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Exchanging Touristic Information between City Tourists

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Abstract: This technical note is based on Bram Braat's final project as a Industrial Design student at the Eindhoven University of Technology. The project was conducted at the User Experiences group in the context of the Hospitality project.
The goal of this student project was to design a product or system that creates social interaction between people in a (semi-)public place. In this case to let tourists exchange experiences with each other in a hotel lobby.
Tourist carry a lot of touristic experiences, for example information about nice restaurants, bars, best visiting times of museums, current events, unknown sights etc. Currently there is not much exchange of this information while advice of other tourists appeared to be given more value than information by guiders or the tourist information.
Based on this, a literature review towards social interaction in public places and an analysis of the context several concepts were created for systems that would enable social interaction between tourists.
Throughout an iterative process these concepts were evaluated and developed using scenarios and experiential prototypes. This iterative process had a high user involvement with several user evaluations. This resulted in a final concept called the CityTIP system, where TIP stands for: 'Tourist Inspiring Pictures'.
This system enables tourists to share their touristic photos with other guests as well gives them inspiration for exploring the city. The CityTIP system has been evaluated in a lab test to investigate the social interaction and general acceptance of the system.

Based on these results a setup for further research is proposed, a setup for a more extensive lab test and a setup for a field test in a hotel lobby of a real hotel.

Contents

1. Introduction

The main starting point of this project is my own interest. In the past years I developed myself as a research-oriented designer, especially towards a research-through-design approach. One of the main topics I find interesting is 'Social Interaction'. In some previous projects I dealt with this in several ways, for example focusing on social interaction within families or on social interaction effects on engagement (Rozendaal, 2008). During one of these projects I came across a PhD thesis by Martin Ludvigsen called 'Designing for Social Interaction', which focused on designing for social interactions in public environments. This immediately grabbed my interest and seemed like an interesting area to design for.

So, in this project the focus is on designing for social interactions in public spaces. The main goal of the project is to design a product or system that creates social interactions between people in the same physical environment, focusing on a semi-public space. There are many contexts you can think of: e.g. museums, libraries, movie theatres, waiting rooms are all semi-public places. In this project however the focus will be on a Hotel Lobby.

The project is conducted at the User Experiences Group of Philips Research at the High Tech Campus in Eindhoven. The project is done within the theme of Hospitality. Hospitality focuses on making people feel at home in a context away from home, which currently focuses on hospitality within hotel environments. Within this theme several different projects are conducted for the hotel environment, this creates an expertise in this field which makes Philips Research an ideal place to perform this project, although currently there are not many projects focussing on social interaction within this theme. There was a project by Bullens (2008) which focused on social interactions in hotel lobbies like this project, but it focused more on social interaction in general, while this project focuses more on the exchange of touristic information.

My personal motivation to do this project at Philips is first to work in a professional environment as an important step towards my graduation. Next to that I wanted to work within a group of people with a certain expertise about the same subject; therefore the user experiences group is an interesting place for me and this project.

This thesis starts with a short theoretical background for social interaction, based on that the project goal is defined in chapter 3. This is followed by an analysis of the context and user and the concept development phase. In chapter 6 this final concept is explained in more detail and in chapter 7 and 8 you can read about the user test with the prototype and the conclusions and recommendations following this user test.

2. Social Interaction

As said in the introduction, this project is about creating social interaction between people in a (semi-)public place. Therefore this chapter discusses some different notions and different theories about social interaction which formed the theoretical background of this thesis.

2.1. What is Social Interaction?

Social interaction can be defined as *'two or more people interacting with and influencing each other either in real time or over time'* (Drost 1996). Interaction in real time is e.g. a telephone conversation or a face to face chat, while over time could be a letter correspondence or e-mail. During social interaction the users have a mutual orientation, both are aware of their subjective orientation towards each other and they respond to each other according to the actions of the other.
Although social interaction might seem quite familiar to communication there is a difference. As stated by Drost (1996), communication appears when two persons are connected and a message is sent from one person to another. Communication becomes interaction when the messages of these two persons influence each other.

2.2. Why Design for Social Interaction?

To answer this question Erickson and Kellogg (2002) state that *'As humans, were are fundamentally social creatures.'* We are very focused on other people and the interaction with them, but in interaction with digitally-mediated interaction this changes. *'The subtle social cues that we use to guide and structure our real world interactions are mostly absent. In the digital world we are socially blind, and our attempt to communicate can be awkward and labor-intensive.'* (Erickson and Kellogg 2002)
As stated by Ludvigsen (2006), most of the design research and commercial products that are focusing on social mechanics, are focusing mostly on distributed social interactions (e.g. CSCW), but less on co-located social interactions.
'*The physical aspect of human sociality is not yet fully explored even if we have been fine-tuning these abilities in millennia. Desktop and laptop computers present in most workplaces and homes are inherently single-user interfaces and might connect single users across the globe, but they are unfittingly designed for the sensitive and complex social situations of physical and co-located social interaction.'* (Ludvigsen 2006)

2.3. Social interaction in Public Places

The focus in this particular project is especially on social interactions within public places or semi-public places. In the 1950's Goffman (1963) conducted several studies to human behaviour in public places. This resulted in observations of the human behaviour which are still applicable on today's situations. Goffman talks about different types of social interactions within public places, varying from unfocused to focused interactions

within co-present situations.
Goffman defines co-presence as the minimal level of social interaction; if two or more individuals are aware of the presence of someone else and their accessibility to approach them (e.g. trains, waiting rooms and shops). Within these co-presence situations, Goffman identifies two different types of social interactions, unfocused interaction, when individuals are communicating signals but not to other individuals in particular, especially non-verbal signals, while in focused interaction individuals have a single (shared) focus of attention, especially conversations. (Goffman 1963, Gahagan 1984, Murphy 2001)
In public places, however the shift between these different types of social interactions requires some rules. Goffman has three layers in the public place for social interaction; each of them can create possibilities and rules for (the shift in) social interaction; the occasion, the situation and the encounter.
The occasion is the main reason why people are gathered together, a social event (classical concert, wedding, shopping street etc.) each of these situations has his own general rules about general behaviour. The next step is the situations which is 'the specific manifestation of the occasion' (Ludvigsen 2006), this can be described as the general level of social interaction and behaviour linked to that, Goffman describes the situation as 'an environment of communication possibilities', the general rules apply to how to behave towards other people in this situation.
The final step is the encounter (or face-to face engagement) in which (two or more) people are in a focused interaction, situations can contain many of these encounters, these encounters have also some general rules about conduct. To start such an encounter you can in say that in general unacquainted people require a reason to enter into a face-to-face engagement in public spaces (in contrast to acquainted people, who have a reason not to do so). (Goffman 1963).

2.4. Physical Co-located Social Computing

Ludvigsen (2006) takes the rules of social interaction by Goffman one step further and talks about different types of social interaction depending on the level of engagement in the interaction between people in public places. This framework (Figure 1) is based on observations of the iFloor an interactive floor stimulating community interaction between collocated people in the main hall of a city library.

The framework is designed to "enable designers to talk about what kind of social interaction is aimed for with a design, based on what type of social interaction space is already present in the context or occasion."
The first level of the framework is described as distributed attention where people are co-present in the same space but have different foci in the area. This could be for example, trains, markets, cafés etc.
If people are focussing on the same thing in the environment there is a next level of social engagement called shared focus. This defines a centre and audience in the environment e.g. theatres, concerts, churches.
The third level is dialogue where people start to have direct two-way communication with each other compared to the one-way communication in shared focus. 'This means

that at the dialogue level each participant is engaging in a shared activity that requires some form of situated engagement with a counterpart and accessibility to the counterparts situations.' (Ludvigsen 2006)
The final level is that of collective action, in which 'the participants work together towards a shared goal within the same activity… In this case the focus of attention is outside the interaction and situation itself towards a shared third subject matter.' (Ludvigsen 2006). An example of this is the iFloor by Ludvisgsen in which people have to work together to control a cursors.
To describe the change of level of social interaction in the framework there is the notion of situational interaction mobility this is a guideline for designers and describes change of level of engagement in social interactions and how tight the framing of the concept or product should be compared to the goal of the designer.

Figure 1: Framework describing types of social interaction in public places (Ludvigsen 2006)

Closely connected to this notion of collective action is the term of interdependence, which is the extent to which participants are mutually dependent upon each other to reach a goal (Stangor 2004) it involves the need to work together to successfully accomplish a task, which is especially interesting for gameplay interactions (Rozendaal 2008).

Finally there is the notion of common ground by Clark (1996), in which he states that for people to social interaction successful they need to have a "set of knowledge, beliefs and suppositions that they believe they share." (Clark 1996). This common ground can be a catalyst for social interaction, both for acquainted persons as for unacquainted.

3. Project Goal

The main goal of the project is to design a product or system that creates social interaction between people in the same physical environment focussing on a (semi-)public space.
This project is focused on a specific context, for this context a hotel lobby is chosen. The hotel lobby is a place where different people are gathered together within the same physical environment, therefore an interesting place for social interaction. Next to that it connects to the research currently done by Philips Research towards the Hospitality domain and the focus on Hotel environments.
The goal in this hotel lobby is to let people exchange experiences with each other through dialogue or collective action. This should be done through a system or product within the hotel lobby, where this system is a catalyst for social interaction.

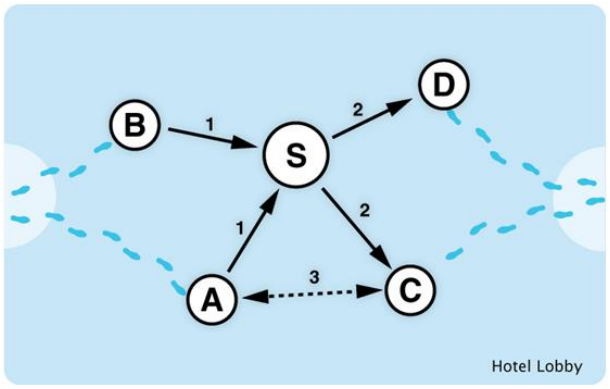

Figure 2: How the system should create social interaction

This is best explained by the scheme in figure 2. Person A and B both arrive back at the hotel from a touristic day in the city, they carry certain experiences of that day with them. These experiences could be about restaurants, museums, current events etc. and could carry valuable information for other tourists (e.g. best visiting times, restaurant reviews, positive and negative experiences), first hand experiences that go beyond the normal travel guides. These persons send (1) there information to the system (S). This could be voluntary or unintentional, this information is then again shown using the system(2) to the other persons in the lobby (C and D) who are triggered by this information and could start talking to the other people to get more information about these experiences as happens in the figure between person A and C(3).

This leads to several subgoals; how to send information from a person to the system(1) including issues about if it is voluntary, what kind of information, how it is leaked and how detailed the information is. How this information should be made visible (2) including issues how public or personal it is and what kind of visual clues are being used and finally how this information triggers social interaction between people (3) including issues involving language and approachability. Ideally for the social interaction the system should be a walk-up-and-use interface (Ludvigsen 2006), which means that there is a low threshold to start interacting with the system.

4. Context

As a context of this project a hotel lobby is chosen, the hotel lobby is a place where different people are gathered together within the same physical environment. Therefore it is an interesting place for social interaction; in this case the social interaction will be provoked through the exchange of touristic experiences, between tourists themselves through a certain product or system. The lobby is accessible to every citizen, but is generally used by hotel guests and has some more rules applied then general public places (streets, squares, parks etc) so therefore it is a semi-public place. The focus in this project is especially on city tourism. As city for the user inquiry and tourist profile Amsterdam is chosen, because it is the most touristic city in the Netherlands, therefore easily accessible and one of the more popular destinations in Europe.

4.1. Touristic Information

There are many different ways tourists can gather touristic information: brochures, city guides (Lonely Planet, Capitol Guides), websites, friends etc. These sources of information are widely used, internet is currently the most popular medium, '*more than half of the visitors of Amsterdam used the Internet to prepare their trip, almost one in five used a travel guide and one in six used information provided by friends and relatives'* (ATCB 2008).
What most of these media lack is the amount of personal touristic experiences (except from friends and relatives of course) with information about e.g. nice restaurants, bars, best visiting times for museums, current events etc. So this study focuses on a product facilitating this exchange of touristic information.
Currently there are some web 2.0 websites trying to provide this user generated information, Tripwolf (tripwolf.com), Spotted by Locals (spottedbylocals.com) and Geckogo (geckogo.com) are some examples, but they all lack the direct social interaction which is the key of this project.

4.2. City Tourist Profile Amsterdam

In 2008 the Amsterdam Tourism & Convention Board created a visitors profile of Amsterdam based on visitor research. They created 4 profiles of Amsterdam tourists, a profile about a same-day leisure visitor, leisure traveller, same-day business visitor and a business traveller. Because this study is focussing on hotels and touristic activities, the main user is the leisure traveller.
According to the ATCB the average leisure traveller is '*a foreign man or woman in his/her late 30s and he or she visits the city with two or three persons. In average he/she stays four nights in the city and stays in a 3-star hotel. (...) During the stay walks around the city, goes to cafés, dines out, goes shopping, tours the canals and visits more than two museums. He/she needs searches for more touristic information during their stay.*'

One-third of the visitors is between 21 and 30 (Table 1) and two-third of all tourists stay

in a hotel (Table 2). Business guests prefer to stay in a 4- and 5- star hotel (49%) or in a 3 star hotel (40%) while leisure guests prefer 3-star hotels (47%).

