

# The Living Area: user studies and concept design

Tricia Rambharose  
M.Sc. Interaction Design student  
Malmö University, Sweden.  
tricia.rambharose@gmail.com

## ABSTRACT

The city of Malmö is involved in Periphèria, an innovation project funded by the European Union, which focuses on the “Stråket” (the path) project that aims to enhance public spaces in the neighbourhood of Rosengård. The work presented in this paper is part of a student group project within the Stråket project and focuses on a specific public space in Rosengård called the ‘activity area’. The aim of this student project was to create a new public meeting place by exploring how technology can be intertwined with traditional ideas to engage social play at this activity area. We focused on young people with the most important target group being young women 16 to 24 years old. Data from user studies was analysed to determine user needs and use qualities, which is the first contribution of this paper. The second contribution of this paper is a novel design concept called a ‘Living Area’. This ‘Living Area’ idea was viewed as the big picture with philosophical meaning and is more theoretical in foundation. For a more practical concept we focused on one possible aspect of the ‘Living Area’ called a “Shadow Play” activity. A simple implementation of “Shadow Play” was made which allowed individuals to ‘play’ with a projection that looked like a shadow; the exception was that this projected shadow frowned when the user did not play with it for a few seconds but smiled again when play resumed. Shadow Play was tested and results showed that people of all ages and gender enjoyed playing with their shadow and said they would definitely like to have an activity like that in the activity area. From these results the main argument of this paper is formed, which is; the Living Area concept and the Shadow Play activity are novel and promising ideas for interactive play in community activity areas.

## Keywords

User studies, living area, use qualities, shadow play.

## 1. INTRODUCTION

Rosengård is a community in Malmö that has become infamous for the number of riots (Jashari, Hallin, Listerborn, & Popoola, 2010) and the creation of public places or activity areas has been found to play a vital role in the social life of communities offering many benefits (Worpole & Knox, 2008). The main problem addressed in this paper is the creation of a new public place, called an ‘activity area’, in Rosengård by exploring how technology can be intertwined with what is familiar and engage play.

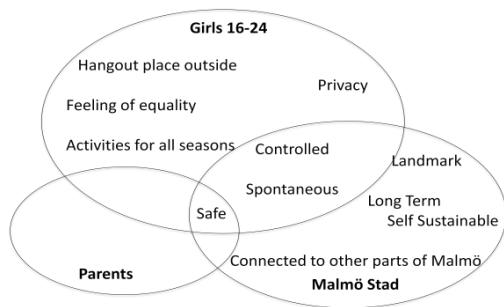
To investigate this problem a 7 week project was given to a group of Interaction Design masters students. There have been many definitions of Interaction Design (Löwgren, 2007), however, the main parts of the Interaction Design process are user studies, concept design and product creation. In this paper we first present the user studies done for this project; the analysis of the findings and then, as a result the concept design, the decisions made and initial prototyping.

In Interaction Design, ethnography has been explored as part of the user studies process as far back as the early 1980’s (Suchman, 1983). For this project, it is clear that the effectiveness of the

activity area depends on the people using it and as such ethnography methods were an important consideration. There are many ethnographic methods (Blomberg & Burrell, 2009). The short time frame for this project allowed no planning of major ethnographic studies. Instead, simpler and shorter term techniques were used. Nevertheless, sufficient data was gathered for analysis which allowed the determination of target users’ needs and their use qualities. Users’ needs are requirements from the users’ perspectives and by analysis of these needs the use qualities are derived and the designers’ perspective is formed. Use qualities are guidelines to the designer in understanding what needs to be done in the process and enable planning of the process in a way that leads to good products (Löwgren & Stolterman, Thoughtful interaction design: A design perspective on information technology, 2004). The target users’ needs and use qualities are presented here and is the first main contribution of this paper and the foundation for the concept design process. In the concept design process of this project several Interaction Design topics were considered including embodied interaction, performing perception, place/space specific computing and democratizing innovation. These technical topics were considered with the main aim in mind of intertwining the familiar and traditional to engage play. Many group brainstorm sessions resulted in a novel concept which forms the second main contribution of this paper to the research field, and the idea for a ‘Living Area’.

