

Designing a Mobile Social Service for a Mall: User Experiences of Kista Galleria

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Abstract: A study was performed to investigate a domain for a mobile and social service, where a web of social trails is overlaid over a physical space. Using a method inspired by work of the city planner Kevin Lynch, 20 subjects were interviewed about their experiences, activities, movements and habits related to a specific shopping mall. Design implications for the service were drawn from subjects' sketches of the area, lists of places important to them, and their daily routes through the mall as drawn on a standardized map. Three user groups were identified based on the amount of activities and time spent in the mall: dwellers, shoppers and exploiters. User sketches indicated that traditional maps are not an optimal means for visualising the mall in the service. Finally, the way subjects grouped, labelled and defined places and objects in the mall provided valuable input to the design of the service interface.

1. Introduction

Mobile services introduce new and interesting demands on the interaction between humans and services. The environment in which a mobile service is used is different from that of a stationary service in many ways, and varies in ways that are difficult to foresee for the designer. Noise levels, privacy concerns and connectedness as well as smaller screens and limited input facilities are just a few of the factors that need to be taken into account.

However, mobile settings also allow for new and interesting services to be developed. Not only may the user be mobile; service content may also be made available to the user based on context. Information of various sorts can be overlaid atop a physical space. Location sensitive tourist information is one example of such a service.

The content that is overlaid need not only be provided by a service content provider. Users may themselves provide information, as exemplified in services for posting virtual Post-It notes, such as GeoNotes [7]. In addition, social behaviour in the real world can be transferred into the world of computer systems.

Social navigation [4] (i.e. following others in various ways) and recommender systems as a means for navigating information spaces has been successfully applied to many stationary information spaces (e.g. [9] and []). By investigating user behaviour

with mobile services, social trails of use may be integrated into the digital web of information overlaid over the physical space.

This work envisages a service that support and enhance the experience of mobile people's activities in a scenario that is more relaxed than at work, more limited than "real life" in general, and more accessible than at home. A good explorative domain for such a service would be a domain that is limited in space; where people come and go on a regular basis; and where prospective users have habits but still might benefit from new information, tips or recommendations based on others' activities. The Kista Galleria shopping mall promised to fulfil these criteria.

Kista Galleria is located in a suburb to Stockholm. It is an indoor shopping mall featuring a movie theatre, a Food Court, an internet café, a tools shop, and a baby-sitting service. As indicated by a previous, ethnographically inspired study [8], at lunchtime on workdays the mall and its Food Court becomes a canteen for office workers. On weekends, families take over.

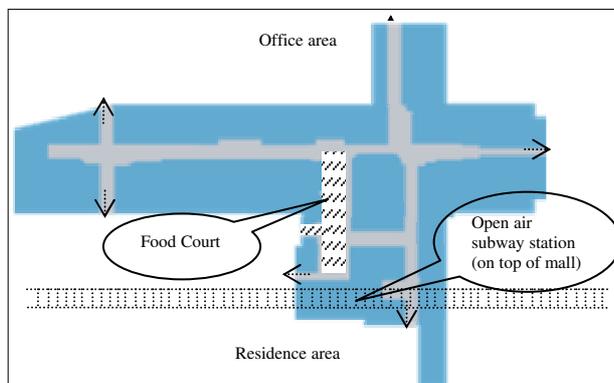


Figure 1. Kista Shopping mall and subway

The location of the mall makes it special: it separates a suburban residence area from a large office area (Figure 1). According to a website promoting the region, this is the "epicentre of the Swedish IT industry", with 375 high-tech companies employing about 18.000 people (www.kista.com). An interesting aspect is that although people both work and live here, it is not really the same people. According to statistics from the local county office, only 8% of the 27.000 people working in the area live there. These 8% constitute a little over 20% of the work force living the region. None of the subjects in this study both lived and worked in the region.

This study was intended to provide input to the design of a mobile and social service based on overlaying the shopping mall with user-provided content in the form of personal and aggregated tips and recommendations on stores, activities and objects available in the mall. Content would be distributed over user devices and server stations (hot-spots). The expected output of the study was to further specify the functionality of the service and provide input for the design of an interface for a system running on the Sony Ericsson combined PDA and mobile phone, P800¹.