Age	Percentage	Total
0-20	4.7%	4.7%
21-30	32.3%	37.0%
31-40	17.9%	54,9%
41-50	16.9%	71.8%
51-60	15.2%	77.0%
60+	13.0%	100%

Table 1: Visitors profile per age category (in %) (ATCB, 2008)

Accomodation	General	Business	Leisure
Hotel	64%	92%	60%
Youth Hostel	18%		20%
Bed & breakfast	1%		
Pension	1%		
Ferry boat	1%		
Other	1%		

Table 2: Accomodation in Amsterdam (in %) (ATCB, 2008)

During the stay itself 68% of the Amsterdam tourists still look for information (ATCB 2008) in general this information is provided through leaflets, tourist offices and hotel employees (Table 3). They in general make their plans in the evening for what they want to do the next day, although some prefer to do it in the morning during breakfast.

Information	Percentage
Internet	52.7%
Travel books	18.5%
Friends and relatives	16.4%
Travel Agency	3.8%
Magazines	2.9%
Travel Agency Brochures	2.9%
Other	10.6%
No information	26.3%

Table 3: Sources of information before visit (in %) (ATCB, 2009)

4.3. Context and User Inquiry

In an inquiry several receptionists of different hotels (two hostels, one 2-star hotel, four 3-star hotels, one 4-star hotel and one 5-star hotel) in Amsterdam were interviewed about their experiences with providing touristic information. In Appendix A a list of these hotels can be found. It turned out that the receptionist in general gets many questions about touristic information, especially information about locations, opening hours of museums, nice clubs, nice restaurants but sometimes also information about gyms and supermarkets. An interesting remark here is that some of the hotels get commission from restaurants or bars if they send people there.
Besides asking information from the receptionist, the leaflet stands and especially

MiniCards stands are very popular.
In general the receptionists saw no direct social interaction between different visitors, but sometimes guests join conversations between receptionists and other guests if they have some information from experiences.
Next to the receptionists also several tourists were interviewed about their experiences, in general they also didn't have much exchange of information with other tourists, only if they sometimes came across tourists from the same country or region. But then they quite liked the tips they got from the other tourists. Brown and Chalmers (2003) conducted ethnographic studies to city tourists and came to the conclusion that the advice of other tourists was given more value then information by guides or the tourist information.
In general backpackers have more social interaction with each other then other tourists, but as stated by Murphy (2001) *'…social interaction and meeting others is an integral part of the backpacking experience, and this plays an important role in the passing on of information.'* But in general the other tourists live in their individual bubble (Thackahara 2005) without many focused social interactions with other tourists.

4.4. Hotel Lobby

During inquiry also the interior of the different hotel lobbies were analyzed. The interior of a hotel lobby is roughly the same for each hotel (Figure 4), there is a desk with a receptionist, some benches and tables for relaxation and several leaflet stands. Sometimes the hotel restaurant is embedded in the lobby or there is a small bar. There is a slight difference between hotel-chain hotels and other hotels, where the hotel-chain hotels have often a more 'formal' interior; this can especially be seen in the placement of the touristic brochures; in hotel-chain hotels they are often more stuffed away in the corner. In the hotel lobby there is currently not that much room social interaction, because it is more a enter and exit area then a place where people some more time, this is different if there is a bar or a restaurant included in the hotel lobby.

*Figure 4: Pictures of different hotel lobbies in Amsterdam, from left to right: Stayokay Stadsdoelen (Hostel), NH Doelen****, Stayokay Voindelpark (Hostel), Acro Hotel***

A very different lobby compared to the others is the CitizenM hotel (Figure 5), this hotel focuses on 'the mobile citizen of the world' and the hotel lobby is a place for work, food and relaxation. This hotel is working towards a more multifunctional hotel lobby, rather then just a passageway. It is a very large area, only divided with some bookcases as room

dividers; there is a place with computers, some benches, a meeting area and a large cafeteria (canteenM) which opens at night as a bar. Because it is a space with several functionalities it is a place open for social interaction especially through the interior.
During a visit to this hotel one of the employees told that the lobby is especially used by guests in the morning (breakfast), at the end of the afternoon (diner) and at night (relaxation).
Currently there are two CitizenM hotels, one in Schiphol and one just outside the Centre of Amsterdam, soon there will be third one in the city centre of Glasgow and other locations will follow soon.

Figure 5: Pictures CitizenM Lobby

4.5. Related work and products

In the recent years there have been a lot of different innovations towards services for tourists and hotels, both in studies as in commercial products. In this part a couple of these products and services are discussed to create a feeling of what has been done in this field.

4.5.1. Examples in Literature

Brown and Chalmers (2003) describe 3 types of tourist technologies: “systems that explicitly support how tourists co-ordinate, electronic guidebooks and maps, and electronic tour guide applications.” Within these fields there are several examples in literature especially towards mobile information systems, for example the Lancaster GUIDE system (Cheverst et al., 2000) an electronic guide that provides touristic information based on your position in the city or comparable systems as Cyberguide (Abowd et al., 1997).
Another interesting concept is The Cube (Galloway et al., 2003), a dice with an interactive screen attached. After The Cube is rolled it displays a slightly ambiguous image from the city. This provokes the users to ask locals or other tourists to find out what it might be.

4.5.2. Web based Travel Guides

As said currently there are several web 2.0-based websites trying to provide user generated travel information, or even personalized information. A several examples of this are the websites Tripwolf (www.tripwolf.com), Offbeat Guides (www.offbeatguides.com) and traveldk (www.traveldk.com), on these websites you can create your own personal-

ized travel guide for you to print out. Some of these website (e.g. Tripolf) have also the opportunity to give reviews and ratings on certain sights or restaurants.
Next to that there are several websites especially focused on reviews and tips, like geckogo.com, spottedbylocals.com and ifeellondon.com. These websites give you traveltips created by other users (geckogo.com) locals (spottedbylocals.com) or based on your mood (ifeellondon.com).

4.5.3. GoBoard

In 2008 the Courtyard Marriott Hotel installed the GoBoard™ in their hotel lobby. The GoBoard is an interactive screen in the lobby showing information about the city, like news, weather, financial news, events etc. It should help you familiarize with this new city. It also includes a map function, for locations and routes to restaurants, malls etc.

4.5.4. NYC Tourist Centre

In January 2009 a new tourist information centre in New York City was opened which contained several Google Maps-powered interactive tables. With this you can browse through different touristic activities or places which can be stored on coasters. These coasters can then be used on several wall-mounted screens for a virtual tour.

4.5.5. Microsoft Surface at Sheraton Hotel

The Sheraton Hotels in the US have a Microsoft Surface in the hotel lobby which includes a map, a virtual concierge (for finding restaurants) and a possibility to create music playlist. With this surface you can interact and create a plan for the day.

4.6. Conclusions

In this chapter an overview of the context and user was sketched, in this part this is summarized into a profile of the target group and the desired environment of the system.

4.6.1. Target Group

As a target group city tourists are chosen, especially focussing on leisure tourist, although "since tourism can be part of business travel, the boundary between work and leisure is often blurred." (Brown and Chalmers, 2003). Because based on the investigation of ATCB most of the city tourists are below 40, the target group focusing on are tourists between 20 and 40. This is still a very general group, but it gives certain guidelines during the process.

4.6.2. Context

The context focuses on especially 3-star hotels (and lower) because most tourists stay in these kinds of hotels according to ATCB, where 4 and 5-star hotels have general more business guests. The lobby environment of the system should be a more social kind of lobby as e.g. the CitizenM lobby, were the lobby is not only be a passageway but also a place to stay for a longer time, with a bar and places to relax.

5. Concept Development

In this chapter the process of the concept development is explained. For this process an iterative process was used with the focus on a user centred approach. This process included several stages of user involvement for evaluation and idea generation, after two iterations this resulted in a final concept which is explained in the next chapter.

5.1. Concept Aspects

As said the goal in this project is to create a product or system that enables tourist to exchange touristic experiences in the hotel lobby to elicit social interaction. This goal was explained by the scheme in Figure 6.

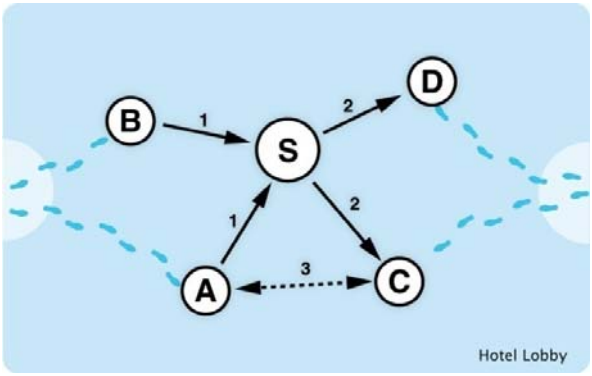

Figure 6: Host eh system should create social interaction.

This scheme resulted in the next questions:

1. How to send information from a tourist to the system?
2. How is this information made visible to other tourists?
3. How does this information trigger social interaction?

From these three questions a more extensive list of aspects of the system can be given:

What is the exact **content** of the system, are pictures being used, is there only text, addresses etc?
How do you **interact** with the **system**, as said, ideally it should be a walk-up-and-use interface, but how is the interaction with the system itself? Examples could be a touch-screen, embodied interaction etc.
How is it **placed** in the **environment**, is it always visible, is it a big interface, or small and more subtle? And how does that trigger people to interact with it?
How is the **opinion** of the tourist embedded in the message? And how detailed is it, just a rating or personal experiences?
What is the **benefit** of the tourist '**uploading'** information, why would he use the system?
Why would the **new tourist** use the system, what is the trigger for him to use it?

What is the direct **link between** the **content** of the system and which **person** it belongs to?
And finally the 'holy grail' how does this system creates **social interaction** between the 'experienced' and new tourist?
These are the main questions and requirements which are all a degree for the success of the concept.

5.2. Process

As said in the introduction of this chapter an iterative approach was used for the concept development (Figure 7). This iterative approach started with an Idea Generation Session, in which within the constraints of the project several ideas are created, in the next step the ideas were clustered resulting in three conceptual directions, which were prototyped and evaluated by users. After this based on the results the conceptual directions were adapted and again evaluated; now according the requirements as set in 5.1 and some of the results of the user evaluation. This resulted in one conceptual direction, for which new ideas were generated, they were again clustered, prototyped, tested with users and adapted, resulting in a final concept, which is explained in chapter 6. In this chapter the different steps taken within the concept development are explained further.

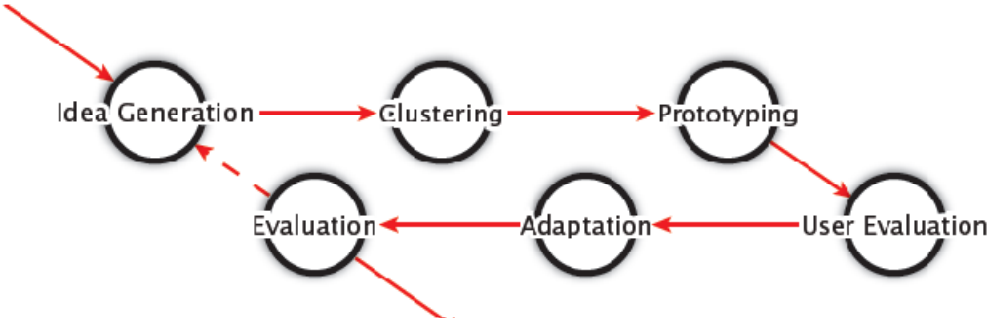

Figure 7: The iterative concept development approach

5.3. Idea Generation Session

To create concepts to answer all the questions as explained in 5.1 an idea generation session was organized.
This idea generation session existed out of three different stages, a warming up stage, an idea generation stage and finally an acting out stage.
The session was held in a room at the university with couches and a large table, which had the most resemblance with a hotel lobby.
As a warming up phase, the participants had to come up with several words they associate with city tourism, to get them 'in the mood'; this session lasted for about 5 minutes.
In the next session the participant were asked to think about concepts fitting the three different subgoals of the project. So first they had to come up with ideas regarding how you could get information in a hotel lobby, then how people could share there ideas and finally how this could trigger social interaction. Each subgoal lasted for 10-15 minutes, after which the different ideas were discussed. To encourage drawings, several drawings

of hotel lobbies were pre made, in which they could draw and pictures of different hotel lobbies were lying on the table.
As a final part, the participants had to create teams of two persons and they were asked to act out one of their best concepts. For this they could use several different items available in the room and had to use the environment as a hotel lobby, this final part lasted for another 15 minutes.
The participants of this brain storm existed out of 4 Industrial Design students (three from TU Eindhoven and one from TU Delft) and one session leader.

This idea generation session about 20 different ideas, these ideas were then analyzed and clustered into three main conceptual directions.

5.4. Conceptual Directions

The three conceptual directions will be explained by a small scenario.

