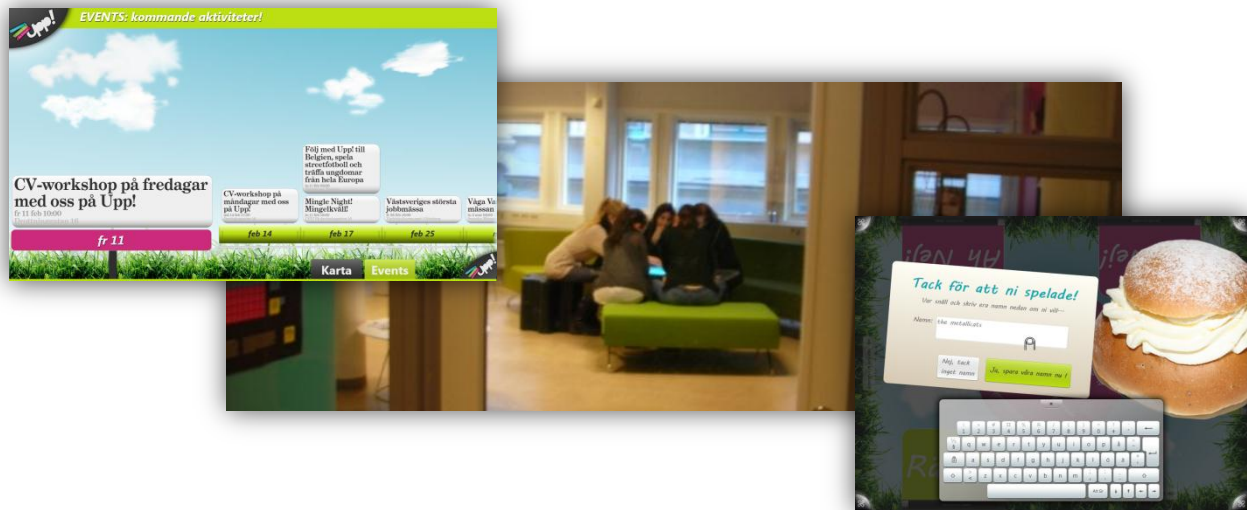


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Social Value of Multi-Touch Interfaces for Public Places

A case study on the conception of large multi-touch applications aimed to support community building, its practical results, and the subsequent analysis of the designers' responsibility in this process.

Master of Science Thesis in Interaction Design

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Social Value of Multi-Touch Interfaces for Public Places: Case Study
Master of Science Thesis in Interaction Design
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Cover:

Left: Screen capture of the Entrance Application developed during the master's thesis. See p.33

Center: Players of UppQuiz developed during the master's thesis. See p.42

Right: Screen capture of the UppQuiz

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1 Introduction

1.1 Aims

This thesis will examine the idea of creating social value with Information Systems, by combining interaction design knowledge, technological knowledge, psychological analysis and marketing involvement. The proposition will be presented and evaluated using as backbone a particular case suited for that approach, in the context of public spaces, politics and a recently blossoming technology: multi-touch screens. Our work process is aiming to acknowledge the multi dimensionality of interaction design work. In clearer terms, when we speak of "social value" of multi-touch interfaces, we consider three levels:

- **personal engagement:** as a designer, what are our personal motivations? How does our environment (supporting structures such as companies, research groups) influence our action and at which price can we act in the sense of a politically charged action?
- **interaction design action and responsibility:** knowing the technologies available and tailor them to a specific situation, in accordance to the level mentioned above. Express what we knew about the technology and the situation at the time of design, and keeping in mind possible organization and technological changes in the future.
- **producing a "social" experience** (not political meaning but in terms of social interaction) through the specific use of a multi-touch, tabletop interface. This level is more concerning the particulars of human-computer interaction in our specific use case, and is the consequence of the previous levels.

We will describe how we approached these three levels of social value through our case study, first by explaining how political concern and knowledge of technology shaped the scope of our action and influenced the concept development.

Secondly we will present our analysis of the situation at Upp, and how a psychological interpretation of group dynamics enabled the creation of tangible requirements for an Information System.

In the third part, we will characterize Large Multi-Touch displays and explain how it influenced our choice of hardware and software platform to respond to these requirements.

In the fourth part we will develop a rationale for two applications which were deployed in the public space, and evaluate the social value provided against the requirements defined.

This will lead us to discussing the role of Interaction Design, and how introducing more control on the marketing aspects can help bring about value to the end users.

1.2 Case study

The case we will describe and refer to in the rest of this work, is a project in collaboration between an independent designer (the author), a multi-touch screen development company (Touchtech AB) and a non-lucrative organization (Upp Göteborg). It spanned the period between May 2010 and January 2011, representing 6 months of full-time work in the city of Göteborg, Sweden. We will first briefly present the two main stakeholders besides the author, for clarity and reference.

1.2.1 Technological Partner: Touchtech AB

Touchtech AB, is a relatively young (3 years) and small company (4 full-time employees in May 2010, 8 in January 2011) located in central Göteborg, Sweden. Touchtech acted as main managing and technological advisor for the project, along with Chalmers University of Technology. Touchtech also provided capital resources for the completion of the project, both in terms of hardware and knowledge, and a comfortable work environment. Touchtech's expertise in developing tabletop and multi-touch applications has helped many clients over the last few years, in different branches of the leisure and sales industry including big names such as Carlsberg, Absolut and Göteborg's Municipality. Its ties with Microsoft guarantee some access to relevant technologies, at a professional level of maturity (Microsoft partner, BizSpark). Touchtech's aims in this project are to reach some new markets, outside of the leisure industry, preferably develop collaborative applications, and obtain insights about best practices. The present work hopefully will answer those questions among others.

1.2.2 Project Benefactor: Upp Göteborg

Upp Göteborg is a local organization, funded both by the City of Göteborg, and by the European Union (European Social Found, www.esf.se) for three years (2010-2012). It aims to provide personalized guidance and help for young people between 16 and 24 years old. The distinction between this organization and existing guidance offers (study counseling, working and coaching agency) emphasize the free-willingness of members to take part in the organization, and the creation of a helpful community of members. Besides those distinctive traits, it is also entirely free of charge, in the tradition of Sweden as a Welfare state.

The personnel consists of Guides, responsible for helping and following members, and an overarching managing organization which encompasses the maintenance of a website, the maintenance of locals in the center of Göteborg, organizing the action of guides and creation of events in the locals. The imposing locals of 1200 square meters downtown were opened to the public in September, for receiving members, groups, and events.

1.2.3 Our action: interaction design, development, marketing

The author was at the initiative of the project, from the initial concepts to the design, implementation and part of the deployment of the project for Upp. The responsibilities largely overcame the Interaction Design field, including taking charge of proposals for buying hardware equipment and consulting time with IT specialists from Touchtech, in order to realize the proposed design ideas.

2 Scope decision and motivations

In this section, we will develop precisely the way partnerships with first Touchtech and then Upp Göteborg came to be. This account will also expose our initial motivations, and how our desire for political action influenced the scope of action for the present work.

2.1 Initial motivations and Touchtech partnership

Initially, the author's proposal was to create a system that would participate in local politics. By local politics, the author formerly considered broadly any technological enhancement in public decision-making and its applications, such as the pilot projects commissioned by the European Union ("European e-Participation preparatory action," 2009). By inability to join the existing programs, and even to contact them at all, our interest broadened to current political issues at the local level, assisted or not by Information technology.

Once that decided, the first step taken to begin research was paradoxically to seek a hosting structure, which would understand and support that research of a political situation rather independently from technology at the beginning. We made that decision in order to benefit from information about currently available technology, to benefit from a supporting and encouraging environment, and to be in measure to actually realize the project with that partner in case it became viable.

However, that partnership was entirely free of engagement from both sides, and until a very late stage (November 2010) remained free from commercial contract and relatively free from commercial influence. The nature of the relationship was initially only to explore the opportunities of introducing technology into a politically charged situation, out of the mutual interest for the political area

Other interaction design-driven companies, perhaps more suited to this kind of work, were also contacted. However, ultimately we tend to believe that the collaboration and contact with specialists in a field is a desirable catalyst which can, and arguably has, sped up a process which would otherwise be difficult to dominate and control. We also were aware that focusing on a particular political issue - domain foreign to us- would be easier by considering simultaneously some specific technologies to narrow down the array of possibilities.

Another defining assumption was that multi-touch-screen based technological solutions is a-priori well fitted to a very localized, public use. This adds up to areas of competence which were highly desirable for the kind of end-to-end work that we wished to achieve: public use, openness to new fields of knowledge, specialization in highly entertaining interfaces.

2.2 Identifying a political issue

The rather large work of prospective research in the early phases of the project revealed some opportunities in the current political climate of Göteborg, regarding a wealth of topics. The gathering of information was performed through a daily reading of the free edition of Metro Göteborg, along

with the headlines of Göteborg Posten, the popular Flashback forum, Newsmill.se and some official sources of statistics such as statistiska centralbyrån ("Statistiska centralbyrån hemsida," n d), kommunens database ("Göteborg Commune Database," n d), national unemployment agency statistics ("Arbetsförmedlingen Statistics," n d), national housing agency statistics ("Boplat Statistics," n d), Göteborg city yearbook of statistics ("Göteborg Yearbook of Statistics," n d). Occasionally, some visits at the Göteborg libraries granted access to specialized magazines of political nature.

Some friends and contacts in Göteborg also helped to find these sources of information, and gave some informal opinion about which issues are most important. This led to the monitoring and evaluation of the following three topics: unemployment, shortage of housing, and financial issues (tax repartition and collection, transparency).

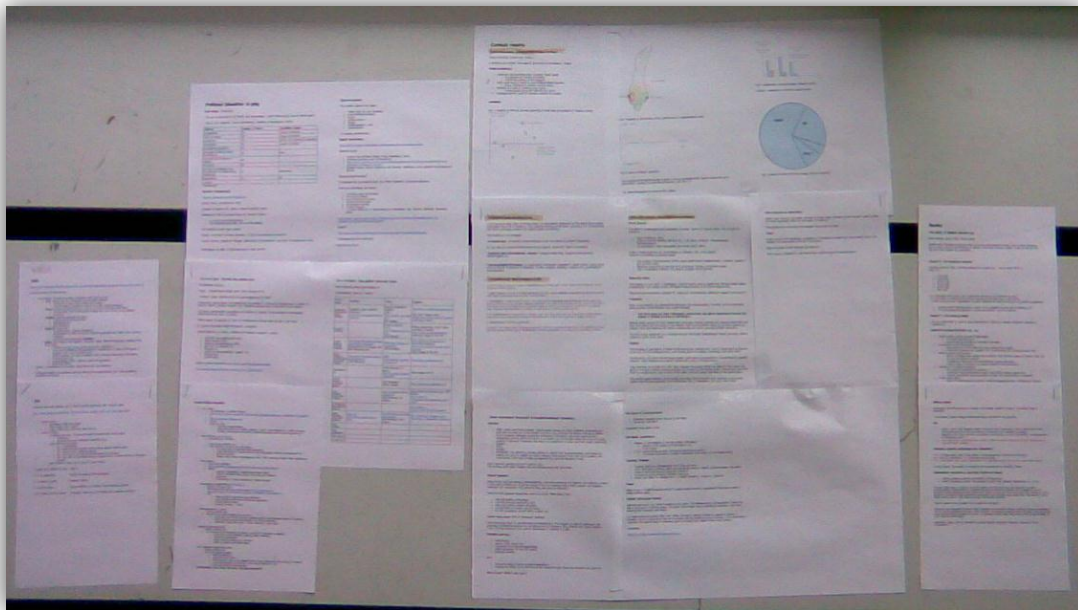


Figure 1: The data collected and assembled as a poster, in May 2010

In addition to monitoring the news, we also performed a series of three interviews corresponding to the three topics at hand, to probe further some potential issues and opportunities. To this end, we met a representative of Arbetsförmedlingen (Unemployment office), a representative of Boplat (public housing agency), and a representative of the city's central district (Göteborg centrum). These interviews helped characterize the local action further, which led to about ten different proposals of public systems using touch-screens and specific political issues. They were narrowed down by a poll sent to peers and interview participants to only three, each corresponding to the three topics.

The help of Touchtech at this stage was concerning information about multi-touch screens, with access to resources, examples, and actual running software to discover the range of already developed products using Multi-touch technology. There was little to no involvement on the political use of that technology, and one session of feedback to evaluate these rough ideas from a technological standpoint, was there to stimulate and encourage our progression in targeting a specific issue.

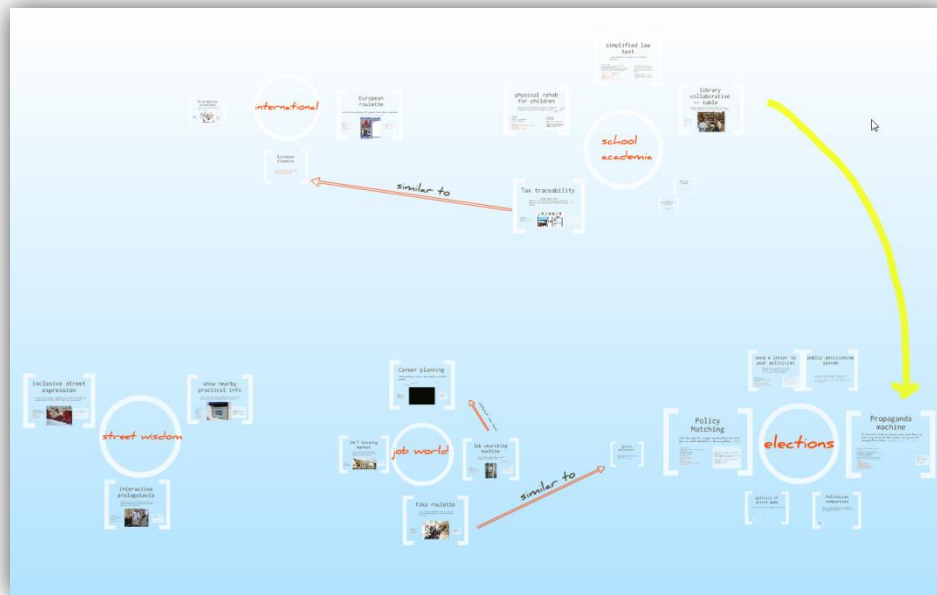


Figure 2: . Different ideas, grouped by general common theme (Gantois, 2010a)

The three remaining concepts were further refined, and evaluated by their likeliness to be implemented, which ultimately makes sense as a criteria for politically-engaged action. Arguably, this decision has directly affected what degree of freedom was left, as design focus was more on practically helping a specific situation, using only the technology of multi-touch screens as provisional anchor.



Figure 3: View of remaining ideas, size representing their relative "likelihood" to be achieved during that thesis timespan (Gantois, 2010b)

Fleshing out ideas in a pitch-like manner, with only a few lines of text and a picture left quite a lot of latitude, and all these ideas would need a lot of refinement if they were to exist. This wasn't perceived as a big drawback at that stage, since there was only a theme and an archetypal organization as target of these concepts, not a final environment or user base. We prefigured that going forward with these concepts would lead to more specific requirements emanating from the different environments, which were too demanding to investigate yet.

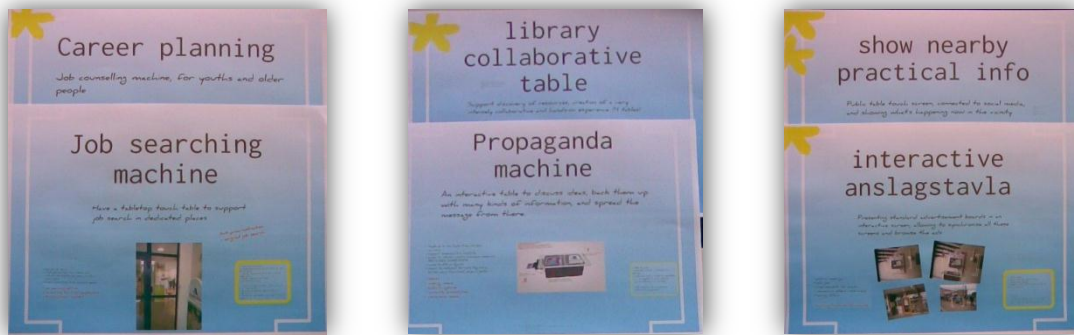


Figure 4: Last three remaining concepts, before choosing Upp

2.3 Political reasons for choosing Upp!

2.3.1 Upp's response to local unemployment

The official figures provided by Arbetsförmedlingen showed an increase of unemployment in 2010. This general tendency over the last few years especially concerns youths between 18 and 24 y.o, ("Arbetsförmedlingen statistics - previous years," n d) which increased from 3.4% of the that age range in 2008 to 5.5% in 2009 in Göteborg only. In the whole of Sweden, from 3.7% to 5.6% between those two dates. It appears this tendency got even worse in early 2010. (from 2.8% to 4.8% for the general population in Göteborg).

Upp identified this problem, and took benefit of the European Social Fund ("Europeiska Socialfonden," n d) to start a project in early 2009. Its political ambitions are to minimize the amount of young people who are unemployed, by providing personalized help devoid of any other stake. The current offer for such guidance is either not-free, thus difficult to access for those who have no income, or belonging to Arbetsförmedlingen which brings two problems: it provides advice, which is at risk of being biased towards the institution in question, and not focused on the welfare of the person, or it is not independent of the person's will to be guided. For example, perceiving social help depends on the Arbetsförmedlingen institution, which members have to visit periodically, and whose primary purpose is not hearing and guiding the members.

Consequently, Upp has a unique position by being simultaneously free of charge, free of will, and focused exclusively on supporting the members. An additional benefit, is that the user base is rather well defined, in terms of ages and locations. (12-24 in Göteborg)

Finally, a very down to earth and practical consideration is the comfortable budget allocated to Upp's activities, which amounted to 8M€ for 3 years. This enabled some discussions initially freed from financial considerations, allowing to consider what would be the best scenario of use, and would fulfill best Upp's objectives.

2.3.2 Upp's focus and technological opportunities

Upp Göteborg's activities and aims seemed a-priori well fitted for considering contemporaneous technological solutions. First, it is in the strategy of Upp to use relevant means to communicate efficiently with its members (Brickzén, Hanson, & Rexmo, 2009). Some previous decisions included making a website, which aim was to "meet youth where they are, and with the methods that themselves are using" ("möta de unga där de finns och med de metoder som de själva använder, ex vis facebook" (Brickzén, Hanson, & Rexmo, 2009))

In this context, here is why multi-touch screen based technologies were considered earlier on, **prior to defining why** exactly they should be used:

- multi-touch technology is assumed "engaging", thanks to enabled direct manipulation especially compared to legacy keyboard + mouse interfaces.
- multi-touch applications are suited for multiple users in collaborative or playful settings, which point and click are much less.
- multi-touch interfaces are flat, smooth surfaces, often resilient to abuse and thus fit to use in public space.
- multi-touch applications exist and are deployable in a reasonable time frame, which reduces the chances of creating a custom-based input system with professional results.
- information technology based entertainment is widespread in youths of Sweden (extensive use of internet based services such as e-mail, social websites, online games, music, and even video streaming, use of multimedia phones, etc...)
- information technology could help to manage large amounts of information and present it in a different way than usual. (6000 expected members to manage with only some predicted 30 employees).

The "originality", if there is any, of this approach, is that we strived to put the emphasis on what the organization Upp, with its overarching goals and means available, could benefit from. It may sound up to this point that the decision of using tabletops and multi-touch screens was firmly implanted already, and almost a necessary step to concluding the partnership with both Touchtech and Upp. It wasn't the case, and specific technology was still not chosen until we performed a prospective user study, and formed a more detailed plan of action in November 2010.

In fact, Touchtech has since the beginning been very open to learning about new technologies, and would probably have assisted us regardless of what kind of technology we should use. Their preference for touch interfaces, is not limited to only table-top factors, but also vertical, more than 2 meters diagonal to tablet 10" or even cellphone format.

