of the designed prototype should work. After all the insights and results gathered from all the field work, the prototype feels unfinished, but the core mechanics are intact. The main goal for it is to attract people and make them come together and interact with each other, which was a success. But how the people get an understanding of the mechanics as well as its existence is what must be further investigated. The negative consequences for this include different types of vandalizations, such as using the prototype to draw inappropriate signs or texts. Solutions for this are still undeveloped since the main idea for the prototype was that everyone should be able to interact with it in the square and not have to worry about having to sign up anywhere or attend an event. But that could prove to be a solution for the vandalization and bad behaviours, to create a sign up or have an application that registers the participants movement and detects specific patterns. Regarding how the area would interact with time plays a major part in how pedestrians view it. Having set times where the newly made application snaps the view of the square and puts it in some sort of library for others to recreate or watch could allow people to create specific art pieces and promote cooperation with each other.

5 Final Iteration

After gathering all the insights and feedback from the field studies, an iteration was designed to get a feel of what a finished prototype could look like and how different interactions would work with it.

The thoughts behind creating a final iteration were to get a better view of what the interactions through the interactive light could turn out to be, as well as how the view of social interaction could change with the implemented ideas. Lucem Lichtbeton (2019) is a German company that creates light transmitting concrete for impressive light applications. They can create extraordinary light, shade and colour scenarios for the design of facades, terraces or driveways. Which can be implemented in normal scenarios like Värnhemstorgets square concrete, in relation to cameras that were the first idea of how to track the movement of the people on the square. Cameras

would be placed at the buildings or streetlights nearby and track the movement of the people walking past but could result to the light that is projected being too weak and wouldn't be able to be visible enough from eye-level.

To feel some sort of accomplishment and reward for not only interacting with strangers but participating in the interaction, there could be a timer implemented that would capture the interactions between the people. Having it set on e.g. every twenty minutes could result in having groups create some sort of museum of movement and it would store all the results in a database, whereas depending on the foot traffic it could cycle through the different made projects when no one is there, or during the nights.
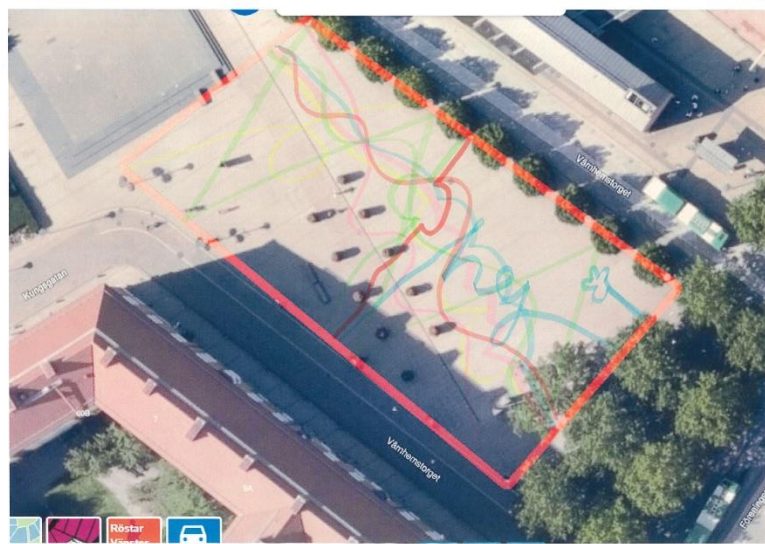

Figure 13. Picture from video, see Appendix C

To get a more personal experience through the interaction an idea to create an app that would allow customization of different colours, sizes and strokes of the lines you could create on the square in Värnhemstorget. It would include a bird-view of the square and the participants and people that have the app notice their work and be able to save it. Having a QR code at the location could make it feel more special since you must be at the location to engage and encounter the different ways of interacting with the prototype. Allowing for customization could encourage the prototype and interaction to become a sort of event that people gather for and create things out of the trackable lines on the concrete, for example like making graffiti without having to damage the environment and having to enforce people to clean it on places it's not allowed.

Figure 14. Example of placement for QR code to engage people to test it out

Figure 15. Simple interface for customizing colours and bird-view of what's currently there

Figure 16. Example of library of creations for exploring

Another implementation which could result into encouraging more interactions and social engagements in public spaces could be an interactive colour mixer, when walking with another pedestrian the colours would combine into a different one and promote social interaction with others.