5.4.1. Photoshare Concept

Figure 8: Photosharing Concept

In this scenario (Figure 8) the system is a system that allows you to upload pictures which are projected on the wall.
Daniel enters hotel lobby, he had just been a day in the city and made many pictures. (1) He walks up to the screen on the reception desk, and uploads his pictures to the system. (2) His pictures are shown, next to others in a projection on the wall (3) he leaves the lobby. Later that evening he comes back, the lobby changed into a bar and he wants to have a drink (4). He sits down at the couch and puts his card on the table (5). At that moment his pictures come forward on the wall (5). Robert who is also sitting in that corner sees some of the pictures and starts talking asking about it to Daniel. (6)

5.4.2. Map concept

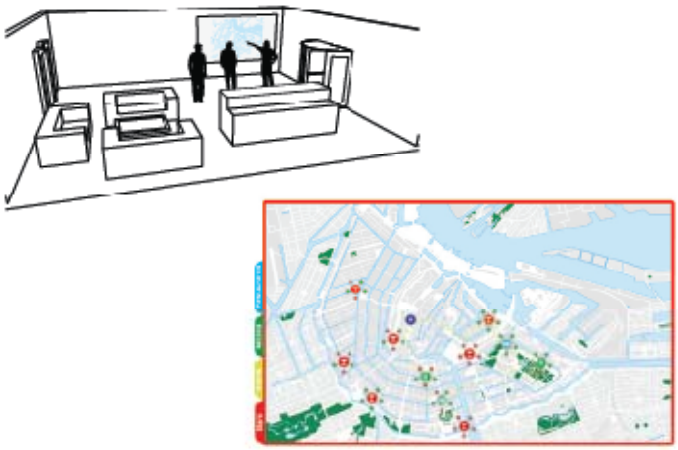

Figure 9: Map concept

The map scenario (Figure 9) shows a system that let you create a 'map for the day' giving you clues about what has been rated positive or negative.
Daniel is in the lobby (1), he walks up to the large map on the wall because he wants to make a plan for the day (2) He knows already that he wants to visit two museums that day and he tries to find a place to have lunch, dinner and a drink afterwards, the map gives him tips which restaurants and bars are close by so he decides to go to the ones with the highest ranking, which can be seen according to the colours of the balls (3). He prints out his map and leaves for the day. Later that day he comes back and wants to add a positive rank to the bar he has been. At that moment Robert is also interacting with the screen, he wants to make a map for the next day. (4) Daniel enters the positive rank and Roberts sees it and starts asking him about the bar. (5)

5.4.3. Recommendations Concept

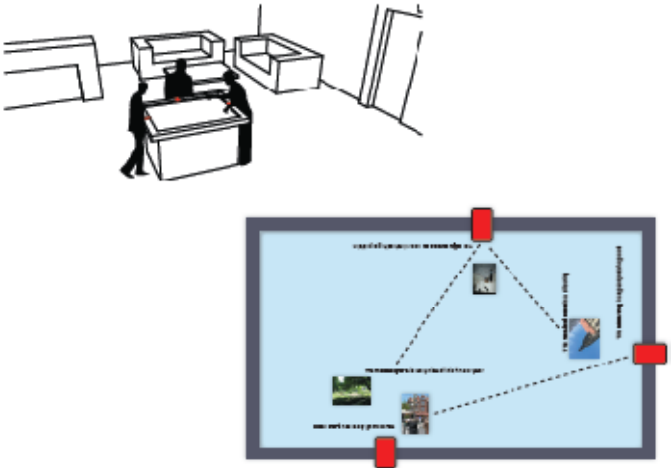

Figure 10: Recommendations Concept

This last scenario (Figure 10) shows an interactive table which gives you recommenda-

tions for the day.
Daniel is in the lobby he wants to have some tips for where he might go today (1). He puts his key card on the side of the recommendations table (2) and pictures come up of museums and bars, he rates the ones he has been with a positive or negative remark and based on that the table gives him clues of other sights which might interest him (3). At that time also Robert and Frank have walked up to the table. (4) Now red and green lights appeared between the different persons, this shows where the others have been and what they thought of it (5).

5.5. Concept Evaluation

For each of these conceptual directions next to the scenario an experiential prototype was made to perform an evaluation, this was done to create a better feeling for the user how the system would work in the real environment and it is ideal for exploring and evaluating design ideas(Buchenau 2000). Several people (all within the target group) were guided through the scenario as being the user and were asked several questions about the different concepts e.g. what they liked about it or disliked and how they felt using it (Appendix B). Next to that several experts (on social interaction and tabletop interactions) were asked to take part in this evaluation as well. These users and experts were all Philips employees (or students) but had all different backgrounds: e.g. psychology, industrial design, biology and computer science.

5.5.1. Photosharing Concept

In general the reactions to this concept were very positive, the users really liked the idea of a wall with user generated pictures as a kind of inspiration, they were also willing to upload their own pictures, as long as it didn't take too much time, and could be more or less private, so they wanted to choose which of their pictures appeared on the wall. They found such a wall very attractive and would see this rather than the current artworks in hotel lobbies. They had the idea that this could give clues what could be done in the city beyond the touristic booklets and brochures.
The users would in general approach other people asking them about their pictures on the wall, if they knew which picture was from which person and they found it interesting, and saw this as a nice starter for a conversation, for ' breaking the ice'.
If they had uploaded their own pictures they were also willing to show them, actually some really liked the idea of that and were open for conversation. In this concept especially the fact that you had to put your keycard on a table or the bar was received quite positive because it gave yourself the opportunity to make yourself available for social interaction if you want to and not if you don't want to. On the other hand it is difficult to see whose pictures are whose.

5.5.2. Map Concept

The functionality of this concept was perceived as very positive by the user. They liked the idea of creating a map for that day. Especially regarding restaurants and bars on the route, They would choose these based on the ratings of other people, this was less the case for museums and sights, most users would base the route on museums and sights they wanted to see but didn't bother that much about the ratings of these, although if a

museum or sight was rated very negative they would reconsider going there.
The readiness to rate places they have been would depend on the impact of the experience and on the person itself; some people would only rate positive experiences other would rate only negative experiences. A nice addition to this concept could be that you could still see the routes of other people as a kind of inspiration. The fact that the map is visible to other people in the lobby didn't bother them, because they weren't doing any really private or secret things. The use of this as a catalyst for social interaction was perceived a bit less, because they said that they were in general not willing to step up to the screen when other people were using it, only if they heard people at the map discussing or if they were asked a question when using the map.

5.5.3. Recommendations Concept

The users were in general positive about this concept; they liked the idea of getting recommendations from the system and the links to other people. If such links appeared on the screen it would be a trigger for them to approach this other person at the table and ask them about their experiences, therefore this would be really a catalyst for social interaction. The problem though with this concept was in the fact that this was a tabletop, in contrast with the other concepts you can not see what the system is doing unless you approach it. Therefore it is less inviting to step up to, especially when other people are already interacting with the table, some of the users would be hesitant to approach the table.
But if they were interacting at the table they would more easily start a conversation, because they were already quite close to each other and the system gave them clues to do so, so interacting at the table already suggests that you are open for social interaction.

5.6. Adaptation and Final Direction

Based on of the above results a small iteration within the concepts was done to solve the issues arising from the concept evaluations.
For the PhotoShare concept, the main problem was that it was difficult to see who the pictures belonged to that were shown by the projection. In the iteration this was now solved by the position of the pictures in the projection based on the position of the 'owner' (Figure 11).

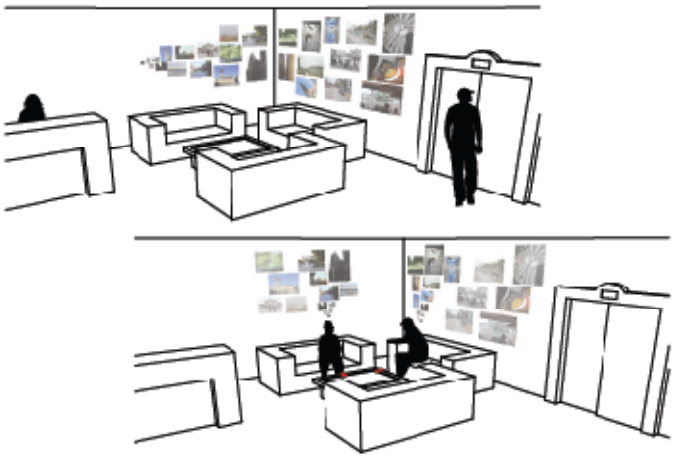

Figure 11: Iteration Photosharing concept

The iteration of the Map Concept now shows three different semitransparent glass plates on which tourists can create their route for the day, on the wall behind the glass plate a bigger map is shown where the routes of the other tourists interacting with the system can be seen as well. This means that three different tourist (groups) at the same time can interact with the system but can still see what the others are doing (Figure 12).

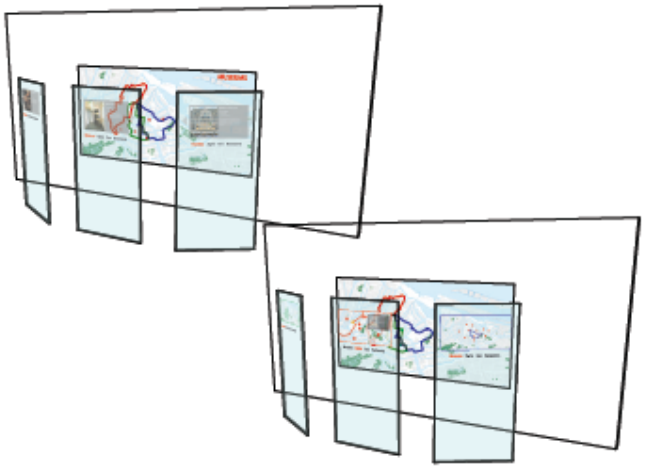

Figure 12: Iteration Map concept

The main problem for the Recommendations Concept was the fact that it was a table and therefore less attractive to walk up to, therefore in this iteration the table display was changed to a wall display, with the tourist standing before the system instead of around. This however leads to problems with the link of the position of the persons in physical space and on the projection on the wall (Figure 13).

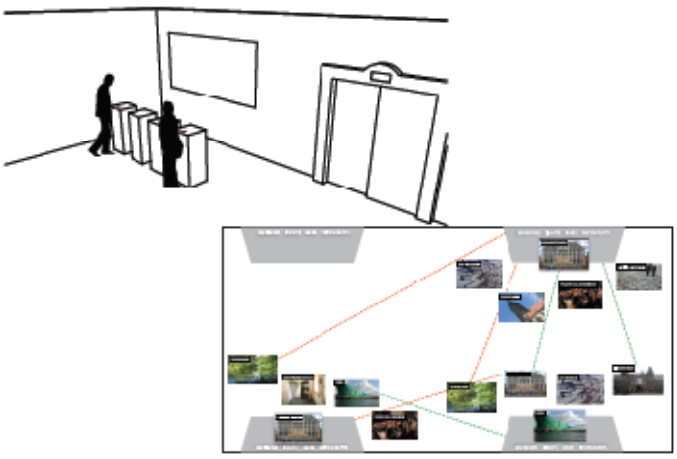

Figure 13: Iteration Recommendations Concept

From these iterations the decision was made to continue with the Photoshare concept as final concept, because during the evaluation the users were most enthusiasts about this concept and after the iteration this concept seemed like the most promising one, as a real working system and for social interaction.

5.7. Explorations within concept

To refine the Photoshare Concept several explorations were done to the interaction and visualization of the three main parts of the concept: how to upload the photos, how to identify the user and how to visualize the photos on the wall. From the uploading of the pictures several scenarios were made, while the identifying and visualization were worked out in several experiential prototypes.

These scenarios and the experiential prototype were used in another user concept evaluation session (Figure 14, Appendix C), with 12 potential users, because we were especially looking for feedback on interaction and visualization the choice was made to use especially users with an industrial design background.
The test was done in the Hotel Lobby of the Hospitality Lab, so within the final context, this gave the users a better idea about the final concept.