In the end, the Tabletop and vertical multi-touch screens proved to be most suited to Upp's desires in the end, but we insist that the couple Upp-Touch interfaces was a rather good *intrinsic* match.

Furthermore, another reason to focus on Upp and abandon other politically-charged options, is that the political orientation of Upp focusing on its members' welfare, makes it close to the orientation of User-centered design / Interaction design as a discipline. The expectations were a relatively disinterested cooperation, further reinforced by the authors' position as independent of technological sale. The common focus on the actual users seemed a critical factor for the collaboration and mutual understanding.

2.4 Partnership with Upp

All in all, the author identified youth unemployment as a major concern for city politics, and simultaneously discovered the existence of an organization (Upp Göteborg), which tackled directly these problems. The remaining concept dealing with unemployment appeared to be particularly fit to this new context, for reasons which we will develop further.

In June 2010 the first encouraging contact took place, followed by a meeting in the City Hall of Gothenburg, which helped greatly in further refining the concept. This concept, a pitch-like description of how the introduction of technology could potentially help the Upp organization, was still considered as very open to discussion. It was merely detailed enough to stimulate the interest and help eliciting the information required to carry the project on. It was also crucial that both parties gather more information about each other.

This was achieved through three additional meetings with the first interlocutor and 4 different Upp colleagues from June to August 2010. The objective of those was to make Upp! representatives discover what is possible to do with touch technologies, and for our part, to characterize how exactly Upp works, and what particular applications could be made.

2.5 Scope decision

After interviewing two guides, one guide coordinator and a webmaster, 4 distinct areas were identified, which showed promising adequation with Tabletop Technologies (Gantois, 2010c):

- One-on-One guiding sessions, with the help of a tabletop system.
- Initial attraction and discovery of Upp, with a shopping window-touchscreen which would make a link between the streets' side and the inside.
- Supporting and rewarding returning members with an entertainment system, based in the fika area (informal, different technologies envisaged)
- Group Activities - Supporting scheduled group work, with an accessible

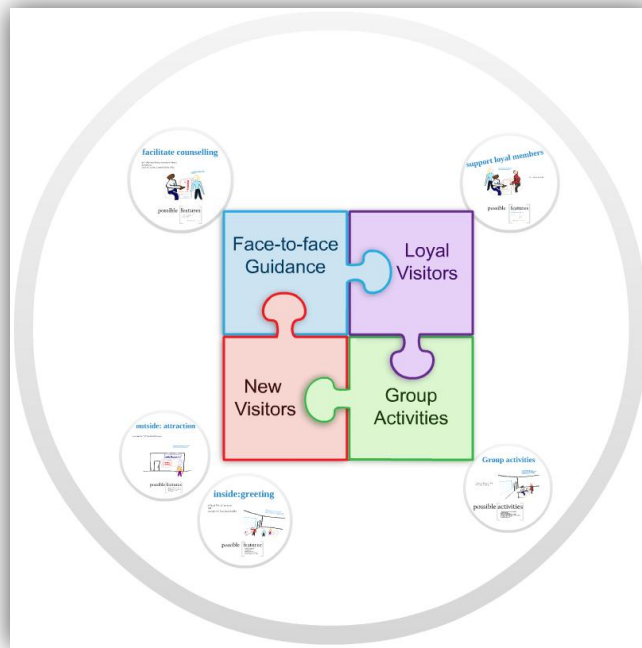


Figure 5: Presentation to Upp of several areas of potential action (Gantois, 2010c)

Out of these opportunities, only a more humble fraction was agreed to be pursued in early September. The objective was to design a system that could **support the creation and maintenance of the Upp community, and the ideas retained were focusing on New Visitors, and Loyal Visitors**. That agreement could only take place once the many details of what the scope of the thesis could and could not be, what would be the role of Touchtech, and our personal interests in that project were presented and finally accepted at the end of August. By that time, interaction design work could finally take place, based on a duo of scenarios which were detailed on their request, and presented at the last meeting (See p:73, Appendix: Detailed scenarios suggested).

Upp committed to the project in October, by investing resources in the proposed hardware and software development. That plan was developed through a user research which will be detailed in the next section.

3 Supporting community building

In this section, we will describe our analysis of the situation at Upp, with a combination of psychological literature and Interaction Design methods. The interpretation of Upp's goals, taking into account this analysis and how multi-touch tabletop technology might evolve, led to the formulation of the practical action plan which was ultimately executed. The field work, its results and its analysis are first presented.

3.1 Field work

3.1.1 Data collection methods

The initial study of the situation comprised both semi-structured interviews and direct observation of the situation at different times and occasions. The interviewees were selected to be representative of the current and expected visitors coming to Upp, through a preliminary discussion with one of the guides, which is a method recognized by Interaction Design practitioners (Cooper, Reimann, & Cronin, 2007; Preece, Rogers, & Sharp, 2007). In addition, some professionally created personas for the website were communicated to us. As Cooper et al. notably warns, these personas were created for an entirely different purpose than ours, which makes them impossible to apply “as is”, but very helpful to identify what different types and attitudes to expect from visitors (see Appendix: InUse personas excerpt, p:80).

Seven interviews were made, among which six current members of Upp, and 1 not yet a member. All interviews were made in Upp, in different rooms which elicited different opinions about the place itself. The focus of those interviews was about member's goals towards Upp, how Upp fits into their daily life, their opinion about meeting other Upp members, their perception towards the locals. More specifically, probing themes to stimulate an understanding of these general points were about Upp activities and events, Upp website, meeting habits with friends, and general questions about their life situation.

These different topics were tackled in a semi-structured way, in no particular order with the help of an interview guide. Each interview lasted for approximately an hour, during which notes were taken and directly after each interview synthesized on a behavioral mapping (see p:73, Appendix: Behavioral mapping, static)

It must be noted that all the interviewees except one, participated almost exclusively in one-to-one guiding activities. This factor is duly noted and taken into account in our analysis.

Complementing those qualitative interviews, three different events were directly observed as participant, two indirect observations were retold through interviews of members, and one account from Upp's staff. These helped get a feeling of the social structure of visitors, and different kinds of behaviors.

The different interviews aimed at gaining an overview of different attitudes, in hope to cluster them into sub-categories, and identify patterns. The method followed the methods of Goal-Oriented interaction design (Cooper, Reimann, & Cronin, 2007). We especially paid attention to a number of behavioral factors, and attempted to visualize and compare these factors from one interviewee to the other, as Cooper advises. As a static representation of these factors didn't prove ergonomically pleasing in a vector graphics program (graphically hiding and changing information), we decided to do as a programming exercise an interactive Behavior Mapper.

3.1.2 Data analysis and results

Without going too much into detail, this software allowed to edit the different behavioral variables of an interviewee (e.g. wants to meet others, or wants to stay alone), and compare them to the others visually. It was possible to hide or add new factors, as required to perceive patterns. Each colored line is the profile of one interviewee. See Figure 13 for an example of pattern identified.

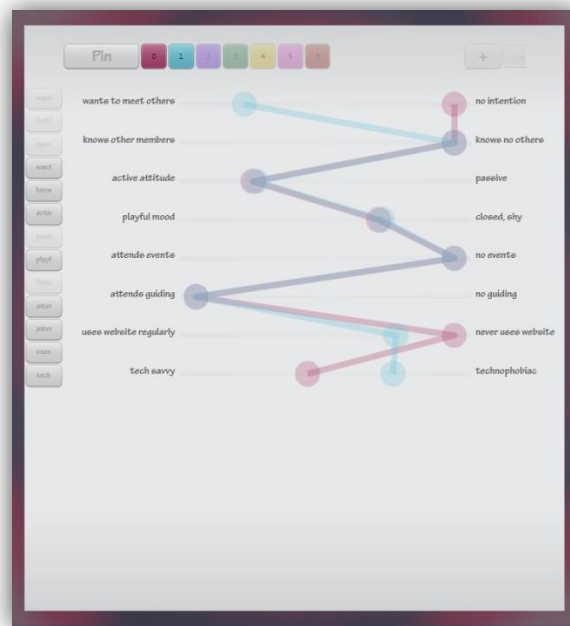


Figure 6: Behavior Mapper: Goal-Oriented cluster of interviewees only

However, the information collected proved insufficient to perform the method advised by Cooper exactly, and personas were considered too difficult and misleading to create, considering the project relies only on one designer/developer, and very marginally relied on other stakeholders. The behavioral mapping helped formulate strong hypothesis about different types, with the help of Personas previously developed for Upp, but can hardly be sufficient in terms of data to prove these hypothesis.

Consequently, this called for a substitute to create a model and communicate these findings to Upp, and occasional advisors at Touchtech and Chalmers. For that, we attempted to summarize the findings into a linear "Continuum".

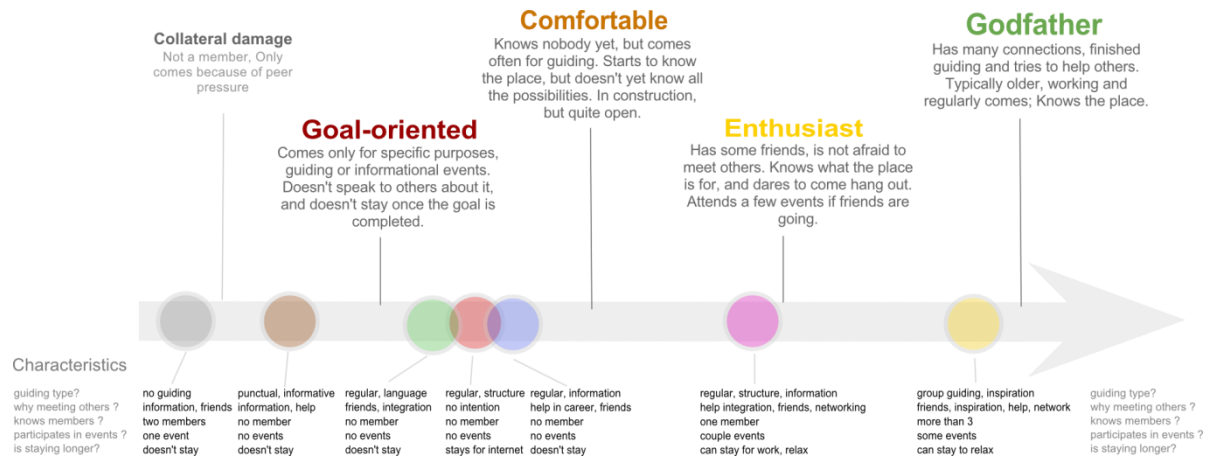


Figure 7: Behavioral Continuum, reflecting the range of different visitor behaviors at Upp

The different interviewees are represented by colored spheres, and rated roughly by their degree of "belonging" to Upp, and being actively engaged as a member. At the leftmost extreme, are people who have no guiding, attend to events only when friends want them to, doesn't have any intention to become a member. At the other extreme, we find members that are coming for regular guiding, and engage into tutoring other members. This "Godfather" type, has connections in the Upp group, participates in many events, and typically stays longer at Upp.

We observed that most members at the time of the interviews, were situated in a very Goal-Oriented type of behavior, which typically involves going away from Upp once their objective is complete: visiting an event or meeting their guide. They do not have extra ties to other members, and do not stay for relaxing or any other goal.

3.2 Psychological analysis

3.2.1 Directing issues

Based on the initial observations and mapping of different behaviors at Upp, remains an important work of analysis, from the perspective of experimental and theoretical psychology. In this section, we will clarify:

- In what ways can Upp participants benefit from an Upp Community?
- How can we characterize what is the situation right now?
- How can we encourage the community creation? What are the requirements?

3.2.2 Upp's objectives on community building

Upp's stated objectives as observed in the Upp document (Brickzén, Hanson, & Rexmo, 2009) and at the occasion of many interviews, is to provide support to its members. By support, we signify that it is hoped creating a community will help the individual members and provide some support at different levels. If we consider the different categories of support to be: (Forsyth, 2008)

- Belonging: satisfy the need for belonging to a group at all, to help create one's identity (any group)
- Emotional support: any kind of behavior which has for effect to maintain the emotional balance of participants (Provided by Upp guides, Upp members)
- Informational support: provide useful information to help members fulfill their goals (provided by Upp guides, event presenters, Upp members)
- Instrumental support: provide material support for individuals. (Upp already provides locals, materials, members could ideally help each other in that respect)
- Spiritual support (guiding, events, members)

Of all these objectives, members themselves are primarily envisioned to provide support of **emotional, belonging, informational** nature. We do not exclude the instrumental or spiritual support, but consider that they are secondary possibilities, possibly fulfilled by other groups than Upp and its subgroups.

Upp's aim is to create the possibility for members to belong to a positive group. This task's scope obviously is larger than that of the current thesis, however we find capital to be as conscious as possible of the situation at large, so as to be able to intervene harmoniously in that environment.

The challenge lying in turning a traditionally negatively-typecasted unemployed group into a positive, uplifting group beneficial to individuals' self esteem (Forsyth, 2008). In this respect, it seems that the optimal type of support provided by Upp would be ideally that of a "Primary group", but at least become some degree of "Social Group" (see section 10.6, Appendix)

Another strong objective of Upp is to ensure its continuation, which involves getting a minimal amount of members according to their initial objective (5000 over three years). This can have dramatic consequences on what kind of group can emerge inside of Upp, as we will detail in the next section.

3.2.3 Characterizing Upp's current community

3.2.3.1 Are Upp members a group?

Entitativity is the reunion of three factors: **common fate, similarity, proximity**. People who are perceived to have these three factors in common tend to be considered a group from the outsiders' point of view. We can infer that Upp visitors are already a "de facto" group from the outsiders' point of view.

The visitors of Upp can also be de facto considered as a **social category** (Forsyth, 2008). They are an aggregation of people who have in common to be: Young, dwellers of Göteborg, most of which speak Swedish as native language, and looking for help.

Among these, the major distinctions seem to operate on **age ranges** and **goal**. Three major goals emerge: finding a job, creating an own company, or changing studies. Three major age ranges are believed to exist [16-18][18-22][22-24], but the observed visitors tend to be older than 18 y.o. which narrows that to two age groups. These sub-groups form collectives: large aggregations of individual who display similarities in actions and outlook (Forsyth, 2008).

The fate of individuals is precisely not common between them, as Upp encourages individual help. Their quests can be mainly about obtaining guidance / emotional support, information, or inspiration.

Despite all these theoretical factors, through a simple interview of a few visitors we can doubt that Upp visitors feel that they "belong" to any of these groups. In the end, yes, Upp members already form a group as a whole, but at this level it has **very low cohesion**. Systematically the answers of Interviewees revealed low responses to questions such as "Is this Upp group attractive to you?" and "Do you feel like you belong to this group?". According to (Mason & Griffin, 2002), this reveals low group cohesion.

3.2.3.2 Upp member's group cohesion

Upp aims to help members to form and maintain highly **cohesive** groups (see 10.7: Cohesion in Groups Appendix), which is arguably not the case currently. All these manifestations of group cohesion are, according to research, caused by a combination of the following factors:

3.2.3.2.1 Interpersonal attraction

Some factors which influence attraction between two people are proximity, frequency of interaction, similarity, complementarity, and reciprocity. These factors can create a group, and / or increase its cohesiveness (Lott, 1965). (Robber's cave experiment) The variety of interests play against Upp's favor, and partially explains its low cohesiveness as a whole.

3.2.3.2.2 Stability of membership

The more stability, the more cohesiveness but Upp is an "open group". Closed groups are more cohesive because there is no competition for the membership of the group (Forsyth, 2008; Ziller, 1965). There is unfortunately no guarantee of long membership at Upp, and turnover can happen anytime, except for some particular goals (creating a company, and participating in the workshops regularly).

3.2.3.2.3 Group Size

The increase of number of social bonds to maintain plays against the cohesiveness of the group: the bigger the group, the more intensive it is for the members to maintain a connection with the rest of the members (Forsyth, 2008; Simmel, 1950). Consequently, it is easier to create small cohesive groups. In the context of Upp, a thousand registered members on the website is way too big for creating a unique, cohesive group. We would then be assuming that Upp wants to create small, cohesive subgroups ("cliques") of two to 7 members approximately.

3.2.3.2.4 Structural features.

"Cohesive groups tend to be relatively more structured [...] in the socially organized sense." (Forsyth, 2008, p125) e.g. a hockey team is structured, which favors cohesiveness. Conversely, the uncertainty of behavior to adopt at Upp (exemplified by the dramatically varying perceptions of the place itself, ranging from "hospital" to "kindergarten") is playing against that factor. So is the absence of clearly defined groups in the case of events visitors.

Additionally, there are many isolates in that group, who are attached to only a guide, and no other member. Concentrated liking (many members like their guide), is not really a mark of cohesiveness, hence liking a common person doesn't necessarily make people get to like each other. Especially since they tend to have privative meetings exclusively, which restricts the opportunity to feel regularly meet other members.

3.2.3.2.5 Initiations.

There are very few formalities to enter Upp, and even less to exit it. The low difficulty to earn a membership doesn't really make members feel as a part of a prestigious, elite group by just being a member (Axsom, 1989; Leon Festinger, 1957; Forsyth, 2008). Furthermore, we already detailed that the overarching situation of unemployed of the members, is adding to that factor.

3.2.3.2.6 The cost of cohesion

There is an inherent paradox in this "create a community" objective. The role of Upp is mostly transitional and not an end to itself. Those who visit, become members and are not part of the staff will leave Upp at some point. To some extent, it is their inherent objective: they *must* improve their situation and leave. From this point of view, being a part of a highly cohesive group might be painful and deterring members from what goals they are trying to achieve (Forsyth, 2008) p135.

Thus, it might be that a relationship of such depth might not be desirable. However, we certainly don't believe it should be explicitly discouraged. In light of these considerations, a "Social Group" type might be enough to provide support during that transitional period.

3.2.4 Factors encouraging group formation

3.2.4.1 Inclusion

According to the Elaboration Principle (Forsyth, 2008) p106, groups tend to grow more complex in time. Several researchers (Benford, 1992; Gibbons & Olk, 2003) found that new relationships tend to emerge from dyads of people: out-group people who are linked to both persons in that dyad are very likely to become friends.

Festinger's theory (L. Festinger, 1954) assumes that in presence of ambiguous circumstances, people tend to reach cognitive clarity through comparing their assessment of the situation to others. Concretely, this effect could easily occur at Upp where the focus of the organization is often not clearly explained, and is inherently broad and difficult to pinpoint. In addition, the presence of a vast empty space with no clear purpose for the different rooms and areas could be a confusing factor prompting this sort of behavior.

However, the fewness of members at the moment, seems to render that effect almost impossible to reach. Hence one of our objectives, to make members stay longer at Upp so that social contact be possible at all.

3.2.4.2 Attraction

How groups form depends of complex attraction and inclusion mechanisms. Many factors and theories exist to explain how this attraction and inclusion works, but here are some strong principles backed up with evidence: (Forsyth, 2008)

- similarity principle "the tendency to affiliate with or be attracted to similar others"
- complementarity principle "the tendency for group members to like people who are dissimilar to them in ways that complement their personal qualities"
- reciprocity principle "the tendency for liking to be met with liking in return; if A likes B, then B will tend to like A"
- minimax principle "the tendency to prefer relationships and group memberships that provide the maximum of valued rewards and incur the fewest number of possible costs"

Obviously, the introduction of technology in such a situation cannot be assumed to influence these factors in a deep manner. As mentioned before, similarity is achieved at Upp through belonging to larger social categories (same school, same ethnicity, same age, same concerns...), but there is no guarantee that this simple fact will be enough for members to befriend each other. We believe that the design would have very limited influence on that. The minimax principle is also an inherent factor to group dynamics which we have nearly no control on.