¹ A new generation of this device, the P900, is available since the end of 2003.

2. Method

There is a lack of methods for aiding the early design phases for mobile services. While mobile services in many respects are similar to interactive services in general, some mobile services exploit properties of the usage situation and use context data as part of their functionality. They might make use of the present position, the presence of other users nearby connected in ad-hoc networks, or information provided by objects (using e.g. RFID-tags) or interactive devices (e.g. Bluetooth stations) nearby.

Some methods for early concept development focus on design for a changing context of use. Oulasvitra et al [6] introduced the *body storming* technique, where the main idea is that design questions should be solved in situ. If developing services for a shopping mall, brainstorming sessions should be conducted in such a mall. Iacucci and colleagues [5] propose a method where a *role-playing game* is created. Acting as a game-master, the designer observes how the game unfolds as new artifacts and situations are introduced. The same paper describes *Situated and Participative Enactment of Scenarios*, a method where a designer shadows a user in her daily activities when interacting with a mock-up of a future magical device.

The mobile social service discussed here is dependent on the architecture of the mall under consideration and the way it is defined and used by its inhabitants. A method proposed by city planner Kevin Lynch was selected as suitable for this specific situation. Discussions on places and spaces (e.g. [1] and [2]) also provided available input to this work.

2.1. A Process of Community Visual Survey

“A Process of Community Visual Survey” [3] is a tool for understanding the (mostly visual) characteristics of an area, identifying qualities that are valuable and worth preserving; or undesirable and should be changed; changing qualities, and whether the change is for better or for worse; and qualities that are most vulnerable to change.

The survey method consists of three steps. During the first two steps, the area is documented as objectively as possible, first viewing it as a set of places and then as a set of “journeys”. Of most interest here is the third step, where inhabitants are allowed to give their views on the area. Lynch suggests a method for interviewing a sample of the area’s people. About 20 people from an interesting user group are asked 1) to draw a map of the area and indicate frequently visited places and routes; 2) to list important places; 3) to discuss visual changes in the area; and finally, 4) to state major visual problems in the landscape ([3], pages 279 and 283).

The original method was slightly adapted to better fit the current purpose. The visual focus was de-emphasized by removing questions three and four. Question one was modified by not specifically asking for a map but more vaguely for a sketch. Further weight was put on routes by moving them from being part of drawing the map to a task of its own. A standardized map was used for route drawing, to enable comparison of routes in a more straightforward way.

In addition, more information was needed about places: names and types of places mentioned, by whom they were used and at what time. Instead of including a specific task for eliciting this information, subjects were encouraged to speak about what they did in the mall, and follow-up questions on time, place and company were asked.

Interviews were based on a manuscript but care was taken to make them informal and open-ended, as recommended by Lynch. To elicit as much information as possible, test subjects should feel relaxed and free to make their own interpretations.

As many interviews as possible (16 of 20) were also made in situ in the mall, for better effect [6]. The remaining interviews were made at our institute, located close to the mall.

2.2. Subjects

For the mall study, it made sense to focus on a plausible target user group for the proposed service. Plausible users were defined to be people visiting the mall frequently (working or living in the region) and with an interest in new technical equipment and services (early adopters). When recruiting subjects, only people of working age and following “office dress code” were approached, and only those either living or working in the region were recruited.

Twenty subjects were interviewed over period of a few days in May 2003, ten female and ten male, aged $18 < 33.6 < 55$. The educational level was high, as could be expected from the selection criteria. The youngest (two subjects), were still at high school level, two were studying for a university degree and eleven already had such a degree. The educational level of the remaining five was more unclear (e.g. studies without a degree), but they were all above high school level.

Fifteen subjects were working or studying in Kista, and the remaining five were residents. One worker and one resident were visitors, staying for a period of a few months. Two residents were young students going to gymnasium (high school level) in the region.

