Playfulness as a motivational tool

USING PLAY TO DEVELOP FOR AN ENHANCED RECEPTION OF SWAPPING REUSABLE GOODS

ZARAH FARAJ

Playfulness as a motivational tool:
Using play to develop for an enhanced perception of swapping reusable goods

Lekfullhet som ett motiverande verktyg:
Att använda lek i utvecklingen för en förbättrad upplevelse av att byta återanvändbara varor

Student: Zarah Faraj

KTH e-mail: zahraah@kth.se

Degree project in: Media Technology

Supervisor: Christer Lie

Examiner: Roberto Bresin

Project provider: Mobile Life

ABSTRACT

This paper examines the field of playful design as a tool to affect and enhance the reception of a mundane activity. The management of swapping reusable household goods between neighbors is explored by designing playful components to enhance the experience. A pilot field study was carried out to observe recycling areas, in conjunction to 20 interviews being conducted regarding their point of views on recycling habits and their perception on their own local recycling area.

The results show a clear indifferent attitude towards recycling and the environment surrounding the recycling area. However the interviewees were predominantly optimistic to the idea of swapping reusable goods with neighbors for its well-known advantages. Concerns were expressed on the practical efficiency and organization of such an activity, as well as on the shameful label perceived by using pre-used goods.

A hybrid mobile application prototype was developed as one suggestion on how to incorporate playful design in a way that takes into consideration the needs and concerns of the users for swapping goods.

Future research includes carrying out case studies on such playful applications for the current intended uses to gather insight on how they are utilized by potential users. Relevant are also empirical studies on how playful design as a tool may be used and its impact on users to get rid of perceived negative labels.

SAMMANFATTNING

Denna uppsats undersöker lekfull design som ett verktyg för att påverka och förbättra mottagandet av en monoton aktivitet. Hanteringen om bytande av återanvändbara hushållsvaror mellan grannar undersöks genom att utforma lekfulla komponenter för att förhöja upplevelsen. En pilotfältstudie genomfördes för att observera återvinningsområden i samband med att 20 intervjuer genomfördes vad gäller deras synpunkter kring återvinningsvanor och deras uppfattning om sitt egna lokala återvinningsområde.

Resultaten visar en tydlig likgiltig inställning till miljön i återvinningsområdet och återvinning. De intervjuade var dock övervägande optimistiska till idén om att byta varor med grannar för dess välkända fördelar. Bekymmer uttrycktes mot vad gäller den praktiska effektiviteten och organisationen av en sådan aktivitet, samt om den upplevda skamfulla stämpeln med användningen av återanvända varor.

En hybrid mobilapplikation utvecklades som ett förslag på hur man kan integrera lekfull design och samtidigt ta hänsyn till användarnas behov.

Framtida forskning kan omfatta genomförandet av flertalet fallstudier på liknande mobilapplikationer för att ta reda på hur de uppfattas av potentiella användare vid användning. Relevant är också att empiriskt studera hur lekfullhet som verktyg kan användas och fungera på användare för att bli av med negativa stämplar.

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INTRODUCTION

"Work consists of whatever a body is obliged to do.

Play consists of whatever a body is not obliged to do."

- Mark Twain

1.1 BACKGROUND

Although the sharing economy has been on the rise since beginning 2000, in the contemporary society swapping reusable household goods is not yet a common activity among neighbors. Household items such as clothes, books, furniture or kitchenware that are lying around in the home without coming to use are usually waiting to be disposed of someday. Instead of wasting this valuable resource of reusable items that exist in most homes, they could instead come to use by a neighbor. This is a case that if dealt with could lead to opportunities such as less consumption and thus financial gain for the consumer, besides being an environmentally friendly act. There exist attempts at organizing swap groups online for the purpose of reaching out to and connecting with like-minded people interested in swapping (e.g. various Facebook groups). However, the process can be inconvenient and inefficient because of the disorganized nature of the online channels, considering they are not developed and adapted for this specific single purpose. Communication between the interested parties may not be clear, neither is it inspiring or encouraging spontaneous activity or inviting for growth. There are also cases where neighbors have among themselves established a swap corner in their apartment building, where unwanted stuff is put for others to pick up as wanted. These types of corners often create a messy appearance in the apartment building.

These voluntary activities indicate a potential need and interest of arranging a functioning system that takes care of such activities in a more organized and enjoyable manner. Swapping usable goods with others has clear advantages, such as financial, social and environmental benefits. However, some might argue for the preference of having and keeping single ownership of their items, commonly referring to reliability

issues or not enough convenience in terms of time and distance. There are issues that make people hesitate to share or swap with others, in particular with strangers. To solve these inherent convenience and uncertainty issues, play is one possible working method to lighten the atmosphere of swapping and make it approachable.

Playful interaction is described as an open-ended activity with exploratory tendencies. We engage in playful activities to have fun and feel pleasure (Knaving et al., 2013). It is a way to create an enjoyable atmosphere and to build up motivation and engagement in activities that are perceived as dull or tedious. It may also be used as a method to eliminate or reverse reinforcement of negative factors associated with an activity. For playing to be fulfilled, it is required that the user participates by free will (Caillois, 1961:6). That is one main attribute that makes playing such a valuable and powerful aid to work with and therefore relevant to explore the integration of it in this case. It has the ability to make us want to do things that are experienced as playful but that we otherwise would rather not do.

To encourage participation for swapping reusable goods between neighbors and make the activity pleasurable, I intend to explore ways on how to develop an interactive and playful system for such a purpose. My intention is to highlight the benefits and opportunities of using playful interaction design as an effective tool for connecting users and show ways that could change the perception of an activity to become engaging and enjoyable.

A shared space existing in most neighborhoods is the recycling area. It is a suitable space to build such a system in considering swapping of reusable goods is closely related to that of recycling. The aspiration is that while being at the recycling area, swapping reusable goods instead of discarding them should be preferred. There are opportunities with the contemporary digital options available that have the ability to reduce or eliminate the level of perceived doubtfulness or enhance the experience of swapping. The vision is that playful design will be the core concept idea that will be studied and used for an interactive swapping system to be developed during this project.

1.2 PURPOSE AND OBJECTIVES

The purpose of the project is to explore the area of playful design and the habits of the neighbors in regards to managing reusable goods. I am to gain understanding in how playfulness as a tool may be incorporated in a shared environment such as the recycling area in a neighborhood where it is possible for people to donate or swap useful goods.

The study aims to examine means that support in achieving a positive viewpoint on the swapping of pre-used goods through inducing an experience where participation comes from free will. This is through the use of playful components. The vision is that this will be represented by developing a system to be used for the swapping of goods. Playful design will be integrated in the system as I strive for plausible ways that attract the attention and interest of the locals based on studies.

The motivation and objective of the project is to shed light on the advantages of using entertainment and playful design tools in particular to affect the reception of a mundane activity and increase willingness for participation. Taking into consideration the discrepancy between attitudes and behaviors towards various activities, there is a need for exploring and experimenting with more approachable options. Assuming that sharing or donating goods may be positively viewed upon in general, it is not obvious that this attitude is actually practiced. Merely having a positive view on a subject is not necessarily enough of a determining factor to persuade for behavior change and to actively pursue that which is perceived positive. In other words, it is inevitable to assume that an attitude does not necessarily lead to behavior. Adding reinforced value to the activity should be vital in order to proceed with further actions and prevent the passive state. Independent activities that do not require skills such as play, while doing an essential task such as swapping goods, is a method that is worth examining.

1.3 RESEARCH QUESTION

Based on the above background description, my paper will examine the following main research question. There are two additional sub-questions that are to be researched to reach for an overall answer to the main question.

Main question:

1. Using playful design, how can a system be developed to support the purpose of swapping reusable household items between neighbors?

Additional questions:

2. How is the local recycling area perceived from a playful perspective?
3. What playful features may support the use of a mobile application for the purpose of swapping reusable items?

1.5 ABOUT MOBILE LIFE VINN EXCELLENCE CENTRE

Mobile Life VINN Excellence Centre (mobilelifecentre.org), formed in 2007, is a research centre within the field of mobile services. It is a joint venture between thirteen partners, both research and industrial, and is funded by VINNOVA, the Swedish governmental funding agency.

Mobile Life provides research focusing on enjoyment, pleasure and play with digital technology in our future life. Experiential, leisure and playful mobile and ubiquitous interactions are explored and studied, putting effort into making serious research on non-serious activities. The research is interdisciplinary with researchers from various fields such as computer science, interaction design, sociology, psychology, game design, fashion, etc.

This paper is part of Mobile Life's project "Homes and cities", researching on the spaces of the home, the city as well as what is in-between meaning the so-called shared "luminal spaces" such as recycling areas. Their connections and the role that mobile technology has and may have are explored and experimented with from different perspectives.

2 THEORY

"You can discover more about a person in an hour of play

than in a year of conversation."

- Plato

2.1 INTRODUCTION TO THEORY

The first section of this chapter will explore the field of playfulness and what it consists of, as well as some technical designs and methods for achieving a playful experience. Moreover, the differences between play and game are discussed before moving on to trying to pinpoint the effectiveness of play and how it matters. A connection is drawn between playful design and persuasive systems design. The second section briefly discusses various swapping solutions in communities and the rise of the sharing economy. The last section attempts to give perspective to this paper's topic of playful design and in combination with swapping in communities by looking through related previous works and projects.

2.2 PLAYFUL DESIGN

Play is a term commonly associated with the perception and experience of enjoyment during the engagement in an open-ended activity. The playful interaction and engagement with an artifact is described to have exploratory tendencies (Knaving et al., 2013). This means that it brings a sense of curiosity to the player which evokes an eagerness for discovery and exploration. The open-ended attribute of play is essential because it is based on the player's voluntary participation.

Caillois, one of the earliest game researchers, defined the concept of play as a free, uncertain and voluntary activity that is pleasurable (Caillois, 1961:6). As soon as the outcome of the play is predictable and becomes certain to the player, the act of playing stops with it. Caillois (1961) means that it is "incompatible with the nature of play"

when erroneous actions no longer are possible by the player or there are no more elements in the play that are surprising to the player. It is therefore a challenge when designing for playfulness to develop play features without specific requirements and not demand predefined commitments to be executed by the player. The designer has to interpret and manage multiple possible actions made in an order and manner that are unexpected or unforeseen, because there is no initial definition of what is to be performed. (Fernaeus et al., 2010)

Motivation is closely linked to play and research distinguishes between two different types of motivation, namely intrinsic motivation and extrinsic motivation. "Intrinsic motivation occurs when the activity is inherently satisfactory, pleasurable or fun for the user, while extrinsic motivations are based on a separable outcome, such as money or approval" (Knaving et al., 2013). Robert A. (2010) states that it is the intrinsic values that contribute to making a playful activity enjoyable. This may be interpreted as depending on the play that is being played with and the interests of the player, different motivations may be evoked and therefore affect the level of engagement and pleasure that the player experiences.

Knaving et al. (2013) mention three key factors to achieving the experience of having fun: accomplishment, discovery and bonding with other players. These factors have some in common to what Caillois (1961) defines as play, such as that discovery could possibly be arising from uncertainty. An uncertain activity or outcome opens up for a need of investigating or clearing that which is uncertain. That is how discovery comes into picture. However there are also some differences in meanings seeing as accomplishment requires some kind of goal-setting, which is not in line to Caillois' (1961) definition of an open-ended, free activity.

Players who find themselves joyfully engaging in an activity and playfully discover new things are shown in studies to be more willing to continue spending time on the activity. They also have a lowered perception of effort (Knaving et al., 2013) compared to other perceived effort in non-playful activities. This relates to the reasoning by Caillois (1961) of why we choose to engage in play. He means that play has the role of helping us to "find diversion, escape from responsibility and routine" (Caillois, 1961:6). Having a sense of responsibility requires putting in effort to keep the promises that come with it,

which could be perceived as a demanding conception. Further, following the same mundane routine does not promote diversion in the experiences you get and instead discourages new discoveries in everyday life. Activities and environments that stimulate playful discovery is advantageous for example for people with creative professions as new experiences contribute to the ability of seeing things in different perspectives (Polaine, 2012). Fernaeus et al. (2010) state that playfulness is a human attitude where having a playful approach brings a richer experience to tedious tasks. This statement is in agreement with the description of Knaving et al. (2013) on the perception of decreased effort in performance-demanding tasks that converts to becoming joyful instead.