However, **complementarity** and **reciprocity** are two qualities which could be "encouraged" by a specific situation. At least, the fact of discovering complementarity in others could be favorised by an interaction, or a game which puts these complementarities in evidence. Similarly, giving the occasion of visitors to reciprocate positive actions may put into evidence some potential new connections and friendship opportunities.

Other factors that favor attraction between people are geographical proximity, frequency of interaction (Lott, 1965). The geographical **proximity** of members is not guaranteed per se, as the place is very large (1600 square meters) and has many opportunities to be isolated from each other. This is a factor that could be tackled through the help of technology, by creating a localized activity, where a visitor knows that something is consistently happening. **Frequency** of interaction, thus, is not easy to achieve. Primarily, we assumed that the events Upp organizes would favor that frequency. An interactive system could help creating a consistent, regular activity to support those, in a more social setting.

3.2.5 Conclusions

As a result of this analysis, we can deduce a few areas where we could focus our action, and detail a little more what kind of group is expected to be created at Upp.

Upp's community as a whole cannot be hoped to be uniform. Thus, the kind of model that Upp rather imagines, is a number of regularly visiting groups, "cliques" of friends, who would be tied to Upp in some way (guided, attending events, being members). Ideally, the identity of Upp as a group would be positive and valorizing for its members, who we believe could emerge from Upp's action at large, and the interconnectedness of said cliques in time.

The typical desirable groups would then be small (2-7 members), reasonably cohesive, constituted of members who can meet each other regularly at Upp and have some activities together, which would trigger some degree of initiation ritual. The open nature of Upp's membership hints that these groups will tend to be short-lived (less than 3 months).

The intervention of technology in this context remains very modest. Mainly, we assume that these kinds of groups can emerge through Upp events, and especially those in small groups that have a regular visit schedule notably workshop attendees. Further, Upp's space could be used for group work, which is a possibility seldom used and seldom known by even returning members.

3.3 Action plan

To summarize the previous points, the types of groups we aim at supporting inside Upp are the following:

- small subgroups of visitors, mostly those who go to events, and guided. Entrepreneur visitors tend to have already the will to do that.
- purpose: leisure and socialization, networking, support, information, inspiration
- level of cohesiveness: middle-range, similar to a "social group"

The way our project intends to support these objectives is two-fold.

3.3.1 Information and promotion

First, and rather indirectly, to encourage members to come to events and to appropriate themselves the space through a promotional presentation screen. This action's objective is to prepare the Upp members to a potentially higher level of cohesion with other members:

- inform visitors more clearly about the **Upp space and its possibilities**, which should reduce confusion about Upp's stance. Hence, the behavior of members would be more **structured**.
- inform visitors about **Upp's events**, to encourage contact to other members at Upp, in small concentrated groups.

3.3.2 Upp Social/Relaxation area

Second, more directly to complement that action, our project will aim at:

- creating an activity that prompts the need for a group at Upp
- maintain that group's attention for 10 minutes, constituted of 2 to 5 people, as regularly as possible

In order to achieve this goal, in interaction terms, we formulated the following requirements:

- make visitors of Upp stay about 10 minutes, and 10 minutes only.
- after 10 minutes, it could encourage others to come
- engage 1 up to 6 persons at the same time
- favor attraction
 - o proximity: frequent visits in the same areas
 - o complementarity: encourage use of complementarity of character and abilities during cooperation
 - o frequency: incite visitors to return regularly to Upp
 - o reciprocity: give visitors the occasion to reciprocate positive actions (but not the negative ones)
- favor inclusion
 - o usable alone, anytime, but strong incentive to use in group
 - o include new users on the fly
 - o engage couples of users and encourage dyads to interact with each other

4 Value of large multi-touch screens

In this section, we will describe and characterize the large interactive multi-touch displays which were chosen to fulfill the presented requirements. We first define these displays, and then describe their hardware and software particularities with the help of current research. This knowledge is an essential part of the decision to use these displays and recommend them for purchase, which to us is an essential part of the design process.

4.1 Characterization of large multi-touch screens

4.1.1 Definition of multi-touch screens

In the present work, the main focus is on Multi-Touch Screens. By this we mean any way of using the human fingers directly on a screen to input information in a computer. There are a number of technologies which allow this detection of fingers. Without going too much into detail, this detection can concern (Buxton, 2009):

- position of the finger
- pressure applied to the surface
- angle of approach of the finger
- force vectors (a pressure applied in a specific direction, or rotation)

An important remark here is that in most commercial products, the only available detection concerns the independent positions of fingers in contact with the screen, i.e. sensing of pressure, angle of approach and force vectors is to the best of our knowledge, very marginal and experimental. []

In these commercially available products, sensing is done by touching the screen from above, and requiring direct contact of the fingers to the surface to transmit input.

This type of interface has become widely adopted thanks to very successful commercial products such as the Apple (r) iPhone (2006) and iPad (2010) ("Fortune.cnn.com article on iPad sales, 2010," 2010; "Money.cnn.com article on record iPhone sales, 2010," 2010; "news.yahoo.com article on iPad sales 2010," 2010), the multitude of Google (r) Android - based devices ("Tech.fortune.cnn Article on Android Activations," 2010), and some spectacular "breakthroughs" like the release of Jazzmutant's multi-touch musical MIDI controller in 2003 and Jeff Han's demonstration of new sensing technologies which paved the way for these successes.

Multi-touch interfaces are sometimes called Touch User Interface (Saffer, 2008), although that definition seems optimistic in the particular case of a simple multi-touch technology. The Touch User Interfaces do not necessarily rely on a screen for interaction, but its particularity is to take advantage of the human haptic sense. To the best of our knowledge, there is no widespread commercially available multi-touch screen which provides haptic response to the touch on large surfaces, although there does exist a body of research on experimental solutions. The response of the digital system can

be visual, auditory, but not directly haptic unless there is use of additional devices. We will not further employ that terminology to designate Multi-Touch Screens.

4.1.2 Definition of tabletop systems

By Tabletop System, we designate a specific type of multi-touch screen-based system, also more explicitly called Horizontal Interactive Displays.

Its main distinctive traits compared to other screens are that the screen is in an horizontal position, which makes it suitable for simultaneous use by several people, and that the digital information on the screen is often directly manipulated, which departs from traditional computer input devices such as keyboards and mice (Müller-Tomfelde & Fjeld, 2010). We would also complete that description noting that these systems, adopting the format of traditional tables, often have larger screens than other desktop screens. A typical commercially available product might have screens ranging from 22 to 77 inches of diagonal. (Ashdown et Al., 2010:78)

The type of screen of these systems can vary widely, and go far beyond multi-touch screens. Some CSCW-oriented systems can propose interactive, tangible items which can be laid on tabletops, to augment the possibilities of said system. For instance, Microsoft Surface can recognize graphical "tags", which can be apposed to various objects in the use environment. In research, we can cite "SLAP" widgets (Weiss, Hollan, & Borchers, 2010), which are translucent objects apposed on top of the surface. Further, "SLAP" madgets, are tangible objects that can move by themselves on the surface without a human intervention to actuate changes in the interface ("Engadget's article on Madgets," 2010).

Some other Tabletop Systems can use various kinds of devices for pointing and manipulating objects, both by direct manipulation and remote pointing (Nacenta, Pinelle, Gutwin, & Mandryk, 2010), among which notably pens.

4.1.3 Short history

Some sources (Buxton 2010), report that touch screens have been a focus of research since the second half of the 1960s, however the first prototypes were single touch, citing the PLATO IV touch screen terminal in 1971. The first truly-multi-touch screen Buxton refers to for human input dates from 1982, and was called "Flexible Machine Interface" by Nimish Mehta at University of Toronto.

In this study, we focus more on a collaborative use, which justifies our particular interest in screens of a larger size than those designed for one-person use. The increased size enables each user to benefit from its own space, and at the same time of a common, shared space.

According to (Müller-Tomfelde & Fjeld, 2010), the first publications on Multi-Touch Tabletop systems date back to 1993. These at first focused on experimental systems, but from 1998 onwards tended to focus on "systems for work environments with multiple users". Another very important trend in research concerned from 2001 the development of "new technologies for multi-touch input".

Aside from these research publications, some commercial products have been developed and some of them met significant success, among which we can cite the most-widely known Microsoft Surface (2008). Its penetration on the market still makes no match for such an already ubiquitous device as the iPhone ("Money.cnn.com article on record iPhone sales, 2010," 2010), but we could speculate that fact originates from a focus on some specific type of applications ("niche" markets), and a price dissuasive compared to a traditional computer (being currently 10 times more expensive, with no comparable software available yet).

4.2 Limitations and opportunities in tabletop systems

"Everything is best at something and worst at something else" - Bill Buxton

Abundant publications and sources of information on usability document Multi-Touch Screen-based systems. We aim in this section to describe the most common particularities which affect current Multi-Touch large format technology, and in particular existing tabletop commercial systems.

From a designer's point of view, it is vital to know these particularities, be them from technology or intrinsic conception of the installation. The expected attitude from that knowledge is not only to work around and with them while these systems exist, but also encourage hardware innovation beyond those limitations.

4.2.1 Hardware particularities

4.2.1.1 Size and format

The tabletop format is, as we mentioned earlier, benefitting from a larger screen. Most often, this has two implications: there is more screen real estate so that people can collaborate together, and not wait for turns (Buxton, 2009). That way, users can develop and respect social conventions, and remain aware of what others do in their peripheral vision. (Ashdown, Tuddenham, & Robinson, 2010). It benefits also individuals, in that it uses the kinesthetic sense in relation to objects on the screen (Ashdown et al., 2010). A direct issue with increased screen size, is that some users can have difficulties reaching out on some areas of the screen (Aliakseyeu, Subramanian, & Alexander, 2010).

4.2.1.2 Image quality

A more indirect downside is that few screens are available with high contrast and high resolutions. Back-projected systems use a projector inside the screen, which constrains the form factor of the screen (looking like a parallelepiped box), the resolutions (rather low, resulting in somewhat pixelated graphics), and the contrast (the vision system requiring a semi-opaque diffusive layer, resulting in distorted colors and lower contrast).

4.2.1.3 User identification

As multiple people can interact simultaneously without taking turns, some problems arise: how to sense to whom belongs the hand? With pointing devices, the issue is easy to solve, but in absence of

device, the best systems developed so far can sense only the hands and forearms, not who they belong to but still can resolve some ambiguities (see www.multitouch.fi for a commercial example).

Some systems exist which are based on LCD screens, which typically solves most of these problems: the form factor is a slimmer board, the contrast is much improved. The biggest downfall of this type of solution, being that the type of sensing is more limited: no built-in recognition of objects, or identification of user is trivial or commonplace.

4.2.1.4 Sensory experience, tangible aspect

From the user's point of view, several particularities are to be kept in mind while designing. Due to intrinsic conception, the user is touching a flat surface, or using various tangible objects. Many of the existing interfaces make a very marginal use of those objects, despite the interest in research, and favors the more flexible direct contact of hands to the surface. As a result, as Buxton (Buxton, 2009) underlines, the "touch" aspect is often overemphasized, for what remains largely a visually-driven experience: predominantly the look of the interface changes dynamically, while the surface itself physically doesn't respond.

Secondly, existing tabletop systems have been deployed mainly in retail stores and entertainment contexts, with relatively short interaction time. As a result, immediate interaction without any object is often preferable, while it is conceivable that a more casual, long-term use would require the addition of interactive objects and pens. Connectedly, that direct interaction with no haptic feedback is limiting for accessibility to blind people, and also for people with limited motor skills (Saffer, 2008).

4.2.1.5 Orientation

A well-known difficulty coming from touch screens in general is to display text and other graphical elements in the right orientation. This issue, while tackled in research, is still not very commonly available for design, and most convenient for optical-based technologies (Takechi & Naemura, 2010). Occlusion of the screen with the fingers or the pointing device can also occur, and need to be taken into account.

4.2.1.6 Materials

Even though, as mentioned previously, the large screens tend to not have any active haptic feedback at all in response to interaction, materials used for creating the contact surface can be very important. They can communicate an idea of quality of the screen, interfere or enhance image quality, and influence resistance to public use.

4.2.2 Identification of design particularities

We previously detailed factors that are "not negotiable" when working with commercial tabletops: intrinsic limitations and particularities. Here we will detail what kind of issues are specifically up to designers to solve. Design on multi-user tabletops is recognized as a tricky endeavor by the research community and by industrials who already found uses for this technology.

Such is the case of Microsoft, who published some documents with design advice for Surface (r) and Windows 7 Touch. In related worlds, designing for Multi-Touch screens is a trendy issue, with the publication of Apple's design guidelines for iOS (iPad, iPhone, iTouch), and Google's own guidelines for Android OS, for smaller form factors (up to 7 inches diagonal).

4.2.2.1 Discoverability

One key issue recognized by some sources, is to make the interface discoverable (Nielsen, 2010; Saffer, 2008). This issue stems from the gestural nature of the touch interfaces, and conventions and standards not yet fully developed. Users can often rely on those conventions to discover conventional GUI interfaces, but in the case of Multi-Touch systems, special effort is devoted to "simplify" (Microsoft, 2008a), and make interfaces more "natural", which can lead to hide functions and assign them "natural" gestures that one has to remember.

4.2.2.2 Consistency

This brings us to another issue, which is the lack of consistency between applications. Even those applications submitted to a strict control before they are published, and clear interface guidelines such as Apple's iPad applications, suffer of inconsistency of conventions from application to application i.e., some actions or gestures sensed in some applications are not supported in others, and vice-versa (for example, on the iPad pinch-to-zoom works only where it is anticipated).

As more screens respond to touch, it still remains that the interaction style of an iPhone is very different from a single-touch interface, itself fundamentally different from a tabletop - multi-user interaction style. These differences are not easily understood by the non-tech savvy users, who have to learn interfaces' particularities: some respond to touch, some won't, some will accept more than one finger, some won't.

This may hinder the willingness of users to experiment new ways, especially as some gestures are not intuitive, but conventional (such as flicking, dragging with two fingers, tapping, double-tapping....), and depend heavily on the user's culture and attitude. This is why relying mainly on GUI conventions makes sense, and depart from them, only when an additional functionality is needed.

4.2.2.3 Lack of affordances

As Nielsen puts it in his early review of the iPad, "sometimes the user doesn't know what is a button anymore", citing graphically-intensive interfaces which rely overly on physical world metaphors to incite interaction (Nielsen, 2010). This refers to a lack of cues in the appearance of the interface, as to *what* can be interacted with. By extension, it also concerns *how* it can be interacted with. This apparently caricatured example can still be found on some tabletop applications, due to the impact and instant gratification that some have to provide, especially in public places (Hornecker, 2008) or in retail applications (Havir, 2010). This could create an interesting social effect, as much as it could create frustration, or worse, embarrassment.

4.2.2.4 Fat finger problem / disclosure

The size of targets to reach ("tap"), which are often an issue in mobile interfaces (Nielsen, 2010), could still be a problem in complex tabletop applications. However, the screen real estate often allows to display targets of an acceptable size, which is definitely an advantage (Benko & Wigdor, 2010). Connectedly, the finger hides at least a part of what the user is interacting with, which can cause problems if the object is too small, or doesn't provide adequate feedback. (Aliakseyeu, Subramanian, & Alexander, 2010)

4.2.2.5 Unified Feedback

When a user clicks a mouse button, it gives haptic feedback to the finger, and sometimes an additional sound, which confirms that the button has been clicked. In absence of intermediary device, the user has to rely on other senses. Feedback can be provided using vibration (in experimental products), but more commonly using visual feedback (transitions, animations), and auditory cues. In some systems (iPhone, iPad, etc.), there is practically no response to the user if he/she touches something that is not interactive.

In some systems a fugitive trace appears showing where the user attempted to touch. This type of feedback is crucial for the user to understand when something unexpected happens: the problem's origin must be possible to identify, whether it came from missing the target that the user wished to reach, or whether it's the system which has failed to register the touch/tap or other gesture. Similarly, (Benko & Wigdor, 2010) signal the issue of reaching constraints in a graphical object, and constraints created by parasite contacts (occasioned by accidental activation, or "tabletop debris": objects present in the environment, and mistakenly registered as interactive). We refer to them for a summary of techniques which address this issue.

4.2.2.6 Importance of sound

In CSCW context, it can be tricky to provide meaningful feedback using sound. Using only stereo or mono speakers can create a cacophony, especially detrimental in public places where other people not directly involved in the tabletop activity can be disturbed, and even users themselves could be annoyed at the incessant feedback[].

4.2.2.7 Orientation

In CSCW situation, the different users tend to have a specific seating arrangement, preferring the long edges first, and then populating the short edges (Scott & Carpendale, 2010). Almost systematically, it means that different users have to see the interface from different angles simultaneously (Takehi & Naemura, 2010). In some cases, it is preferable that others can not see clearly what others are doing (playing a poker game, for example, or in the case of productive applications, avoiding to distract the other users from their task), but in other cases, users want to see what others are doing, be it a graphical element, a map, or a text. This particularity of making things available from 360 degrees is best solved case-by-case, with a thorough understanding of user's goals and territory. (Microsoft, 2008b).

4.2.2.8 Gestures

Longer use times can generate the phenomenon of "hot finger". The repetition of dragging gestures, especially can be detrimental to pleasure in use (Benko & Wigdor, 2010).

It appears that the catalog of gestures in use is rather limited, despite claims of "naturalness". Few interfaces are able to sense pressure, and what remains is limited to a contact with a flat surface. How many "natural" gestures of that kind do we perform in everyday life? The range of gestures that a flat surface "enables", is far richer, than just promenading the tip of the fingers on them which is arguably marginal.

Based on that observation, it is not surprising to see some researchers formulate criticism about "too complicated" gestures (Nielsen, 2010): those gestures rely on conventions and learning, and recognizing an affordance in the interface which hints that this particular gesture can be performed in this situation. The richness in gestures can be thus a peachy, straining user's memory, in a way similar that CLIs (Console Line Interfaces) do. With this consideration made, knowing a gesture by heart can be far more empowering and productive for "expert" users who have more time to devote to learning the interface. However, practice has shown that the timespan usually allocated to public touch screens is very low, and counted in minutes (Hornecker, 2008).

4.2.2.9 Text input

Input of text, often allowed through touch screens, suffers still from some intrinsic difficulties. Strong research sources suggest that with current commercial systems, text input is best done with a traditional keyboard, and not a software emulation. The benefits of the tangible keyboard are better ergonomics (possibility to rest the wrists without risking to trigger accidentally other GUI elements), better productivity (possibility to learn how to type without looking at the keyboard). Further, users in test conditions rated input with tangible keyboards more pleasurable and natural (Weiss, Hollan, & Borchers, 2010).

4.3 Hardware choice and deployment plan

This broad review reflects our understanding of the technological situation at the moment of taking crucial design and marketing decisions. The most important of those decisions being which existing technologies to recommend and design for, but for the most part these design advices and factors to take care of were duly noted and acted upon.

The initial plan, decided in November, was to develop and deploy quickly (one week of development) a vertical 42" multi-touch LCD screen destined to the Entrance of Upp, to welcome visitors and support returning visitors.

Once this screen deployed, a Surface Unit (horizontal, 30" multi-touch tabletop back-projected screen) would follow with some standard applications, leaving time to develop a custom-designed application for it, devoting more design/development time.

Both solutions are intricately linked together, and we consider it a strong benefit to have been able to advise Upp as to which technology to choose. Both screens were chosen for their consistency in terms

of development tools (Microsoft .NET platform), GUI widget libraries (Microsoft WPF), professionally tested history (Microsoft Surface, Windows 7 Multi-Touch), and pushing forward of some strong principles for large-sized touch screens: controllers specifically designed to address the fat finger problem, the tabletop debris with a visual feedback mechanism, deep integration with the Windows Operating System API.

However, some trade-offs had to be made in terms of hardware: picture contrast, luminosity and resolution are very different in both screens.