## 2. USER STUDIES: NEEDS AND QUALITIES

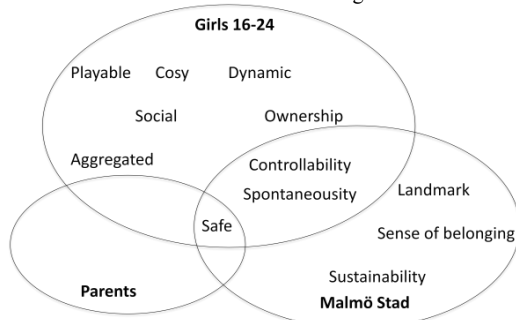
Ideally user studies are done in the data gathering process and then from these results, concepts are made and implemented. In this project, however, direct contact with the target users, girls 16-24, proved to be futile. All the information initially available about the target group was acquired from field work documentation given to us by the stakeholders, Malmö Stad, including interviews and the results of workshops. As the designers, we made great efforts to learn more about the target user group both directly and from different perspectives. Observations were made by regularly visiting the Rosengård activity area and its environs and by using the fly-on-the-wall technique to observe people and locations. Interviews were done with professionals who worked in Rosengård and were also knowledgeable about its history, culture, education and free time activities. We also met at intervals with representatives from the stakeholders in the project, Malmö Stad. Furthermore we held workshops to give us direct contact with the target users; however, they were only possible later in the design process and were used to get feedback on concepts rather than initial data gathering. From this fieldwork we determined there were 3 user groups (1) girls between 16-24 (2) Malmö Stad and (3) the parents of the girls. This paper focuses on group (1) – the girls; however, for future real life implementation, it is important to consider all users. Further analysis of the fieldwork data gave the main needs of the user groups as shown in Figure 1.



**Figure 1: Target users and needs**

It is important to note that the needs shown in Figure 1 are the main ones found based on our work and upon which we chose to focus in this paper. Different terminologies can be used to describe these needs and other needs may also exist. We focused only on the main target user group of girls.

**Hangout place outside:** We learnt that due to the small sizes of most homes in Rosengård, it is usually difficult to have several people over. Young people and young girls in this area, therefore, preferred to meet with friends somewhere outside of their home. **Privacy:** Since privacy at home was not available due to space restrictions, we learnt that while young girls wanted a hangout place outside, they also wanted a certain level of privacy so that they could chat with friends. **Feeling of equality:** Currently in Rosengård, most outdoor activities cater to young boys. In the interviews we learnt that young girls wanted a private place outdoor where they could feel like equals without domination of the area by young men. **Activities for all seasons:** Due to big seasonal and weather changes in Malmö, girls need an activity area that they can rely on and so ensure its use and success. **Safety:** this is a need for all target user groups but especially parents. Young girls' use of an outdoor activity area can be restricted without parental consent and so parents need a safe place for their daughters. **Controlled and Spontaneous events:** Malmö Stad will need to use the activity area for some controlled and planned community events such as markets. Young people also need spontaneous events to enjoy their free time. From the user needs, further analysis was done to derive use qualities and the main ones are shown in Figure 2.



**Figure 2: target users and use qualities**

Similar to the needs, different terminologies and more use qualities can exist. Based on our fieldwork however we present the main use qualities for the girls' user group.

**Playable:** In relation to the need for an outdoor hangout place we learnt that something important to target group of girls is to have fun with friends by 'play'. This included favourite activities such as dancing and singing. **Cosy:** It was also important to the girls to

have a feeling of cosiness in an outdoor meeting area. **Dynamic:** This means adapting to user needs and qualities over time and not remaining static. This is necessary to keep the interest of the target group over time and not only in the beginning. This quality should be integrated in the hangout place and also relates to the need of Malmö Stad for something self-sustainable and long term. **Social:** This relates to the need to feel connected to other parts of Malmö and the girls wanting a place to socialize with friends. **Ownership:** This quality means that the target girls feel, to an extent, that they are the owners of the activity area. This quality is important to motivate the girls to go to and even feel like caretakers of the activity space and it relates to the need for equality and, in some ways, safety. **Aggregated:** this means that the activity area itself and also the activities within are a collective representation of the target users and not of a particular group or individual. This feeling of collectivity relates to the need for equality and connectedness. **Safe, controllability and spontaneous** are self-explanatory as they are the feelings related directly to the needs stated.

The user needs and use qualities we present here are the first contribution of this paper to the field of research because it forms a framework or guideline for future design projects focusing on young girls in Rosengård.