Costello et al. (2007) talk about two related states between exploration and play where the former aims at exploring what an object *can do* and the latter finding out what *can be done* with that object. The player switches between these two states during the interaction of an object. The switch from the state of play is triggered when the player starts feeling restless by the discoveries already made and therefore reverses back to the state of exploration seeking new possibilities for play. Costello et al. (2007) means that the process of exploration can be seen as a precursor to playful behavior. The exploratory behavior is closely tied to that of playful behavior as both show signs of curiosity. To be able to explore, a sense of playfulness and imagination is essential and likewise, a playful behavior triggers motivation for exploring that which is being played with. With that, playful behavior may be viewed as an exploratory mindset. It is a mindset or an attitude towards an activity that has the ability to transform the experience of a mundane activity into being playful (Lucero et al., 2014), also much to the agreement of Fernaeus et al. (2010) as described earlier. The spontaneous enjoyment arises from engaging in an activity in a way that is different than unusual, by small impulsive actions performed with minimal effort. (Lucero et al., 2010)

Authors in one research paper (Costello et al., 2009) made an attempt at characterizing the experience of play by going through the theories and concepts explored by six early play theorists, one among them being Caillois. They developed a framework by categorizing the various aspects of play into 13 categories, namely: creation, exploration, discovery, difficulty, competition, danger, captivation, sensation, sympathy, simulation, fantasy, camaraderie and subversion.

Huizinga is another early and well-cited game and play researcher that was active earlier than Caillois. In his book *Homo ludens* (1950) he goes into depth to describe play as he perceives it. He means that play is a temporary activity out of the ordinary life that is a necessity for both the individual and society for reasons such as its social associations and as a cultural function. (Huizinga, 1950) The context surrounding a playful system also plays a significant role in how the activity is perceived and experienced by the user. When the social setting is perceived as inspiring or inviting it is promoting a fun and engaged community. For example, it is argued that it is useful to use tools such as lighting for creating an atmosphere or a certain mood in interactive installations (Gronbæk et al., 2012).

Polaine (2012) conducted a study on the essence of play and interactivity in our culture, society and in the emerging interactive technology innovations that are increasing. The author discusses the differences between play and interactivity as the formation of play being a strategy for the design process, whereas interactivity constitutes the content of the system. The experience perceived by the interactivity is the primary aim and with the implementation of playful design, Polaine (2012) means that these two factors - interactivity and playfulness - contribute to engagement of an interactive system. Furthermore, he states that although all other aspects besides the interactivity itself such as the quality of graphics and audio certainly do play a role to the overall experience, they are secondary elements. "A beautiful but tedious interaction remains a tedious interaction regardless of the graphical treatment." (Polaine, 2012) He explains that the experience of pleasure and the engagement comes from playing with what is interactive and willingly trying to get better at playing, rather than learning how the developer had intended it to work.

Polaine (2012) developed in his paper four principles of interactivity and experience. He stated that the user goes through four stages when experiencing interaction, namely: 1) the invitation stage, 2) the exploration stage, 3) the immersion stage, and 4) the participatory interaction stage. The contents of these stages are described below.

The invitation stage was first used by Pesce (1996) describing the stage in which the user is feeling a temptation to approach a certain activity. Pesce told about a time where he went hiking on top of Mount Tamalpais in California, searching for a specific oak tree

which had a swing hanging on it. As he explains it, the joyful sight of this inviting swing and the "delightful play" that a swing can bring had him recalling that moment. "I can only recall the joy on seeing that swing. For that is the true interface, the open invitation to play." (Pesce, 1996) The very first interaction occurs through our senses of sight, sound and smell because that is the first contact or connection we get instantly from a distance before we have approached or started directly interacting with the interface. Regardless of functionality, usability or the technology, the first things we notice when we first encounter an interface are the visuals, the audio and if we are close enough and if applicable, the scent and even feel. (Polaine, 2012) This is much similar to how we instinctively collect such data when we build a first impression when meeting new people before we have started communicating or interacting with them. The same mechanism may be applied when designing for play and engagement, taking the first impression into consideration and our senses to create an attractive play.

The exploration stage is when the user, after successfully being invited, becomes curious and starts exploring by interacting and searching for play opportunities. The player also starts looking for affordances and eventual rules. (van Beukering et al., 2014) Continuing this stage is the immersion stage which is when the playing experience actually occurs and the player feels absorbed and immersed. (De Valk et al., 2012) The play is now familiar and the players may show expressive behaviors or competitiveness for example trying to reach a goal. (van Beukering et al., 2014) The participatory interaction stage consists of communication as a participation form such as through social networking, messaging and presence technologies. After having taken the first step and experienced an interaction, we start connecting, socializing and interacting with other participants. (Polaine, 2012)

The concept of playfulness is usually connected and compared to the concept of gamification which is inspired by the design and implementation of gameful elements in video games (Deterding, 2011). This will be briefly discussed in the next section, *2.1.1 The distinction of playfulness from gamification*.

Game and play are two terms often misused interchangeably by the general public, for example considering the very common question "should we play a game?" (Lucero et al., 2014). The terms have attributes which are intertwined but they still have very distinct differences to them. The differences are essential to my paper as to not mix up the concept that I am trying to achieve. It is thus of relevance to clearly distinguish between the two.

Gamification is defined as the use of game design elements in non-game contexts. It is a tool for enhancing fun and encouraging participation by using similar gamified techniques found in video games, such as high scores and various achievements. Play or playful interaction on the other hand is argued to be different in the sense that games usually are goal-oriented while play has exploratory tendencies (Knaving et al., 2013). Gamification is considered as complementary to but distinct from playfulness (Deterding, 2011). They can be utilized together by taking advantages from each other to enhance the experience of an activity.

The distinct difference between game and play is usually discussed in regard to the concepts of *paidia* and *ludus* coined by (Caillois, 1961:27). Paidia (playing) refers to an exploratory, free-form, expressive and improvisational recombination of behaviors and meanings. The term refers to the spontaneous play instinct of children and their natural desire to express themselves and the feeling of being the cause of something (Caillois, 1961:27-28). Ludus (gaming) refers to a type of playing that is structured by rules and competitive strife toward goals (Deterding, 2011). Furthermore, gaming is a formal activity that appoints players the titles of winners or losers and is an activity most common in board games and video games (Lucero et al., 2014). Oftentimes patience is a great factor to games which is why interruption that prolongs it is usually caused by a specific reason, for example an agreement between players or the decision of an umpire (Caillois, 1961:36,6-7).

As with gamification, there is a risk with playfulness when the player becomes too immersed into it that the main activity itself is overshadowed and becomes secondary. This restrains from not only self-reflection in regard to the main activity but also gaining knowledge when it is desired (Knaving et al., 2013). It is thus a challenge that

needs to be taken into consideration when designing. The importance of thinking about how the implementation of playful design will affect and support the main activity is significant (Knaving et al., 2013). If there is too much emphasis on the playful part the player may disregard the main activity or underlying intention. That makes it difficult to develop motivations to further support and be involved in and recognize the main activity itself.

2.2.2 THE IMPACT AND EFFECTIVENESS OF PLAYFUL DESIGN

Designing with playfulness as an approach creates an enjoyable setting and builds up motivation and engagement in activities that may be perceived as dull. However to motivate people to engage in a playful activity, a community being part of it is a trigger. In a fun community, the players usually do not care about the activity itself but rather on simply having fun together with the other players while playing (DeKoven, 2002). This could be interpreted as the activity in fact not being fun at all or having the same level of funness had the players been playing by themselves without company. The important part is the sense of having fun as a collective group. The effectiveness of this comes from the realization that when a group of people are engaging in a fun activity, it is perceived as inviting to the outsiders. A group of people showing signs of having fun signify to the onlookers that it seems to be an enjoyable activity which awakens a sense of curiosity. A wish of also joining in and exploring the fun is not farfetched or unlikely, therefore making it one step closer to participation. Hesitation may arise if no one is part of the play which makes it a difficult situation to judge the value of the play or of playing at all. As discussed earlier in this paper regarding fun, it is achieved by the three key factors: accomplishment, discovery and bonding with other players (Knaving et al., 2013). The theory of DeKoven (2002) about fun in communities goes hand in hand with the definition of fun by Knaving et al. (2013), creating bonds with the other players and caring for everyone to have fun. Much is pointing towards attending to the current emotions of the users.

It is discussed in research that there is a connection between gamification and their success and increased profitability through higher customer engagement (Hamari, 2013). Likewise, there are various play-oriented projects showing positive results that

were developed to be fun and enjoyable with the intention of increasing participation and engagement towards a certain activity. In the section *2.4 Related work*, some examples of such projects are presented.

2.2.3 PERSUASIVE SYSTEMS DESIGN

Persuasive systems design strives to affect the user's thoughts and behaviors with interactive technology. It aims at promoting motivation and making an impact. (Oduor et al., 2014) Through the applications that interactive technology provides, it is possible to affect the way users behave and think. Although there is a possibility, it is not a simple task. Oduor et al. (2014) states that for persuasion techniques to succeed, it is not only necessary for them to be interactive but the participation of the users must be voluntary. Through enhanced connectivity and mobility, the ability to persuade increases.

Oduor et al. (2014) further states that people have a natural desire to interact and express themselves, their identity, opinions and relationships. This human desire can be witnessed to be frequently taken advantage of today to establish new digital businesses e.g. social networking services. Services such as Facebook, Twitter, Instagram, Youtube and Tumblr have all achieved success with high number of users. They serve the users with various communication tools (text, image and video) and the possibility to express themselves in different ways such as conveying opinions about contents by rating functionality. We are also daily either being influenced by others or influencing others through social situations and the actions we make (Oduor et al., 2014).

Social mobile games are developed primarily for the social and fun interaction between players (Coulton, 2014). The games typically have a simple user interface and are easy to comprehend and get into, also often encouraging players to use their social network to further engage more players to join and interact with. Such a game is the interactive and playful mobile game *Draw Something* which is a drawing and guessing application. These types of games utilize the player's desire to express themselves, in this example by freehand drawing and socially connecting with friends. The social connectedness and the playfulness of drawing are persuasive features that fulfill players' need of expression. However, people are motivated differently depending on what need or

needs are more stimulating to them. For example, some are more stimulated by the need for social connectedness and are therefore more eager to engage in social activities, whereas some may enjoy the individual challenge of the activity and instead fulfilling the need of personal growth. (Rozendaal et al., 2011)

Rozendaal et al. (2011) explain the relevance of designing for persuasion. As technology evolves and with it the great potential to influence humans and their behaviors for various beneficial purposes such as solving societal or environmental problems, it is only right to use it for such. The design community has therefore shown increased interest and attention towards designing for persuasive systems for having the potential to make a change in long term. Feelings of pleasure and intrinsic motivation are universal human needs for behavior change (Rozendaal et al., 2011), so developing playful persuasive systems should prove effective.

Throughout several previous studies discussing persuasive design and technology, the intention of behavior change through social influence in an interactive way is a recurring theme, for example as explained in the text above and additionally as mentioned by Centieiro et al. (2014). The social influence, social connectedness, social interaction and the human desire to express oneself are aspects often talked about in relation to persuasion. It is understood that it is one significant key factor in the design of persuasive technology. Mueller et al. (2014) state that "the presence of a remote participant appears to affect the exertion performance", and referring to an example of networked bike riding allowing for distributed races. By allowing for the participants to receive data from the other participants such as visualized heart rate, it was reported by the participants that their experience and motivation while cycling was enhanced. In other words, this shows another type of social presence and connectedness with the other participants, persuading them of engagement by offering relevant data from the remote participants. Although they might in reality be engaging and interacting by themselves they are remotely in a distributed community.