Surface is 1024x768 pixels with low contrast and luminosity. Different angles of view around the table produce significantly differing colors. The NEC screen, based on infrared sensors placed on top of a LCD screen boasts a far better picture quality, full HD (1920x1080) resolution, high contrast and color fidelity under most angles.

Materials are in both cases suited for public use, with the nuance that Surface is more resilient to enable use as a table and the rugged touch feeling proves to be adapted to longer use. The NEC screen has a very smooth surface which provides crisper graphics but less pleasurable touch experience. The interaction time spent on the latter is expected to be short (under 3 minutes), which justifies this trade-off, compared to the Surface which is expected to be used approximately ten minutes.

Both screens are very sensible to halogen and direct sunlight. Surface can use visual tags to recognize objects and identify users, while the NEC screen cannot, which could introduce some confusion in the long run. That is why we advocated instead for the use of RFID tags, cheap to produce, and relatively portable from platform to platform through external hardware readers.

Most of these differences are actually desirable, and make both screens suited for very different purposes, while still sharing a lot of conceptual conventions: one for a social and recreational use, the other for a promotional "discovery" use.

5 Design action and results

In this section, we will present what practical value large multi-touch displays ultimately brought to Upp's situation. We will present the software that was designed specifically for Upp, how it intends to bring value to the users from a group dynamics standpoint. We present the results obtained for both of these applications, and formulate some recommendations for further developments.

5.1 Entrance screen

5.1.1 Target

The interface is targeted at visitors who demonstrate traits of "Goal Oriented" type (cf. Figure 7: Behavioral Continuum, reflecting the range of different visitor behaviors at Upp), and also to a lesser extent "Enthusiasts" and "Comfortable" visitors. The idea is to provide an opportunity for those who come regularly but do not know the full spectrum of possibilities, to discover that. This way, it could help Goal-Oriented visitors to return for activities which they hadn't paid attention to, or would miss if they'd go away immediately, or discover clearly the different categories of what is possible in the Upp locals (this was explained nowhere, not on the website, nor inside the Drottninggatan 16 office). In a sense, they are not really newcomers, but they still need to discover a lot in a way that will appeal to them. That is why the design target is not the newcomer, but the Goal-Oriented and up.

The thinking behind this comes from Cooper in regards to perpetual intermediates (Cooper, Reimann, & Cronin, 2007). Knowing events should get newcomers "up to speed" quickly, and at the same time allow returning visitors to have their memory refreshed, or have opportunities to discover new interesting activities.

5.1.2 Prototyping

In order to validate our ideas, screens, and the way the interaction would be happening, a quick, low-fi prototype was built using Microsoft Expression Blend Sketch Flow®. This helped iron out a few potential difficulties, was shown to Touchtech for feasibility, three potential users and three major project stakeholders: Mattias Rexmo (Project Leader), Johannes Haglund (Former Upp member and now Upp staff) and Carina Ovesson (Upp webmaster) on a similar-sized screen.

Please see appendix at p:84, for more details on that version.

5.1.3 Design rationale

In order to achieve the requirements the entrance screen contains:

- A map view, to show territories, show Upp possibilities and reduce initial stress in the first visits
- An events calendar, to show upcoming happenings and allow to register for them (target them better)
- A presentation of Upp (not so much to reduce ambiguity as to expose the different possibilities offered by Upp)

Here is the behavior and design rationale of these different elements. Please see p:84, Appendix: UppEntrance final version for more pictures and detail.

5.1.3.1 Event Calendar

The calendar is the part that required most attention. We wanted something both visible from afar, in a hurry, and readable from close, promoting active browsing. After many different ideas and impulses, we decided to stick to a scrolling calendar (on the right), but will leave the events of the day permanently at the hotspot of the screen (Tidwell, 2005), in large size to increase visibility from a distance. The “bubbles” containing event information are stacked up by day, and only one of them by column can be opened at a time. Their default state is reduced, with just the headline, location and date. When the user presses one, it reveals the content and additional pictures if there are any, and reverts to its default state after 20s of inactivity. Furthermore, the event calendar is the “default” screen of the application. When the programme doesn’t register any activity for 2 minutes, it resets the scroller to the default state, and displays the event calendar. This way, the screen fulfills a passive state most useful for “Goal-oriented” people, who just pass by. If they are intrigued by the headline, they may want to know more. “Enthusiasts” and “Comfortable” people will also see this screen, which will perhaps act as a reminder of near-coming events, or discover them if they don’t regularly read the e-mails or browse the website.

5.1.3.2 Map

Given the size of the screen and the design target, the map is not supposed to be seen from afar. The design will then be very conventional: a static map, and pins which explain what you can do in specific areas. Tapping on a point of interest will bring up some pictures, and short descriptions. It is here for “Goal-Oriented” people, who want to quickly find their way. Incidentally, the way of presenting the four different zones by colored categories with an action description should be easy to remember the basic information of what is possible at Upp. Perhaps this simple knowledge can prompt more questions, and help develop new interests in Upp. “Comfortable” and “Enthusiasts” can use this screen to show others where things are, or discover themselves some new things to do. If by their exploring, they wonder what the places are used for, they can consult the map and get a short description.

5.1.3.3 Information

Regardless of in the map or in the calendar, tapping on the top-left Upp logo brings to a modal panel, with information about Upp. Initially, another modal panel was envisioned, allowing direct registration to Upp. Unfortunately, delays in the unification of Upp's database made this implementation impossible. The contents of that screen is also modifiable by an xml file, and consists of text and optional picture.

5.1.3.4 Styling/Graphic design

This part, crucial in a welcoming screen, relies on existing colors, codes and graphics which Upp uses in their press releases, advertisements, leaflets, website and even on their office. It clearly conveys its message and stays very simple in appearance. The grass and clouds, characteristic of Upp's style, are animated which conveys more life to the screen, make it look more touchable and interactive to encourage use.

5.1.3.5 Statistics

The application records thoroughly but anonymously information about its use: length of interaction on different screens, number of contacts, elements moved, rotated, scaled or opened. It also collects information about GUI elements which are not interactive, but may be mistakenly attempted to be touched. This raw data is parsed and delivers daily and hourly reports, useful for Upp as an EU-funded project as well as Interaction Design, to identify any problem hard to observe directly and monitor the evolution of interest over a period of time.

5.1.3.6 Flexibility and long-term value

Most texts and pictures displayed on the screen can be changed through XML files, which removes the need to recompile the program every time Upp wants to update the information.

Another important point, is that the screen's interface allows for more "pages" to be developed in the future, as new needs arise. The bottom tabs leave space for further developments, and the overall design is not tied to these two categories only but rather generic in that respect. It is then conceivable to connect that screen with other web services or local databases.

5.1.4 Development and deployment

The first screen interface was designed and developed in three weeks, 175 hours of development with about four hours of consulting from Touchtech from two iterations. The first iteration focused on the layout, general concept, and delivered a low-fi prototype. Once this tested and validated informally, the second iteration aimed at developing a working version. When the screen was delivered, it wasn't possible to install it due to unexpected complications on the part of the building's caretakers.

Consequently, the plan to stimulate discussion with end users through a first screen and incidentally the test of said screen in real situation didn't happen when expected. It was ultimately deployed on January 21st, 2011.

Another unexpected development was the absence of access to the Events database of Upp, which delayed the availability of the calendar view to February 2011.



Figure 8: Project leader Mattias Rexmo and Upp Visitor using the map on 21st January 2011

5.1.5 Results

As we can observe on Figure 9, past an initial deployment peak, which was partly provoked by a demonstration to the staff, the map screen was fairly regularly consulted in that short period, with a minimum of 15 consulted rooms per opened day, and peaks when special events take place such as on February 2nd.

We can also observe that the “Help Screen” is much less consulted, which can be caused by both inability to discover the feature, or returning members who do not specifically look for general information, but rather specific areas in Upp to discover more. This type of behavior is the one we initially aimed for: supporting returning members primarily, and help them move in the engagement continuum. The map legend feature is also regularly used, which is a positive point, and shows that users seek simplifying their perception of Upp by categories. Note that the calendar was installed on February 2nd.

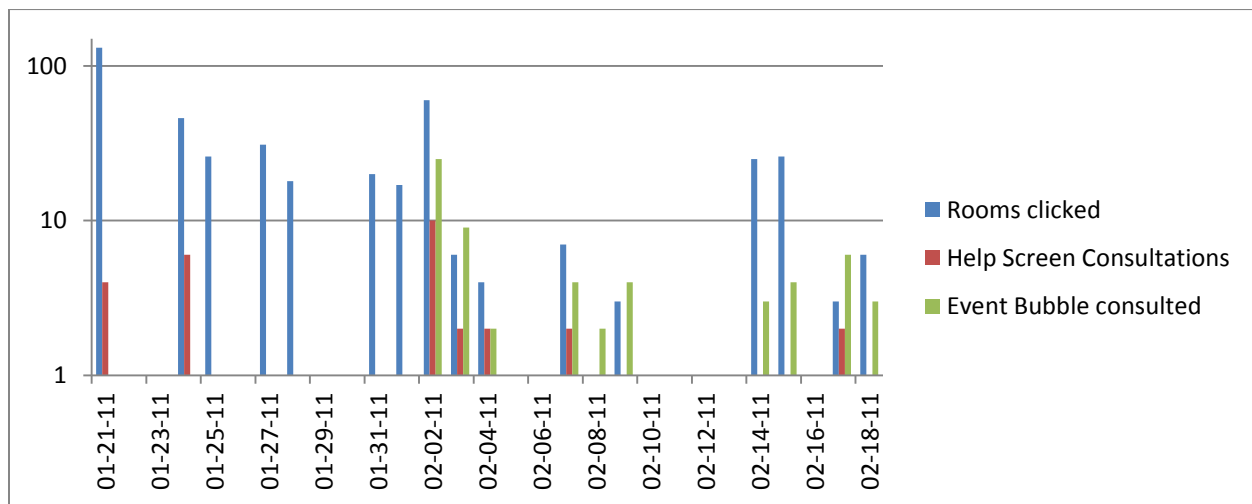


Figure 9: Clicks on help screen, map room, and map legend from January 21st to February 18th, 2011

Another interesting graph (Figure Figure 10: Evolution of consultations of events, and map rooms from 21st of January to 18th of February, collected a little later show the evolution of use of the events screen, from the day it was installed on February 2nd, and compared to the consultations of the map. Surprisingly, there are whole days without any use of the screen, which points either at very low visits, or accidental screen turned off. Other possibilities are that Upp staff organizes or participates in fairs somewhere else in the city, in which case most guides are absent and events are postponed. In comparison to the map points, the consultation of events is only a smaller fraction, typically less than half of the rooms clicked.

This can find two explanations: one, the halogen light in the entrance “tricks” the screen into thinking that a contact is still on the screen, which prevents the application to know when it is unused. However, the fake contact point on the screen is impossible to see, and is probably located “out of the screen” real estate. This issues means that the application doesn’t go back to the events view, contrary to what was designed. In turn, this reduces the discoverability of that screen, and users may think that they already know the map so they don’t feel compelled to interact again. The second explanation is that the events screen is more informative than interactive, and typically can be used from a distance,

just by passing by. This behavior of use is expected and even encouraged, as that part of the interface is aimed at newcomers and returning members.

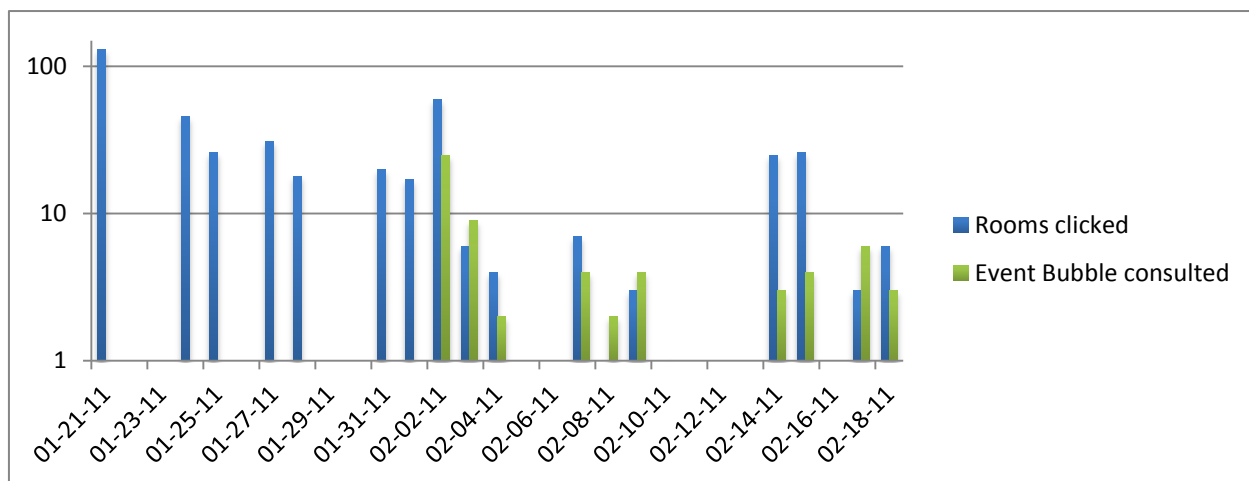


Figure 10: Evolution of consultations of events, and map rooms from 21st of January to 18th of February. Please note this is a logarithmic scale, as some peak values would make ordinary values difficult to read.

We can also examine which categories of rooms were clicked more often, as Figure 11 shows. The most consulted category was “group” (grupp) category, followed closely by “relax” (avslappna) category. This is very positive, as interviews showed that Upp members who are being guided are least familiar with these two possibilities: we can assume that learning more about this, by knowing where and how at Upp they can be performed, is positive to enable Goald-oriented visitors to become more comfortable and stay longer. Conversely, the “Guiding” (guidning) category was least consulted, which also strongly hints that people interested in the map were already being guided or aware of what it is.

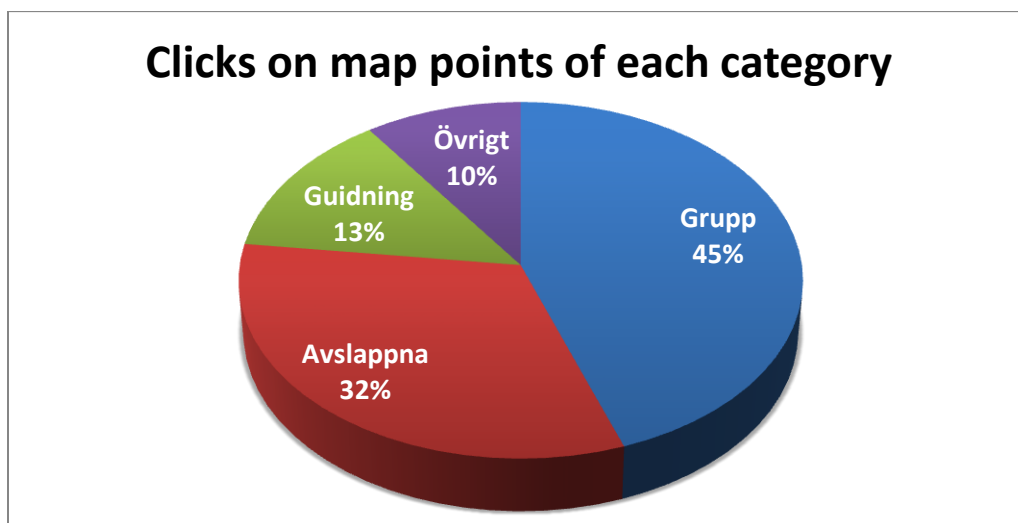


Figure 11: Repartition of clicks on map rooms by map category, from January 21st to February 18th, 2011

5.1.6 Further developments

Overall, the response to the entrance screen has been very positive, both from the staff and from the visitors as use statistics showed. However, there are still some possible improvements which could be achieved in the future.

First, the integration with Upp member database would be very positive, allowing users to store information about the events on a web service, or simply sending reminders to email, phone or facebook would greatly improve the chance of visitors to be better informed about events. For this, we imagine that RFID cards or other means of identification would be suitable, and linked to the upcoming unified database. This feature interests Upp strongly as well, since it would provide information about individual visits and return rate, which isn't possible at the moment.

Secondly, we would recommend further integration of that screen with the Surface applications, and potential mobile applications (android, iOS), through the same membership card system. This would give more interest in having the membership card, and enable some more design possibilities, such as creating a high-score or visitors-customized page on the entrance screen. This way, visitors would see that others they might know were there, and adapt their behavior consequently, by choosing to synchronize with them or not.

5.2 Tabletop system installation

5.2.1 Target

This recreational part of the plan is aimed at visitors of Upp, at the "Comfortable" zone of the engagement continuum. They may want to stay at Upp to meet new people, but there is only the opportunity of events. Consequently, secondary targets are "Goal-Oriented" categories (visitors who come only for some specific purposes), and "Enthusiasts". It is likely that "Godfather" figures will find the Surface useful, because it gives them a pretense to invite others to do something together, and something to talk about, although the Surface and its application are not specifically needed for that purpose. Godfather figures tend to invent their own pretenses, and naturally invite other people. Our objective is thus mainly to support "Comfortable" visitors, because they may see beyond their ordinary goals, an opportunity to relax and thus make Upp space more lively and populated. In turn, this increased amount of people, would influence Enthusiasts and Goal-Oriented people indirectly.

5.2.2 Early deployment

Part of the initial plan for responding quickly to Upp's situation included a deployment of large touch screens to stimulate discussion with Upp members. As delays accumulated, it turned out that the Entrance screen was deployed after the Surface, which was unexpected. The Microsoft Surface Unit was deployed on December 15th, 2010 at Upp with several "out-of-the box" applications, which were installed to familiarize visitors to what the WPF framework could do with multi-touch input.

These applications are three games (checkers, chess, Tiles, a reaction – puzzle multiplayer game) and two simple media applications (a picture viewer, a music player). Both of the latter were loaded with Upp pictures and music, and set up so that they can easily change content on their own. Additionally, a screensaver application called “Attract” starts automatically after a moment of inactivity, imitating water to invite to touch the table. Unfortunately, since these applications were standard and downloaded from Microsoft Surface’s official website(Microsoft, n d), it was not possible to modify them, so no statistics of use can be collected, or to identify visitors.



Figure 12: The pictures of Upp in a standard application on Surface

This is why, as soon as this solution was deployed, we worked on an application that would be tailor-made for Upp.

Another unexpected change to the original plan was in the deployment space. From the beginning it was assumed that the location would be in the Fika (Cafeteria) area. However the lack of available snacks and natural passage of visitors made it a place where the Surface would be harder to discover. This eventuality was thought about, with the installation of the map, but at that time, it wasn't yet deployed so instead, the Surface was installed near sofas, in a relaxing area near the entrance where there is some passage.

5.3 Tabletop custom applications

5.3.1 Concept decision

In a similar manner to the design process of the Entrance screen, the design process consisted in brainstorming sessions (Kelly, 2000) to find possible interface concepts, and evaluating them against the requirements elicited in part 3. In the face of time constraints, we decided to settle on the concept

which at the time would also be reasonable to achieve in the remaining development time. With the help of Touchtech supervision, we settled on the concept of a quiz game.

This decision's strategic advantages are that its content should be flexible, and easy to change in the long run to renew the interest of the game without the intervention of any technological specialist, which other scenario-based games (adventure games, role playing games) or puzzle games (physics based puzzles, among others) wouldn't enable. Another interest is that its appearance doesn't need to be rich in graphic design.

In turn, it won't run the risk of distracting the players from the essential of the game: the other players. Finally, the structure of the quiz is simple enough that the game mechanics be only slightly modified to attain the remaining requirements. Game design being out of our domain of expertise, we preferred to devote time on making a proven game mechanic to work on the Surface [], and try to adapt it to meet the social goals defined earlier.