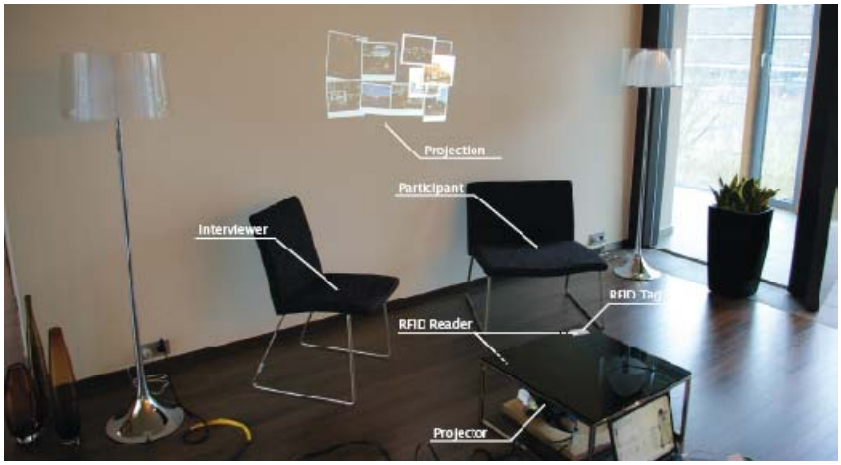

Figure 14: Setup final concept evaluation

5.8. Concept Evaluation

After this concept evaluation not much needed to be changed in the concept. In general the users liked the concept; they liked the fact that photos of tourists were projected in a hotel lobby environment. Although some users, didn't think it would fit in all kinds of hotels, it depended on the type of lobby and hotel, especially for a bit lower class hotels and hostels it would be a nice feature.
It would in general attract them to take a closer look, as one person said *'I was on a city trip last week and had to wait for a while before we could check in, in that time I took some leaflets and brochures from the leaflet stand and started reading them to get a first impression of the city, such pictures would be nice for that as well, I would definitely walk up there.'*
There were some small changes proposed by the users, regarding the size of the pictures and speed of refreshing of the photos. The fact that the photos were a bit rotated gave them a playful and more user-generated look, one person proposed the idea to give the pictures a more 'Polaroid'-like look by creating more white space below the photos which could be used for some extra information (name of uploader, location etc.).
One main issue that was still open was interaction with the photos, in the current concept there was no interaction with the system except from putting your keycard on the table. A situation was proposed in which the user could stop the refreshing of the system by moving his keycard to another part of the table, but most users found this unnatural and would rather focus on an interaction with the projection itself, which turned the wall in a large interactive display like e.g. the Intelligent Shop Window by Philips (van Loenen et al 2006) or the CityWall (Peltonen et al 2008). This could open many new interaction possibilities regarding moving, scaling and rotation of the photos.
Regarding uploading the pictures the users found uploading the pictures through a computer with a card reader in the lobby the most feasible and reasonable, although they were most enthusiastic and saw more possibilities for the future scenario with an application on your Smartphone (Apple iPhone, Samsung Omnia, HTC Touch Diamond etc.) to

upload the pictures taken on these Smartphones using a simple application and a connection to the wireless network.

The results of this evaluation were analyzed and some of the features were tested which resulted in a final concept and scenario.

6. Final Concept

The final system is called the CityTIP system (Figure 15), where TIP stands for: 'Tourist Inspiring Pictures'. The system enables tourists to share there touristic photos with other guests as well gives them inspiration for exploring the city.

Figure 15: CityTIP logo

6.1. Scenario

Andy, Daniel and Ryan are three friends from England who are together on a City Trip in Amsterdam, when they check-in in the hotel the receptionist gives them their key and a brochure with a short explanation of the CityTIP system. They are curious and immediately have a look at the system in one of the corners of the hotel lobby. They like the idea of having inspiring pictures of the city projected on the wall and especially Daniel is intrigued by the system, he is the one in the group who always takes the pictures and has a Flickr account (Figure 16).

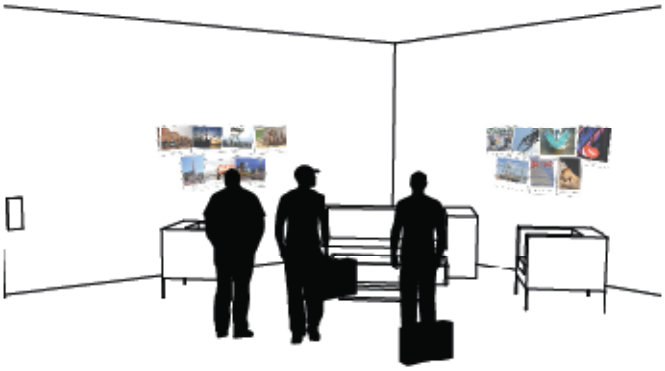

Figure 16:The projection on the wall in the lobby

The next day they have had a touristic day in the city and Daniel took many pictures, some especially to upload in the CityTIP system. When they arrive in the lobby Daniel connects his iPhone to the wireless network in the hotel, and downloads the small application, to upload the pictures he is asked for his room number. Now he can easily send the pictures from his iPhone to the system (Figure 17).

Figure 17: Uploading pictures using a Smartphone

Later that night they want to have a drink in the lobby which includes also a bar, they order a drink and sit down to the table next to the CityTIP system because they want to have a look at their pictures again.
Daniel puts his card on the table and their pictures are shown. When discussing their pictures Andy enlarges one from the Vondelpark where they've been that day (Figure 18).

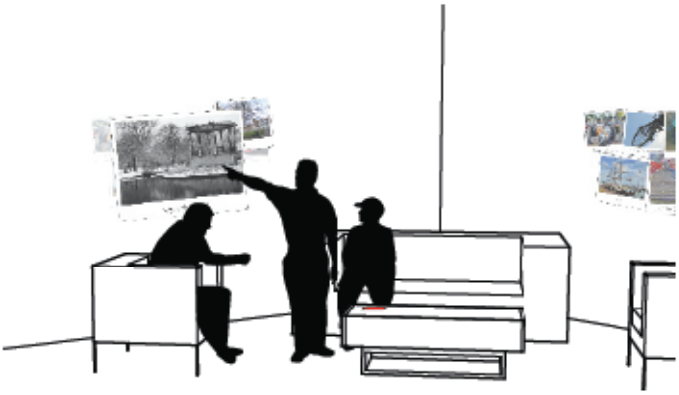

Figure 18: Enlarging one of the pictures

At the same time Emily and Frank are in the hotel lobby, they just arrived this afternoon and are thinking of a plan for what to visit tomorrow, they see Andy, Daniel and Ryan interacting with the CityTIP city and see an interesting picture of lake in a park, they really like to go there, because the next day is going to be sunny. They decide to walk up to the three friends and ask them about the pictures. They learn that it is the Vondelpark, so they decide to go there the next day; they start to have a conversation about other recommendations in the city with the three friends (Figure 19).

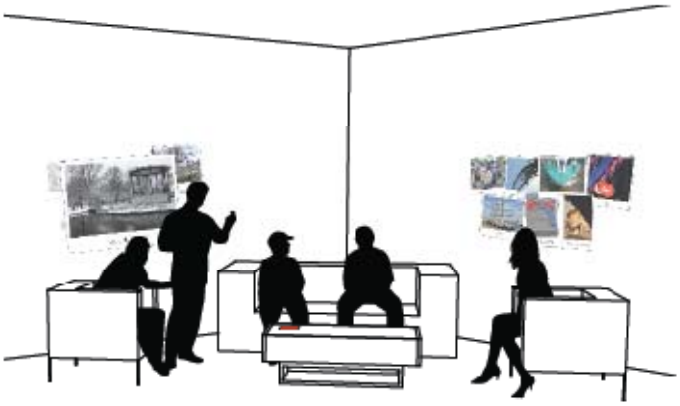

Figure 19: Exchanging experiences

6.2. Social Interaction

The goal of this project was to design a product or system that creates social interaction between people in the same physical environment, in this case to let them exchange touristic experiences. So how does the explained system support this, based on the mentioned theories and requirements set in chapter 5?

First according the *place* in the *environment*, the pictures are projected on a wall in the hotel lobby, therefore it is always visible; the *interaction* with it is chosen to be fairly easy, both for uploading as interacting with the photos on the wall; this to make it almost a 'walk-up-and-use' interface.
For the content photos made by the tourists are chosen, although the fascination of tourists to take photos or videos can be criticised (Bourdieu, 1990) it is an integral part of a holiday. Tourists take photos to remind themselves later or to show to others (relatives), "an important part of a holiday is sharing that holiday with others who are at home(…)it displays how visitors are not isolated individuals but are part of a social group."
The *opinion* of the user however is not included, but one can assume that users will especially upload pictures they found interesting themselves and carry certain memories.
The *benefit* of the tourist for '*uploading*' lies in the fact that they can contribute to the collective of pictures, both anonymously as non-anonymously, contributing photographic media to a community on the internet is very popular as can be seen on the website Flickr (flickr.com). According to Van House (2007) *photo exhibition* is an important use of Flickr according to public sharing of pictures, just showing your pictures to others as a form of self-expression. This can also be towards sharing pictures together, as tourism is a social activity, 79% of leisure visits involve groups of two or more (Brown and Chalmers, 2003). Next to that people in generally reacted positive on if they would contribute their pictures to the system within the different user involvement stages of de concept development process.
For *new tourists* the CityTIP system can (with or without other users present) give tips or hints to find new places. As said in 4.2 according to the Amsterdam Tourism Board, 68% of the Amsterdam tourists will still look for information during their stay.

The *link between content and user* is made in the interface, the pictures of the user 'appear to come out of him' (Figure 20) which gives a direct connection between the user and the pictures, the user is free to choose to make this link visible by putting his card on the table.

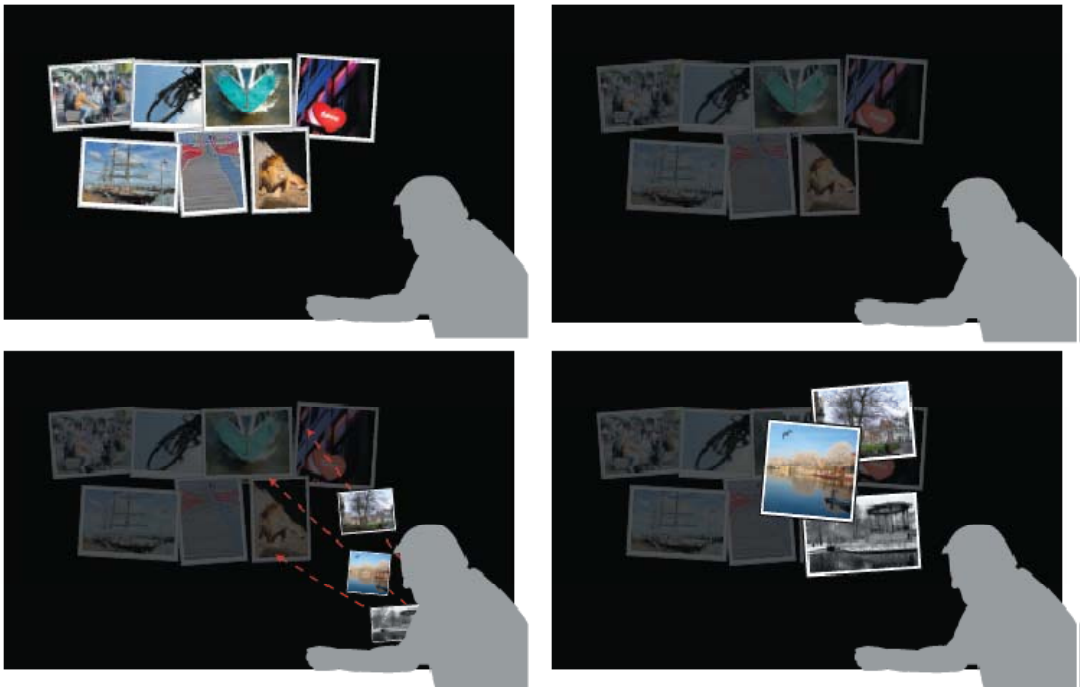

Figure 20: How the personal pictures appear when a key card is placed on the table

Then finally according to *social interaction* when looking at Ludvigsen's levels of social interaction (Ludvigsen, 2006), the current level of social interaction in a Hotel Lobby is Distributed Attention, guests are present in a hotel lobby but have different foci in the lobby, but are aware of each others present. The level of social interaction aiming for with the CityTIP system is Dialogue, which means a shift from Distributed Attention, through Shared Focus towards Dialogue. The shift from Distributed Attention to Shared Focus, is supported through the projection of the photographs on the wall, this gives different guests in the same area a shared focus, according to how the situational interaction mobility is supported – "can users themselves take their social interaction to a different level if they choose" (Ludvigsen 2006) this is quite open for the guests, they are free to walk towards the projection and have a look.
The second step (from Shared Focus to Dialogue) is supported by the system through the step where guests put their key card at the table and are connected to 'their' pictures, this gives other guests the opportunity to approach them about their pictures. Again this can be done voluntary so the guests can freely choose to take the social interaction to the next level.

As said by Brown and Chalmers (2003) exchanging touristic information between tourists is given great value by the tourist itself, it provides also a 'ticket to talk' (Sacks 1992)

with other tourists, a ground for a more general conversation. This can even be of more value for people than just exchanging information (Brown and Chalmers, 2003), but for this system not the main goal.
Also the succeeding of the advice and experiences shared (so if tourists will follow the advice given by others) is not a goal of the system. In research to the influence of word-of mouth information on touristic decisions between backpackers Murphy (2000) found out that "the degree of influence is dependent on the consistency of reports on a particular destination or tour from different people, how well they knew and/or liked the person who provided the information."

As said by Ludvigsen (2006): "Designing for social interaction is an ungrateful role for a designer since the users will themselves construct meaning of the entire system, regardless of the designers' intention". Therefore a real life user test will be conducted with a working prototype to test the assumptions given. This will be further explained in chapter 7.

6.3. Technical Setup

The system consists out of a computer, two projector, four RFID-readers, a table and a numerous amount of RFID tags (in the keycards or in the keyring) (Figure 21).