Centieiro et al. (2014) argue that in order to create persuasive applications that users will use, it is crucial to make them fun. "People are more willing to perform activities when they are fun and entertaining."

2.3 SWAPPING IN COMMUNITIES

Collaborative consumption or the sharing economy is a phenomenon that started to appear in the early 2000s. Yochai Benkler, a Harvard law professor advocating open source software, discussed in a 2002 paper regarding the success of open, free software. He made a prediction on how the phenomenon of such collaborations can have much wider application in society beyond software. He called it "commons-based peer production", saying it is less costly than market-based production and may outperform such markets in the future. (Yochai, 2002) Collaborative consumption is described as "the shift in consumer values from ownership to access". Through networking technologies, consumers connect with one another by creating local and global communities to swap, lend, borrow and share goods in order to "do more with less". This model is perceived as having social, environmental and economic potential as it helps reconnect communities and build a shared space for repurposing goods. (About, collaborativeconsumption.com)

Means of Exchange is a UK-based company that works with the vision of creating opportunities for economic self-sufficiency in communities and promoting the use of local resources by the utilization of emerging technologies. Regarding swapping, they mean that they are "usually organised to discourage the disposal of usable items and to encourage the recycling of items between members of a community". Means of Exchange have a well summarized explanation on the meaning of swapping, cited accordingly to the below ("Swapping", Means of Exchange. meansofexchange.com):

> *Swapping is the exchange of goods or services between two or more parties. Unlike bartering, which can be a form of exchange where both parties are primarily interested in personal gains, swaps and swapping events are often organised to promote social and environmental issues, and/or to save participants money. Swapping events are organised by individuals, communities or enterprises, where members bring items of their own they no longer want (such as clothes, food, crafts or furniture) and swap them for similar items brought by other participants. There is no cash involved in these exchanges. Swapping events are organised for a variety of purposes, but swapping events are usually organised to discourage the disposal of*

usable items, and to encourage the recycling of items between members of a
community. This not only saves the swappers money, but it also reduces the
environmental burden of the disposal of 'old' goods and the purchase of
'new' goods.

Botsman and Rogers (2010) discuss in their book *What's Mine is Yours* the sharing economy and how it is evolving. In their book, they have organized several examples of collaborative consumption into three systems: product service systems, redistribution systems, and collaborative lifestyles. (Botsman and Rogers, 2010:52) Redistribution markets are what they call markets that enable used or pre-owned goods that are not needed by the owners to be redistributed somewhere to someone who needs it (Botsman and Rogers, 2010:53). A couple of examples of marketplaces brought up are NeighborGoods and Share Some Sugar, services for sharing and borrowing goods with neighbors and friends. One of the most successful swap sites, U-Exchange, had a 70 percent rise of new members in 2008 and in 2009 another swap site called SwapTree grew tenfold in members, showing the growing business potential. (Botsman and Rogers, 2010:xvii)

With the rise and popularity of such services today, including Airbnb and Taskrabbit, the phenomenon is becoming familiar and more are welcoming and accepting of the idea. However, Botsman and Rogers point out the limits of collaborative consumption although they still stress on the potential of a paradigm shift. Despite the unavoidable that there will be people who are reluctant to sharing and swapping their items and insist on ownership, as they become more exposed to collaborative consumption in the future they might convert and shift. (Botsman and Rogers, 2010:xxii) Seeing as this is the beginning of the convergence it is still in the early stages and is developing while the phenomenon is explored with. Therefore I believe there is great potential for new ideas and inventions in this field, space for other alternative creative ways of sharing than the services that exist today. Future inventions will better accommodate to the user's needs and behaviors to persuade them engaging in the sustainable movement. Botsman and Rogers predict that "there is an unbounded marketplace for [...] peer-to-peer exchanges between [...] neighbor and neighbor." (Botsman and Rogers, 2010:xiii) Collaboration

may be face-to-face or it may be groups that form to connect online and create peer-to-peer interactions. Botsman and Rogers imply that people are sharing more in their communities for example in the neighborhood, apartment building or in a group in the social service Facebook. (Botsman and Rogers, 2010:xv) The birth of collaborative consumption started through sharing on social networks online, as the authors believe we will recognize the phenomenon. (Botsman and Rogers, 2010:xx)

In an article from 2012 by the newspaper for Öresund-based news, "NyttfrånÖresund", it is reported that Köpenhamn municipality wants to reduce waste by 20 percent in six years. Among the plans to achieve that goal was to implement swapping locations by the recycling areas in neighborhoods. This is an example of one effort to adopt a swapping culture among locals living in the area. Facebook is another example where people have taken the initiative to establish online groups specifically for swapping goods in their neighborhood or city, as mentioned earlier by Botsman and Roger (2010). There are also already existing groups created for general communication within their local living area that are being used by the users for advertising swapping requests or events.

For example, the student building Videbusken in Stockholm has a Facebook group for communication between the residents. This group is also being used for requesting a swap or borrowing of items. Furthermore, they have among themselves created a "swapping corner" in their building where people can drop items they do not need for others to take. Another Facebook group for swapping and donation of items in Stockholm, in English called "Donation/Swapping/Receiving in the 08-area" (Swedish original title being "Bortskänkes/Bytes/Mottagesi 08-området"), has over 54 thousand members. There are several other groups created for such intentions on Facebook with thousands of members and are actively participating in the sharing culture. Like Botsman and Rogers implied, sharing and swapping goods usually occur online for various reasons, such as the convenience of connecting and communicating with interested and like-minded people from long distances.

2.4 RELATED WORK

In this section, I will bring about some related previous work and projects. The first sub-section *2.4.1 Playful design examples* contains examples of earlier research and

developed projects and technologies within the field of playfulness and reported to have positive outcomes in changed behavior and/or experience. The second sub-section *2.4.2 Local and community swapping* contains examples of swapping projects established in different communities.

2.4.1 PLAYFUL DESIGN EXAMPLES

The automobile manufacturer Volkswagen had with their project 'The Fun Theory' from 2009 challenged the public into inventing fun ways to do various activities that are not commonly fun to people, such as taking the stairs or throwing rubbish in the rubbish bin. Their hypothesis was that fun changes people's behaviors and therefore wanted people to explore this. One project for the competition is one titled Piano Staircase where they recreated the stairs at a subway station in Stockholm into piano keys, both visually and audibly (see Image 1). As people step on the stairs, the corresponding piano key is played. According to the creators, 66% more people than normal chose to take the stairs instead of the nearby escalator. This shows the effectiveness of adding play to the staircase and how it awakened the curiosity of people to try it out as it was something different than usual. People had fun discovering this new experience with the different sounds that each step induced. Many of them were seen playing on the stairs by jumping on each step and going up and down the stairs together with their companions. This observation shows signs of bonding with other players, discovery of new sounds and accomplishment as the player is the cause of a sound playing. There is also a sense of accomplishment in the cases where there were several players playfully attempting to create a little melody together. This type of play is in line with Caillois' (1961) definition, as a free, uncertain and voluntary activity. It also shows the players feeling an intrinsic motivation for engaging in this activity, according to Knaving et al (2013) as discussed earlier. That is, the activity was intrinsically rewarding with exploration and fun rather than being driven by extrinsic motivations such as monetized rewards.

A second project is the World's Deepest Bin which is a normal trash bin except that when rubbish is thrown into it, it prompts a sound effect that makes people perceive the bin as if it was very deep and that the rubbish that was thrown keeps falling inside the

bin (see Image 2). According to the creators of this project, 130% more rubbish was thrown into the bin compared to another nearby bin during one day of field trials. People became interested in the sound induced, started communicating with each other and showed curiosity in the bin by trying to look inside of it. This experiment, like the Piano Staircase, shows the interaction of the participants between each other and with the playable artifact.

Image 1: The Piano Staircase project for the Fun theory award by Volkswagen (2009).

Image 2: The World's Deepest Bin project for the Fun theory award by Volkswagen (2009).

Recyclebank (www.reyclebank.com) is an online service based in the USA. The service awards active users that take sustainable actions or attend their online courses with points which may be used to purchase environmentally friendly products in their online shop. Sustainable actions are for example reusing or repurposing old materials like glass jars, newspapers and textiles.

In a study by Arrasvuori et al. (2012), designing new playful artifacts was explored through the application of a design framework, PLEX Framework. The final concept developed, Ecoway, consists of an interactive garden house with plants and a watering system (see Image 3). Through a GPS-enabled mobile phone application, the user waters the plants depending on their choice of transportation. Choosing a sustainable commuting option such as biking or using the subway provides more water.

Image 3: The prototype of Ecoway.

The recycling of pet bottles has been explored in a gamified way in a paper by Zaki et al. (2013). Gamification has been implemented in one recycle bin for pet bottles. The user is rewarded with a happy emoticon in the form of a smiley on a screen above the bin and a coin sound is elicited when a bottle is dropped into the bin. The bin was up for trial in a college and it is reported that the rates of recycled pet bottles in the bin tripled compared to a standard bin that was placed right next to it. The college students were observed to be enjoying being rewarded with the emoticon. The authors argue that social rewards such as emotional encouragement are more effective than material incentives to change and encourage behavior. There are thus signs of more value and long-lasting effects in exploiting human responsiveness.

In a study by Centieiro et al. (2014), a playful and mobile location-based application prototype named Gaea was developed to explore ways of generating engagement, persuasion and social interaction. The prototype incorporates interaction with public displays with the aim of prompting users to recycle virtual waste objects into virtual recycle bins that are located within a predefined geographical area. Using the application on a smart phone, players locate and collect virtual waste objects in their area and then approach a public display where the players will be able to select the corresponding virtual recycle bin for each waste object. The intention of the application was to raise awareness on the users' recycling behaviors and the impact waste has on the planet's natural resources, as well as act informative for correct recycling. While developing the prototype, four key requirements were used: making use of the natural environment of the play area, having a large number of users, making use of entertainment and encouraging social engagement. Results showed that these gave positive responses.

Image 4: Photo booth in Japan.

Photo booths are digital vending machines that operate with an automated camera to produce photographs. The photo booths are mainly used for passports and other forms of identification although one or several users may pose for a photo inside the booth. There are different types of machines that may be used for entertainment purposes other than taking identification photos (see Image 4). Some offer a variety of different features to alter the taken photos, such as altering the lighting, using cameras from different angles and blue screen effects. A touch screen or pen-sensitive screen allows for the modification and decoration of the photos, e.g. changing the background image, adding virtual clip art, borders and free hand drawing on the photo. The photos are then printed out as a strip of photos. Some booths also offer the possibility to produce the photos as stickers or on postcards. These types of photos are often used as souvenirs or traded with friends and family. The photo sticker booths have especially maintained high popularity in Japan and throughout Asia since its first deployment in Japan in 1995 (Okabe et al., 2006). Capturing and sharing visual information within peer networks is viewed as a fun practice to bonding between friends and creating memories in ways that make the events and social networks visible to others. Drawing graffiti on the photos and adding other modifications expresses creativity and playfulness and is "the most enjoyable part of the experience" that "generally takes more time than the photography" (Okabe et al., 2006). The modifications also display the creative talents of the users that personalize each photo. The variations of the different photos as a result and the many possibilities for modifications are encouragements to recurring engagement. It builds an enjoyable social activity with a common recreation that is distinguishable from others, i.e. other forms of photos. (Okabe et al., 2006) Combining

technology and photography, the sticker photos have developed into a playful, collectable and sharable hobby between peers where identity and personal representation make the photos relatable. (Chalfen et al., 2001)

2.4.2 LOCAL AND COMMUNITY SWAPPING

There exist various projects established for the purpose of swapping goods with each other and many are developed with some degree of fun-ness in mind. One such project, entitled Swap-O-Matic, is constructed like a vending machine but instead of buying it is for swapping products. People donate their unwanted stuff by putting them into one of the boxes of the machine (see Image 5). The machine uses a point system to manage the swapping instead of real currency thus making it a free activity. Users can earn points by donating stuff to the machine and likewise, points are required to acquire an item from the machine.