5.3.2 UppQuiz competitive

5.3.2.1 Rationale

The first version of the game was developed with a competitive frame of mind, to enable some really fast game legs and leave some time for a further iteration, based on the reactions to a simple competition. This version fulfilled the following of the requirements stated (cf. Upp Social/Relaxation area p:24).

- make visitors of Upp stay about 10 minutes, and 10 minutes only.
- *after 10 minutes, it could encourage others to come*
- engage 1 up to 6 persons at the same time
- *favor attraction*
 - o proximity: if a group gathers around the Surface, it achieves this objective
 - o *complementarity: encourage use of complementarity of character and abilities during cooperation*
 - o frequency: incite visitors to return regularly to Upp
 - o *reciprocity: give visitors the occasion to reciprocate positive actions (but not the negative ones)*
- *favor inclusion*
 - o usable alone, anytime, but strong incentive to use in group
 - o include new users on the fly
 - o *engage couples of users and encourage couples to interact with each other: make subgroups, and then encourage mixing them*

Table 1: Hypothetical requirements fulfilled by the competitive quiz, in bold

This solution favors inclusion but partially favors attraction mechanisms. There is an intrinsic trade-off between engaging couples of users explicitly inside the application, and allow players to join or leave as they pleased. We privileged the latter, as including the players in the game at all seemed a more

positive message than requiring dyads which may feel rigid and unnatural and as such, directly rejected unless there is direct supervision from Upp's staff to ensure rules of the game are upheld. Another factor at play would be the reward experienced through playing the game. If significantly big, players could be motivated to play more and follow the rules, but some could be inclined to seek indirect ways of reaching the reward (cheating) In addition, use of dyads prevent from playing alone, which is why this idea wasn't implemented in the end.

The time limitation is not strictly implemented, because there is no way currently to identify the players, and the reward for playing is a score. This is due to the setback in unifying databases and connecting users to a profile. Instead of introducing a temporary solution which would confuse staff and visitors in the long run (Microsoft Surface tagged cards), we preferred to leave that as further development.

Particular care has been taken to avoid involuntary moves for joining, by using slider controls similar to Apple's "Slide to Unlock" on iPhones and iPad.

Another issue was the 360-degrees nature of the interface. The pod at the center rotates to a standard position of 45 degrees compared to Figure 43: Welcoming view on the UppQuiz. The content displayed in the center is mirrored on each side of the pod, which allows the three players at each of these sides to read the message, albeit with a minimal contortion. The central pod can be rotated by hand as well, in case users prefer another seating arrangement. This trade-off was made to accommodate the low screen resolution (1024x768), when questions have a large text to avoid scrolling as much as possible.

Sounds play an important role to inform players of what happens (when players join, or leave, when questions are answered, when someone buzzes), and is designed to be neutral, to produce a subtle atmosphere without impairing the communication between players.

The score is recorded for each player that was there at the end of the quiz, and is not ordered by session but by date.

The graphical design is once more based on the codes and colors of the existing Upp documents and website. For screenshots, please see p.95, Appendix: UppQuiz competitive version.

5.3.2.2 Results

5.3.2.2.1 Informal feedback on the competitive quiz

At a few occasions the working version of the competitive quiz was tested, with two players two times spaced by one week of work. On January 21st, the working version was styled to fit the Upp graphic chart and released on the Surface with 6 short quizzes. We observed the use, notably 5 players during a fair to which Upp participated, on January 25th. This provided input for the development of both the competitive and cooperative version.

A few issues were identified in interaction and game mechanics terms. Due to the central position of the answer, and the attention of each player to this area, sometimes players' hunch is to press the center piece instead of their buzzer in the competitive quiz. We observed on several occasions that players can "sabotage" other players by answering instead of them. This can be easily reciprocated, which goes against the requirements we set off.

Due to the low resolution on the surface, and sometimes long questions, the center area of the quiz is divided in two halves, covering each 3 players' visual orientation. However, this solution is not optimal because two of these players have to turn their heads to read the question properly, which may be considered as unfair. In further versions, players can rotate the center display themselves to suit their seating arrangement better.

Figure 13: Upp members playing the competitive Quiz spontaneously, looking captivated on 4th February 2011

In terms of gameplay, we observed on occasion the possible reciprocation of negative actions between players (turning the central pod without notice, answer something wrong for another player). This factor, was explicitly against our objectives. Despite the very sparse use of sound, and clear short questions, we observed that players concentrated excessively on what happens on the screen, to the expense of discussion and social behaviors. This was also a major drawback of this solution, which prompted the development of an explicitly cooperative version. Despite that, we still didn't assume that a 100% collaborative quiz would be interesting enough to be played as frequently and casually as the competitive quiz, which is why we continued developing the latter. It might be a matter of personal preference, which quiz different types of groups or individuals would favor, and still benefit from its social and entertaining effects.



5.3.2.2.2 Use statistics for the competitive quiz

Between January 21st and February 18th, the competitive quiz was available on the Surface, along with the other programs previously mentioned. Despite the little content available, Figure 14 shows that the quiz was regularly and spontaneously played.

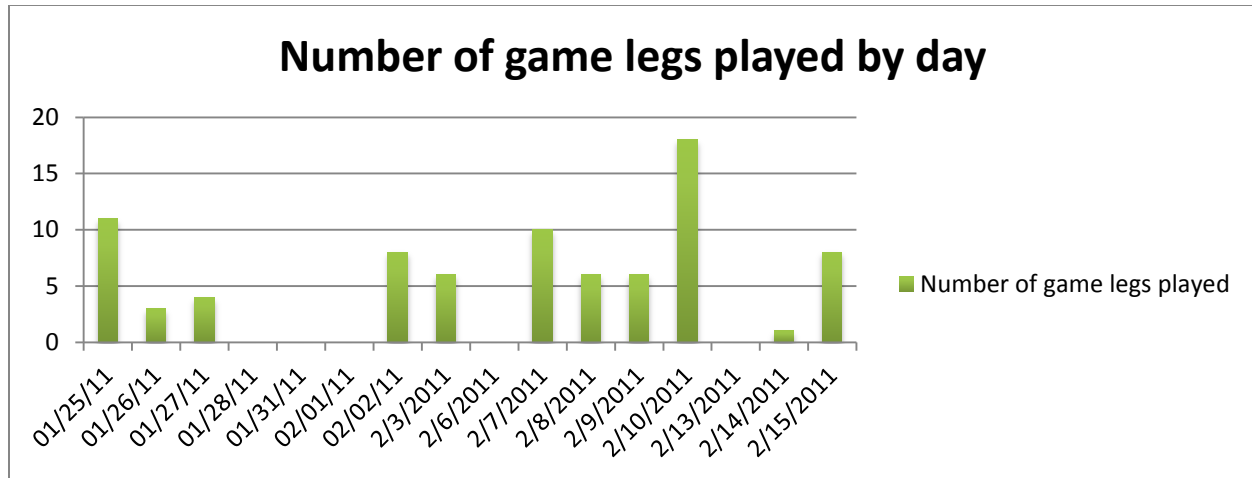


Figure 14: Number of quizzes played by day, between January 25th and February 15th

Looking deeper into that use, one can observe in Figure 15 that peaks are similar to those of the entrance screen: visitors seem to come to the Surface near lunch break (12:00-13:00), and later in the afternoon, at "fika" (coffee) break. This also hints that the game is played to relax between activities or meeting guide. There is another timid peak of use around 20:00, which corresponds also at a time when evening events end. All in all, this confirms that our target group is reached, for the specific kind of use that it was designed for: relaxation.

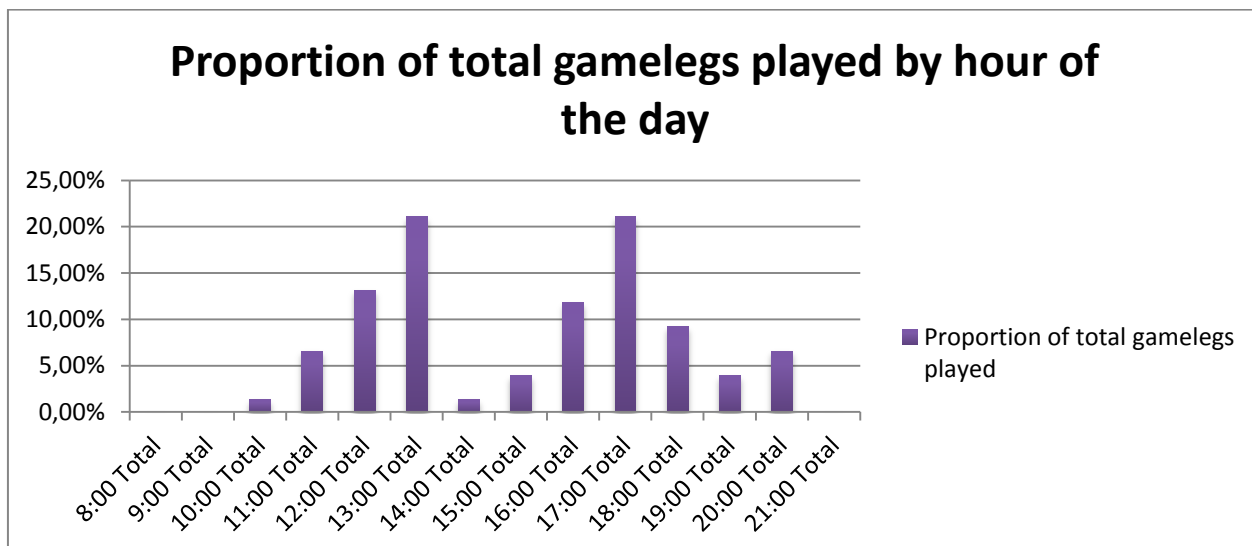


Figure 15: Repartition of quiz playing, by hour between January 25th, and February 15th

Another measurement showed that 90% of the quizzes started were ended with the same number of participants as they started. Very marginally, one user was leaving (9%) before the end, and the remaining percent corresponded to two players leaving. This is really positive, and showed that the

game was interesting enough to be played. Another contributing factor might be social convention, and members of that group of friends would not “let the others down”.

The distribution of number of players per game leg is also interesting to consider. Figure 16 surprisingly amounts nearly one third of the games played by only two players, about 10% with only one player. These facts are coherent with our analysis of Upp’s social group situation. Some visitors come alone, and end up leaving by lack of things to do. Those visitors could play the quiz, and entertain themselves. We also mentioned a theory that social groups form and propagate by dyads. The dyads are thus the more likely form of group to be observed in a social structure that starts to develop. Another interpretation is that these dyads organized their visits together from the start.

Surprisingly enough, three-player configurations were the rarest, with less than 10% of occurrences, which is to contrast with the second most common configuration: Four players (25%). A recent study showed that the long edges of a rectangular table are populated first, and considered the most convenient for a variety of tasks, and the short edges are then in turn populated (Müller-Tomfelde & O’Hara, 2010). We favored that observation further with the decision of duplicating the question texts only two times, which covers only 180 degrees of the table. The “best” seating arrangement is therefore 4 players, 2 on each of the long edges, and 2 players, each on the same or opposite edges. Five-player and Six-player configurations are lower than 4-player. This might be a combination between the fact that such bigger groups are fewer statistically than smaller groups, and that the game itself might be more difficult to play as more players join, which is going against our objectives, once more.

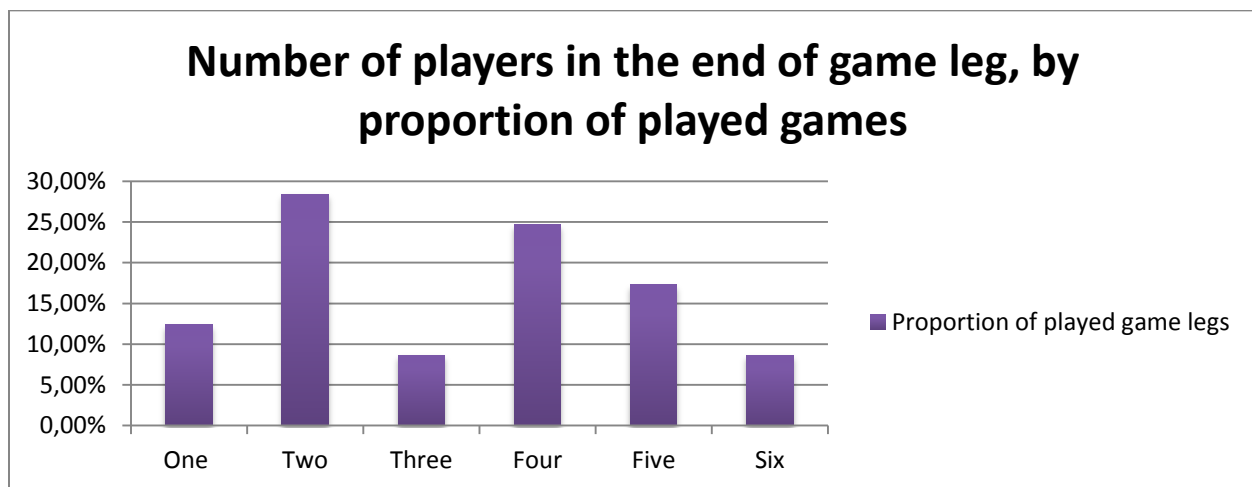


Figure 16: Number of players by game legs

A final observation concerns the content of the quiz itself. In Figure 17, we can observe that the top 3 quizzes played are made of trivia questions, which are a mix of many different random themes. (History, Geography, Maths, Culture, Music, Art ...). This choice is justified by the alphabetical presentation of tests in the list, which shows these three quizzes first, but also this hints that quizzes with diverse content are preferred by players. If players don’t know each other yet, they wouldn’t decide to decide on a specific theme. This might slow down the decision of starting the game at all, and later create inequalities between players, the one deciding a theme he/she likes having an advantage. Thus, a very mixed set of questions has two advantages: it eases the decision to start the

game, and favors the display of complementary abilities *during* the game rather than *before* the game.

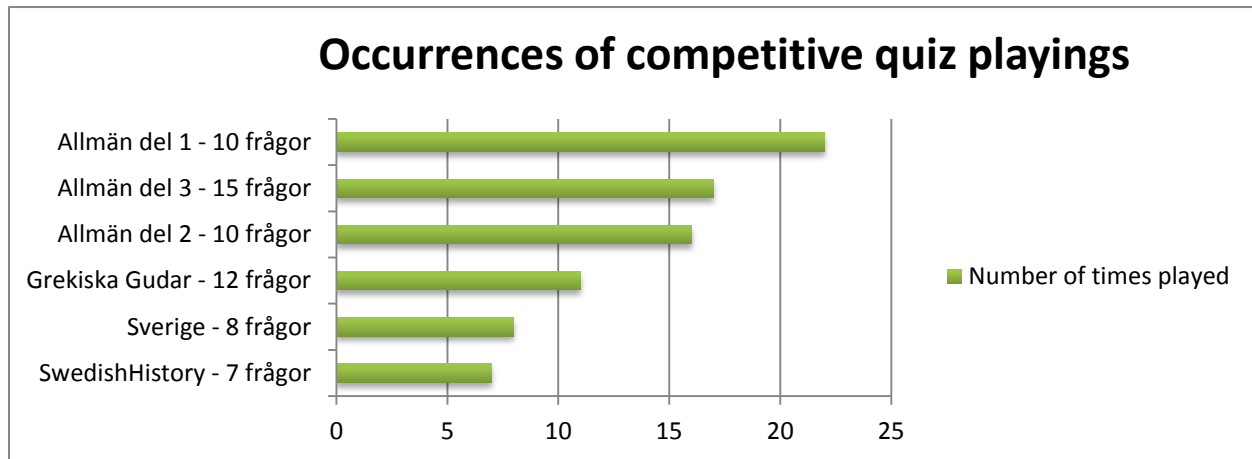


Figure 17: Cumulated number of times played, by Quiz theme

Some of these issues were aimed to be solved by the next iteration, the Cooperative Quiz.

5.3.3 UppQuiz cooperative

5.3.3.1 Rationale

A second version of the Quiz game was developed, based on the feedback of the competitive version, where we aimed at cooperation between the players. It aims at fulfilling the following requirements (in bold):

- make visitors of Upp stay about 10 minutes, and 10 minutes only.
- *after 10 minutes, it could encourage others to come*
- engage 1 up to 6 persons at the same time
- favor attraction
 - o proximity: gathering around the Surface at all
 - o complementarity: encourage use of complementarity of character and abilities during cooperation
 - o frequency: incite visitors to return regularly to Upp
 - o reciprocity: give visitors the occasion to reciprocate positive actions (but not the negative ones)
- *favor inclusion*
 - o usable alone, anytime, but strong incentive to use in group
 - o include new users on the fly
 - o *engage couples of users and encourage couples to interact with each other*

Table 2: Hypothetical requirements fulfilled by the competitive quiz game, in bold

This version aims at favoring attraction mechanisms more, since it enables reciprocating positive actions, by answering correctly or helping reach the common goal: a team high score. Reciprocating negative actions is more difficult, because it also goes against the individual to sabotage the whole team. The basics of the previous game are preserved, which enable flexible joining and leaving of the game, with up to 6 players. The time constraint wasn't implemented rigidly, but depends of the time required to answer the different available quizzes.

The game mechanics were modified, in that all joined players need to answer the same question. The answers are located in their player zones, which enables easy access to answer, and the point system is devised so that the whole team wins the question if more than half the participants answer right. Each player answering right grants 10 points to the team score, so on the whole, the intended effect is two-fold: it incites players to join, to reach higher scores easier, and it stimulates cooperation, in that if everyone is convinced of an answer, the result is much greater.

The questions are also intended to be more difficult to answer, and as such, the time needed to answer is augmented to allow discussion between players. The difficulty of questions prompts the creation of diverse and complementary groups, in order to cover the question's various subjects and difficulties: vocabulary questions, history, general knowledge, logic, ...

The question answers located in each player zone, are randomized in order relatively to each other, which hinders "cheating" by players who may use other player zones and simulate other players to earn more points. Another way to limit that cheating impulse, is to offer at best only a modest reward, such as a free coffee or bun instead of more expensive rewards.

The score is recorded by team, and ordered by highest score first. Once a quiz has been completed, the team can enter a name, or all of participant's names which will show in the top list. Graphically, this version was changed to inform players of the change of game mechanics. The welcome screen color was changed, and the point attribution animation was inverted, to signify that each player contributes to the common score. The score itself is displayed on the central, common area. For screenshots, please see p89 Appendix: UppQuiz, cooperative version.

5.3.3.2 A/B test of competitive and cooperative quizzes

5.3.3.2.1 Test protocol and hypothesis

From the previous observations, we decided to do a third iteration of the Quiz development, with a focus on collaboration as previously exposed. In order to compare the benefits of this version, we ran a more formal test, with a questionnaire to assess the closeness to initial requirements. The first session was performed on February 17th, at Upp, with four visitors in the age target, one of the "Enthusiast" type, and three "Goal-oriented". Occasionally, a "Godfather" type would eavesdrop and play with the visitors. The thinking behind this mix, was that groups may form when regularly coming visitors would invite newcomers to a game. The majority of participants would therefore be in the target group, and one participant in the secondary target group.

Two quizzes were developed for the occasion, to test our hypothesis that the cooperative quiz would solve part of the social shortcomings of the competitive quiz:

- the more players, the easier it is to answer the question, both by statistically combining the participants' knowledge and also because the application allocates more time for answering the questions (incrementally by player who joins), therefore increasing feeling of inclusion
- players have to discuss between themselves, and not focus on the Surface primarily (eye focus, discussion)
- discourage negative actions, and encourage positive actions

The quizzes were designed so as to have significant and similar diversity compared to each other, and roughly amount to the same playing time, estimated to 10 minutes. The competitive game leg ultimately lasted 11'00" and the cooperative game leg lasted 13'20". This roughly meets our expectations for how long the game could last, and meets more than the requirements previously exposed.