2.4. Procedure

The interview milieu was set up on location in the mall and subjects were recruited as they were passing by. Subjects were told that the experiment leaders were researchers trying to design new mobile services for the mall and that we would perform a short interview, to better understand what people typically do in this mall. If wanted, more information was given after the interview. Subjects were then given three tasks, one at a time:

1. *Draw a sketch over Kista.* Subjects asking if they should draw the region or the mall were told to make the choice themselves. While drawing, they were encouraged to include both views.

2. *Write a list of important and/or frequented places:* Subjects were told that the order was not important. For each place, follow-up questions were asked about

whether they would go there mostly on their own or with others, when during the day, and how frequently.

3. Draw frequent routes on a standardized map: When response to task 2 faded the list was put aside, and subjects were presented with a simplified version of the official map of the mall and a set of colour pens. Responses to task 3 were solicited by asking what routes subjects would typically take when entering and leaving the mall on different occasions. If needed, they were encouraged to draw more routes (going to work, when coming home from work and when going to the mall for lunch) based on what they had revealed about their activities during tasks 1 and 2.

Finally, a set of demographic questions were asked, on age, educational level, occupation, profession, and workplace.

3. Results

Documentation for each subject included their sketch(es), the place list and route description, together with the demographic notes. The whole procedure was also documented on video with sound recording. Video tapes (5 hours in total) were studied in a systematic way. Sketches, list of places and routes on paper only gave part of the picture, since many places were only talked about but never put on paper. In the post-study analysis, all places mentioned during task one and two were noted, as a complement to those written down by the subjects. The order in which places were included was also examined, and the starting point for drawings was noted.

3.1. Sketches

The sketches drawn in task 1 varied from detailed maps to sketches, overviews, and pictures with more artistic qualities. Figure 2 shows some examples: a detailed map, an artistic skyline depicting “home” and mall with subway (T) and landmark high-rise building, and a drawing including details of the stairs and handrail from subway to mall entrance level.

Most subjects (16 of 20) drew regular maps, but some subjects took the instruction to draw a sketch of their experience of the mall quite literally. Figure 3 shows two such examples. The first shows the frustration that this subject felt with the organisation of roads and parking lots in the neighbourhood. The second sketch shows quite a different experience of the mall. Instead of showing the mall building as a rectangular or cross-shaped box, it shows the region as a ragged circle with the mall (or more specifically, the Food Court) as a circle within. Placed inside the circle are various restaurants and some people.

Six subjects focussed on drawing the mall only, while four subjects only drew the outline of the mall and concentrated on the surroundings. Of the 15 subjects who included in-door mall details such as alleys, shops and the location of the Food Court, only four also indicated some outline of the building. These results strongly indicate that this mall is experienced from the “inside” in terms of the shapes of alleys and patterns of walking through the space. The outer shape of the mall building is not

known or of little importance to subjects, as is its exact internal structure or the number and location of exits.

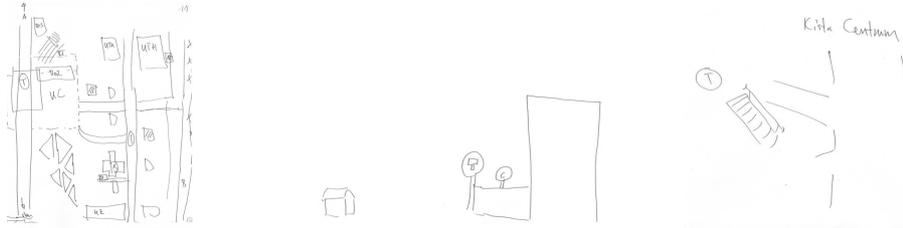


Figure 2. Left: subject 11; middle: subject 14; right: subject 6

In-door sketches of the mall exaggerated the size of alleys while shops were drawn as smaller entities. One strategy used by several subjects was to first draw the passages and then “hang” little shops on the sides (Figure 4, left). Even those subjects striving to draw “real” maps with correct scale distorted size, a both common and efficient behaviour in map drawing, as discussed by Tversky [10].