Image 5: The Swap-O-Matic, a vending machine
to donate, acquire or swap items.

An article in the newspaper of Karlstad municipality has reported about three kindergartens installing "open shelves" for parents to put their children's outgrown reusable clothes and shoes for other parents to pick up for their children (see Image 6). The shelves, nicknamed Tage (sort of a pun where it is both a person's name but also where '*tag*' in Swedish translates to '*take*'), are reported to be not only an environmentally friendly solution to reduce the waste of children's clothing but are also helpful for the parents to get hold of clothes as children quickly outgrow them. It is thus financially beneficial as well and appreciated by the parents. A parent is free to take or

leave clothes in the shelf without any requirements making the shelf conveniently self-managed by the parents and easy to use. Clothing swaps are common in Sweden with several events taking place a year, eg. by Swedish Covenant Mission Church for the child and youth movement (SMU) and Society for the conservation of nature (Naturskyddsföreningen). The latter holds Sweden's record for the number of clothing swap events arranged, with 102 events held last year in 2014 and 11 400 participants, showing a continuously growing demand for such swap events and the interest for the benefits that the sharing economy has.

Image 6: A pedagogue at a kindergarten in Karlstad municipality showing off the shelf Tage.

LittleFreeLibrary (LFL) is a project dedicated to make people all over the world build free little local libraries in their neighborhoods where anyone passing by may pick up a book and/or put a book in the built shelf (see Image 7). The project aims at encouraging literacy and spread the love for reading. The small libraries appear in various sizes and appearances. They may be freely designed however the owner wishes. LFL offer a few models for sale for those who cannot build their own library. They offer a basic shelf without any decorations for starters (see Image 8) as well as several pre-decorated libraries. There is also an official sign that they encourage the users to have on their libraries so that they can identify as being part of with the project LFL (see Image 9). The sign contains a number for each library and with this the user becomes a worldwide member of LFL as well as has the option to get the library listed on a world map on their website (see Image 10).

Image 7: Little free libraries set up by different people in their neighborhood.

Many of the libraries however are built by their owners in creative and playful ways to be visually attractive and inviting to potential readers, sometimes even accompanied by a bench so that people can pick up a book and sit down to read on the spot. This makes it an interesting social environment for people to meet up and discuss topics they have read in books for example. It becomes a way of creating and maintaining a friendly community in the neighborhood.

**Image 8: The basic little library
offered by LittleFreeLibrary.**

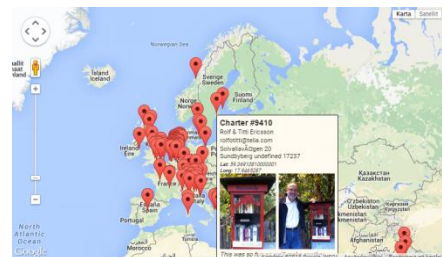**Image 9: The sign of
LittleFreeLibrary.**

**Image 10: World map with registered
members of LittleFreeLibrary.
Here showing a member from
Sundbyberg, Stockholm.**

3 METHODOLOGY

"The creation of something new is not accomplished by the
intellect but by the play instinct acting from inner necessity."
- Carl Jung

3.1 INTRODUCTION TO METHODOLOGY

In order to gain better knowledge and understanding of how neighbors interact with one another and in their neighborhoods, qualitative interviews were conducted. Their behaviors, habits and viewpoints in regards to recycling and swapping were of interest, as well as the opinions on their local recycling area. The interviews were intended to answer the research question (2) *How is the local recycling are perceived from a playful perspective?*.

Prior to the interviews, a pre-study in the form of a pilot field study was carried out as a means of preparation for the interviews. In the following sub-sections I describe how the pre-study and the interviews were carried out. A motivational description of the technical method chosen is given as well along with how the ideation phase during the design process was performed. By applying methods and suggestions gained from the theory discussed, this would support in developing a mobile application prototype that could illustrate a vision of ideas, answering to research question (3) *What playful features may support the use of a mobile application for the purpose of swapping reusable items?*.

By summarizing the results gained from the above two questions, the intent is to conclude with an answer to the main research question (1) *Using playful design, how can a system be developed to support the purpose of swapping reusable household items between neighbors?*.

3.2 PILOT FIELD STUDY

An unstructured pilot field study was carried out on the 23rd of March 2015 in central Stockholm, mainly in the areas of Gamla Stan and Slussen, and lasted for approximately two hours in the afternoon. The intention of the pilot field study was partly for it to be a preparation prior to conducting the interviews and partly to study and observe relevant areas that I am researching directly by getting up-close to the locations. For example I wanted to examine different types of apartment buildings and their locations in relation to their recycling areas and other common areas such as distance, availability and access. I also wanted to see the surrounding environment that the recycling areas were located in and the various types of design solutions for the recycling areas. Observing these things this way would also be useful in generating hypotheses (Bell, 2006:189) that could help in arranging the interview questions as well as generate new questions, as I could base them for instance on the assumptions for how their spaces might be like and find other related questions from there. Additionally, the observations would allow for better understanding and relating to the interviewees for example when they would describe the environment in their neighborhood and explain their behaviors and experiences in the common areas. Unstructured studies are usually conducted because the objectives and purposes are clear but the details are not which is my case here. A pattern of the gathered data from the field study is expected to appear afterwards, therefore any definitions or structures are put on hold until all data is gathered and a pattern can be tracked. (Bell, 2006:188-189)

While observing during the field study, photographs were taken of the environments that were thought of as interesting, inspirational and relevant to my research that could be helpful. This was done for the purpose of being able to look back and recall the field study later. The pilot field study was not structured in the sense that specific apartment buildings or specific streets were planned ahead to be observed and studied, but rather it was an open-ended field study which was led mainly by interest, access and time at that moment.

3.3 INTERVIEWS

A number of semi-structured interviews were conducted with the intention of getting a better understanding of the interests, needs and behaviors of potential users to a system for swapping reusable goods with neighbors and other locals. With the interviews, I wanted to receive insight into aspects such as their behaviors and habits in their own local recycling area as well as in their home when preparing to recycle. In the cases that they did not recycle waste, it was of interest to receive their motivations and point of view on the matter. Other aspects I wanted to gather were people's general attitudes and motivations, or lack thereof, towards swapping, sharing or donating goods with others. Additionally, their perceptions on the issue regarding objective and subjective values of different types of goods as well as whether the varying functionalities of goods have a stance in their motivations, were of interest. Lastly, general views on second-hand goods and flea markets were also interrogated on to get a glimpse of their eventually differing standpoint regarding used goods sold in commercial markets.

The intention and expectation of gathering data about the interested areas explained above is that they will be useful during the phases of idea generation and development of a prototype for swapping goods. To be able to do that it is necessary to take into consideration the end users and their interests. Their current behaviors and habits are also of importance because it signals how users might want to interact with the prototype. The flexibility of semi-structured interviews is an advantage to receive in-depth answers as follow-up questions may be asked for further development of their motivations (Bell, 2006:158). Seeing as I needed qualitative data, this was a good option.

The interview questions were composed based on the literature study, the pilot field study and on own assumptions found to be relevant to ask about. I also received consultation for how to construct my questions and go about conducting the interviews from my two supervisors. The interviews were performed in Swedish as the interviewees were all Swedish and therefore the questions were prepared in Swedish. The questions as well as the answers are thus translated to English in this thesis. The list of interview questions in English can be viewed in the *Appendix*.

During a 3-day period, a total of 20 semi-structured interviews were carried out in collaboration with another master's student from KTH. We sat together while carrying out the interviews. The reason for this is that we had similar themes for our thesis projects and thus related questions and target groups. We decided to conduct it in a pair but still individually in the sense that we had our own prepared questions and asked them separately.

The interviewees were informed that they would be individually interviewed by us for approximately 30 minutes at KTH campus in a booked and quiet room. The interviewees were chosen and invited at random from our network to voluntarily participate. They were invited to a Facebook event after accepting our interview request prior to the invite. The event included a brief text introducing the interview topic and a link to Doodle (a scheduling tool, doodle.com) where they could mark the time and date they were available for an interview.

The gender division among the interviewees was eight being females and 12 males between the ages of 21 to 31. They were either students, working or both (students with part-time jobs). In total they lived in 18 different neighborhoods around Stockholm. The size of their residences varied from 22 to 94 square meters. Nine of the interviewees lived in owned apartments, another nine in rented apartments and two had rented student apartments. Regarding the type of lodgers, nine of them lived on their own, one with their parents, another one with a sibling, three with a roommate and finally six lived with a partner where one among them also had a child (see Image 11).
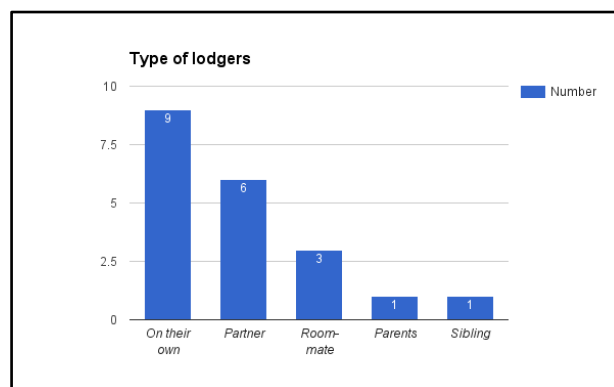

Image 11: Number of people with the respective type of lodgers.

During the interviews, the interviewees were offered cookies and tea as a means of gratitude. A brief verbal introduction on the topic of my paper and the type of questions I would ask were given. I also emphasized how I would manage the gathered data from them and that it is completely anonymous, before I went ahead with the interview questions. Making sure they understood all of these were of importance as it is my responsibility and to ensure that no complications later on would occur (Bell, 2006:157). The interviews were all audio-recorded anonymously with permission from the interviewees. Audio recording would allow for focus on what is being said and eliminate the possibility of getting distracted or interrupted had I been taking notes instead, which can be inconvenient during an interview. (Bell, 2006:165) Audio recording an interview is also beneficial not only for the possibility to be able to re-listen to the interview later during the evaluation, but also to reference to vital comments made and categorize patterns.

3.4 CROSS PLATFORM MOBILE APPLICATIONS

Building native mobile applications can be expensive especially if the application is to be supported on all platforms and devices. (Charland et al., 2011) They have to be developed by writing for each native programming language for the platforms and evaluated on each device. It is ideal for various markets and organizations to not only offer compatibility support for their applications on the latest devices but also on the slightly older devices that are still widely in use, in order to reach and allow a wider user base. The process may be difficult and time consuming as the older devices do not have the same performance capabilities as the latest ones and might require special support. However, unless it is a heavy performance application such as 3D games, the performance argument may not be noticeable enough comparing to a well-built application using cross platform application tools. (Charland et al., 2011) Developers are therefore migrating to develop applications using such tools in order to minimize the development costs and time and increase efficiency. (Dalmasso et al., 2013)

The differences among the various platforms and devices are many and vary greatly, from the different tools, build systems to APIs and device capabilities. What they do have in common is that through the native code (Java, Objective-C, .NET, etc) it is

possible to access the mobile browser. With that comes the possibility to interact with JavaScript and make calls to native code through JavaScript. (Charland et al., 2011) This is where cross platform application tools (e.g. Apache Codova, Xamarin) come into picture.

Cross platform application tools allow access to device functions such as GPS, accelerometer and camera. In combination with a UI framework (e.g. jQuery Mobile, Sencha Touch) an application developer can implement a native mobile application using just web technologies like JavaScript, HTML and CSS. The application can then be built for use on several platforms including iOS and Android. With no skill requirements for programming in the native mobile language like Java for Android or C/Objective-C for iOS, this makes a so-called hybrid application - meaning it is neither a native nor a web application. It is not native because it is not written in its native programming language and using the platform's native UI framework, nor is it a pure web application as it has access to device APIs such as camera and may be packaged for distribution on mobile application markets.