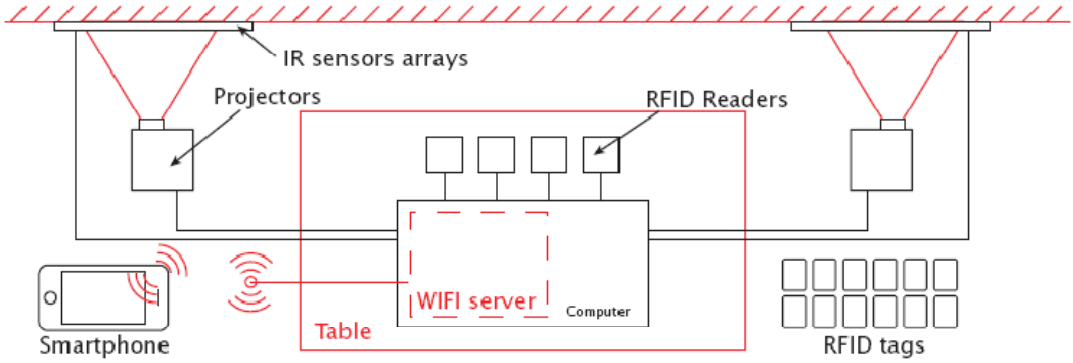

Figure 21: Schematic System Architecture

The computer is connected to the four RFID readers who are mounted below the tabletop on the tabletop the places of the RFID readers are marked with a dashed outline of a keycard. The projectors are placed that they project on a wall near the table and that it correspondents with the position of the chairs or benches and the places of the RFID readers.
On the computer a wireless network (WiFi) is running to which you can connect with your Smartphone, for this Smartphone you can download a small application with which you can send your pictures to the CityTip System. The Smartphone (iPhone, Omnia, Touch Diamond) is chosen because it has several advantages to general cameras; first of all, the way data is stored there are many data storage cards: MD, SD, miniSD, CF etc. To deal with this you would need a separate system with a card reader, while with a Smartphone you can easily connect to a wireless network. Next to that there is the in-

creasing use of those kinds of phones and the increase of use of such phones as camera. The RFID readers track when a Tag is near and identify this tag, showing the right pictures at the right place.

For the prototype this is slightly different in this case the projectors project from inside the table, therefore the table is placed under 45 degrees with the wall, in this case it is possible to project from both sides of the table (Figure 22). There is no wireless network running because in the prototype there is no possibilities to upload pictures, in chapter 7 is explained why. The software in the prototype is running in Adobe Flash.

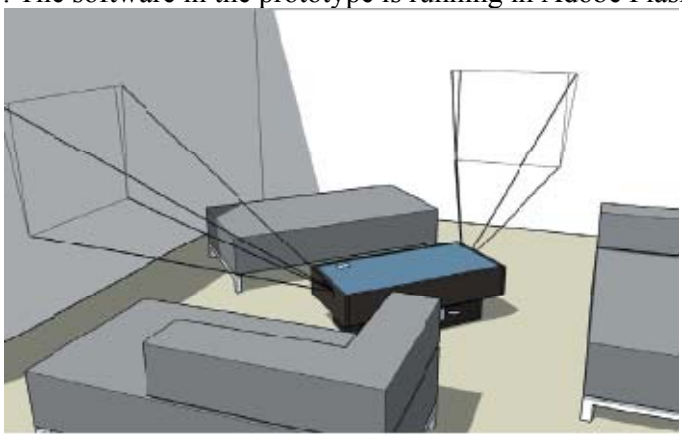

Figure 22: Drawing of the setup for the final user test

6.4. Graphical User Interface

The graphical user interface shows the projection of different pictures, the pictures have a Polaroid-like look so that captions can be added to the photos. There are 7 pictures shown, for each projection (Figure 23), which randomly fade into other pictures, this is done in a quiet pace to give tourists enough time to look at the pictures. When a person is identified the general pictures will fade (at only one projection) and his pictures are shown on top (Figure 24), there are three pictures at a time shown from each user, they also fade away and are replaced by new pictures. When a picture is enlarged (Figure 25) it won't be replaced.
When you didn't enter any pictures in the system and you put your card on the table a black Polaroid will appear with the text that you can upload your own pictures using the wireless network.

For the prototype the Graphical User Interface is almost the same except from the fact that you can't enlarge pictures.

Figure 23: Normal Projection

Figure 24: Personal Projection

Figure 24: Enlarged Picture

6.5. Interaction

For the interaction there are three parts, the interaction with the Smartphone, the interaction with the table and the interaction with the wall. The interaction with the table is the easiest one, by putting your card on the table your pictures appear on the projection near you.

As said uploading pictures can be done by using a Smartphone, the Smartphone is connected to the system by downloading a small application on your cell phone. After downloading this application you have to log on with your room number, this do identify yourself and to make the connection between your key card and the pictures. After this you can select from your pictures on your Smartphone the ones you want to send, after which you can send them to the system.

The interaction with the wall is also kept very basic, while looking at pictures you can enlarge a picture by touching it on the wall. This can be done from the normal projection as from the personal projection. When a picture is enlarged, this picture won't be refreshed. When you touch the picture again its size will be decreased again. To detect if you touch a picture an array of IR sensors will be placed above the projection, these will measure if something is blocking the IR beam and how far away this is from the sensors, so it can identify which picture is touched.

7. User Test

To test if this CityTIP system meets the main goal of the study, if it will enable tourists to exchange touristic experiences with each other, a final user test with the system was conducted. To measure the success of the CityTIP system it was compared with a control system with some changes in the most important social features.

7.1. Lab Test

Testing social interaction is a difficult thing, because it goes beyond the usability of the product. It is a more spontaneous process between people. The ideal situation to test the system would be in a real hotel lobby, with real tourists and real photos. This however brings a lot of uncontrollable parameters with it, for example the number of participants, as experienced in a similar project by Bullens (2008) where in a three week period only 9 system interactions were observed. Besides that a completely working system is needed and a cooperating hotel.
In this experiment a lab setting is chosen, in this case in the Hospitality Lab of the ExperienceLabs of Philips. As Hoonhout (2007) states testing products and systems in ExperienceLabs can give a lot of information about the experience of people and it can give a 'natural setting' for the product or system in an environment where it is comfortable for people to stay for some time. The challenge is to setup the lab test to come as close as possible to a test in a hotel lobby of a real hotel lobby.
The Hospitality Lab contains out of two main parts, the lobby and a hotel room. The lobby is set up as a real hotel lobby, so there is a main entrance, a reception desk, an elevator door, some benches and is used to test and exhibit projects.

7.2. Procedure

For this user test a prototype of the CityTIP system was created as explained in chapter 6. As said the interaction possibilities of the prototype were reduced to the interaction with the table. So if a participant would put a key card on the table his pictures would appear. In the prototype the possibility to upload pictures using a Smartphone was not present, because in the test was tested if the system would be a catalyst for social interaction rather than the focussing on the complete interaction with the system. Because they could not upload pictures the participants were asked to send pictures in advance.
The interaction with the wall was also not implemented as this would mainly be a feature to increase the interaction possibilities of the system, while it does not directly influence the social interaction between the participants of the study.
The setup and interaction of the control system were the same, although this system did not show their own photos when they put their key card on the table, but it gave them one recommendation. This recommendation would appear from the centre of the projection, this to take away the effect of the picture appearing from where the user sits.
With these changes the direct link between the user and the pictures appear, for the tour-

ist himself (as it is not his own picture) as for other tourists (the picture appears from the middle).

For the test participants were recruited, they were asked to participate in a usability test for a new system on city tourist inspiration.
The next step was that real touristic pictures of the participants were needed, because in the concept this is one of the important things that people start to talk about their own pictures. These were gathered through a pre-sent questionnaire (Appendix D); this questionnaire is about city tourism and included questions about 'where they have been on a city trip recently' and 'what they found interesting there'. In this questionnaire they were also asked to send (by mail) 5-10 pictures of one of their city trips to use them in the tests; the users were told that the pictures were used in the test, this was to prevent people from sending pictures that were to personal for public display. In the explanation about the system and the test the notion of social interaction was left out. In the days preceding the experiment these pictures were connected to a key card for each person.

7.2.1. Participants

Employees from the High Tech Campus were recruited as participants in this study, this gave several advantages, first of all because there is a great number of people within the target group (age 20-40) at the High Tech Campus; secondly they are in the vicinity of the Hospitality Lab, which avoid transportation problems, and finally there is a wide variety of different nationalities at the High Tech Campus (as in a real touristic hotel).
A main problem that might have occurred is that some of them might already be acquainted with each other and that this already creates social interaction between each other this might be unavoidable and influence the data.

In total 14 participants participated in the study; 7 participants used the CityTIP system and 7used the control system. The choice was made to do a between-participant study, because the focus is on the social interaction and asking people to participants several tests would have increased the chance that they were already acquainted with each other from the previous test.
The participants were all in the range from age 20 to 40 (except from one person who was 45), 5 were female, 9 male, the majority of the participants was Dutch, but also 1 Indian, 1 Chinese, 1 French and 1 German were involved.
The pictures they sent were from many different cities, but there was some overlap since two people sent pictures from Florence and two people sent pictures from Paris). There were also pictures from Prague, Berlin, London and Rome.
In the original scenario groups interact with the system, but in this test only individuals will interact with the system. This is because the focus of this test will be on establishing social interaction rather than the general interaction with the system.

7.2.2. Experiment

On the day of the experiment people were asked to turn up at a certain time, differing 5 minutes for every participant (so one at 10.30, the next one at 10.35 etc) and were asked to stay for 10 minutes. This was done to create a situation comparable to a real hotel

lobby (where also people walk in and out) and to increase the number of different situations were two people were present at the same time (Figure 25). Both tests were divided into two sessions, one with 4 participants, where three social situations could occur and one with 3 participants where two social situations could occur. This gives in total 10 situations, 5 for each condition.

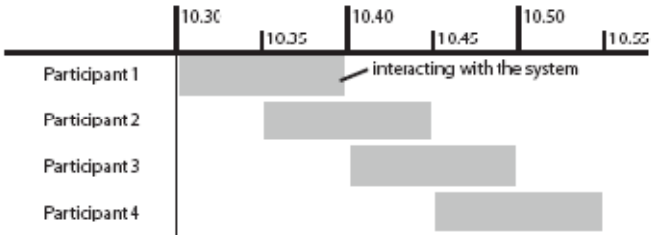

Figure 25: Particpiants interacting with the system

Each of them was welcomed at the Experience Lab, led to the lobby and there they were asked to fill in a consent form. They were given a key card and asked to experience the system.
The working of the CityTIP system was explained to the participants by an explanation on the table (this is comparable to the real hotel situation where people receive a leaflet about the working of the CityTIP system), although nothing was said about social interaction. They were offered a drink and were told that they would be called back after 10 minutes to fill in a questionnaire about their experiences with the system.
This questionnaire consisted out of two parts (Appendix E). The first part included several open about usability settings, they had to answer this based on their experiences with the system and on a small scenario they were given about the complete working of the system.
The second part was a technology acceptance test with a 7-point Likert scale from 'Totally Disagree' towards 'Totally Agree'. The questions in this test were based on the UTAUT by Venkatesh et al. (2003), this UTAUT questionnaire focuses on technology acceptance within a work environment. Several applicable questions were taken from this and changed from this work environment to a city trip environment. The questions taken from the UTAUT questionnaire were taken from the constructs performance expectancy (utility), effort expectancy (ease of use) and attitude towards using technology (fun). To this one question was added were they where asked if the system would make them connect with other hotel guests more easily.

7.2.3. Observational Method

The participants were observed using an observation form, on which the different types of social interactions could be written(Appendix F). As a backup a camera and a microphone set up in the hotel lobby, they were 'hidden', although the user will be aware of being filmed because they signed a consent form in which they agreed to be filmed, these videos will be analyzed later.

7.2.4. Measurements

The success of the system was measured by comparing the number of 'successful interactions' for the CityTIP system and for the control system. These 'successful interactions are interactions where the participants start to talk about their city tourism experiences using the photos on the CityTIP system.
The different social interactions (dialogue) were coded according to towards the next scheme:

0. No Dialogue
1. General Dialogue
2. Dialogue about the System
3. Dialogue about the Pictures
4. Dialogue about their experiences based on the pictures. (successful interaction)

The system would be called a success if the CityTIP system will have more interactions within social interaction '4' than the control system.

7.3. Observation Results

In total there were 6 situations where 2 participants were present at the same time; this is fewer than the 10 situations expected. This was because some people arrived early and some arrived late.
On the other interacting with the system for 10 minutes appeared to be quite long. This could because first of all, they were interacting on their own, while when interacting with it in a group (as in the scenario) the interaction with the system would be prolonged by the conversation between persons in the group. Next to that the fact that they weren't actually on a holiday might have increased their interest in the system
From these 6 situations there were 3 in the test with the CityTIP system and 3 in the test with the control system.

For the CityTIP system there were 3 occasions were two people were interacting with the system at the same time. On one occasion there was no interaction at all between the participants, they both sat down and were interacting with the system, waiting to be called back for the questionnaire.
On the second occasion there was a bit of general dialogue and a bit about the system, the new person approaching the system asked what it exactly did and how it worked, but after that the conversation stopped.
On the third occasion there was dialogue about the pictures, where they have been and how they liked it. In this situation the persons interacting with the system had both been to Florence and were sharing their experiences.

Also for the control system there were 3 occasions were two people were interacting with the system at the same time. On one occasion there was some general dialogue, after which they started interacting with the system.
In the other two occasions there was some dialogue about the system, one asked the other how it worked, but after that the conversation stopped.