5.3.3.2.2 Questionnaire

A semi-qualitative questionnaire was answered by each participant, after each of the two game legs. This questionnaire was evaluating individual's perception of inclusion in the game, noticing other people's positive and negative actions, discovery of others' personalities and abilities (see p:105 for the questionnaire, and p:114 for the detailed results)

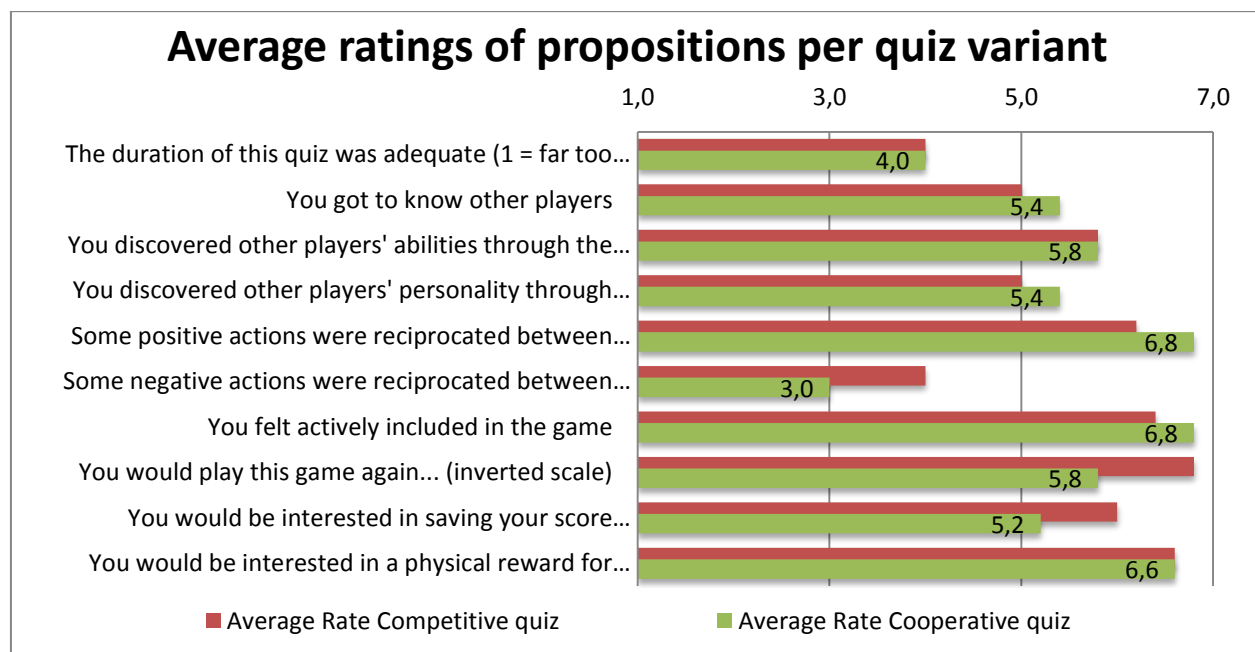


Figure 18: Abridged chart of the A/B questionnaire results

These preliminary results, average of opinions from a very small group of users, hint that the cooperative quiz is fulfilling the requirements at least as good and better than the competitive version. The only points on which the Competitive quiz was found superior, is when evaluating how often the game would be played in the future, and evaluating the interest in identifying users through a physical card. The cooperative version was found better to know other players, especially in assessing other players' personalities. The rating on discovering other players' abilities is identical. There are significant differences in observed positive actions (6 for competitive, 6.8 for cooperative), and observed negative actions (3 for cooperative, and 4 for competitive). This hints that the cooperative version discourages

successfully negative actions, and encourages the positive. Both versions were rated adequate in duration, and imagined more interesting with a small reward. These results are to take with a pinch of salt, as the number of answers (N=5) is far less than enough to have statistical validity, and the participants knew each other before the test, although not in the context of Upp.

The qualitative comments gathered during that questionnaire, are however illuminating some of these results. We can safely assume that deciding to play a competitive or cooperative game is a matter of personal preference, as some found it more fun to solve cooperative hard questions together, but others found that their contribution was less essential to winning the game. The global engagement of the individuals is unsurprisingly lower in a cooperative situation, as has been well documented in psychology, and labeled as "Social loafing" phenomenon (part of the effect studied by Ringlemann among others, when coordinating groups). Another interesting observation, is that players didn't behave entirely competitively in the competitive game. This can be caused by a lack of promised reward, and also willingness of players to play fair, and not leave someone in difficulty.

5.3.3.2.3 Direct observation

During the test, a video was shot with the consent of the four participants. The video was later reviewed and the occurrences of the following events counted, to assess whether the opinions of the players were confirmed: discussion between players; -positive and negative actions between players. The main findings are summarized in the following table:

	Competitive Quiz	Cooperative Quiz
Time	Time highly monitored, only one time-out questions	Relaxed atmosphere, with two occurrences of time-out questions, and one occurrence of a player leaving the table to refill his/her glass.
Discussion	There were no occurrences of group discussions, because there was no time to perform them. Discussion between players happened regularly, most often addressing the rest of the group a comment or question, which would later be answered by one or two other players (respectively, 11, 16, 3, 7 occurrences of discussion initiations).	In difficult and confusing questions, the whole team gets involved, whereas in knowledge questions of specific nature, only 1-2 individuals got involved. (social loafing, 8 out of 16 questions)
Positive for group	Positive actions for the group were performed, notably rotating the central circle for the group's advantage, (respectively 2,8 and 2 times by the players who did it)	Positive actions were directed to the whole group. Everyone at least once performed a small task beneficial for the team, such as pressing the validation button (respectively 10,2,1,2 times which shows a ritual and division of tasks)
Negative for group	Negative actions directed to the whole team occurred on one occasion (involuntary exit)	Negative actions can only penalize the whole team, and occurred 3 times without intent (exiting the game, answer too late)
Negative for player	Negative actions could be performed against specific players, like answering in their place, but this didn't happen.	There was no intentional negative action between players.
Positive for player	Positive actions for other players happened, but were mostly involuntary like dropping the answer of the quiz. They weren't reciprocated, most likely	None

	because there was no occasion to do so (the participants couldn't answer the other's questions) ¹	
Complementarity of players	Complementarity between players was shown when the other players dropped an answer when they shouldn't. (2 occurrences)	Complementarity was shown in a few occurrences where only one person knew the answer, and convinces the others (respectively 5, 5, 3 and 2 times)
Laughter	6 occasions of laughter in the group	6 occasions of laughter in the group

The game rules and functioning were quickly understood. The competitive game was understood fully by the test group in two minutes. In the cooperative game, however, one player didn't understand how the players were to cooperate, which others understood by the point animations: the points contributed by each player are added up in the middle of the central circle, which updates the common score. The visibility of the score was found insufficient in the beginning of the game leg, and the indication of whether the whole group answered right or wrong was found to be too short. However, other players quickly explained the functioning, which resulted in inclusion of these players but only after 4 minutes inside the game. We do not feel like changing these elements would improve the design, as it is aimed at returning members primarily (Cooper's perpetual intermediates). Instead, we will concentrate on writing this essential information in the program selection menu.

The cooperative quiz provides virtually no occasion to perform negative actions towards other players, as they immediately penalize the group. Thus, they tended to be not reciprocated, which was the objective. On the other hand, positive actions performed for specific players also are helping the group. The test group took turns performing duties that help the group, such as pressing the validation button. Competitive quiz, on the other hand, displayed similar behavior for the group, and also for particular individuals. Thus, there is a trade-off between allowing one-to-one interaction, and including all the players in the game.

The attitude of players was, as intended, friendly in the competitive quiz primarily because of the lack of real reward, but the players appeared more focused, concentrated and engaged in the game (as shows their monitoring of time) in the competitive quiz. The cooperative quiz created a relaxed atmosphere, on the whole favorable to socialization.

The cooperation sparked extensive group discussions for at least half the questions. Other questions, too easy or too specific, showed very impoverished discussions, typically involving following another player's hunch. This shows clearly a trade-off between showing complementarity between players, and keeping them motivated by the questions. Thus, there is an important work on finding new, diverse and adequately long questions, which play a crucial part in the design. By contrast, the competitive questions must be short to read. There was almost no group discussion, but players all had an occasion to show their specific knowledge.

¹ There was, however, an occasion when a positive action (encouragement) was reciprocated by a comment later in the game.

5.3.4 Further developments

In summary, both quiz versions can provide similar duration, host 1 to 6 persons, and include new users on the fly, be fun and engage groups spontaneously. However, we observed a trade-off in attraction mechanisms, where the cooperative version favored complementarity and reciprocity better, at the cost of estimated frequency of play. Conversely, the competitive quiz would be played more often, but would provide less opportunities for discovering complementarity and reciprocity.

This, we believe depends on how well the questions are selected for the cooperative quiz: they must be confusing for the group, but not overly rely on knowledge which shuns the discussions. Alternatively, that issue could be solved by the inception of a small team reward (like a semla, or a coffee each), which would stimulate the frequency at which this game is played. However, to prevent issues of cheating and abusing, these rewards would have to be small, and regulated by the system itself. By that we mean, that players should be identified in some way, and quizzes they have already played should not appear anymore.

- make visitors of Upp stay about 10 minutes, *and 10 minutes only.*
- *after 10 minutes, it could encourage others to come*
- engage 1 up to 6 persons at the same time
- favor attraction
 - o proximity: gathering around the Surface at all
 - o complementarity: encourage use of complementarity of character and abilities during cooperation
 - o frequency: incite visitors to return regularly to Upp
 - o reciprocity: give visitors the occasion to reciprocate positive actions (but not the negative ones)
- favor inclusion
 - o usable alone, anytime, but strong incentive to use in group
 - o include new users on the fly
 - o *engage couples of users and encourage couples to interact with each other*

Requirements currently fulfilled:

By cooperative quiz better

By competitive quiz better

By both equally

By none equally

Table 3: Comparison of requirements fulfilled by the two quiz versions

Requirements in gray on Table 3 were not yet tackled by either of these designs. Limiting the duration of the game to 10 minutes might introduce frustration, so we would advocate for a unique weekly or daily quiz, which would last approximately 10 minutes, after which it wouldn't be available anymore. This assumes that an identification of players exists, but this modification might be necessary if antagonistic group start competing for using the Surface(as mentioned p: 81 in the Appendix:

Territoriality and situational factors). Finally, engaging couples of users as a requirement was discarded, as it goes against the requirement of including new players on the fly.

Based on this summary, the main improvement would be to identify the players individually, thanks for example to an interactive membership card. This eventuality was thought of from the beginning, as shows the Appendix p:87 where the card is used for answering questions. The Surface does accommodate a variety of identification mechanisms (graphical tag, RFID tags, login + password, ...), but such a system wasn't yet implemented, because of the organization's lack of definitive decision on this matter (the identification system should be unified to reduce excise for the end users, who would have only one identification information to remember). Of course, delivering rewards and administrating the identification system ultimately falls under the responsibility of Upp.

Other long-run advantages are that Upp would collect more valuable use statistics, and users would leave a more personalized trace at Upp, which in turn could be connected to social websites to inform their friends, and increase their chances of meeting someone, staying longer or have a reward for coming often. From this point on, would come also the need to unify the different games and applications on the surface in a coherent application, with the same branding, the same statistics logging, and the same membership card regulation benefits.

6 Discussion

As briefly mentioned in the introduction, the author was not only at the initiative of the project, but also responsible for most of its aspects: marketing, interaction design, software development, deployment and testing. This situation appears to be quite extreme, and the result of very specific conditions, which we will attempt to expose and analyze.

6.1 Enabling factors: why it happened

6.1.1 A decisive technological partner: Touchtech

Touchtech's early involvement, though politically a sound decision in our opinion, influenced undeniably our thinking. The main drawback may be an early but tacit commitment to use touch interfaces in the project. However, the company never specifically encouraged the use of one type of interface against another, and was open to develop its knowledge in other areas such as mobile (phone or tablet) development, or any other experimental type of interface. Time proved that this inclination is still a major part of what Touchtech is, starting development on Windows Phone 7, or using the gesture sensor Kinect on some commercial projects. Furthermore, another company specialized in electronics, Pluspole AB shared the office with Touchtech which could have enabled some more experimental kinds of interfaces. However, as Jakob Nielsen stated, "Experiments should remain in the lab", meaning that we preferred a maturing technology rather than attempting to reinvent one at the expense of available resources and visitors.

By contrast, the advantages comprised an opportunity to discover many different kinds of touch screens, experience them personally and also be inspired by the many captivating projects which were developed by the Touchtech team. This informed and inspired the design, helped to form opinions about what would be possible to achieve, at what cost, and for what durations. Additionally, some of the hardware and software which is routinely used by Touchtech such as the Surface, and its Software development kit, are only available to a select few "partner" companies chosen by Microsoft. Even more than that, they helped arrange the provisional rental of the Surface while it was discontinued by the announcement of Surface 2.

This company contributed more than significantly to the development effort, with around 40 hours of help in total, without counting informal discussions and advise. The help consisted in development tutorials, materials and seminars, development time, and also access to some of their licensed code base: examples, libraries developed in-house and also development tools (such as Expression Blend, Microsoft Office, Photoshop, Team viewer; other software such as Visual Studio being available for Chalmers students). A workspace was also allocated with a permanent desk at the office.

The support of Touchtech concerned also welcoming Upp staff in this office on three occasions, letting them experience different interfaces by themselves, and generally providing excellent information for them to take decisions during the delicate inception of the project. The company ultimately took responsibility for ordering the hardware, which was greatly facilitated by the previous cooperation of

Touchtech with the City Hall. This already existing channel of communication enabled a flawless billing, and relevant help in receiving and configuring the two screens.

On a personal level, it was also extremely important to receive moral support throughout the project, which contained its share of uncertainties and difficult, confusing times. Overall, it would be naïve at best and dishonest at worst not to acknowledge the decisive role of Touchtech in the realization of this project, helping in nearly all of its aspects.

6.1.2 Decisive dispositional factors: Upp

The nature of Upp as an organization is also a strong factor which favored the execution of this project.

Its interests and objectives put naturally the emphasis on the end users: the visitors, or members. As Upp's objectives are quantified, it needs to maintain trust in regards to its members, so that they do not give bad publicity and hinder reaching the objectives (regardless of the political commitment, Upp still has to maintain its activity in order to pursue its political goals). To understand and act on these goals, our own position in the correct age group, and becoming a member of Upp ourselves has successfully aligned the concerns of Upp, the concerns of its members and the concerns of user-centered design.

Another factor in the very nature of Upp, is that it counts very positive, motivating people, who are dedicated to help others and trained to deal with young people from past experiences as educators and teachers. The author being one of these young people, Upp was likely to help us manage our action throughout the project, and work at actively enabling this project.

Among the staff, one guide in particular named Werner Storck played a very crucial role in this project, from believing in its value at the earlier stages, to providing practical help when it came to contacting and interviewing other members. The benevolence of this individual gradually enabled to discover the rest of the organization, and helped convincing the rest of the staff including leader Mattias Rexmo to carry on with the project at all in August. Werner Storck constituted a decisive communication channel with Upp in that it enabled to meet other members of Upp when visitors were very scarce. He also provided guidance when it came to formulating the final proposal which was accepted in October, and provided informal but decisive feedback on the early versions of the Entrance Screen and the Quiz.

We may also mention the positive influence of his constant moral support in a manner much symmetrical to Touchtech's. However, these factors alone cannot explain fully how this Interaction-Design centric project was accepted. For this, we may analyze and summarize these factors in terms of a marketing mix.

6.2 Marketing mix: how it happened

Upp's financial commitment on the project (October 2010) relied retrospectively on a carefully established marketing mix. The popular classification of McCarthy separates marketing tools into four categories – “four P's”: product, price, place and promotion (see Figure 19 below).



Figure 19: Four P's marketing mix, (Kotler & Keller, 2008)

In the case of our project, the marketing mix was formed from an interaction design point of view. If we were to examine the project in terms of these four poles of action, the result would be the following.

6.2.1 Detailed analysis

6.2.1.1 Product

6.2.1.1.1 Product variety

The end products didn't exist when the sale happened. Instead, what was “sold” was the development of a project responding to Upp's goals to create and maintain a community. The main flaw in our approach, which possibly slowed down the decision-making process, is that the proposal was unique, and provided an “all or nothing” sentiment.

6.2.1.1.2 Quality

The quality of this project was tacitly guaranteed by the support of Touchtech and Chalmers.

6.2.1.1.3 Design

The design of this product was promised to be tailor-made for the visitors of Upp. Interaction Design was thus the main asset of the end product, with a commitment to end users and also the customer, Upp.

6.2.1.1.4 Branding

As previously mentioned, the branding of our project was associated with Chalmers and Touchtech, established brands of quality and experience, which provided trustworthiness.

6.2.1.1.5 Features

The features to be developed were not precisely decided at the point of committing financially. The high-level objectives to achieve with them were however clearly agreed on and documented with research, and their execution relied on professional design work.

Arguably, the simple fact of proposing cutting edge multi-touch hardware was a feature in itself, making a cultural statement appealing to digitally aware youths.

6.2.1.1.6 Services/warranties

The hardware functioning was guaranteed by the respective constructors, NEC/PQLabs and Microsoft. While Touchtech stipulated the responsibility of the software falls unto the Author, they also offered support services regarding the function of hardware.

The Author acted as a technological advisor throughout the project, as Upp was devoid of specific knowledge in the IT department. The quality of this project was hinted by the participation of Touchtech and Chalmers.

6.2.1.2 Price

6.2.1.2.1 Product price

The expenses of Upp were hardware (including transport) and counseling hours from Touchtech, explicitly excluding the Author's working hours.

To this cost we may add the resources necessary to maintain the two interfaces: turn them on, off, cleaning them, report malfunctions and add new content. This price was fixed, abstracting Upp temporarily from the fact that Upp rents a Surface from Touchtech which will be replaced by a Surface 2 as soon as it's available.

One might also mention the large budget on which Upp operates, 80 million Swedish Crowns for its three years of action.

6.2.1.2.2 Payment period

The payment period was at the end of the fiscal year, which facilitated the commitment of Upp, and the billing was organized through the already established channel Touchtech-City Hall.

6.2.1.3 Promotion

6.2.1.3.1 "Sales" promotion

The promotion of this project was achieved first with Werner Storck through online chat, then e-mail and ultimately meeting at city hall and Touchtech. Thus the promotion initially wasn't direct, but through his help.

Other members of Upp visited gradually the office and directly experienced existing applications.

Ultimately the proposal was formulated to the main decision maker, Mattias Rexmo after a meeting in person. The communication channel used for this proposal was e-mail, a text document stating the objectives, means, and estimation of costs backed up by previous presentations of scenarios. Frequent meetings helped instill interpersonal trust which enabled honesty in communicating technological limitations and advantages (not being a Touchtech employee granted more credibility in that role).

6.2.1.3.2 Advertisement

There was no advertisement, nor discussion of price until a concrete action plan was proposed, in October, with evidence backing up the proposal. The main message and accent was on the fact that the design process would be user-centered, with the **political guarantee** to act in the target group's interest.

6.2.1.4 Place

6.2.1.4.1 Transport

The transport and deployment were ensured by Touchtech and the Author.

6.2.1.4.2 Location

Taking into account the place where visitors usually congregate, make it fit with the style and activities there are integral part of the design.

6.2.2 The influence of Interaction Design

Here is, in shorter form, the different points of the marketing mix. Colors indicate the contributions of the respective actors: Interaction Design as a discipline (positive and negative aspects), Touchtech, Upp.