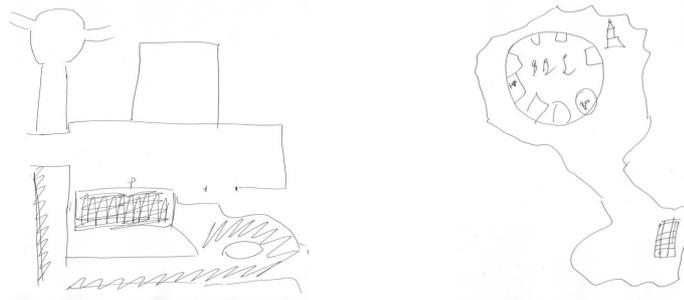


Figure 3. Shopping mall and surroundings. Left: subject 2; Right: subject 5

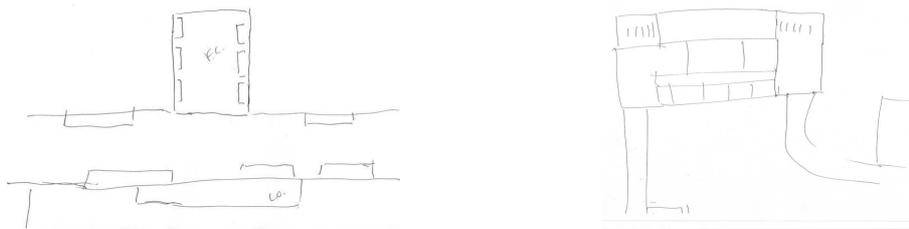


Figure 4. Distorted size (subject 3 , left) and selective drawing (subject 16, right)

In general, sketches not only focused on use but completely and explicitly omitted rarely visited parts of the mall (Figure 4, right). One subject also commented on this while drawing:

Subject 9: I think that Kista Galleria looks something – it doesn’t really – like this ...

Subjects also repeatedly drew certain aspects of Kista to do with how to travel to/from the area. Thus, sketches by people arriving by subway would include subway and workplace as well as the connection between them (e.g. subject 16 in Figure 4). Those

arriving to Kista by car might include more of the outside with roads and buildings (subject 11 in Figure 2 and subject 2 in Figure 3).

In general, the subjects who participated in this study did not frequent all parts of the centre. Not very surprisingly, dead ends were less frequented than central parts. Subjects working in the region rarely included the residence area in their sketches, while residents would omit the work area.

3.2. Places, regions and naming

While drawing sketches, a number of places were mentioned although few were marked on the sketches. In general, fewer places were mentioned when subjects were asked to write down a list of places. Most would mention their workplace, the Food Court and a few other places, such as a few (~3) shops they would frequent and a restaurant or two. All subjects mentioned the Food Court, and a few very well known shops and restaurants were frequently named and listed.

Some parts of the mall would be referred to as named regions that could include several smaller places. The Food Court was regarded either as one place or as a region consisting of restaurants and seating areas. The “fashion alley” and “the food stores” and the “alley by the entrance” are other examples.

Places would also be grouped according to their use. When trying to recall places subjects would typically say something like “sometimes I buy presents” or “I shop for clothes” and then list a number of stores. This categorizing would correspond more or less to that used by the mall (e.g. using labels such as Shoe shops, Restaurants, and Service). One category outside of that system was “errand places”, grouping places such as the chemists, the dry cleaners and the post office.

Several observations were made on the naming of places. Subjects would not always remember the exact names even of shops they frequented a lot, but would instead refer to them by type: “the Pet shop” (Subject 8) or “the Italian” for the Italian restaurant in the Food Court. Names conveying feelings or impressions were also used, such as “the spangle shop” (Subject 17) for a shop selling pretty dresses and accessories. Frequently, subjects would work hard to remember the name of stores, sometimes succeeding and sometimes not. Places were instead recognized based on their location and type: when presented with the official map subjects would point at it and give detailed information.

Subject 8: “... and then it’s the food store, I don’t know what it’s called...”

An important goal for Lynch’s survey method [3] is to find places that are perceived as particularly nice or beautiful and thus worth preserving. The subjects in the mall study rarely expressed strong positive or negative opinions.