7.4. Questionnaire Results

Looking at the open questions of the questionnaires people thought of the CityTIP system as 'a nice idea'. They liked it and would use it, as one person said: "I would use it to look at some pictures during drink, dinner or waiting." The participants would see it fit in the hotel lobby, especially regarding inspiration and decoration.
The participants were positive about uploading pictures to the CityTIP system; most people would do that, especially when travelling in a group. Some actually would upload pictures to get to know other tourists as one said: "I like to share pictures and it is an easy way to start a conversation" and another one was talking about "showing off with his pictures to meet people in the hostel".
The CityTIP would especially be used to watch and discuss pictures with fellow travellers, but also to watch their pictures with strangers from the hotel and to see what others have visited. One person says he would use the system to "watch pictures with strangers, if I want to meet others" and another one about "sharing pictures with other travellers".
For the CityTIP system also the possibility to interact with the wall was shown, this was seen as a valuable addition: "current implementation misses interactivity" and "would make it more fun to use, especially when information can be interactively retrieved".

For the control system the opinions about the system were positive as well, which means that a system for sharing pictures is perceived positive. One person found the system "quite innovative" and another "very appealing", the participants were also positive about using the system itself "I would use it for suggestions to visit in the city I am staying in". Also for this system the participants would think it would fit in a hotel lobby. For the control system the participants were a bit more hesitant to upload their pictures, and would only upload "general pictures" or "one or two that turned out nice". In this case most participants would upload only pictures without people on it, and especially "interesting sights which are not in the guides". But this is actually quite positive as the system can help people discover new things. The control system would be used mainly for inspiration while waiting in the lobby and to get more information "outside the obvious touristic scope of a city".

Also for both systems some issues arose, for the CityTIP system some of the users were hesitant to use it, some of the fact that they didn't have an iPhone, or didn't want to show pictures to other guests, others were a bit doubtful about the effort: "I wouldn't use the system if too much effort is needed to upload the pictures". Next to that some participants would rather see it placed in the bar or restaurant because there you stay for longer time and can discuss the pictures better. Most hotel lobbies are quiet and they felt "uncomfortable talking, laughing and discussing in such an environment".
Others would like to have it in the hotel room, because of privacy reasons and because it is more relaxing to watch pictures there. One person would not upload pictures because she "had no iPhone".

For the control experiment one person said that he wouldn't use it because he "usually reads up on the sights and museums before a city trip and thus already know what he would like to see". Although most persons would like to see more functionalities in the system: "now it was a bit boring", "I expected more info to go with the pictures".

A complete transcription of the answers of all participants can be found in Appendix G.

7.4.1. Likert Scale Questionnaire

In this study 14 participants filled out a questionnaire, 7 for each system. This is a very low number of participants for a reliable statistical analysis as Gorsuch (1983) states that rating scale studies should have a question to participant ration of 1:5 to obtain useful findings. In this questionnaire there were 10 questions, so 50 participants would be needed to do an accurate statistical analysis.
With this in mind the results were still analyzed to investigate if some results could be drawn from the questionnaire.
If you compare the results from the open questions to the results Likert scale questions there is actually a bigger difference between the two systems. The results of the different questions in the questionnaire were clustered into 4 constructs (Table 4), based on the clusters of the UTAUT questionnaire (Venkatesh et al 2003) which are Utility (Cronbagh's α: .705; 3 items), Ease of Use (Cronbagh's α: .862; 2 items), Fun (Cronbagh's α: .842; 4 items) and Social Connectedness (1 item). The reliability of the constructs was measured using Cronbagh's α. Nunnaly (1978) has indicated 0,7 to be an acceptable reliability coefficient for Cronbagh's α. As can be seen the three constructs, based on more then 1 item all have a higher α as 0,7 .

Utility
I would find the system useful for my city trip.
Using the system enables me to find interesting new sights more quickly.
Using the system increases my range of visited sights in the system.
Ease of Use
The interaction with the system is clear and understandable.
I would find the system easy to use.
Fun
I like working with the system.
Working with the system is fun.
Using the system on a city trip is a good idea.
The system makes city tips more interesting.
Social Connectedness
The system makes me connect with other guests more easily.

Table 4: Constructs and Questions

Of these 4 different constructs box plots were made (Figure 26-29). As can be seen, for all four constructs the CityTIP system was ranked more positive then for the control system.
The results of the tests were analyzed using a univariate analysis of variance (MANOVA). Based on that can be said that the difference were significant for Utility ($F(1,12) = 6.88$, $p<.022$; partial $\eta^2 = .36$), Ease of Use ($F(1,12) = 5.44$, $p<.038$; partial $\eta^2 = .31$), Fun ($F(1,12) = 11.41$, $p<.005$; partial $\eta^2 = .49$) and Social Connectedness ($F(1,12)$

= 7.23, $p<.020$; partial η^2 =.38). This means that the fact that the CityTIP system was rated on all constructs more positively than the Control system might be significant and can not be based on chance, so you can compare the means for the different situations. Although as said with this low amount of participants it is difficult to be completely statistical accurate. The means are added in the box plots as dashed lines.

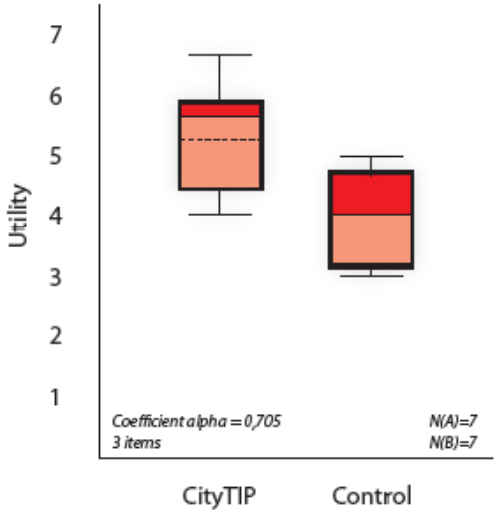

Figure 26: Utility of the System

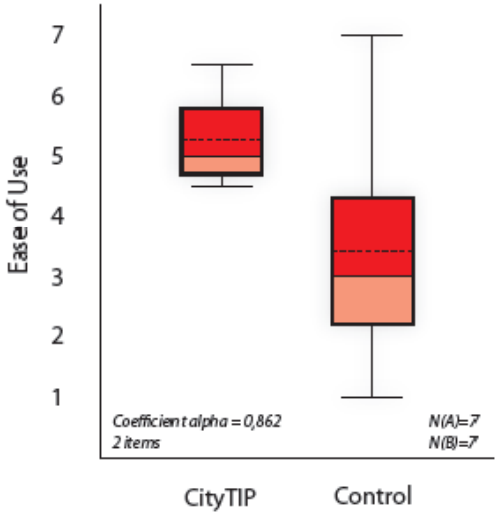

Figure 27: Ease of Use

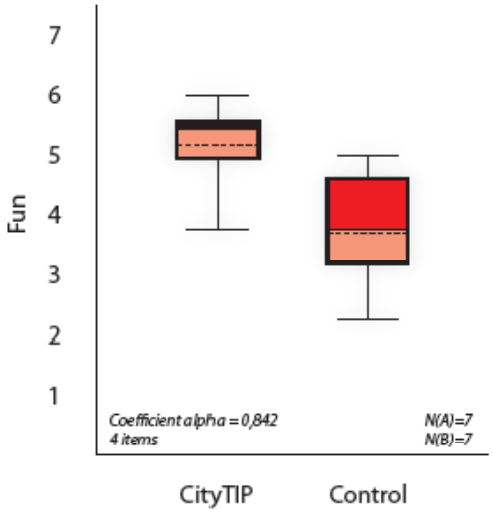

Figure 28: Fun

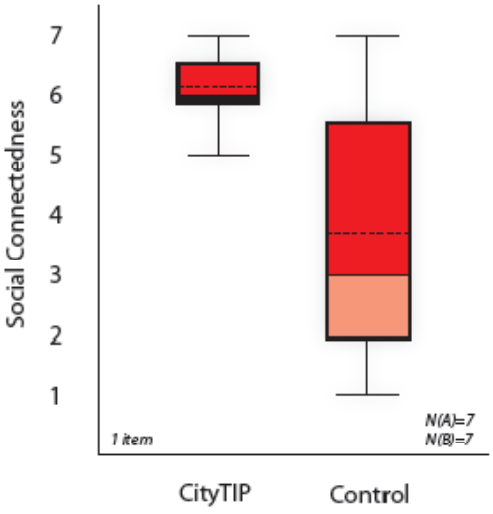

Figure 29: Social Connectedness

7.5. Discussion

As said in chapter 3, the main goal of the project was to design a product or system that is creates social interaction between people in the same physical environment. In this case to enable tourists to exchange experiences with each other within the hotel lobby.
For this the CityTIP system was developed and the goal of the user test was to test if it really created the intended social interaction.

7.5.1. Social Interaction

In total there were 6 measured social occasions (occasions where there were two people interacting with the system at the same time), 3 for the CityTIP system and 3 for the control experiment. In one of the social occasions with the CityTIP system two participants started to talk about their experiences (a successful social interaction), based on the photos on the wall, they both had been in Florence and submitted pictures of that.
In the control experiment the highest perceived social interaction was where they just talked about the system itself for a short while.
This looks like a success, but it is very hard to state any conclusions on this.
First of all, as said, there were only 6 social occasions. Within the setup of the user test the goal was to get 10 social occasions (5 for each condition), which is still a very low number, but due to several reasons this was decreased to 6. To state any real conclusions on the test according to social interaction a larger number of social interactions need to be measured to compare the two conditions.
The fact that the participants in the 'successful social interaction' which created already a certain common ground for them. While in the other situations with two people present they had been do different cities, based on this it would have been better to give the participants a list of cities where they could have send pictures from (Paris, Amsterdam, Rome, Florence etc.) and try to group people with the same destination together.
Finally due to the fact that they were interacting alone and not in a group and that they were not really on a holiday, so maybe not that interested in the recommendations, the 10 minute interaction time appeared to be quite long. A solution for this might be to shorten the interaction time, or extending the interaction possibilities, so there is more to 'discover' for the participants. The interaction possibilities could be increased by implementing the interaction with the wall.
It is very difficult to state major conclusions on the test from a social interaction perspective, there might be a potential that it works, because in one situations there was the desired social interaction, but to get a better view on that a more extensive test need to be performed.
From the experiment several things were learned about the test and how it could have been improved, therefore based on this a setup for both a larger setup test as for a field test are created. These tests won't be performed within this project but will be given to Philips Research' to investigate the further potential of the system. More can be read about this in Chapter 8.

7.5.2. CityTIP system

The CityTIP system itself is perceived positive throughout several user involvement stages of this project. Within the results of the open questionnaire you can see that the participants liked the idea. Also throughout the other user evaluations the participants saw the system as 'a nice idea' and though it would really fit in the hotel lobby. Some of the participants said that it would also fit in a hostel or a lower rated hotel (1 or 2 stars), which fits quite well to the target hotel as stated in 4.7. Next to that some of the participants would move it to a more social location as the bar of the restaurant. This is not actually not an issue as the focus of the environment of this system is on a more social hotel lobby.
When the participants were asked if they would upload pictures to the system, the majority of the users would do that, although they were hesitant to upload pictures with people (themselves or other tourists) on it. This is actually not a problem for the CityTIP system as the focus is on exchanging experiences to find new interesting sights, restaurants etc. therefore pictures of these places would be a better inspiration for other people than pictures of groups of people.
The CityTIP system was seen as both an inspiration for new sights but also as a way to meet other tourists in the hotel lobby, by 'showing off with your pictures' and 'an easy way to start a conversation'. It is very interesting to see that the participants saw this functionality as it is not being explained as such a system in the scenario. These results are promising because it gives an indication that people would possibly use it for the main goal of the project (creating social interaction between people).
Most people think that adding more interaction possibilities (for example interacting with the pictures on the wall) would increase their use of the system.
Interesting to see it that for some of the questions the control system seemed to be perceived more positive than the CityTIP system itself, this can probably be clarified by two reasons. First of all in for the control system there was no direct link with your own pictures while in the CityTIP system there was. Therefore for the CityTIP system the participants would be a bit more hesitant about the system regarding privacy of the pictures, while in the control experiment this is not really an issue. Next to that for the control experiment the system was regarded more positive towards its potential, so if more functionalities were added it could be more interesting, while for the CityTIP system they rated more the system they had experienced and on the added scenario.
If you combine the results from both systems you can see that there is a positive attitude towards an inspiration system within the hotel lobby based on pictures by tourists. Also the fact that they are shown on the wall is seen as a nice decoration within a hotel lobby.

A main problem was, as said earlier, that in the test there was only a few possibilities for interaction. The interactions with the wall, as well uploading the pictures were left out. Therefore to get a complete response on the system a prototype should be worked out where these features are implemented, now the responses about that were based on scenarios and storyboards.

If you for example look at the results from the Likert scale questionnaire in the final user test (Paragraph 7.3 and Figures 26-29), you can see that the system is first of all, perceived much more positive than the control system, but that it is also perceived quite positive on its own. Again there are only 7 participants used for each system, but together

with the results from the open questions and the feedback from the other user tests throughout the project, based on this you can say that people are very positive about such a system and would like to see and experience it in a hotel lobby.