### 3. CONCEPT DESIGN: THE LIVING AREA

Based on the defined user needs and use qualities, one main concept for further development, called the 'Living Area', was selected. Inspirations for the Living Area concept came from (1) "fühlometer" ('feel-o-meter') that uses smile detection in a physical location to reflect a mood via a large smiley face sculpture (Wilhelmer, von Bismarck, & Maus, 2008) and (2) a mood-reading billboard for advertising called Jell-O's 'Pudding Face' which uses online input via Twitter to make a face on the ad smile or frown (huffingtonpost, 2011). From these inspirations, the mood of people either in a physical location or through online interaction is combined to output a facial expression that represents a collective mood. In this novel concept, the idea of something being alive and feeling moods is intertwined with the idea of creating interaction with and in the activity area using new technology. Furthermore, the Living Area provokes a philosophical approach of designing a public area as a living organism. One traditional metaphor for this idea is the digital pet game 'Tamagotchi' which was successful in giving a digital object "life" and forming attachments with the user.

At this stage in the design process a workshop was conducted with Radio RGRA. This workshop focused on getting feedback about users' interest in affecting the mood of a place as well as the impact of the mood of a place on users. A card sorting technique was used and pictures of the abovementioned inspirations presented. Results validated users' interest in the Living Area concept.

#### 3.1 Living Area Inputs

The inputs of this Living Area concept include both digital and physical factors. Physical inputs refer to a combination of physical interactions with or physical presence in the activity area. Examples of physical inputs include statistics of physical and online visits to the activity area over time and other forms of mood/face/voice detection of users in the area. In traditional terms people's physical presence and activity in a place affects both the mood of the individual and others present. The Living Area concept provokes thoughts on translating this familiar experience to the mood of a specific place. This raises the question of

whether people determine the mood of a place or if the mood of a place determines the people present. Digital inputs refer to online interactions with or an online presence in the activity area. Digital inputs include interactions with representations of the activity area in social media such as a Facebook page; also online searches and website hits about the activity area and possibly even some form of smart phone app for information about and mobile access to the activity area. The options for digital inputs are varied and have not been developed further in this paper but are important considerations. By digital inputs, persons who cannot be physically present in the activity area can still affect the mood of the area.

### 3.2 Living Area Outputs

The outputs of the Living Area can be viewed as subtle or explicit. Explicit outputs refer to direct and obvious indications of the mood of the living area. Examples of explicit outputs include statistics related to the Living Area such as the number of physical visits and online hits; digital displays that show a distinct mood such as a smile or even music and tones played in the park or online that is already synonymous with a feeling. This relates to the field of music and mood (Murrock & Clark, 2005). The idea of the mood of a place is not traditional and no previous work was found on the mood of a public activity area. The explicit output is therefore important to bring the idea across effectively and obviously to the users. Subtle outputs refer to indications of the mood of the activity area that are not as obvious and more subjective in nature. Subtle ways to indicate and affect mood has foundations in other fields such as colour therapy (Wills, 1993) and light therapy for mood enhancements (Golden, et al., 2005). This is also intertwined with traditional subtle indications of mood such as the colour variations of a mood ring. Subtle output is important in order to not bombard users with only explicit forms of output and allow some user subjectivity and room for their own interpretations.

### 3.3 Living Area Applications with focus on ‘Shadow Play’

The previous sections show that both inputs and outputs of the Living Area cover a wide range of possibilities and need for further development. Due to the short time frame for this project it was not possible to consider all combinations and developments of inputs and outputs. It was decided therefore to choose a sub-concept to our main Living Area concept for further development, define its input and output, and show how it can be used to represent and affect the mood of an area. The Shadow Play sub-concept was chosen; it is based on the traditional play with a shadow but intertwined with the use qualities defined and implemented using new technology to form a digitally playable shadow. This digital shadow represents the mood and life of the Living Area itself. Related previous work on shadows for play is shadow monsters (Worthington, 2005) which found that the traditional shadow with which everyone is already familiar can be combined with new technology to generate playfulness and enjoyment.

#### 3.3.1 How Shadow Play works

How the shadow works in practice is that it will always exist in a specific area in the activity area. Technically, it can be a digital projection on a wall or digital screen. For safety, equipment in the construction of the Shadow Play should not be easily broken or stolen. The idea is that when someone is not playing with the shadow its mood will take the form of the aggregated mood of the Living Area. When someone plays with the shadow they will see this digitally modified shadow following their bodily movements

like their real shadow; however, other aspects of the shadow will reflect, not the user’s mood, but rather the mood of the living area.