Apache Cordova, for instance, is a set of device APIs that allows access to device specific functions from the use of JavaScript. This can be used in combination with a UI framework such as jQuery to develop a mobile application. As these JavaScript APIs are built on web standards, they are compatible on multiple device platforms and thus portable with no or minimal changes necessary to other platforms. The JavaScript APIs used will in turn interact with the native mobile APIs when building and packaging to generate separate native application executables for the different platforms (Dalmasso et al., 2013).

3.5 IDEATION

The application design and features were developed iteratively throughout the project. Several brainstorming sessions were held for possible designs and features of the application. The initial brainstorming process consisted of sketching various designs and taking notes of possible features by using traditional equipments, i.e. pen and paper. The idea generation was partly based on the studied research and partly on the results

obtained from the interviews. The aim was to develop an application that makes use of interactive elements that could be considered playful and fun.

As a few design ideas started to shape, a lo-fi mockup of the application was created with Balsamiq (a tool for creating lo-fi online mockups, balsamiq.com) as a second step to take the ideas further (see Image 12). Making design plans ahead such as making a few simple lo-fi mockups of the application is helpful in defining and visualizing the end state better and determining the key features (Saffer, 2010:48).

Apache Cordova (cordova.apache.org), a platform used for building hybrid mobile applications, was used for the actual hi-fi application prototype development. It was combined with the UI framework jQuery Mobile (jquerymobile.com) to enhance the user interface and experience.
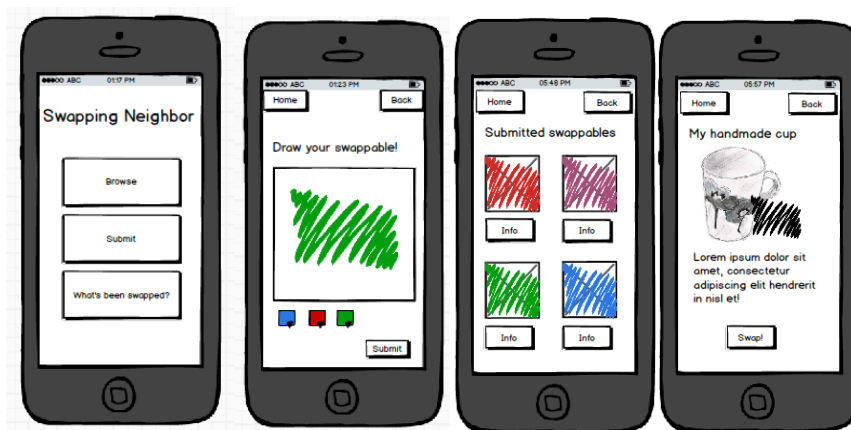
Image 12: Mockups of the application created with Balsamiq.

4 RESULTS

"All work and no play makes Jack a dull boy."

- Proverb

4.1 INTRODUCTION TO RESULTS

In this section I first lay out the findings gathered from the pilot field study. I then go into presenting the results from the conducted interviews. Lastly, I present and describe the developed prototype application.

4.2 PILOT FIELD STUDY

Prior to the pilot field study there were a few suggestions that I intended to observe in relevant areas, as described in the *Methodology* section. During the pilot field study, those suggestions turned into three main points that were of interest to examine which functioned as a basis during the study. I performed the field study while having these points in mind during the observation and a number of 12 different observations were made. Photographs were taken during the pilot field study of the observations where some examples are presented here. The three points I wanted to examine are as follows and presented along with a motivation for the points and the results collected.

Examining the locations (1)

Examine the location of the apartment building in relation to the location of the building's recycling area or waste area, taking into account aspects such as distance, availability and accessibility.

The reason for the first point was to gather information on the distance between the building and the recycling area to reflect on whether that could possibly be an issue in some way for the locals. For example, if the distance is too long it might be considered

bothersome to go to the recycling area for instance. Other than the distance, when possible I tried looking at the availability and accessibility aspects, for example how the locals access the recycling area (key, pin code, etc.) and when it is available (all day or otherwise).

All of the cases that I observed of recycling areas were located relatively close to the apartment building, either in a corner right by the side of the building (see Image 14), in a recycling room in the building accessed from the outside of the entrance (see Image 16), nearby in a smaller park area (see Image 18) or right inside the apartment building by the entrance (see Image 15). The majority was protected by only allowing access through a key by the local residents and thus had all-day availability to the area. The protection were in the form of having a dedicated recycling room in the building with a solid locked door, in an area outdoors that is locked to the outsiders or when it was inside the apartment building it is then protected by the entrance door which usually required a pin code.

In other cases the recycling area had bins that were open to the general public as well and not only to the local residents in an apartment building, as they were openly available and accessible by anyone.

Images from left to right:
Image 13: The closed door to the recycling area of a building.
Image 14: A small recycling area protected behind bars.
Image 15: A waste bin or recycling bin placed in a small separate area between the entrance and the lobby.
Image 16: Recycling room in the building from the outside by the entrance.

Examining the surrounding environment (2)

Examine the surrounding environment that the recycling area is located in, for example cleanliness, the setting and disturbances.

The reason for examining this point was to observe the location in a wider perspective, the space surrounding the recycling area where there is a possibility for various factors affecting the local residents in any way while recycling. Seeing how the surrounding environment is maintained or arranged in terms of cleanliness, the setting and potential disturbances for instance could bring information about how to design for such an environment and give better insight into the conditions that the local residents are in.

The observed environment surrounding the recycling areas was perceived as clean in most cases. In one of the cases, the bins were overfilled with waste on the ground nearby. The setting of the recycling areas was different. One recycling area was located very openly by the main road (see Image 17). Another one was located between apartment buildings, openly in a small park area with two benches close by (see Image 18). Further, another had the recycling containers located in front of a playground, in an outdoors area only available for the local residents (see Image 19). Disturbances here can be having children playing or running around in such a close distance while recycling, cars and people passing by on the street, or people wanting to have a seat on the benches in the park while a local is in the middle of recycling at the bins.

Images from left to right:
Image 17: Open recycling area in front of a main road.
Image 18: Recycling bins in a small park area with two benches, located between apartment buildings.
 Image 19: Recycling containers in front of a playground in a private area for the local residents.

Examining the design solutions (3)

Examine the different types of design solutions for the recycling area or bins.

The intention of examining the design solution was to observe various ways of designing for recycling areas and different types of recycling containers and bins. Greater knowledge in the different types of appearance, shape and functionality could provide me with a better capability to grasp and interpret the interviewees' description of their own recycling areas. The intent was also for this to lead to inspiration and a good ground when I look into possible ways and opportunities to design for a playful swapping system.

Some of the design solutions were in the form of large, rectangular recycling or waste containers with a small circular shutter on the front to drop the items through (see Image 20). There were also even larger recycling containers with openings on the front (see Image 17). A differing type of design solution for waste is seen in the foreground on Image 21, where the design resembles that of a snorkel of a submarine with a shutter on the top front side. Others had shutters directly on the wall on the outside and inside of the apartment building, and solid door shutters with no insight (see Images 22-23).

Images from left to right:
Image 20: Large recycling or domestic waste containers with shutters.
Image 21: Background: Large recycling containers with shutters. Foreground: Design resembling a snorkel for domestic waste.
Image 22: A shutter on the wall from the outside of a building for domestic waste or recycling.
Image 23: A shutter on the wall from the inside of a building for domestic waste.

4.3 INTERVIEWS

The interviews were conducted in Swedish and the results are therefore translated from Swedish to English. The questions asked were initially divided into five parts (see the *Appendix*) but got naturally intertwined during discussion due to the nature of semi-structured interviews. After going through the answers and combining similar results, I

have therefore rearranged the results into three segments. The first segment talks about the behaviors and habits in regards to recycling and their perception of and habits in the recycling area, as well as their perception of the items in those areas. The second segment presents the interviewees' attitudes and views regarding swapping, sharing or donating pre-used items and their general consumption and perception of such items. Finally, the third segment presents their experience on the surrounding environment of the recycling or waste area, as well as their opinions on for instance the location and distance. Below are the results of the respective segments.

Behaviors, habits and perceptions on recycling and the recycling area (1)

A majority of the interviewees expressed that they often recycle or recycle most of their waste (see Image 24). Besides having a solution for general household waste from for example food, which was present for all interviewees, 60 percent also had a recycling area nearby for waste such as metal, plastic, cardboard, paper and light bulbs. Less than a third had a separate and dedicated area where they could drop other types of waste that is more bulky for example furniture or electronic waste. Furthermore, some of them had access to a clothes fundraising collector in their neighborhood and one had a separately located area only for recycling paper (see Image 25).
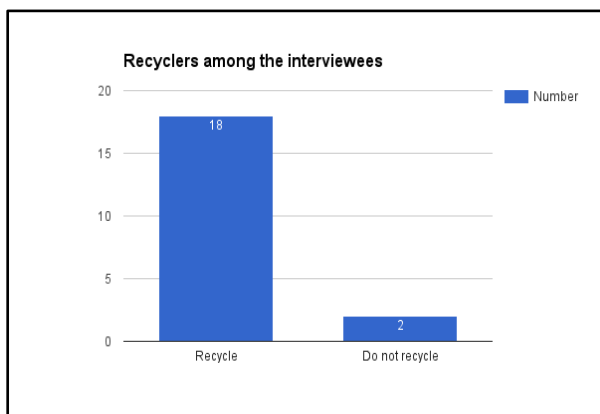

Image 25: Number of active recyclers among the interviewees.
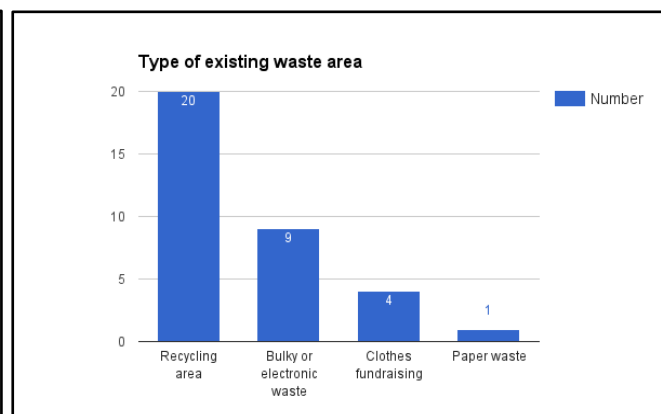
Image 24: Number of people with the type of waste area existing in their neighborhood.