It could be noted that several subjects indicated that residents and workers tended to stay on their side of the mall, not mixing with the others:

Subject 14, resident: “I never go here” (puts a cross at one of the exits to the working area)

Subject 16, worker: “and over here it is sort of... well... it is completely black” (waving her hands over the residence area) “... no, I know... church ... no I don’t know anything there”

3.3. Routes

An interesting behaviour noted was that subjects would frequently draw very specific and reoccurring routes that they often took through the mall. They would turn at this corner and pass that store on a regular basis:

Subject 17: “This [indicating on map] is my favourite shop; I take a look there every day”

It was not unusual to use one route for going and another for coming back. Subject 20 gives a good example of pre-defined route behaviour. He described usually going one way from the subway to work but on some occasions using the other subway exit; using different routes going home from work depending on the time of day; and usually going one way to lunch at the Food Court but another back from lunch (Figure 5).

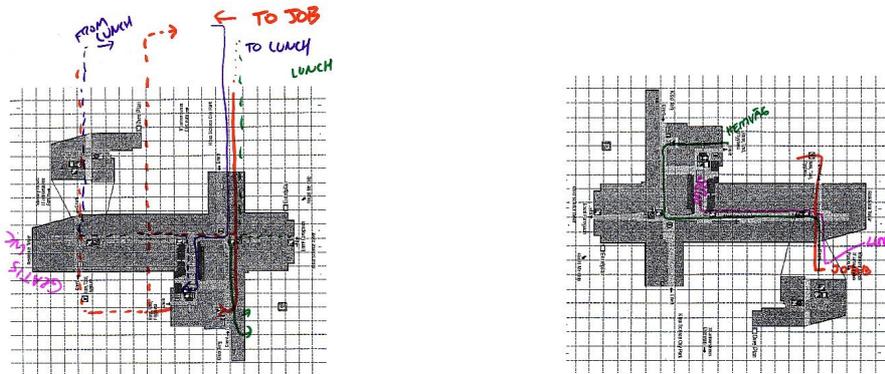


Figure 5. Alternative routes for subjects 20 (left) and 16 (right)

3.4. Activities

Activities in the mall were naturally defined by the facilities available: mainly shops and restaurants. A more detailed analysis revealed the following activities.

- **Transport:** going to/from work or to/from home, often following standardized routes as discussed in the previous section.
- **Eating:** Having lunch, dinner or coffee. Residents would go for a snack or a coffee; workers would go for lunch a few times a week. A few office workers reported that they were more or less forced to have lunch with their group (their closest colleagues) about once a week, but would have lunch at work otherwise.
- **Errands:** Subjects reported using the mall for buying things that they needed (as opposed to browsing/shopping, below). Two cases for errands could be discerned:
 1. Knowing exactly what to buy and (usually) where to go. Replacing a light bulb or going to the dry cleaners are examples of such errands.
 2. Knowing where to go but not exactly what to buy. Examples are buying a present at a specific shop or shopping for groceries.
- **Shopping:** strolling around the shops, possibly but not necessarily buying anything.

Other activities mentioned were playing games or getting connected at the Internet café, going to the movies and simply hanging around.

3.5 User types

Regardless of whether subjects were working or living in the area, three different user types could be identified with regard to the activities performed and time spent in the mall (Figure 6):

Dwellers spend leisure time in the mall, meeting friends, hanging around, going for a coffee; they use the shops and go to the movies. Residents are typically dwellers, but not all residents are dwellers and not all dwellers are residents.

Exploiters spend as little time as possible in the mall, but do appreciate it for providing service. The shops are used as a convenient way of getting errands done – picking up a missing tool at Clas Olsson, the tool shop; using the dry cleaners; or going to the chemist's. Exploiters may also pick up their lunch at the Food Court or at one of the grocery shops. If they have lunch in the mall it is typically at someone else's initiative, such as a weekly lunch with colleagues.

Shoppers, finally, fill the gap between dwellers and exploiters. Shoppers take advantage of the fact that the mall is close to where they work (all shoppers in this study were workers), both for browsing shops and doing actual shopping. When going to and from work and at lunch they will take an extra walk around the mall, and they might occasionally go for a movie or to play computer games at the Internet café.