#### 3.3.2 Shadow Play inputs

The inputs to the Shadow Play are classified as either instant or aggregated as illustrated in Table 1. Instant inputs are taken directly from the user(s) playing with the shadow at a specific point in time. Examples of instant inputs are the number of users playing with the shadow, the size and shape of the user and the users’ body movements. Aggregated inputs refer to a combination of input factors from users interacting with the activity area both physically and digitally and over a period of time and related to the Living Area inputs. Aggregated inputs are important to Shadow Play so that the shadow will be a reflection of not just one user and so it relates to the use quality of equality and aggregation.

	Instant	Aggregated
Digital		<ul style="list-style-type: none"> <li>• Browser search hits</li> <li>• Social Media interactions</li> </ul>
Physical	<ul style="list-style-type: none"> <li>• Number of users</li> <li>• Facial expressions</li> <li>• User’s height</li> <li>• User’s body movements</li> </ul>	<ul style="list-style-type: none"> <li>• Statistics related to Living Area</li> <li>• Seasons</li> <li>• Weather</li> <li>• Time of day</li> </ul>

Table 1: Shadow Play inputs

#### 3.3.3 Shadow Play outputs

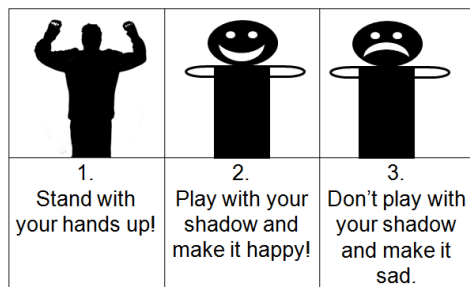
The outputs of Shadow Play can be broadly classified as either instant or aggregated and each of these further divided into subtle or explicit. Instant output is direct output given to a user based on their instant input. Instant output is important because it is the current user’s direct interaction with the activity and the user will have some expectations of response from the shadow. Examples of instant output include change in the size and shape of the shadow and body movements of the shadow.

Subtle and explicit instant outputs are connected to the Living Area output categorization. When applied to the shadow, instant explicit outputs are the body movements of the digital shadow and instant subtle outputs are the less obvious changes in the mood and attitude of the shadow as the user interacts with it. For example, more user interaction with the shadow makes the shadow happier. Aggregated output of Shadow Play is the same idea as aggregated output of the Living Area. The aggregated output is shown more in the facial expression of the digital shadow. The facial expression should be exaggerated, having human properties, but not be too human according to the concept of the uncanny valley (Mori, 1970) which states that too much resemblance to a human form can actually be repulsive. Other possible outputs like lights and sounds or music could emphasize moods and make a unified experience of the Living Area combined with the shadow. Dance can also be integrated into Shadow Play by provoking the user to follow the shadow in dance moves for more playfulness. This paper, however, presents the initial concepts and future work will be done on advancements.

### 3.4 Initial prototype creation and testing

Shadow Play itself has many opportunities and areas for development. Our initial prototype aimed at concept validation based on the target use qualities. An initial prototype was created that considered only instant physical input from a single user and which gave only instant output. Testing of aggregated inputs was not possible as it would require more time than allowed in this project. Implementation was done using processing and Microsoft

Kinect. The prototyped digital shadow was made to mimic the users' body movements; however, the facial expression was used to show a mood by showing a frown if not played with for 5 seconds and a smile otherwise. We tested the Shadow Play concept at a Christmas market in Rosengård with an audience comprising primarily of the target user group upon which we focused (girls 16-24) but also people from the other two user groups and all parts of Malmö. For the set up on that day we used a simple portable projector connected to a laptop running Processing and MS Kinect. Instructions were printed both in English and Swedish. The English version is shown in Figure 3.