The participants were positive about the utility of CityTIP system (Figure 26); they would see it as a useful system during their city trips and it would help them to find new sights more quickly. Interesting to see is that it is also perceived more positive than the control system, while this system is actually focused more on giving you new tips for interesting sights than the other system. It is difficult to clarify this, but if you compare it to the results of the open questions this could probably be due to the lack of information you get about the sight, the system now only provides a picture and the name, while you probably would like to have a bit more information (location, what is interesting there etc). If you compare this to the CityTIP system this extra information could be retrieved from the other participants if they are present.

The interaction and ease of use of the CityTIP System was also perceived very positive (Figure 27), they found the interaction quite easy to use and was clear and understandable. Strangely there is a great difference with the control system, which is difficult to clarify, because the current interaction is the same (putting a key card on the table). This could also be due to the fact that you don't get much information from the control system which could decrease the perceived ease of use, because now the participants didn't know exactly what to do with the recommendation, as they are not on a real holiday there is a low connectivity with the results, and (as can be seen from the open questions) would like to get more information on the sights.

The participants also thought that using the CityTIP system would be a good idea and was fun the use (Figure 28), they liked working with the system and thought it could possibly make a city trip more interesting. There is again a difference with the control system which could be based of the fact that a 10 minute interaction with the system was a bit too long as explained earlier.
Finally the participants of the CityTIP system thought the system would connect them with other guests more easily compared to what the participants in the control experiment thought (Figure 29). This is supported by the results of the open questionnaires where people already saw the CityTIP system as a possibility to connect to other participants.

In general it can be said that the system is perceived positively and that tourists would like to use it and see it in a hotel lobby. There is potential that it can work as a catalyst for social interaction, although to investigate if this is the case a more extensive lab test and a field test need to be performed.

8. Conclusions

In this chapter the results of the project will be concluded and recommendations will be done towards further development.

8.1. Conclusions

The main goal of this project was to design a product or system that creates social interaction between people in the same physical environment focussing on a (semi-)public place. In this case enabling tourist to exchange touristic experiences with each other in the hotel lobby.
For this the CityTIP system was created through an iterative process with a high user involvement and several experiential prototypes. The CityTIP system was evaluated regarding theories and requirements and to test if the system would created social interaction a user test with a prototype was setup in a lab environment.
In this user test out of 3 situations were two people were interacting with the CityTIP system in one situation the participants started to exchange experiences with each other. In a control experiment with a control system there were also 3 situations were two people were interacting with the system. For this system in none of the situations there was the desired social interaction. This is not proof that the system will work as it might come down to a coincidence, but from it can be sad that there might be a potential that the system will work as a catalyst for social interaction.
Although to investigate this further future research need to be done. A lab test with a larger number of participants will be performed to test if participants would start exchanging experiences with each other. And to test the full potential of the complete scenario a field test in a real hotel lobby need to be performed as well.

Based on the feedback of all the participants throughout the different user involvement stages (including several concept evaluations and a questionnaire at the user test) the CityTIP system was perceived positively. Tourists would like to use and see it and would like to see it in a hotel lobby. They liked the CityTIP system as inspiration and decoration, and would also like to upload pictures to the system.
In the user test the control system was also perceived positively what means that a system providing pictures made by tourist would be a positive addition to a hotel lobby and a city trip.

8.2. Recommendations

Based on the results from the user test recommendations were made towards the further development of the system and for further tests of the system.

8.2.1. Further development of the CityTIP system

The CityTIP system has been perceived positively by the participants during the different user evaluations and tourists would like to see and use such a system in a hotel lobby. But for further development of the CityTIP system there are some issues which need to be addressed, especially regarding interaction with the system.

Using your key card on the table to activate the CityTIP system might not be the best solution as people might not feel comfortable putting their key to their room on a table in a semi-public space, while their focus is in a different direction (towards the wall). A solution could be to use the card only to 'log you in' or 'log you off'. So by swiping your card along the marked area on the table, you are identified and your pictures will appear on the wall, you can take your card away again and still your pictures will be visible. Sweeping again your card along the marked area will log you off and your pictures will appear again, in this case you keep your key card close to you instead of putting it on the table for a longer time.
To support which interaction would be best an observation could be done towards how people behave in semi-public places (including hotels) if they sit down, do they put their belongings on a table (for example, wallet, telephone, keys etc.) and can be asked during the lab test or observed during the field test.

One of the things that it isn't implemented in the prototype is the uploading of the pictures. In the scenario a system is proposed using Smartphones and a wireless network, because it has several advantages to general cameras such as data storage and connectivity (as described in paragraph 6.3) and the fact that more people at the same time could upload their pictures. But due to this the usage of the system would be decreased as for example one participant in the user test said that she wouldn't use it because she didn't own a Smartphone. There might be other solutions, e.g. by sending pictures by MMS or using Philips Connectivity Panel (A system that allows hotel guests to plug in easily any external device and connect it to the Hotel TV). A more extensive study with several studies could help finding the best solution.

The interaction with the wall is very basic. If you touch the picture it is enlarged and if you touch the picture again its size is decreased again. More interactions could be added to the system, e.g. manually enlarge the picture, rotation, but also more information could be retrieved or added by 'turning the picture around'. This leads also to the kind of multi-touch technique is used, in this case it is based on a range of infrared sensors on top of the projection, but other techniques might be used, or maybe touch interfaces instead of projections. Related to this is the scalability of the system. With the system as proposed now 4 (groups of) people can interact with the system at the same time, because there are two projections and on each projection there are two interaction possibilities. These could be increased by using more projections (or touch screens) and a larger table. Or maybe more smaller tables within the same environment.

8.2.2. Lab test

During the performed lab test a couple of problems arose, which need to be prevented

during a more extensive user test.

First of all the low number of social occasions, this had several reasons, there were only 14 participants but with this amount still in total 10 social occasions could occur. But due to the fact that people didn't show up at the right time, or some cancelled at the last moment there were fewer social occasions, next to that the time of 10 minutes for interacting with the system appeared to be too long (especially for the control experiment).
To create a higher number of social occasions in the more extensive user test first of all more participants will be asked (30). To prevent participants showing up late they will be asked to come in pairs every 10 minutes. If they both arrive at the right time, one is led upstairs by one of the researchers, while the other has to wait for 5 minutes to be sent upstairs. If only one of them is on time he (or she) can already be send upstairs. If they both arrive late (or one or both cancels) there will be an actor present in a nearby room to play a participant. He or she is asked to create a passive role in the interaction with the other participant, to let the other participant lead the interaction.
To prevent the interaction for getting boring before the ten minutes, ideally the interaction with the projection on the wall should be implemented in the prototype, this will increase their possibilities and the time they can spend interacting with the system. Another option might be to decrease the interaction time to 6 minutes, which seemed to be an acceptable time from the previous experiment, because of that schedule need to be adjusted as well.
In the one occasion where the participants started to talk about their experiences within the test they both had been to the same city. This will be the same when the system is in a real hotel lobby where people also are in the same city. Participants will be recruited who have been to a certain range of cities (Paris, Rome, Amsterdam, Berlin, London) participants who have been to the same city will be put together in the experiments. Related to that was the fact that not all people sent pictures, because they didn't have enough time and some of them just didn't want to send pictures. This will be prevented by giving them more time to send the pictures and by the recruiting they are asked if they had made touristic pictures in one of the cities.
Based on these changes a new setup for a lab test is written, which can be found in Appendix H.

8.2.3. Field Test

Because this extensive lab test still doesn't show if hotel guests really will use the system and if it will create social interaction between them, also a field test needs to be performed.
When doing a field test the focus will not only be on establishing social interaction but also on the usage of the system in general. For this the interactions which were left out during the lab test need also to be implemented, so that the tourists could go through the whole interaction, also uploading pictures to the system.
This system will be placed within a Hotel Lobby of a hotel in a touristic city, because the focus is on a more social lobby, the perfect place would be for example the CitizenM Hotel (in Amsterdam centre) or a similar hotel where the lobby is more then just a passageway.
If the keys (or key cards) won't be connectable to the system a key ring with RFID con-

nected to the keys could be used to identify the tourists for the system.
The system will be placed in the hotel lobby for a longer period to do a longitudinal study. As city trips are in general a couple of days (in Amsterdam this is in general 4 nights (ATCB, 2008)) it would be ideal to setup the system for a couple of weeks (2 to 4) to get a high number of different (groups of) tourist.
Because camera observation within a hotel lobby would be not possible as there are many privacy issues involved, the best way to do observations would be using an observer observing interactions with the system in the hotel lobby. It might be strange that the same person sits in the hotel lobby for the whole day, but this might be solved by using several observers. Next the interactions with the system can be logged (how many pictures are uploaded, how often it is used, when it is used etc.) this could give an indication of the usage of the system. Finally the receptionist and concierge could be interviewed how they perceived the tourists interaction with the system. Talking to the receptionist and concierge could also give an idea about the acceptance of the hotel about the system.
For this test could be considered to do also a comparison study with the control system, although this increases the length of the field test and conclusions can probably already be drawn on the observations of the CityTIP system itself.

With the results of this final field test can be seen what the potential is of the CityTIP system as a real system in the hotel lobby.

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A List of Visited Hotels

Hostels
Amsterdams Stadsdoelen (Individual)
Kloveniersburgwal 97

Amsterdam Vondelpark (Groups)
Zandpad 5

Hotels
Prins Hendrik Hotel***
Prins Hendrikkade 52-57

Amsterdam Hotel Season Star***
Martelaarsgracht 18

Acro Hotel **
Jan Luijkenstraat 44

Ibis Amsterdam Centre ***
Stationsplein 49

NH Doelen ****
Nieuwzijds Voorburgwal 50

NH Amsterdam Centre *****
Stadhouderskade 7

B Questions Concept Evaluation

Photosharing Concept
Would you be willing to share your pictures with this system?
Do you like the idea of (your) pictures present in the hotel lobby?
Would you like the idea that your pictures come up front when you are around?
Would it trigger you to approach someone about the pictures?
Would you like other people to approach you with questions about your photos?

Map Concept
Would you use such a screen to create a map for that day?
What do you think of the idea that it is visible for everyone in the lobby?
Would you base your route on the ratings of others?
Would you be willing to rate a place you've been?
Would you be willing to step up to people interacting with the screen?

Recommendations Concept
Would you use the recommendations table for finding interesting new spots in the city?
Would you start interacting with it if someone else is using it?
What do you think of the idea that it is visible to other people at the same table what you are doing?
What do you think of the idea that other people can see where you've been and what you thought of it?
Would you ask other people about their (positive or negative) experiences?
Would you mind if people ask you about your experiences at a certain sight?

General Questions
Do you miss information or information you like to share?

C Questions Concept Evaluation 2

"You are a city tourist in and you are currently in the hotel lobby, in one of the corners is a small seating area. Above this seating area are some pictures shown."
What would you use it for?
Would this attract you to walk up to the couches?
Is it clear for you which pictures are yours?
What do you think of the quality of the projection of the pictures?
Would you like the pictures bigger or smaller?
What do you think of the added sound?
What do you think of the speed of the projection? Would you like the possibility to slow this down or stop it, or maybe speed it up?
How would you like to do that?
Would you like just one or more of these projections?
What do you think of these alternative projections, which do you like best?

D Questionnaire Before

Questionnaire CityTIP System

Name: _____

Age: _____ Gender: ◯Male ◯Female

1. How often in a year do you go on a city trip (for multiple days)

◯0
◯1-2
◯3-4
◯5-10
◯10+

2. When you are on a city trip, where do you generally stay? (Multiple answers possible)

☐ Hostel ☐ Bed & Breakfast
☐ Hotel (1-3 star) ☐ Pension
☐ Hotel (4-5 star) Other _____

3. For how long do you generally stay?

◯2-3 days
◯4-5 days
◯6-7 days
◯+7 days

4. With whom do you generally go on a citytrip? (Multiple answers possible)

☐ Alone ☐ Friends
☐ With my partner ☐ Colleagues
☐ Family (including children)

5. What do you do like to do in the city? (Multiple answers possible)

☐ Walk around ☐ Go out for Dinner ☐ Go to a public park
☐ Visit Museums ☐ Shopping ☐ Tours
☐ Sightseeing ☐ Nightlife Other _____

6. Where do you get your touristic information from before and during your trip (multiple answers possible)

☐ Internet ☐ Travel Agency ☐ I don't look for information
☐ Travel Books ☐ Magazines Other _____
☐ Friends ☐ Travel Agency Brochures
☐ Receptionist ☐ Other Tourists

7. How many pictures do you generally take on a citytrip?

- ◯ I don't take any pictures
- ◯ 1-20
- ◯ 20-50
- ◯ 50-100
- ◯ 100+

8. What do you photograph in the city?

9. What do you do with your pictures after your trip?

- ☐ Make a Photo Album
- ☐ Make a Scrap Book
- ☐ Show to Relatives
- ☐ Store on computer
- ☐ Put them online
- Other

10. Where did you go on your last city trip?

11. What did you like the best in that city? (which museums, restaurants, sights etc.) and why?

12. Could you please send 5 (or more) pictures of things you found interesting on your last citytrip.

Submit by Email

If this button doesn't work, please save the pdf and send it to me (bram.braat@philips.com)

E Questionnaire After

Questionnaire CityTIP Variation A

Please read the Scenario first

1. What did you think of the system, would you use it, and why or why not?

2. Do you think it fits in a hotel lobby, why or why not?

3. Would you upload your own pictures in the system, why or why not?

4. What would you use the system for (just inspiration, watching pictures with fellow travellers, etc.)

5. What do you think of the system as an interactive wall as proposed in the scenario, would that influence your usage of the system?