When asked whether people had noticed any reusable items in the recycling area or other waste area for bulky waste, four admitted to actively looking for reusable items and having taken items several times (see Image 26). One expressed that they are "a healthy shoplifter" in the recycling area, taking furniture, lamps, papers and plates,

saying it is a waste to throw things that are reusable. Another was expressing disappointment on the large amount of items thrown that is still usable. "I sometimes peek [in the container] to see if there is something useful", saying they had taken things such as pots, boxes and a skateboard. They argued that things that get thrown in the recycling area become "dead" items and would prefer it if people for example would somehow mark their items as usable or functioning so others could take it if they wanted. Facebook groups is an option that people use to donate their reusable items, "but these things that don't end up there in the groups and end up in the recycling room become sort of a middle ground". They continued, "what is this middle ground? [It] doesn't end up in an online selling site or Facebook but still maybe it's worth doing something with. It's interesting, what kind of a place [the recycling area is]". Another one said that they felt like a "baglady" because of how much they take things due to people throwing a lot of reusable items, "it's crazy". They told about how in their previous apartment building, they had a room where people could put their usable items. "It would have been nice if that existed in other places as well". Similar to how the previously mentioned interviewee described the items in the recycle area as being "dead", this interviewee as well expressed thoughts on how these items are classified as trash. They expressed how embarrassing it is to "dig in other people's trash" and "you feel stupid" if you would be found out. "It is a social norm, an unwritten rule, you just don't do that, it's ugly to do something like that". On the other hand, things that are put somewhere else for instance in the stairwell in the apartment building are considered more "okay". Another interviewee said that they sometimes go to their recycling area "just to see if someone has thrown something useful".
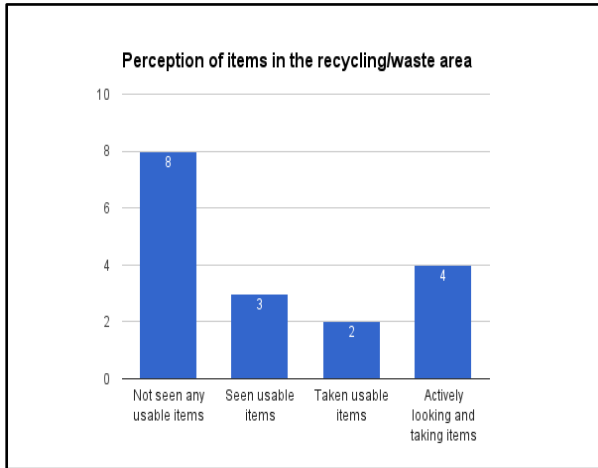
Image 27: Number of people on their perception of whether they had seen usable items and what they had done in that case.
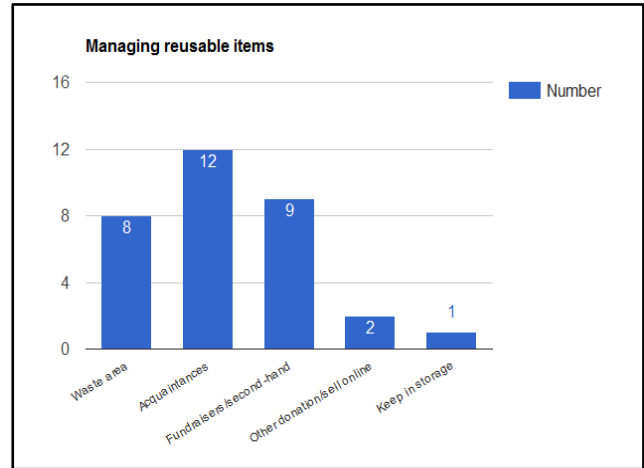

Image 26: Various options where the number of people opt to take with their reusable items.

There are various options that people choose between when dealing with their own reusable items. Most of the interviewees would choose to either contact acquaintances like family or friends to give away their things to or donate to second-hand shops or clothes fundraiser collectors if it is available in their area (see Image 27). Otherwise they would throw it away in their recycling or waste area where they live even if it could be useful to someone. In other cases, a small percentage could also be willing to try to sell or donate it online so it comes to use, or just simply keep it in their storage room until they can deal with it in some way. One interviewee for example explains that they would try to get in touch with the neighbors they know in their apartment building if anyone is interested and also check online swapping groups, before finally throwing it away. They express their opinions that it "would be fun to be able to swap with your neighbors because for me it would be comfortable if someone could just come and get whatever I want to get rid of, so it comes to use again". They continue with an experience they had themselves, "it's also fun for me, I have received very pretty bowls from a neighbor that I know".

Attitudes and perceptions regarding swapping and consumption of goods (2)

Knowing what is available

One person talked about the need of knowing what is available for swapping with their neighbors to determine whether you are interested in anything or not. The thought of an unknown neighbor knocking on the door to ask for a swap was considered "weird". Therefore they meant that having something more regulated like some sort of an organized system for swapping items would be helpful and convenient. Another interviewee discussed similar issues regarding getting information prior to an eventual swap. They thought the process is difficult without a "proper" or "smooth" method especially when it comes to swapping clothing considering essential factors such as size and style. Even brand and quality of the clothing were of importance to some.

Swap notifications

Four interviewees had seen notes put up by neighbors on the bulletin board in the entrance of the apartment building. The notes could consist of a picture and text offering to donate items that will otherwise be thrown away, for example due to recently moving in or out of the apartment or having bought a new item and wanting to get rid of the old one. One of the interviewees told that the notes also could be found on the windows by the entrance or put in the post boxes because their bulletin board is placed where it is difficult to view. One positive argument for putting up notes about items you want to get rid of was the convenience, that is, if someone located close by could easily come and pick it up instead of having to deal with long transportations yourself. They also told that some people would even drop their items in the entrance hall for neighbors to take if they want. Often the items would be soon gone, meaning that someone found it useful and chose to bring it to their home. It is not allowed to put items in the entrance hall but it is obviously appreciated by the neighbors to get free stuff, as expressed by the interviewee.

Personal values

Another interviewee talked about the value of items, mentioning both economical and sentimental values. They did not think they could swap items that held some kind of sentimental value to them but items holding an economical value were perceived as more tolerable for swapping. Another one with similar mindset regarding values talked about how they treasured a type of clothing that they collected, saying that they "loved" them and therefore would never put it up for swapping. This interviewee also expressed thoughts about how different items hold different possible uses, meaning that this gives them varying values depending on the person using it.

Swapping behaviors

One interviewee told about how frequently they would swap with friends and family. "It feels like every weekend something goes back and forth", they said. Further, a lot of the things they own at home has been swapped, estimating that "50 percent is from IKEA and 50 percent is pre-used stuff". They also expressed that swapping was especially appreciated with children's stuff as children outgrow their clothing and toys very quickly, and therefore swapping is a very helpful way economically for families with children. They also told about a so called clearance event organized at their children's kindergarten where lost and found items that were not picked up by their owners could be taken.

Opinions on second-hand and flea market

Some of the interviewees expressed skepticism towards second-hand stores and flea markets. They showed insecurity towards the pre-used items such as questioning where it originated from or who had dealt with it previously, saying "someone that I don't know have used this" and that it feels better swapping something with someone who is known personally in some way. Not knowing the history of the items is a recurring issue among the interviewees. The type of items also matters for whether it could be considered for swapping from unknown people that are not friends or family. There are for example difficulties swapping items consisting of textile like clothes or a

sofa which is considered "kinky" ("what if they had lice?"), whereas other "sterile" items such as tables, chairs or bureaus are easier to clean. Judging from these expressions, it appears to be an important factor to be able to clean it as a way of "restoring" the item. Even if it is possible to wash clothes, there is a personal attachment to the textile - "you have a relationship with your sofa and your bed", explaining that "I rather have my nephew's poop on my sofa than a strange nephew's poop".

Three interviewees meant that the economical benefit is one factor that drives them to buy second-hand and four meant that it is economically beneficial mainly due to the purpose the items were going to be used for. The common purpose was that they wanted to buy clothing to reshape for occasions such as "dress up parties".

Online community groups

Joining online social groups, i.e. on various social media such as Facebook, is an occurring alternative activity to get in touch with people in a nearby area who are willing to either trade or receive donated items, as well as ask for a trade for a particular wanted item. Other online options that are used include second-hand e-commerce services such as Ebay (ebay.com) or the Swedish sites Blocket (blocket.se) and Tradera (tradera.com).

The location of the recycling area and surrounding environment (3)

Most of the interviewees have their local recycling and/or waste area outdoors, however the experience of the environment inside and around the areas varies almost to a draw. Some express that it is usually tidy and works well except for a few occasions where it could be messy in the area with stuff lying on the ground. Others express mild to strong opposite opinions. One interviewee said that it can get chaotic and unorganized and meant that one reason could be due to the signs about recycling directions for the bins being unclear which causes confusion and people dumping stuff incorrectly. Another expressed that they "dread going in there", explaining that their recycling room is dark with the lights not switching on immediately, trash on the floor and bins being full.

Regarding the location and distance to their area, one interviewee who had their recycling room in their apartment building commented that it is a "luxury because I have it so close" and therefore "I don't need to go out to the yard or go to a recycling area". Meanwhile, another had a distance of a few kilometers to their recycling area and therefore recycled approximately once a month because they need to drive by car to the location with their waste.

4.4 SWAPPING NEIGHBOR - A HYBRID MOBILE APPLICATION

A prototype of a hybrid mobile application has been developed to demonstrate a way to implement playfulness when swapping or donating pre-used items. The application allows users to draw on their photographed items that they wish to swap or simply donate to give the items a personal and playful touch. Furthermore, there is a possibility to browse through a list of previously submitted items to see if anything of interest is up. The application being hybrid, it takes advantage of having access to mobile device functions by using the mobile camera.

The opening view of the application has three button options to navigate further with: Add items, Browse items, and Claimed items (see Image 26). Their contents and ways of interactivity are described below.
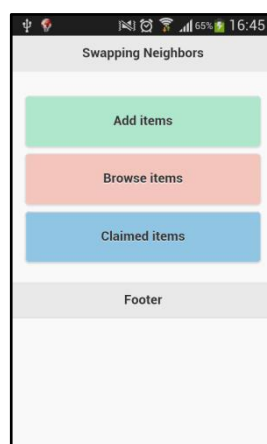

Image 28: Home page view with three options for navigation.

ADD ITEMS – SUBMIT AN ITEM FOR SWAPPING

Three different views will be displayed by proceeding with the "Add items"-button.
They are listed below in order.

1. A view with a button is displayed, prompting to capture a photo. On click, the button activates the device camera.

2. The user is able to draw on the captured photo (see Image 29). Seven buttons for the drawing feature are displayed:
   - Clear (clear the canvas from any drawings),
   - Draw (activate the drawing pen),
   - Eraser (activate the eraser to erase on the drawing),
   - Four colored buttons: Red, Green, Blue and Black, corresponding to the color of the drawing pen that will be activated. Default color is Black.

On the bottom of the view, there is a button for submission – "Save image".

3. The view with a submission form (see Image 30). The form is to be filled out with a title, e-mail and a description of the image. The e-mail will be used to notify the owner about interested people.

BROWSE ITEMS – WHAT IS TO SWAP

Two different views will be displayed by proceeding with the "Browse items"-button.
*They are listed below in order.*

1. A list of the submitted items is displayed to be browsed vertically. The items are listed with the image, title and description, along with a "Grab this!"-button (see Image 31).

2. "Grabbing" an item sends the user to a form view, where e-mail and a short message to the owner of the item are asked to be filled out. This form will be sent to the owner by e-mail. This way, a connection will be created and the two people may go further from there with swapping. Grabbing an item deletes it from this list.

1. An archived list of the previously claimed (i.e. "grabbed") items is displayed (see Image 32). The items are listed similarly to how they are listed in the Browse-list, except without a "Grab this!"-button. Additionally, the images here include a "CLAIMED"-stamp on them to indicate and clarify that they have been claimed.

....
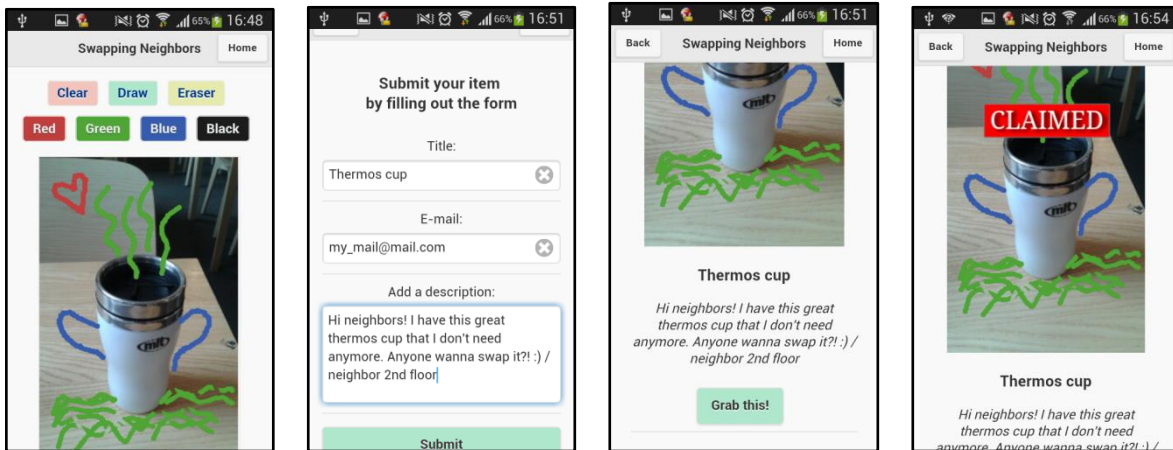
Images from left to right:
Image 29: Drawing view. Image 30: Submission form view.
Image 31: Browse list view. Image 32: Claimed list view.