**Figure 3: Instructions for Shadow Play**

Approximately 30 people of all ages, gender and cultural backgrounds interacted with the Shadow Play prototype in over three hours duration in total. Each person was allowed to freely play with their digital shadow and then they were asked a few questions about this interactive experience. From observations, Shadow Play was intuitive, natural and familiar to everyone. No explanations were required. We found that people tended to make facial expression in the hope that their digital shadow would mimic this. In most instances users danced with their digital shadow. Overall everyone was observed to have fun playing with their shadow and confirmed this in the discussion after. Everyone said the shadow activity is something they will like to have in the activity area and a game they will enjoy playing with their friends. Unexpected findings were observed when two girls of each less than 8 years old also found the activity very fun and even understood the basic concept of mood behind it. Furthermore, the music present at the market was observed to encourage everyone to dance with their digital shadow. For further validation of these results at this point, the second workshop was held with some girls in Rosengård to get more detailed, direct and individual feedback. This workshop entailed mainly informal discussions and showed favourable feedback on Shadow Play.

#### 4. CONCLUSIONS AND FUTURE WORK

The main problem addressed in this paper is concept design for a proposed activity area in Rosengård by intertwining traditions with technology for interactive play and focusing on girls between 16-24 years old. We focus on the user studies and concept design process of this interaction design project. From the user studies, main contributions were made by definition of target users' needs and use qualities. Based on this, the second main contribution is made by presentation of the philosophical Living Area concept and the more practical 'Shadow Play' activity. An initial prototype of the Shadow Play was created and tested and results found that it was very playable, social (since friends enjoyed observing their peers in this activity) and spontaneous (since the

shadows' movements were left open to the user. These results support the main argument of this paper, that the concepts presented here are novel and promising ideas for interactive play in activity areas. Main lessons learnt for further work were (1) Shadow Play is fun for everyone but should be modified to attract specifically and especially the target group of girls and (2) To improve playability and familiarity with the shadow, variations on the appearance of the projected shadow need to be investigated such as inclusion of the shadows' legs and other body forms. Future work additionally involves more advanced prototyping of the Shadow Activity to include all input and output options already defined.

#### 5. ACKNOWLEDGMENTS

The author acknowledges the hard work of the other group members in this interaction design student project, the support of Malmö Stad., and the help and support of staff at the Arts and Communication department of Malmö University both for project work and writing of this paper.

#### 6. REFERENCES

- [1] Blomberg, J., & Burrell, M. 2009. An ethnographic approach to design. *Human-computer interaction: Development process*, 71-94.
- [2] Golden, R. N., Gaynes, B. N., Ekstrom, R. D., Hamer, R. M., Jacobsen, F. M., Suppes, T., et al. 2005. *American Journal of Psychiatry*, 162 (4), 656-662.
- [3] huffingtonpost. (2011, 3 8). *Mood-Reading Billboard: Jell-O's 'Pudding Face' Ad In New York City Smiles Or Frowns Based On Twitter Emoticons*. Retrieved 01 15, 2012, from huffingtonpost: [http://www.huffingtonpost.com/2011/08/03/mood-reading-billboard-jell-o\\_n\\_917475.html#s321731&title=JellO](http://www.huffingtonpost.com/2011/08/03/mood-reading-billboard-jell-o_n_917475.html#s321731&title=JellO)
- [4] Jashari, A., Hallin, P. O., Listerborn, C., & Popoola, M. 2010. Det är inte stenarna som gör ont. *Röster om konflikter och erkännande från Herrgården, Rosengård, Mapius, Malmö högskola*.
- [5] Löwgren, J. 2007. Inspirational patterns for embodied interaction. *Knowledge, Technology & Policy*, 20 (3), 165-17.
- [6] Löwgren, J., & Stolterman, E. 2004. *Thoughtful interaction design: A design perspective on information technology*. The MIT press.
- [7] Mori, M. 1970. The uncanny valley. *Energy*, 7 (4), 33-35.
- [8] Murrock, C. J., & Clark, A. V. (2005). Music and mood. *Nova Science*.
- [9] Suchman, L. A. 1983. Office procedure as practical action: models of work and system design. *ACM Transactions on Information Systems (TOIS)*, 1 (4), 320-328.
- [10] Wilhelm, R., von Bismarck, J., & Maus, B. 2008. *Stimmungsgasometer*. Retrieved January 15, 2012, from Stimmungsgasometer: <http://xn--fhloimeter-q9a.de/>
- [11] Wills, P. 1993. *Colour Therapy: The Use of Colour in Healing*. Element (Shaftesbury, Dorset, Eng. and Rockport, MA).
- [12] Worpole, K., & Knox, K. 2008. *The social value of public spaces*. Joseph Rowntree Foundation.
- [13] Worthington, P. 2005. Shadow monsters. *The Show: Two-Like Nowhere Else*.