The idea behind this is that it must happen at the same time when walking across the square, if someone walks over a colour after its already been there, it won't come together. This would allow for different combinations and social interactions, only having a specific number of colours and having to "unlock" or discover new colours, you had to interact with others that were on the square. Including the objects that are already on the square could improve social means and allow the place to be more inviting. Having the benches, streetlight and decorative flowers be a part of the light prototype and change colour throughout time, have some sort of interactive interaction with people to change their behaviour and setting or be changeable by the application to have a specific colour could be inspiring for visitors to stay at the location and appreciate the interaction between others.
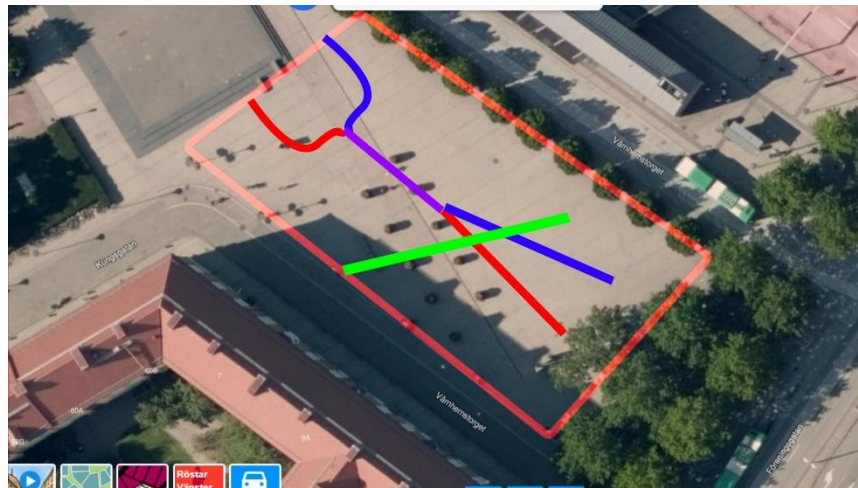

Figure 17. Picture from video, see Appendix D

6 Conclusion

The focus of this thesis was to investigate and discover new possibilities within social interaction in public spaces through interactive light and to answer the research questions. Focusing on field studies and engaging with people was the main knowledge source and provided information on how to improve not only the miniature model of the light installation proposal but the social interaction according to their ways which would result in more interaction and attraction to the place. In this thesis, there were field studies conducted to gather information regarding social interaction in public space and people's thoughts on Värnhemstorget. The first field study were interviews, the participants got to answer questions regarding the topics of the thesis and provided ideas and thoughts on how it can be improved as well as what can be done to make it more attractive. The second was observations, that was made to get a view on how people navigate around the mentioned space, how they use the space they are given as well as try to get an

understanding on how personal space works. The results gave insight into different ideas regarding creating a prototype and how I could solve and encourage different ways of socially interacting in public spaces. For the last but what became the most important field study, user testing. Throughout the thesis, user testing had the greater impact as well as resulted in the most insight and knowledge to get an understanding of the shyness within the Swedish people as well as on how to answer the research questions as well as discovering new possibilities for future work and implementations.

The main findings throughout the thesis were that people don't mind socially interacting with others if there is a goal or some sort of accomplishment by doing it. Such accomplishment could be that it prints the work of the participants and having them reflect over something they participated in and interacted with. Having more than just the square is a part of the interaction and prototype could turn the whole of Värnhemstorget and the plateau into a common community for the participants, where they meet and engage together. Different mechanics regarding the prototype proved to be successful and make it feel more personalized when engaging not only alone at the square, but with others. Creating some sort of application where people can re-watch their creations and what others have done could prove encouraging, where participants gather to create different types of arts. Turn the place into a museum of movement where different engagements get displayed depending on foot traffic. The research questions got explored, but moreover helped to discover different ways of how to keep encouraging people to engage in social interaction in public spaces and what is currently missing that could encourage a more extrovert and inviting society where people engage with each other.

7 Future work

Future work concerns a wider and deeper analysis regarding different people's behaviours and thoughts regarding social interaction. Implementing new and different methods or field studies could result in different ideas than the ones developed in this thesis. The future iterations made in this thesis could be a starting point on what could be done and what to improve on for the future to make it a successful design. Having the user testing done in different seasons such as winter could have brought up different results and ideas on how the prototype would work and if there still would be an interest in creating something through the prototype and if there would be any type of encouragement of social interaction even though its winter. Certain paths were more promising than others regarding the results received from the field studies such as, focusing on it is more inviting for outsiders, different ways to customize and save the work that has been done through the prototype. It is

a prototype that could encourage social interaction in public space, it could evolve to become a sort of gathering location where groups of friends or strangers encourage each other to participate.

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9 Appendix

9.1 Appendix A

https://www.youtube.com/watch?v=mNsIXEfr6Do

9.2 Appendix B – User testing questions

Questions before showing the prototype video:

1. What are your thoughts on Värnhemstorget?
   a. What kind of purpose do you think it serves?
   b. What do you do if you are here, at Värnhemstorget?

Questions while user testing as well as after user testing:

2. What do you think about social interaction in public spaces?
3. Thoughts regarding the Swedish society and how we as a people interact with others?
4. Do you socially interact with strangers in public spaces such as Värnhemstorget?
5. What would make you become encouraged to socially interact with strangers in public places?

Questions regarding the prototype, its functions and how they felt about it and if it could encourage social interaction:

6. What were your thoughts regarding the functions of the prototype?
7. How do you see this encouraging public interaction is social space?
8. What would you like to change for it to become more engaging and encouraging for people to start socially interacting?

9.3 Appendix C – Iteration video 1

https://www.youtube.com/watch?v=IBx7lgmHsq4

9.4 Appendix D – Iteration video 2

https://www.youtube.com/watch?v=Jt8y3mK9aP4