The main feature of the application includes the playful interactivity of drawing on a photographed image and displaying it to the other users. This application is intended for use by local neighbors in nearby apartment buildings, taking accessibility and availability to the items into consideration. The desired available items should be easily accessible in terms of distance to appeal to the users.

The app is partially designed as an attempt to go through the four principles of interactivity as developed by Polaine (2012). First, the invitation stage which is represented by the home page view (Image X) intends to give a playful visual impression judging by the colorful navigational buttons, referring to the sense of sight. The user is further invited to engage with the app by choosing any of the buttons. Secondly, as the user has been invited, an explorative and curious mindset sets in. At this stage, the user starts interacting and searching for play by capturing an image and discovers the drawing features. At the third stage, the user starts immersing into the

play activity by joyfully drawing on the captured image to alter it freely. The app is experienced to be fun. On to the last stage, the app allows the user to communicate with other participants by publicly displaying the result of the altered image, browsing through other participants' images and sending a message. The user starts to participate actively by connecting to others' contributions and through social networking which keeps the content of the app updated.

5 DISCUSSION

"The true object of all human life is play."

- G.K. Chesterton

5.1 INTRODUCTION TO DISCUSSION

In this study, I propose a suggested mobile application prototype developed for the purpose of attempting to convert the negative reception of an activating into being playful and enjoyable. The activity studied in this case is the management of recyclable and reusable items by neighbors. By observing the field where recycling occurs, a better understanding of the environment in the neighborhoods were gained, making it easier to relate to the describing of those interviewed and their behaviors in the recycling areas. The interviews conducted highlighted a prevailing interest to the subject but also brought forth some issues that both prevented and deterred them from taking further steps and engage in swapping. Below I will discuss the main points realized from the field study and the interviews and their connection to the gathered literature study. Following that, I will come to argue in what ways the suggested mobile application prototype could come to use by taking the results into consideration.

5.2 FIELD STUDY

The recycling areas are generally perceived to be dull and uninspiring spaces. The design of the environment is not intended for creative creation or the exchange of ideas, nor does it offer playful ways for recycling or the management of reusable items. There is a clear single purpose and way of using the recycling area which is to merely sort recyclable waste to the associated container. Play has been described as being an open-ended activity that is fun and pleasurable which makes it an interesting aspect to research in combination with the subject of recycling. Because of the way the environment is designed, the act of recycling is not perceived as a spontaneous, engaging activity and that is mirrored in the non-interactive recycling areas currently

present. Opposite to being dynamic, recycling is static and automatic in the sense that it is repeating the same behavioral patterns each time therefore making it predictable. The recyclers behave in such a way that they are not engaged in mind and function as they did the previous time as per command. Play, though, cannot occur while the activity is predictable. The uncertainty of an activity is what makes for exploratory behaviors that mirror the act of curious play. Furthermore, incorporating interactivity in some form is an essential and a central factor for the concept of play. To play means to engage in an activity and engagement means interaction with or involvement in an activity or an artifact. This in turn raises a wider awareness and reflection towards the activity. In other words, to make recycling a more enjoyable activity it is necessary to integrate certain elements that call for and encourage exploration and interaction. To do so in this case, it is possible to introduce different ways that are unpredictable each time to recycle or swap reusable items.

5.3 INTERVIEWS

There is a great interest and desire for organizing a dedicated swapping space that is convenient and easy to use locally in the neighborhood. Items that are in good condition but are not useful anymore by their owner could come to use by a neighbor with the help of such a space. Although there are some self-organized swapping corners or spaces in apartment buildings established by the residents, there is often a shameful label or feeling put on those who dare take things that others have deserted. However, this feeling is believed to have been derived from a widely known social norm which means that it is frowned upon to take things that others have regarded as waste. Specifically, there is great embarrassment and shame in case you are accidentally found out by neighbors while digging and searching through garbage in recycle bins for reusable items.

There are advantages of swapping with neighbors, such as the convenience of being close by for transportation and economic benefits, as well as the opportunity to foster good relationships with your neighbors. However, although swapping is met with optimism as a first impression and judging from the previous experiences as expressed among the majority of those interviewed, it is not a simple task to undertake when it is

needed. There is an issue to deal with regarding how to issue the notification of a possible swap opportunity to the public. Putting up notes on shared notice boards in the lobby of the apartment building is currently a common approach to reach out for interested neighbors, as well as joining local social media groups to connect with people. The developed prototype is intended for use locally for this reason, as an aid in notifying the neighborhood for an efficient swapping process. Furthermore, the playful touch that is incorporated is intended to support higher engagement and eagerness of the local users.

Despite the optimism of swapping and the positive attitude towards pre-used items, there is a fear present of using such items of an unknown person. It could be a neighbor or other stranger. There is a perception that the items are somehow dirtier or unsafe compared to the items of acquaintances or friends. This indicates that there is a need to know a person on a more personal level and develop a sense of security or bonding.

5.4 APPLICATION PROTOTYPE

Convenience

The application is dynamic in the sense that the produced images are varying and colorful. Even if there is no initial intention of actually swapping, simply browsing through the submissions by the neighbors just for the sake of looking at the images and the drawings because of curiosity makes it interesting and fun. By leisurely browsing through the list of submissions, it may trigger an interest to swap because of the inspirational nature that playful and unique images could give off. It is inspiring as each drawing on every image is unique - no two images appear twice. The possibility to browse through a list of items through an app anyplace supports the need of convenience expressed by the users. Without having to look in the recycling area or the local swapping corner whether someone has thrown something of interest or not, users can see what is available directly through the app. It also allows for efficient communication and connectivity between neighbors through the app and e-mail, with no need to directly get in touch. Moreover, this would eliminate the issue of shame for digging through other people's trash.

Engagement

Engagement with the app can be supported by providing motivational elements that are intrinsic, extrinsic or even both. Motivation is linked to play and integrating possible motivating elements are therefore of use to generate a playful behavior. (Knaving et al., 2013) Specifically it is the intrinsic motivation that is mainly the drive for a playful and enjoyable activity, such as when the user experiences a feeling of satisfaction, pleasure or joy. A combination of both extrinsic and intrinsic motivation could occur from interacting with the app. The extrinsic motivation is based on a separable outcome and in this case it becomes apparent when the user has managed to complete a swapping process. Getting an item of interest should evoke a sense of motivation. The interactive play features of the app is intended to support the concept of a free and fun activity with no specific user requirements (Caillois, 1961) and instead being more user-dependent on how it is perceived. That would give space for playfully experimenting with what is available to the user rather than following a set of instructions, which represents the intrinsic motivation that is sought after. Following the three key factors as described by Knaving et al. (2013) for achieving a fun experience - accomplishment, discovery and bonding with peers - the developed app is intended to create a feeling of accomplishment by allowing the user to generate their own image for display as well as claim others' objects. The user discovers and visualizes new fun ways for displaying their objects by altering and enhancing with digital paint brushes. The images could be completely altered and depending on the user's painting skills, this feature can make for an interesting possibility that it could turn into a digital art gallery by neighbors.

Drawing feature

Free-hand drawing on images creates a personalized and creative environment that could be relatable. It also gives character to the photographs as if giving life to the item, possibly contributing to the users getting new ideas for different ways of using an item making it also a platform for innovation. Being able to relate to the work of a user supports the building of an emotional bridge between the creator and the spectator which promotes good relations between neighbors. Sharing self-created visual content that is visible within a network is an enjoyable experience for both parties, i.e. the

creator and the viewer, as can be observed by the huge recognition and attraction that photo sticker booths have in Japan. Self-creation is a way of being creative and playful, opening up for an exploratory mindset (Lucero et al., 2014). The app may even be used by several people at a time, engaging several into a collaborative activity to capture and draw on an image together. The drawing feature allows for spontaneous enjoyment and impulsive actions with minimal effort. This leads to a collective playful experience while combining technology and photography.

Seeing the several widely used contemporary social media channels such as Facebook (facebook.com), Instagram (instagram.com), Flickr (flickr.com) and Youtube (youtube.com), visual communication, using for example photography or video content, is overall the type of medium that is dominating the popular web content rather than only pure text. Visual communication or imagery is an easily grasped medium and one that is generally relatable by the public, making it a popular sharing medium for immediate and fast effective narration and engagement. Images are said to be a universal language which explains the phenomenon that it is easier to digest.

6 CONCLUSION

"Life must be lived as play."

- Plato

6.1 CONCLUSION

This paper has researched the area of playful design and how it may be used and incorporated in a mobile application to swap reusable goods between neighbors. The use of an organized and dedicated platform for swapping has been realized to be of interest and widely requested judging by all swapping attempts both online and offline in various forms. The currently existing recycling areas are not encouraging or allow for alternative uses in case of reusable items. Neither are they capable of managing the needs of the neighbors and the requirements necessary for a management system of such goods in the current state of the design. There prevails a dilemma on how to deal with items that are perceived to be too wasteful to discard, because they could very well be reused by others. The issue is what possibilities and obstacles there are for building a platform where neighbors can communicate with and notify each other about items available for swapping. Such a platform would also mean it is essential to make the requirements clear for it to be sustainable in the long term. Users in this case request for example local swaps for transportation and time efficiency needs, as well as the option to browse through items in comfort before making a decision.

The recycling environments are currently built for a single purpose without the consideration of the users' perception. It is taken for granted that however it is received, it shall be used by the locals either way. From that viewpoint, it is therefore interpreted as not necessary to put in effort into making it appear to be or used for anything more than it could be, that is, keeping it as it is initially intended for which is a space for recycling household waste. The locals get no space to recycle reusable goods to other locals. It is this matter that I am attempting to expand this environment for it to become useful and multi-functional, starting with a mobile application that takes the first step into an interactive and playful way of recycling.

Defining waste is a subjective matter. What is waste for one may not be waste for another. This is proved by the engagement and dedication that some neighbors have towards making use of the things that others have considered waste, but is still functioning or otherwise may be used for another purpose in other ways. Seeing as how one describe themselves as a "baglady", it is of good grounds that we can understand there is great potential of developing this into something benefitting for the locals, the society and the environment. What better could there be to then also make it a playful experience and make it a natural and fun part of our lifestyle?

6.2 FUTURE RESEARCH

Future research may include the study on the effectiveness of such an app with focus being on the playfulness aspect. Case studies may be conducted on the app at any location to observe the level of enjoyment and engagement from the users. Studies may also be carried out on the app in combination with a fixed, organized location where the items submitted in the app can be collected personally by the interested person. A third alternative is to specify an apartment building as a study object where the residents are willing to test the app for a certain period of time that is necessary to allow for enough time to consider swapping items. This may also be combined either with an established location dedicated for the items to be placed at, or offer for the owners of the items to keep them at their place and instead allow the interested person to come by and pick it up. Through communication between the two, they may agree on a suitable solution.

It is also necessary to conduct further interviews on the views and perceptions of users regarding playfulness but also for a more in-depth understanding of swapping reusable items with unknown people. A drawback with interviews is that the process of conducting and analyzing them is very long. For a smaller project like my thesis, only a few interviews were possible to carry out. (Bell, 2006:158) For a bigger project, preferably more people should be interviewed to receive more in-depth results regarding their needs and motivations for swapping. This also prevents eventual bias made unconsciously during interviews or analysis of the results. (Bell, 2006:167)

An interesting aspect is to study the shaming labels put on those taking and using donated goods for free that are considered as garbage by its original owner. There is an

expressed social norm that does not allow such an action without feeling shame, if it is not paid for in a second-hand store or at flea markets. There is a need to investigate this area and find a solution that can mitigate this complication and inner conflict of those who are willing to use pre-used items but fear to do so in front of others unknown.