Product	• Absence of significant competition • Software not guaranteed • Quality guaranteed by the branding of Touchtech & Chalmers • Hardware guaranteed • Tailor-made design • Multi-Touch hardware a feature in itself • Detailed features not settled
Price	• Fixed price • Existing payment channel • Large available budget • Favorable payment period • Low price, but very long duration of project
Promotion	• Upp Staff experienced directly different technologies • Inside communication from Werner Storck • Detailed e-mail proposal • User analysis prior to solution proposal • Political guarantee • Trust and honesty in advising different technologies
Place	• Transport and installation included • Location-specific proposal

Legend:

- Points covered thanks to Touchtech
- Points covered thanks to Upp (dispositional factors)
- Points covered by Interaction Design study
- Negative points due to Interaction Design study

The Interaction Design way of thinking had implications (in green and red) in all four of the poles. The Product pole was affected, in that user-centered design cannot invent a solution before significant study of the users' goals has occurred. The positive side of that constraint, being that the "what" of the project could be decided in conscience, making the choice of multi-touch technology a feature in itself

representing a statement to the target group, and commitment toward software development. Software development on the other hand wasn't fully detailed, which made it difficult to argue precisely how the project would achieve its objectives.

However such power could have been significantly exploited for less honorable goals, Upp decided to trust us to work in conjuncture with its goals, themselves' needing to be in alignment with the members' goals. Part of the answer why Upp made this decision, is because the competition in large touch-screens is very limited in the region, which makes a similar offer virtually inexistent, and the risks were very measured despite our absence of experience in the field.

Another part is to look for in the notion of "political guarantee" in the promotion part. We will explain in the next section what we mean by this notion of politics in interaction design.

6.3 Interaction design, politics and profit

6.3.1 Interaction Design responsibility

Our intentions are not to procure a detailed analysis of what is an ethical Interaction Design behavior, although this analysis appears to be as difficult to produce as critical to know. Rather, we raise the opinion that the Interaction Designer is sometimes at a pivotal position in organizations to influence the quality of products and systems destined to be used by many human beings, and takes many decisions influencing their welfare.

Based on that premise, we wish to show that an interaction designer sometimes could, and in this case should:

- be politically conscious about his/her actions as much as possible
- participate in marketing duties to help define the "what", and not only the "how"

What concerns Interaction Designers is primarily the "How". How IT based products and systems are doing what they were supposed to do, the detail of their behavior. The decision to produce them in the first place, and the "What", being a shared responsibility with other High-Level Decision-Makers (Cooper, Reimann, & Cronin, 2007). We duly note that in literature and in facts, the term "Interaction Designer" can encompass a wide variety of roles, this exact role depending on the organization it belongs to, its needs, philosophy and understanding of Interaction Design as a discipline (Mayhew, n d). It also depends on personal sensibility and talents, what a designer feels able to do or not to do in practice. We mean the term "Interaction designer" in the way Cooper et Al. define it, primarily concerned with the behavior of interactive products, while knowing that this behavior is very intimately connected to other areas: graphical design, conceptual design, software development, information architecture, etc. Cooper et al. go even beyond that and underline a strong connection between the "what" and the "how":

"In the world of digital technology, form, function, content, and behavior are so inextricably linked that many of the challenges of designing an interactive product go right to the heart of what a digital product is, and what it does."

(Cooper, Reimann, & Cronin, 2007)

The Interaction Designer is then in a privileged and critical position, being in possession and often directly producer of information about a great variety of topics which inform the design process, both in what and in how. As such, he is also in a position to suggest changes that can be implemented, in possession of the necessary skills to evaluate this implementation (with user testing or other means), or able to delegate it, and finally responsible (more or less collectively) for the behavior of interactive products, that is to say, the way they respond to human contact. That is, how the product presents itself to the user, but in many cases also what it *is* to the user.

In the particular case study that we presented, all of these elements were accessible, and the organizational situation, extremely simplified due to the small scale of the project, allowed the designer to assume successively marketing-sales, design and development. It is thus primarily with such **small-scale** projects, **local range** and with **few people** involved that we conceive the Interaction Designer to have the most leverage in marketing and feature decisions. We easily imagine that the interaction designer in a larger team can have a more rigid work description, and more circumscribed role. However, we believe that regardless of the scale of the project, Interaction Designers could benefit from a reflection about how their role has political influence.

6.3.2 Political influence

The word “politics” as we think of it in the context of design, is defined earlier as “the process by which groups make collective decisions” (Quesenbery, 2004). In the case of our project, the political decisions can be thought of in different manners:

- **The politics of the city of Göteborg**, which aims at fighting unemployment through the creation of Upp.
- **The politics of Upp**, which aims at fighting unemployment through events, locals and in general the creation of a community of young people. It aims also at its own survival, as part of this aim.
- **The politics of Interaction Design as a profession**, achieving employer goals within the boundaries of law, culture, and ethics.
- **The politics of Touchtech**, using and developing technology for its own survival and profit, by conforming it to the goals of a variety of clients.
- **The politics of major technology creators** such as Microsoft, Samsung, Apple, Google, whose goals are also to ensure their own survival and profit, while affording to

In this report, we are interested primarily in the political action at the level of an Interaction Designer, formally freelance but with strong ties and dependence to Touchtech. By transitivity, we can hypothesize that choosing Upp as an “employer” allows Interaction Design to act in conformance with the political goals of Upp, and in a broader sense with the politics of the city, while still being dependent on the political decisions of the major technology creators. This situation seemingly aligns concerns of Interaction Design as a discipline to the politics of its customers, without making interests of major technology creators a priority: while marketing (as a discipline) is primarily concerned with satisfying the customer, which may or may not be the end user, Interaction Design appears to be primarily concerned with the end-user of its design.

The marketing strategy we chose was explicitly based on these assumptions, and was contradictorily executed at the expense of our own financial interest. Consequently, would we have to sustain our action, basing marketing strategy on political concerns would tend to be unprofitable. This is a classical issue documented notably by Smith (1995), and represented as the Marketing Ethics Continuum (see Figure 20). In the present case, we would place our action, between “Consumer Sovereignty” and “Caveat Venditor”, meaning that the producer (Touchtech, the Author, Chalmers) interests were much less favored than the consumer interests (Upp, Upp members). However, there are a number of business trends which document the possibility of moving towards this axis and maintain the producer’s activity.



Figure 20: Marketing Ethics Continuum (Smith, 1995)

6.3.3 Profit and social action

In recent times, considerable attention has risen on different ways of doing business, putting more emphasis about the values (as in moral values) of organizations and companies, some of which are considered to be risky for profit-making. Considerable effort is made to reconcile a tolerable ethics of individual work and profitability.

(Upshaw, 2009) presents a framework which promotes the values of honesty and integrity throughout the marketing strategy. One of the most interesting tools she mentions, is researching what she calls “integrity-heavy users”, much in a similar way that (Herstatt & von Hippel, 1992) recommend to research “Lead Users” for interaction and product design. We found the characteristics of these users to be very close to our own personal inclinations (see p:116, Appendix: Integrity-heavy users) which perhaps helped us formulate the “Caveat venditor” marketing strategy that we followed. As a result, we found these attitudes to be useful guides when deciding for one design solution / one hardware

choice over the other, and good predictors of factors to keep in mind for satisfying the users/customers in the long run. In addition to studying these specific kinds of behavior, Upshaw emphasizes that all initiatives cultivating trust should be systematized:

“Good intentions and sporadic initiatives won't create a reliable trust machine[...].But if marketers can establish a pragmatic, systematized approach to managing integrity, it will yield greater respect, credibility, and trust from the customer. That, in turn, should result in stronger revenue streams, strengthened brand loyalty, and a workforce that feels good about what they do for a living.”–

Lynn Upshaw, Integrity without sacrifice (1-1)

This echoes some discussions about the Return on Investment (ROI) of Usability, and diverse strategies deployed by Interaction Designers and Usability practitioners to market their own costly practices (Bloomer & Croft, 1997). In fact, the challenge appears to be very similar, and the obstacles seem to be found in the very nature of businesses: increasing and sustaining profit, which gives reign to figures such as ROI. While we do not have general indicators for either of those practices (ethical marketing and usability), we do subscribe in applying them into our designs.

The concept of trust and honesty in marketing strategies (trust in the brand, honesty in communicating around what the products/services are and aren't) appears to be a central concern in these new trends (Billings-Yun, 2010; Shockley-Zalabak, Morreale, & Hackman, 2010), which can include focusing on value rather than pricing (Reilly, 2010). All these values are considered essential for long-term exchanges.

A concrete response to these concerns is named “social entrepreneurship”, which explicitly aims at combining social action, beneficial for society at large and financial profit. The financial profit being at the service of the action, and not the opposite: profits should only be reaped to ensure the continuation of the enterprise or the growth of its action. There are a variety of archetypes of social entrepreneurs, the most relevant to our situation being the “social business entrepreneur” and the “corporate social intrapreneur” (Clark, 2009). The social business entrepreneur creates a business that aims at social change while being economically viable, whereas the corporate social intrapreneur strives to steer the corporate behavior to make it more socially responsible.

The current project draws inspiration from these archetypes, while missing the mark on the profitability aspect. However, the influence of our work on Touchtech's awareness of social issues might increase in the future. Interaction Design and Social entrepreneurship appear to have social concerns in common, and also the will to change situations, inherent to Design practice. We strongly believe that their combination can be economically viable and socially beneficial, at the price of a carefully considered marketing strategy.

As (Kotler & Keller, 2008) mention, marketing as a discipline is adapting to many new factors such as globalization and increased competition and the shift of values previously exposed. The concept of social responsibility, incorporated into the emerging “Holistic marketing” strategy, addresses this concern explicitly. A range of corporate social initiatives are practiced by companies around the world (see p.22, table 1.2 in Kotler & Keller, 2008). Simultaneously, the profession undergoes a series of “shifts” in its practice, among which “From marketing does the marketing to everyone does the

marketing". This acknowledges that many different roles in businesses have an impact on the customers, therefore participate in the marketing activity in a broad sense.

In these conditions, the idea of delegating significant marketing control to Interaction Design practitioners couldn't be more topical.

6.4 Synthesis

6.4.1 Marketing as an Interaction Design role?

We established that in some situations, enabling the Interaction Designer to pursue the political objectives of his/her profession means acquiring more decisional power in marketing duties. That said, we observed that combining these two concerns can create internal tensions, if not motivated by clear political commitment to withstand the financial under-performance.

All in all, should a marketing "persona" be added to the Interaction Design practitioners, much in the way Kelley defines ten different roles relevant in a creative project (Kelley & Littman, 2005)? The different roles exposed in this book, and the attitude toward them is not really clustered: they represent different types of behaviors useful for an innovative design process. Similarly, our conception of design work envisages a certain flexibility. The flexibility and the responsibility to not shy away in front of decisions which can seem at the edge of design action; namely, the "marketing" realm. Revendicate the freedom to step up on deciding the "what", and not only the "how". But this possibility is by no means a necessity: it may depend on the size of the project, the personal inclinations and aptitudes at a given time just like the personas of Kelley & Littman.

In this project, personal experience has shown that switching from a point of view to another is at times very convenient and empowering (figuring out what users could really be helped by, and testing the hypothesis without debate) and at times, very distracting and stressful (worrying about economic success).

Furthermore, introducing marketing concerns in the middle of an Interaction Design process, could be damaging for its innovative power. An RSA talk by David Pink (Pink, 2010) argued that giving rewards for creative people is not stimulating their creativity. Quite on the contrary, this short talk suggests that it hinders creativity, which in some way we exemplified. None of the applications that were ultimately produced were prowesses, neither in technical terms (no development of new technology), nor in "creative", "innovative" terms (all ideas have classically been developed before), even though financial performance was not in our goals. On the contrary, marketing roles in business environments benefit from being rewarded in proportion with their results, that is, the number of prospects that become customers.

This is the opportunity to underline the strength of this approach: carefulness. In effect, the long time spent to develop a plan for Upp wasn't lost, as it proved to be fit to its environment, and opening opportunities which previously were inconceivable for Upp's staff. The applications developed are a strong starting point, which should speed up and enlighten exchanges and further developments between technological/design partners and Upp. As a result, this project has also served as an

education of key members in the organization. The value provided, but also the potential value towards which to tend.

Marketers deal with factors that are still very different from Interaction Designers, and Designers in general. It is our conviction that those factors are best managed by marketing specialists. It takes much different human and technical skills to perform both roles properly, and probably even more to perform both roles at the same time even though the methods employed can overlap in some specific cases (cf 6.1 Enabling factors p:53).

It remains that Marketers and Designers have a lot to learn and benefit from close cooperation, in order to deliver products that have better behaviors, do not over-promise, and do not get overtaken by technological experimentations.

6.4.2 Advantages and disadvantages

We have shown that granting marketing decisions to Interaction Design provides more political control for the individual, and a better opportunity to act along values of Trust, Honesty and Social Issues. Simultaneously, taking Interaction Design into the marketing mix can bring crucial information about technology and end users and favor long-term relationships between producer and consumer.

As we have experienced this situation first-hand, albeit in a very controlled and particularly favorable environment, here is an attempt at synthesizing the positive and negative aspects of this proposal.

It is subjectively very motivating to be in measure to take decisions from the beginning to the end of a project, guided by strong moral values. It allows for creating a life narrative based on values, and not a disparate collection of projects, characterized only by their technological content. It is a tremendously educational experience, allowing to explore the difficulties and trade-offs between a variety of points of view. This we consider to be a major design exercise.

Being in an interaction design post, one has objectively good opportunities to discover a broader range of available technological solutions, and participate in critical, politically charged decisions in this respect. This power in particular, could be a great asset in a holistic marketing strategy provided that resources are available from both the producer and the consumer to sustain the preliminary user study, and not only the market study in case it doesn't overlap. We postulate that increased integration between what is sold (marketing promise) and what is made (design/development product), creates more satisfaction for the end benefactor of the project. In turn, this increased satisfaction can prove to be a competitive advantage.

We imagine well that this competitive advantage is especially relevant when the producer company/structure makes a clear commitment to nurturing long-term relationships towards its customers / beneficiaries. In that case, recent business trends have shown that moral values such as honesty and trust are two key values. We postulate that communication from an Interaction Design perspective is an asset.

That said, the Interaction Designer could become a unique hub of knowledge, which guided by the wrong values could be particularly destructive. The continuous intertwining of private life and digital

technologies creates an urge for a particularly careful thinking before releasing new designs (Blevis, 2007; Greenfield, 2006). Effectively combining the three disciplines can be dangerous. The danger is to have the opportunity to manipulate the users, but also to make the change more effective or expeditive.

Furthermore, with greater possibilities come greater responsibilities, which can be alienating for the creative process, but also we may argue that it can damage marketing transactions: in some cases it is conceivable a user-centered study reveals that a certain situation wouldn't benefit from an IT-based system. In these cases, there wouldn't be any other coherent choice, but to abort the project. This entails a new way of thinking about projects, perhaps best solved not by Interaction Design, but by Service Design, less concerned by the materialities and more concerned by the processes. After all, Interaction Design presupposes that an IT-based installation/product/creation will be considered. Evaluating if a certain system should be created at all, is a valuable operation, which could be best performed by Interaction designers when an IT project is suspected to solve some issues.

This all relies on trust between producer and consumer, which takes time to establish, and much energy to maintain. In our experience, the interpersonal trust is best established between few people, so this approach would be best suited for small-scale projects. At the same time, the extremely difficult responsibility to choose the "what" from a variety of technological and non-technological solutions seems best suited for extremely large companies/groups, who can afford to cancel the project (delegate it to another company) or perform it in-house.

Finally, we may never stress enough that the individual's ethics in such a position must be impeccable, as it would be fairly easy to deceive people and advocate that one's own skillset (what one knows how to do) is the best solution. In our case, at the beginning of the project we didn't know anything about multi-touch interfaces and the software skills required. Now that these skills are developed, that makes us paradoxically less credible in advocating a Touch technology.

Thus, either the designer could lean toward marketing, and be open to a wealth of different technological and non-technological solutions (Service Design for instance) either lean towards development, and be involved later in the project lifecycle, more concerned with the practicalities of the "how".

7 Conclusion

Based on commitment for political action, we combined Interaction Design methods such as scenarios, brainstorming and analysis of user goals with knowledge about multi-touch screen technology currently available. We iteratively directed the scope of our action on supporting the creation of the Upp community which bears critical importance for Upp, its survival and success on helping young unemployed people.

We performed a psychological interpretation of the information available, which led us to formulating an action plan to facilitate the creation of social groups in Upp. Scenarios, presentations and design proposals were accepted, and technological equipment was bought to execute this action plan. The choice of two large multi-touch screens, keeping in mind their characteristics and possible developments, successfully enabled the design and deployment of two applications, one aimed at information for returning members; the other aimed at recreational use and socialization to stimulate more directly the formation of social groups.

Results, obtained by direct observation of the interfaces' use, questionnaires and anonymous statistics collection, showed that the interfaces are successfully, regularly and spontaneously used by visitors in the public space, which we have evidence are the actual target groups. We believe the current installation has the potential to be further developed in order to produce a more integrated information technology environment -mobile applications, tabletop applications, tablet applications, based on user identification which would enable creating more meaningful statistics, and a more controlled experience for the visitors.

Finally, our experience in combining marketing duties and Interaction design proved to be very satisfying at the level of the individual, and grant more political power for change in the hands of the designer. Due to the increased stress and overhead in the design process, we would advocate this approach either for small projects giving opportunity to nurture trust, or for larger structures which can afford to consider a variety of technological and non-technological solutions before settling for one. At this price, we could imagine an Interaction Designer fully in charge of his/her political responsibilities.

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Friends

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More

Anna Kaczmarek

10 Appendixes

10.1 Appendix: Detailed scenarios suggested

One possible Group Scenario: CV workshop

1. The guide presents how to write a CV, The table is not activated.

2. The guide shows an exercise on the table. Each member activates their account with their member card.

3. The participants do the exercise alone. Jan and Sus explain the exercise to Ulla, who arrived late, and they collaborate in a playful way.

4. The guide comes back to answer some questions, and welcome Ulla. Now Jan has finished, and he would like to take his exercise home.

In conclusion.
After the workshop,

... the table recorded who participated and how long

... the participants have enjoyed their work and can continue on their own, tell their friends about it.

... and the guide could concentrate on what is really important: people!

5. From the table, Jan prints a copy of his work. Ulla also leaves, but prefers to have it in her email.

Another Group Scenario: Fika



1. Josefine is new at Upp, and came for a fika. She is a little depressed, and doesn't dare join other tables...



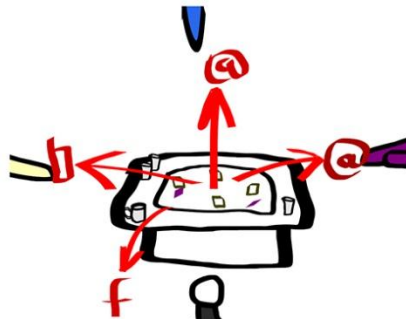
2. Per asks if he can join Josefine, and shows her how her card activates the coffee table.



3. Josefine is intrigued, and starts to play a game with Per. They get to know each other a little, and it turns out Per waits for his friends.



4. Sus and Jan arrive from the CV workshop. They meet Per and Josefine, and all check out upcoming events at Upp...



5. There is another workshop tomorrow! The table sends the time and place:
- to Per and Josefine via email,
- Sus with her phone
- Jan through facebook.

In conclusion...

... the participants have played, met new people, and will come back for more events

... the table recorded who came and what they did

... Upp knows better the expected number of participants to this workshop

10.2 Appendix: Behavioral mapping, static

Each colored dot corresponds to one interviewee, and the slider position represents our own global assessment of how they compare to each other on a number of factors elicited through interview. The interviews proceeded for a duration of approximately an hour each.