I would find the system useful for my city trip.

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

I like working with the system.

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

Using the system enables me to find interesting new sights more quickly.

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

The interaction with the system is clear and understandable

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

Using the system increases my range of visited sights in a city.

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

Working with the system is fun.

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

I would find the system easy to use.

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

Using the system on a city trip is a good idea.

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

The system makes city trips more interesting.

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

The system makes me connect with other hotel guests more easily.

Totally Disagree ○ ○ ○ Neutral ○ ○ ○ Totally Agree

F Observation Schedule

Time	P1	P2	Type	Comments

G Transcriptions open questions

1 What did you think of the system would you use it and why or why not?

I like the concept. I would use it, to look at some pictures during drink, dinner or waiting. I would not use it right after checking in, as in step 2 of the scenario, but go ty my room first.
For me the possibilities were not very clear, I only could show my pictures on the wall I had no idea that the wall is touch sensitive I would like to have more interaction.
Nice system I would not use it: I have no iPhone and I do not plan to buy one I do not want to show my pictures to other guests in the hotel.
Nice idea, I would probably not often use it, could be nice to look at the photographs taken during the day with the family, but then better on the TV in the room.
If the system could automatically takes my pictures then it would be nice to use. Not if too much effort is needed to upload the pictures.
A nice idea, especially to get an impression of the city if you just arrived. I doubt if I would use it with touching the wall, maybe better to navigate on your iPhone.
Nice system for sharing experiences. I may use it in a more relax environment, but may not use it in a 3 or 4 star hotel.

B

At first glance it looks very appealing. I was anxious to use it. I expected more info to go with the pictures, more interactive. Details like opening hours, background info
Quite innovative. Perhaps would come in handy to get a quick overview of attractions
For suggestions to visit in the city you are staying in.
Yes for waiting in the lobby.
I like the idea but I expected more. I would use it if it had more functionalities. Now I thought it was a bit boring
Nice as an enhancement of the atmosphere I'm not sure if I would really use it as I usually read up on the sights and museums before a city trip and thus already know what I would like to see.
It seemed a sort of photo browser triggered by my keycard. It did not show information except the name of the building.

2 Do you think it fits in a hotel lobby, why or why not?

Yes in the lobby, as there is usually is not a lot to do there and typically you are there to wait. But also in bar & restaurant to discuss pictures/happenings during dinner. Also in hotel room for atmosphere and checking if pictures appear correctly
Yes -> you can see pictures from others -> you get inspired No-> everybody can see your pictures, maybe a bit more privacy Touching walls -> dirty
Yes -> for people to interact together No - > I would install the system in hotel rooms as well – for people like me who do not want to interact with others after a day of sightseeing or show my pictures to others
Lobby could fit, has a good appearance. For function of sharing bar or restaurant would be better. Sharing with partner or family in room
Yes but maybe in a hostel with younger people.
Yes can really add something, but maybe it depends on the interior
No most of the hotel lobbies are quite. I might feel uncomfortable talking, laughing and discussing in such an environment.

B

Yes certainly. The lobby is a nice place to prepare yourself for the hours or day to come when visiting a city
Seems fine. Might even be better to have them inside the room
Yes definitely when setup is as broad as here.
Yes it is decorative and gives an impression of the guests like a digital guestbook.
It does fit in a hotel lobby. These are areas in which you often have to wait and where there is nothing more to do. It is also the core of the hotel so it's a good location
I would prefer to have it in the guest room. As I usually find it more relaxing to view photos in my own room instead of in the lobby. I would also feel more relaxed discussing photo and suggested tips in my own room (with my partner) than in the lobby.
It's a welcome into a city as well as the hotel

3 Would you upload your own pictures in the system, why or why not.

yes certainly when I'm travelling with a group
Yes I like to share pictures and it is an easy way to start a conversation
No: no iPhone
Yes it could be fun. My wife would probably not like it for privacy reasons
Yes if I would like to meet people in the hostel or if I really like my pictures and want to show off (and maybe something with it)
If I made nice pictures and if it doesn't cost me a lot of effort. It is nice to share pictures with others.
Maybe the main issue is the privacy. I might load the pictures without me or my friends on it.

B

Yes to give it a personal touch to inform others with nice places and things to do that you don't find in a brochure. I'd like to add more than just a picture, also remarks.
Only the general ones with the typical monuments and attractions. For obvious privacy reasons. I might not upload all the things from my holiday.
Probably not. I also don't use hyves, msn etc so much and don't have any weblogs or so.
Yes one or two pictures that turned out very nice. Yet no personal pictures.
Not in a hotel, or maybe only pictures in which there are no people. I wouldn't want pictures of myself showing. On the other hand if I had discovered something interesting in a city that's not in the guides I would like to share it.
Maybe a few that just show nice shots of the sights of the city. Not photos with people on it.
No as mine are likely of less quality. Yes if I have some new content which likely is not the sightseeing item itself.

4 What would you use the system for?

Watching pictures with fellow travelers Discuss highlights of the day Get info on where other travelers have been.
See your own pictures Share with friends See what other people in the hotel have visited
If the system were in a private room, I would use it to watch the pictures of the day with people who joined me in the trip
Watching my own pictures: for privacy a function could be added to delete pictures from the system. Would be good for travel info if information is added.
Watch with strangers (if I want to meet others)
Inspiration, sharing of pictures/experiences, also to see experiences of others.
Sharing, Also sharing with other travellers

B

Inspiration and to get in touch with other travelers, (by meeting themin the lobby, using the system)
Exchanging or looking at snaps from a holiday. Discussing presentations perhaps. Quick overview of plans/itineraries
Mainly inspiration
Watching while waiting for appointments, taxi, bus
Inspiration and hopefully more information that's outside the obvious touristic scope of a city
Quick inspiration to show other people (primarly friends/travel companions) what would be nice to visit
Bit of inspiration

5 What do you think of the system as an interactive wall as proposed in the scenario, would that influence your usage of the system?

Yes this is a valuable addition. The current implementation misses interactivity. Useful functions: Zoom, Next/Prev, Get info on location/picture, get info on router to location of picture of other person.
People sit around the table everybody can interact with the table and everybody can see the projection on the wall. If people stand in front of the wall other interested people can't see the pictures very well. Also the walls get dirty by touching it all the time.
The use of the wall is a nice idea: it gives the feeling of simplicity of the system. I think it would influence positively the use of the system for me.
Would make it more fun to use. Especially when information can interactively be re-trieved I would use it more
It's pretty much as I imagined, looks fun
I don't find touching the wall and usage of the keycard very useful, use for navigation your telephone or laptop
Yes the system itself is easy to use and interactive.

H Setup Lab Test

Lab Test Setup
Usability Testing of the System through Observation & Questionnaire

Main Goal of this user test is to find out if the CityTIP System will help participants to start talking about their touristic experiences with other participants. This will be compared to a situation with a slightly different system.

This test will take place in a controlled environment, the Hotel Lobby of the Hospitality Lab; the difficulty will be to create an atmosphere that is close to an atmosphere in a real hotel lobby. In this test we want to measure social interaction, the participants have already a common ground (being invited to the test), so there is already a possibility for social interaction, therefore focus will be on 'successful social interactions' using the CityTIP System.
With successful social interactions is meant that they start talking about their touristic experiences based on the pictures on the CityTIP system (or the equivalent in the comparison test).

Participants
The test sessions are done in groups of 5 and there are two different tests: the experiment with the CityTIP system and a control experiment, the test will be between participants, so 30 people will give 3 test with the CityTIP system and 3 control experiments, during each test there are multiple moments that social interaction can take place. Because the people will overlap there will be 4 social occasions for each session (where two people are present at the same time) 3 sessions this will give a total of 12 social occasions for each experiment.
The participants should be from within the target group: people who are between 20 and 40 and have been on a City Trip. In the pilot study only participants from within Philips were used, but for this test also participants could be recruited outside Philips, although this would probably give more difficulties regarding scheduling and preparation (how to direct the participants to the High Tech Campus for example) and they should be rewarded.

Script of the test
3 Weeks in advance
From three weeks in advance you should start distributing posters or e-mails about the test. These posters will ask participants for a usability test and interview about city tourism and are spread over the HTC campus (and beyond). In this will be that we especially look for people between 20 and 40, because that is the target group, also is asked for people who have been to a certain range of cities (Paris, Rome, Amsterdam, London and Berlin) and have taken pictures there. While doing this, you could vary a bit in the amount of people for each sessions but the total amount of social occasions should be the same between the two tests. A social occasion is a situation where two people are present at the same time.

2 Week in advance
Two weeks in advance you start sending out the small questionnaires (by mail) which will be send out as a small 'sensitivity questionnaire' and 'preparation for the test'.
This questionnaire includes general questions about city tourism and includes questions taking pictures on a holiday. They are asked to send (by mail) 5-10 pictures of the city trip, to use them in the tests; they are told that the pictures will be used so that other people are able to see them, without explaining the complete working of the system. They will be given 1 week to fill out the questionnaire and send the pictures
Besides that a schedule will be made with groups of participants who have been to the same city.

1 Week in advance

For each person the photos are linked to the key cards for this person and to the CityTIP system. For each test a certain set of photos is created with only pictures from the city where the participants have been. These are pictures from the participants but also some other (license free) pictures of this city will be added.

Day of the test
-Preparation
Hidden cameras and microphones are set up in the Hotel Lobby area; the CityTIP system will be started. The experiment will take place in the hotel lobby behind the desk of the receptionist, the assistant experimenter will be at the door downstairs and an actor will be present in a nearby room to ac in the test if one of the participants doesn't show up or is too late.

-Arrival of the Participants.
The participants will be asked to turn up at a certain time at the ExperienceLabs, with intervals of 10 minutes, at each interval two participants are invited. So e.g. if the test starts at 10.30 the first two participants will be asked to arrive at 10.30 the next two at 10.40. They are welcomed by the assistant experimenter. He will lead one of them upstairs, ask the other to wait for a couple of minutes and after five minutes lead the second one upstairs. Due to this the participants will arrive at the hotel lobby each differing 5 minutes with each other. By asking them to turn up at the same time, you prevent that people will turn up too late, so if one of them is too late you can already send the other one upstairs, if both of them are too late or one participant doesn't show up, the actor will be asked to participate in the test.

When a participant arrives in the lobby the experimenter will ask them to fill out a consent form. The working of the CityTIP system is explained (this is comparable to the real hotel situation where people receive a leaflet about the working of the CityTIP system). Although there will nothing be said about the social interaction features it should have. He is given a key card and asked to experience the system. The experimenter will offer them some coffee/tea and will tell them that they will be called back after 10 minutes to fill out a questionnaire.

-Observation
During the time they are present, the participants will be observed to see how they use the using the CityTIP system and if they start talking about their experiences at the places on the pictures to the other person. This observation is done by the experimenter using an observation form and will be analyzed afterwards by analyzing the recorded observation videos.

-Questionnaire
When the participant is called back after 10 minutes they are asked to fill out a questionnaire about the system, this includes several open and closed questions about usability settings (e.g. how did you like the system, would you also use it if you were in a group with people etc.) and includes a TIPI test to test their personality, this test is conducted to see how different personalities influence the test.

-Concluding the experiment
The participants are given their reward and are taken to the door.

Interaction with CityTIP system

When placing a key card on the table the system will show their pictures, because the pictures enter the project from the side they are sitting on, they seem to appear from them. When interacting with the wall one of the pictures can be magnified.

Interaction with control system

The script of the control test will be roughly the same, but there are some slight differences.
When placing a key card on the table the system will not show their own pictures but will show a general recommendation to visit in the city. The picture will appear from the centre of the screen. When interact-

ing with the wall more information of one of these sights can be found.

Results of the Test

Measurement

The success of the system will be measured by comparing the amount of 'successful interactions' in the 'real test' and the 'comparison test'. These 'successful interactions are interactions where the participants start to talk about their city tourism experiences using the photos on the CityTIP system.
The different social interactions (dialogue) will be coded according to towards the next scheme:

0. No Dialogue
1. General Dialogue
2. Dialogue about the System
3. Dialogue about the Pictures
4. Dialogue about their experiences based on the pictures.

Analysis

The analysis will be done using a video analysis system and the results from the filled out observation forms. By counting the different interactions and by using a non-parametric analysis can be seen if there is a significant difference according to interactions between the CityTIP system and the control system.
Based on that and on the amount of 'successful social interactions' the success of the system will be defined.
The results of the questionnaire will be used to find out how the participants like the appearance system, how useful they think it is, how easy it is to use it and how easily it would connect them to other participants. The results of the Likert questionnaire will be analyzed and compared between the two different tests as is done in the pilot test.
Recommendations for the system will be drawn on the results.