There are of course various additional features that may be developed both to enhance the playful aspects as well as the functionality of the app in general, some of which I may suggest. For example:

Apart from an archived list of *claimed* items, it could be of interest to include lists for *pending* and *wanted* items.

As the content of the app grows, i.e. more items are added by the users, the list of items will become very long making it difficult to browse through all of what is available. Therefore, it could be of interest to divide and organize the items by categorizing them based on type. Users will freely be able to choose the type of items based on interest or need at the moment, without having to browse through items that they are not looking for.

For a higher playfulness level, it is possible to implement additional playful elements apart from drawing. For instance, similarly to how photo sticker booths use objects to add to the photographs, implementing draggable image objects that may be dragged into the image frame could be an added fun option to choose.

Currently, the prototype provides communication between the interested and the owner through e-mail. Better communication tools may be offered, such as the use of social media which has the advantage of the user publicizing their swapping habits to their network.

Taking into consideration the environment in which a system is used and the social setting overall could improve the perception and experience of the app itself and the activity it intends to support. A setting in which the surrounding context interacts with the app could promote curiosity to approach. One example tool could be the use of lighting for setting a mood and improve engagement in the app. (Gronbæk et al., 2012) It is therefore of interest to closely study the effectiveness of using the app in fixed settings with various designs.

APPENDIX

Demographics

- Age
- Gender
- Where do you live?
- Sizeof apartment
- How do you live?
    - Inhabitants with you - family, friend, partner
    - Rented or owned apartment
- How long have you lived in your current apartment?
- Occupation - student, worker
- Ask for permission for recording the interview. Inform about the anonymity of the interview. Ask if it is OK to eventually get back for follow-up questions later, and likewise it is OK for them to get back to us for additional thoughts or comments.
- Do you have any comments before we start?

Topic of interest: behaviors in the recycling area

- What do you do with your household waste? *(recycling or not)*
- Do you have a local recycling area/waste room for bulky waste in your neighborhood?
    - How far is it from where you live?
    - How does it look like? (*indoors, outdoors, etc*)
    - How do you get access it? (*eg. key, pin code, open access, etc*)
    - Can you describe the environment in and around it? (*eg. clean, spatial, dark, light, messy, etc*)
- How often do you recycle your waste? (*eg. once a week*)
- Can you describe the process or routine when you recycle and take care of other waste? From how you deal with the waste at home to when you take it to the recycling area.
    - Any motivations for choosing to do it this way?
    - How long does it usually take you to recycle?
    - (if several inhabitants in the apartment) Is anyone responsible for the waste and recycling, motivations? Anychallenges?
- Can you talk about your usual reactions or habits when you happen to meet a neighbor at the recycling area?
- Can you recall a time where you have seen something in the recycling area that someone has thrown, that to you looked clearly functional and reusable?
- Has there been a time where you yourself have thrown something you don't need in the recycling area, but that were functional and reusable?

Topic of interest: attitudes towards swapping goods

- Do you have any interest into something specific that makes you collect it in many quantities?
    - Would you be willing to exchange it for something else?
- Have you ever exchanged things you had in your home with someone else?

Topic of interest: consumption behaviors

- What is your view on second-hand stores or flea markets?
- Have you attended or been part of a flea market?
    - Have you bought or sold anything at a flea market yourself? (*examples of what?*)
    - Can you tell about your latest experience in a flea market?
- Do you have anything in your home that you use less often than once a month?

Topic of interest: relationship between neighbors

- Have you had any conversation with a neighbor?
    - How do you know each other?
    - Can you tell me about the last time you had a conversation?
- Have you ever knocked on a neighbor's door asking for help with something? *(e.g. asking to lend a screwdriver)*
    - Did you know that neighbor from before or "new"/stranger?
    - Can you tell me more about the event?
- Have you visited a neighbor's home?
    - How do you know each other?
    - Can you tell me about your last visit?
- Have you ever experienced something like that yourself, a neighbor knocking on your door?
    - Did you know the neighbor from before?
    - Can you tell me about the event?

Topic of interest: behaviors at home

- How do you spend your time at home during a normal weekday and weekend?

REFERENCES

LITERATURE

Arrasvuori, J. et al., 2011. Applying the PLEX framework in designing for playfulness.*Proceedings of the 2011 Conference on Designing Pleasurable Products and Interfaces - DPPI '11*, pp.1–8.

Bell J (2006) Introduktion till forskningsmetodik. Studentlitteratur.

Benkler, Y., 2002. Coase's Penguin , or , Linux and The Nature of the Firm. *The Yale Law Journal*, 112, pp.369–446.

Berengueres, J. et al., 2013.Gamification of a recycle bin with emoticons.*ACM/IEEE International Conference on Human-Robot Interaction*, pp.83–84.

Botsman R and Rogers R (2010) *What's Mine Is Yours: The Rise of Collaborative Consumption*. New York: HarperBusiness

Caillois R (1961) Man, Play, and Games. University of Illinois Press

Centieiro P, Romão T and Dias AE (2014) Playing with the Environment. In: A. Nijholt ed. *Playful User Interfaces*. Gaming Media and Social Effects. Springer Singapore.47–69.

Chalfen, R. &Murui, M. Print club photography in Japan Visual Sociology, 2001, 16, 55-73.

Charland A and Leroux B (2011) Mobile Application Development: Web vs. Native. Commun.ACM. 54 (5), 49–53.

Costello, B. & Edmonds, E., 2007.A study in play, pleasure and interaction design. *Proceedings of the 2007 conference on Designing pleasurable products and interfaces DPPI 07*, (August), p.76.

Costello, B. & Edmonds, E., 2009.A tool for characterizing the experience of play. *Proceedings of the Sixth Australasian Conference on Interactive Entertainment (IE '09)*, p.10.

Coulton P (2014) Designing Mobile and Ubiquitous Games and Playful Interactions. In: A.

Nijholt ed. *Pl˝ayful User Interfaces*. Gaming Media and Social Effects. Springer Singapore. 71–95.

Dalmasso I, Datta SK, Bonnet C and Nikaein N (2013) Survey, comparison and evaluation of cross platform mobile application development tools. In: *Wireless Communications and Mobile Computing Conference (IWCMC), 2013 9th International*. 323–328.

De Valk L, Rijnbout P, Bekker T, Eggen B, de Graaf M and Schouten B (2012) Designing for playful experiences in open-ended intelligent play environments. In: *IADIS International Conference Games and Entertainment Technologies*. 3–10.

DeKoven B., 2002. The Well-Played Game. Writers Club Press.

Deterding, S. et al., 2011.From game design elements to gamefulness. *Proceedings of the 15th International Academic MindTrek Conference on Envisioning Future Media Environments - MindTrek '11*, pp.9–11.

Fernaeus, Y. et al., 2010. Please enjoy!: workshop on playful experiences in mobile HCI. *Proceedings of the 12th international conference on Human computer interaction with mobile devices and services - MobileHCI '10*, pp.505–508.

Gronbæk, K. et al., 2012. Designing playful interactive installations for urban environments-the swingscape experience. *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 7624 LNCS, pp.230–245.

Hamari, J., 2013. Transforming homo economicus into homo ludens: A field experiment on gamification in a utilitarian peer-to-peer trading service. *Electronic Commerce Research and Applications*, 12(4), pp.236–245.

Huizinga J., 1950. Homo Ludens: A Study of the Play-Element in Culture. Boston: Beacon Press

Knaving, K. &Björk, S., 2013. Designing for fun and play: Exploring possibilities in design for gamification. *Proceedings of the First International Conference on Gameful Design, Research, and Applications - Gamification '13*, pp.131–134.

Lucero, A. et al., 2014. Playful or Gameful? *Interactions*, 21, pp.34–39.

Lucero, A. & Arrasvuori, J., 2010. PLEX Cards : A Source of Inspiration When Designing for Playfulness. *Fun and Games*, 15, pp.28–37.

Mueller FF, Gibbs MR and Vetere F (2014) Designing for Social and Physical Interaction in Exertion Games. In: *PlayfulUser Interfaces*. Springer. 227–251.

Oduor, M., Alahäivälä, T. &Oinas-Kukkonen, H., 2014. Persuasive software design patterns for social influence. *Personal and Ubiquitous Computing*.

Okabe, D. et al., 2006. The social uses of purikura: Photographing, modding, archiving, and sharing. *PICS Workshop, UbiComp*, pp.1–4.

Polaine AJ (2010) Developing a language of interactivity through the theory of play. (PhD thesis)

Rozendaal M, Vermeeren A, Bekker T and de Ridder H (2011) A research framework for playful persuasion based on psychological needs and bodily interaction. In: *Human Behavior Understanding*. Springer.116–123.

Saffer D (2010) *Designing for interaction: creating innovative applications and devices*.2. ed. Berkeley Calif: New Riders Pub.

Stebbins, R. a., 1997. Casual leisure: a conceptual statement. *Leisure Studies*, 16(March 2015), pp.17–25.

Van Beukering A, de Valk L and Bekker T (2014) Wobble: Supporting Social Play through an Open-ended Play Environment. *Creating the Difference*, 91.

ONLINE RESOURCES

Swapping. Means of Exchange, Available: http://www.meansofexchange.com/types-of-exchange/swapping/ (Accessed: 06 March 2015)

Swap-O-Matic, 2013. Available: http://www.swap-o-matic.com/ (accessed: 11 March 2015)

The Fun Theory, Volkswagen, 2009. Available: http://www.thefuntheory.com/ (Accessed: 13 March 2015).

"Skåpet Tage är bra för både miljön och plånboken", Karlstads kommun, 2015. Available: http://karlstad.se/nyheter/2015/mars/skapet-tage-ar-bra-for-bade-miljon-och-planboken/ (Accessed: 25 March 2015)

Reyclebank. Available: https://www.recyclebank.com/ (Accessed: 27 March 2015)

LittleFreeLibrary (2014). Available: http://littlefreelibrary.org/ (Accessed: 29 March 2015)

"Färre sopor ska gå upp i rök" (24 August 2012), Nytt från Öresund. Available: http://nfo.nu/?p=128885 (Accessed: 29 March 2015)

Balsamiq. Available: https://balsamiq.com/ (Accessed: 15 April 2015)

Apache Cordova. Available: https://cordova.apache.org/ (Accessed: 20 April 2015)

jQuery Mobile. Available: https://jquerymobile.com/ (Accessed: 20 April 2015)

Doodle. Available: https://www.doodle.com (Accessed: 20 April 2015)

Pesce M. (1996) Three panels in two days. Available: http://hyperreal.org/~mpesce/tpitd.html (Accessed: 09 May 2015)

About. What Does "Collaborative Consumption" Mean?, Collaborative Consumption. Available: http://www.collaborativeconsumption.com/about/ (Accessed: 15 May 2015).

Sveriges största klädbytardag - 18 april 2015, Naturskyddsföreningen. (13 November 2014) Available: http://www.naturskyddsforeningen.se/nyheter/sveriges-storsta-kladbytardag-18-april-2015 (Accessed: 15 May 2015).

SMU's Klädbytardag, SMU. Available: http://klädbytardag.nu/default.asp (Accessed: 15 May 2015)

About Apache Cordova. Available: http://cordova.apache.org/ (Accessed: 15 May 2015)

Photo Booth. https://en.wikipedia.org/wiki/Photo_booth, 19-08-2015. (Accessed: 21 August 2015)

Photo Booth image. https://upload.wikimedia.org/wikipedia/commons/thumb/b/bf/Purikura_Booth_2.JPG/220px-Purikura_Booth_2.JPG (Accessed: 24 August 2015)

Mobile Life VINN Excellence Centre, www.mobilelifecentre.org

"Homes and cities", Mobile Life. http://mobilelifecentre.org/content/homes-and-cities