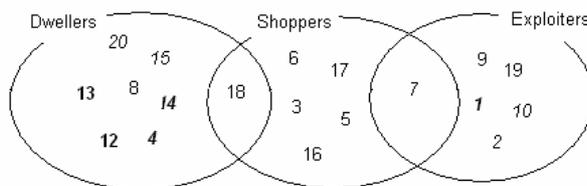


Figure 6. Dwellers, shoppers and exploiters. Residents in bold face, male subjects in italics

Users could also be classified using another dimension: their coverage of the mall area. The *high coverage* group is dominated by people arriving by subway and working in the area. They typically use more than one entrance and use more facilities (stores and restaurants). Subjects with *low coverage* only go to a few places in the mall, and only use one entrance. This group includes both residents and workers arriving by other means than the subway.

4. Discussion and Design Implications

A number of design implications were drawn from this study:

1. The definition of a viable target user group that will benefit from and be interested in a social mobile service;
2. Input to the design of a representation of the space suitable for conveying aggregated user behaviour;
3. Suggestions for how to categorize and cater for naming of places, areas and objects that users might want to express opinions on.

4.1 Defining the target user group

In the analysis of the study results above, two dimensions by which users can be characterised are relevant to the design of a social mobile service. The first is the activity dimension, where users are classified as exploiters, shoppers or dwellers. As we want to support the activities that occur in this specific mall, it is crucial to find a user group that indeed does perform some activities in the mall besides just passing through on their way to or from work. Thus, shoppers or dwellers are most interesting to us.

The second interesting dimension is the coverage of the mall. Since certain groups have a natural, larger, coverage of the area, they will more frequently encounter hot-spots with aggregated trails or other users through whom they can obtain tips and recommendations.

One characterisation of the target user group is that they often travel by subway to work, they often have lunch in the mall, and that they spend some time shopping in the area even if they might not hang around in the evenings. They also often take one route to work and another route to go home and the same at lunchtime. Thus, they will be passing through several parts of the mall. Most of them are working in the region, known to be a high-tech, engineering industry area. Thus, it is likely that many users in this group will be early adopters who are interested in new technology and who have access to advanced mobile phones, such as the P800, for which we are developing our service.

4.2 Naming of places and areas

The results on naming and categorization of places and areas show that people do not necessarily use the names and labels provided by a content provider. Exact naming is forgotten, nicknames and new categories are used, and places and objects are defined in relation to context. This has severe implications on the design of the service, especially if content is to be provided by the users themselves.

A solution to this problem is to provide users with an open-ended interface, where new categories and labels can be entered (when entering a tip or recommendation) and explored (when searching). However, initially leaving the service completely empty probably makes it impossible to use.

In addition to allowing for new labels, the service should therefore offer a selection of different types of labels, collected initially from the studies. As the system is put to use, user-provided labels will be made available to other users. Preferably, the list of available labels should be manually moderated.

4.5 Using Maps

The social mobile service discussed here would use aggregated trails of various kinds as the basis for interaction. An initial design suggestion was to use a map-like representation of the mall in which to show who had been there, what routes they had taken, where tips had been placed, etc. However, the results from this study indicate

that the mall is not perceived as depicted on the standardized map. Drawings focussed on more aspects than those related to maps, including seemingly un-important details such as handrails and trees. A conclusion that might be drawn is that any presentation of the activity of Kista might not necessarily be best presented as a map, but offer different views adjusted to these different perspectives with marked places of personal importance to some and more route-based overviews to others.

However, map drawing is a much more difficult task than map reading. The official mall map is presented in many places in the mall, and is thus easily recognizable. An alternative solution would be to use the official map but to modify according to the results of this study, taking into consideration previous research on how to communicate using maps and graphs as discussed e.g. in [10] and [11].

5. Concluding remarks

The aim of this study was to gain knowledge and understanding of the use of a shopping mall. The study provided input to the design a social mobile service where a real life domain of human activity is overlaid with social trails of user behaviour. In addition to these design implications, the study also supports the validity of an initial assumption: that a shopping mall is a good explorative domain for such a service.

Acknowledgements

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