Figure 21: Behavioral mapping, static version

10.3 Appendix: Behavioral mapping, interactive

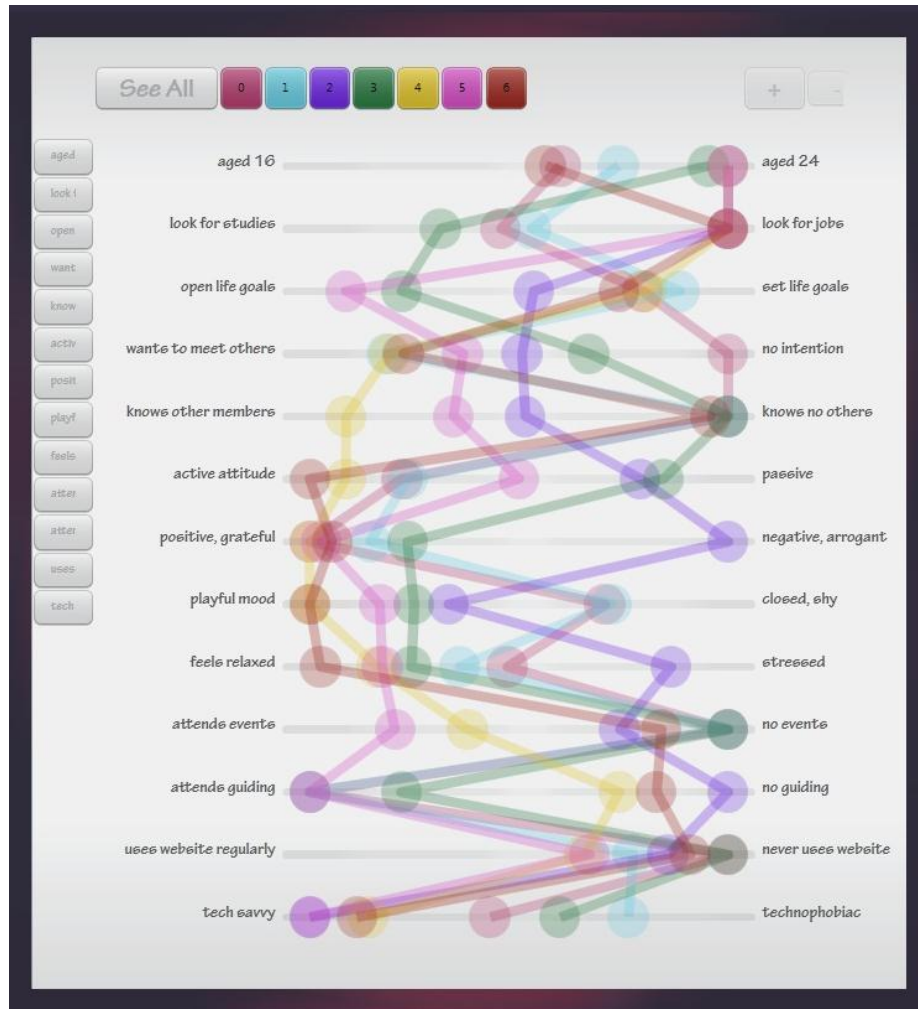


Figure 22: Behavioral mapping, interactive version with all factors and all interview participants

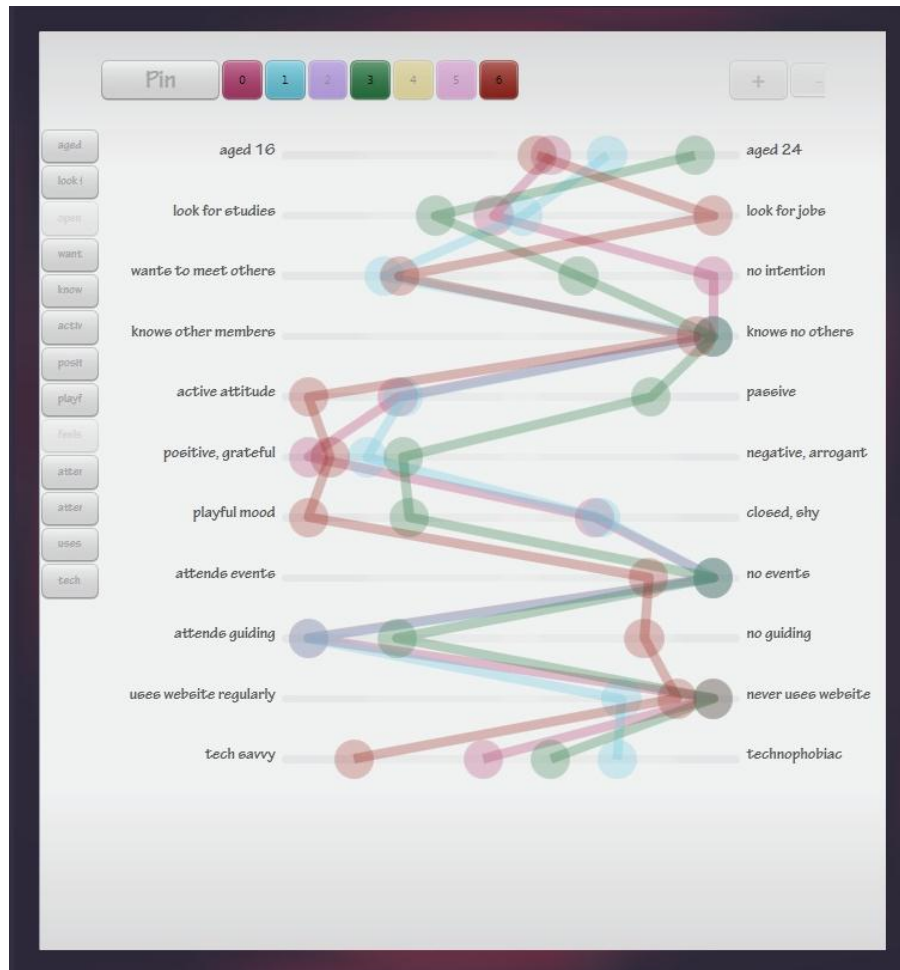


Figure 23: "Goal-oriented" cluster of behavior, and "Comfortable" cluster are very similar, but differ in their attitude of playfulness toward Upp and will to meet others



Figure 24: Differences between a "Godfather" type in yellow, and an "Enthusiast" in pink



Figure 25: Goal-oriented interviewees

10.4 Appendix: InUse personas excerpt

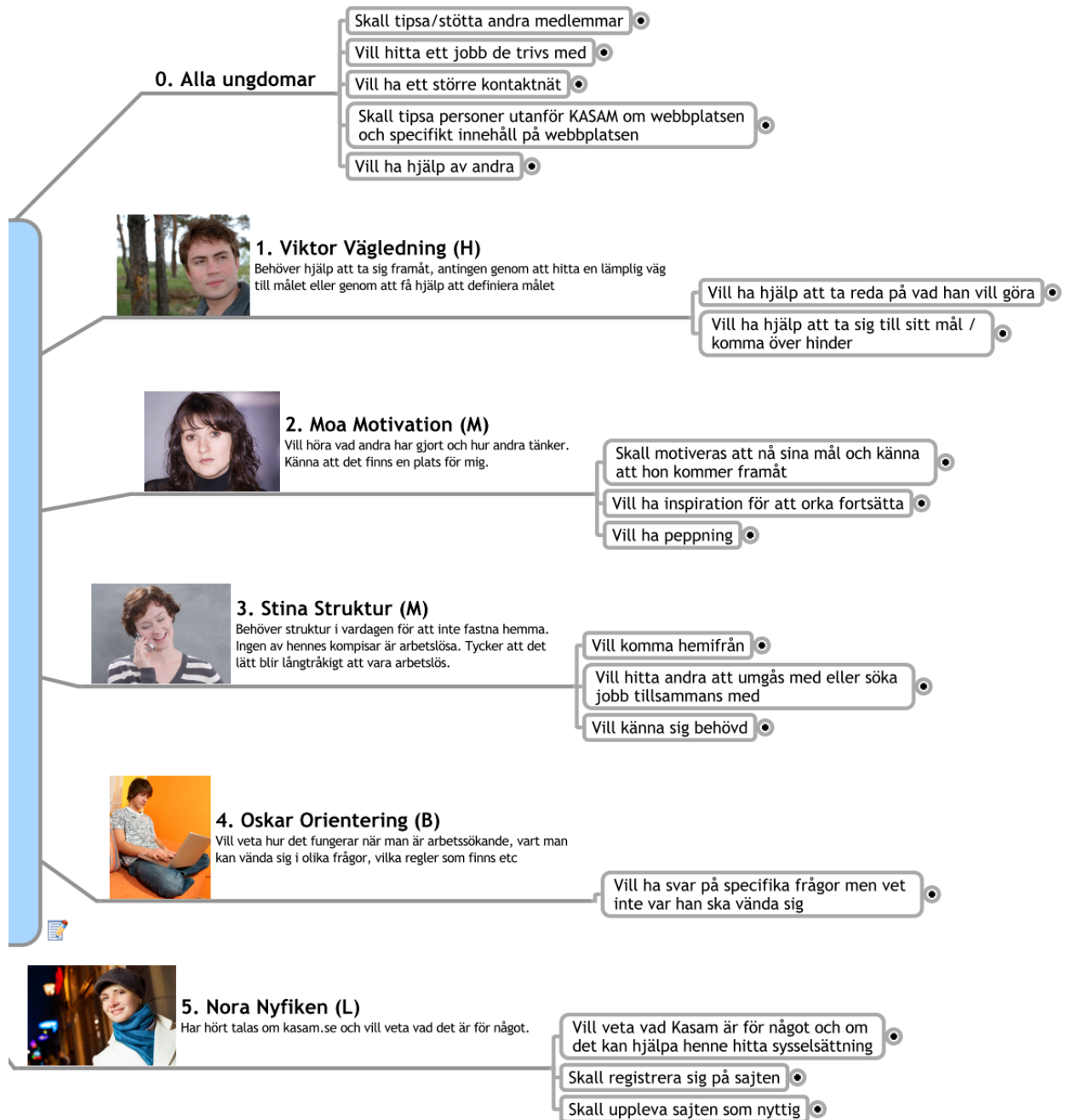


Figure 26: Excerpt of a requirements diagram made by the company InUse based in Göteborg, for the creation of the Upp website (uppgoteborg.se). This part shows the different personas taken into account in the requirements, with the most prioritary target on top

10.5 Appendix: Territoriality and situational factors

Space and context exert a profound influence on groups. That is why the situation and the contents of the place itself is important to consider when introducing change. We ourselves do not have much leverage on this kind of decision, due to the reduced scope of our action, but the available space and situation are important constraints to be aware of prior and during design time. The following factors are extracted from Forsyth, 2008.

Sound

Preference for quietness for some visitors, sign of socialisation for others.

Temperature

This is a factor we have no control on, but we observed it to be quite cold in the winter, which can deter visitors. Lots of empty space accentuate the difficulty to fill the space with warmth.

Clarity

Clear offices, and uplifting colors, perceived positively by all interviewees.

Danger

No perceivable danger directly.

Personal and interpersonal zones.

There are both privative, intimate rooms and interpersonal zones. Guiding spaces can be both privative or in relatively relaxed zones. Groupwork and events room are more privative, whereas "relaxing" areas are more likely to be invaded and social: this is where the confusion ends. A number of zones are for more general purposes, such as toilet, printer and coat hangers have a supporting function. These notions seemed quite fuzzy for interviewees, most of whom didn't know all those possibilities beyond guiding.

Behavior setting

The behavior to adapt at Upp is not clear right now for members, but reducing all ambiguity is not desirable. The system should still prompt for questions but hint at possibilities in Upp.

Group territories

Group territories could easily emerge if the system is considered desirable by several groups of visitors. This could lead to the creation of antagonistic groups, who would compete for this limited resource, which could escalate into conflicts.

10.6 Appendix: Two types of social groups

From Forsyth, 2008

Primary groups {for example: family, cliques}

- a small,
- long term group with
- face-to-face interaction,
- solidarity,
- interdependence and
- identification.
- Shapes attitudes, values, social orientation of the members.

Social groups {for example: work groups, clubs, congregations}

- a small number of individuals who interact with one another over an extended period of time
- more formal
- shorter duration
- less emotional bonding
- more instrumental to some specific goals

10.7 Appendix: Cohesion in social groups

One definition of cohesion can comprise 5 factors: social cohesion, task cohesion, perceived cohesion, and emotional cohesion, from Forsyth, 2008 : p123

- social cohesion
 - attraction of members to one another and to the group as a whole p.123
 - A possible measure is the ratio of people cited as friends in the outgroup and ingroup p.119
 - likeliness that the group stays together, strength of the bond
- task cohesion
 - capacity to perform successfully as a coordinated unit and as a part of the group
- perceived cohesion
 - the construed coherence of the group; sense of belonging to the group; unity
- emotional cohesion
 - emotional intensity of the group and individuals when in the group

10.8 Appendix: UppEntrance final version



Figure 27: Calendar view: this is the screen that is displayed by default after a moment of inactivity. On the left, the next upcoming events, on the left a scollable list for the next days



Figure 28: The clouds and grass are animated over time, to confer an interactive feeling. When the event titles are clicked, the detailed view shows a picture, and description. They close automatically after 20 seconds of inactivity.



Figure 29: The default map view, accessed by the buttons on the bottom. Each point and room is clickable and displays a popup with pictures and description of the area. All these are editable by Upp Staff directly



Figure 30: Clicking on the legend buttons turns on or off all the map points/zones of that category. The red arrow signifies the position of the screen, and emergency exits are marked too. The map is a 2d rendering of a 3d sketchUp map (©Google).



Figure 31: Examples of points of interest. Some have pictures, some don't. They are resizable, and close automatically after 15 seconds.



Figure 32: The welcome screen, activated by clicking the Upp logos, top left and bottom right corner in diagonal balance. It closes just by tapping the message, and not only the X, to accommodate short people.

10.9 Appendix: UppEntrance lo-fi prototype



Figure 33: The events calendar, with an “upcoming” zone on the left, and a scrollable area for the next few days. Each Bubble contains the title of the event, the date, and description when it is clicked.

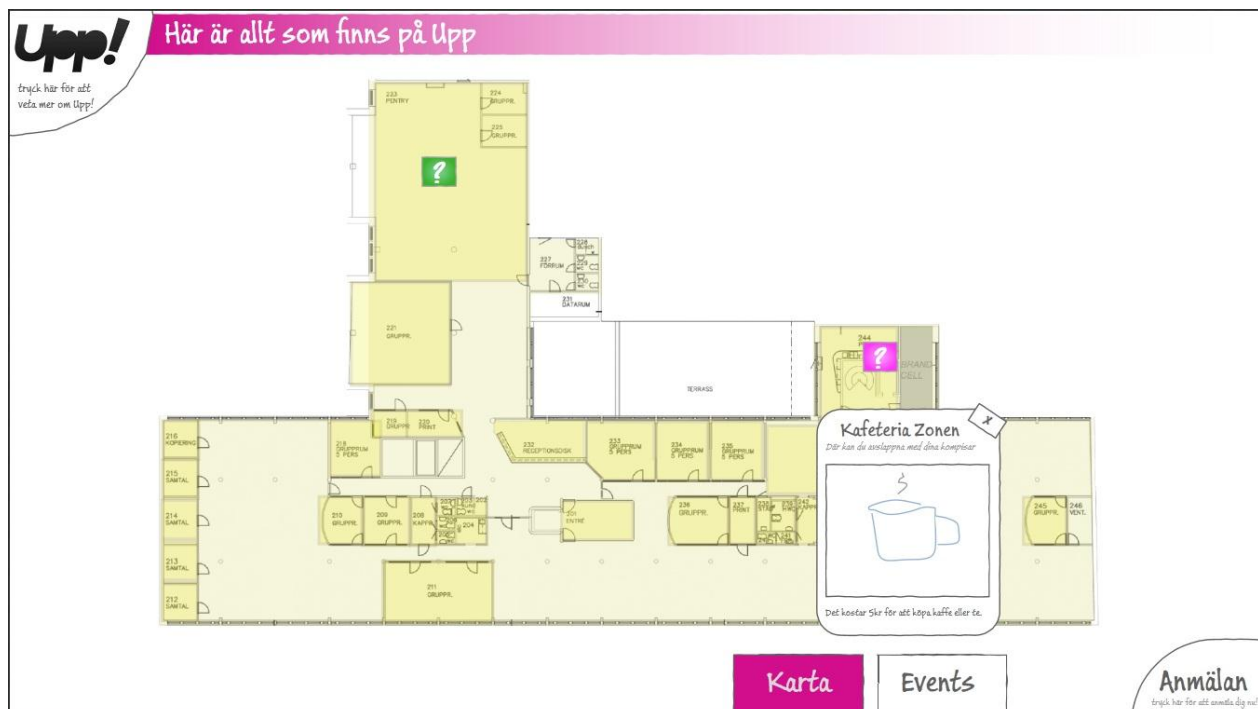


Figure 34: Map screen: this features points of interest on the map, which make a description pop-up with a picture. The idea of clickable categories was intended by color coding.

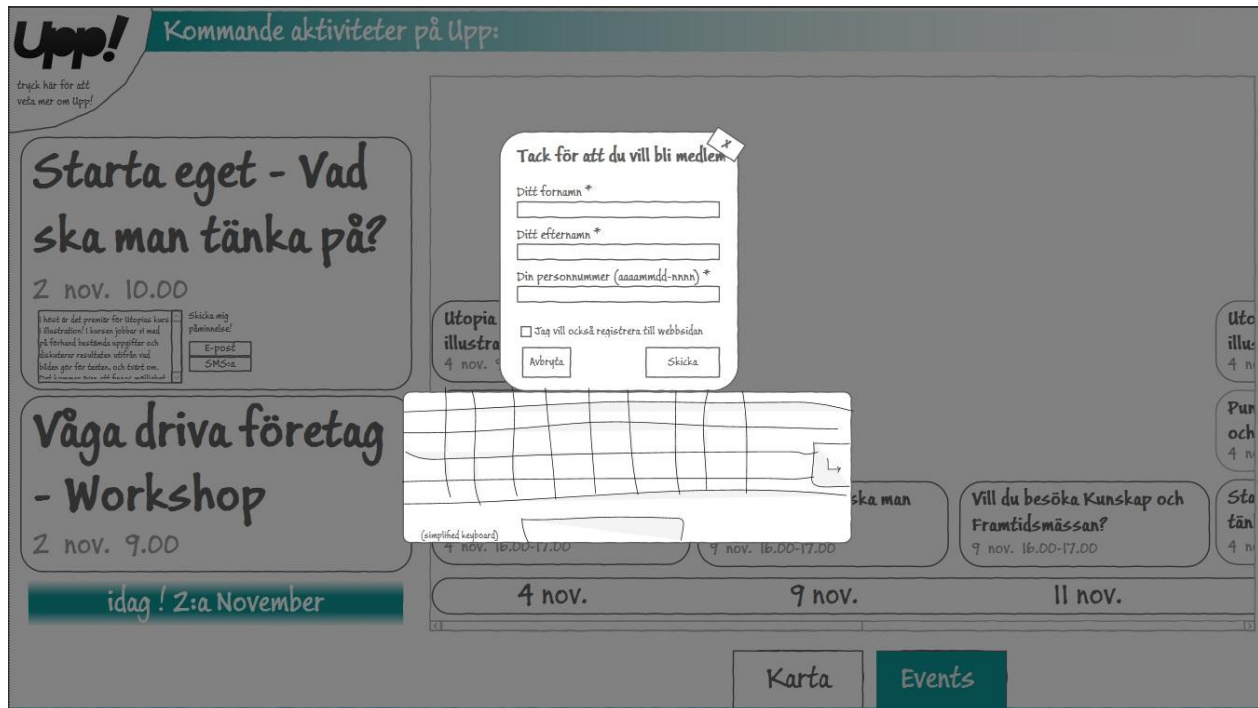


Figure 35: Registration of new members through the entrance screen. Idea which wasn't implemented in the end due to database inadequation.

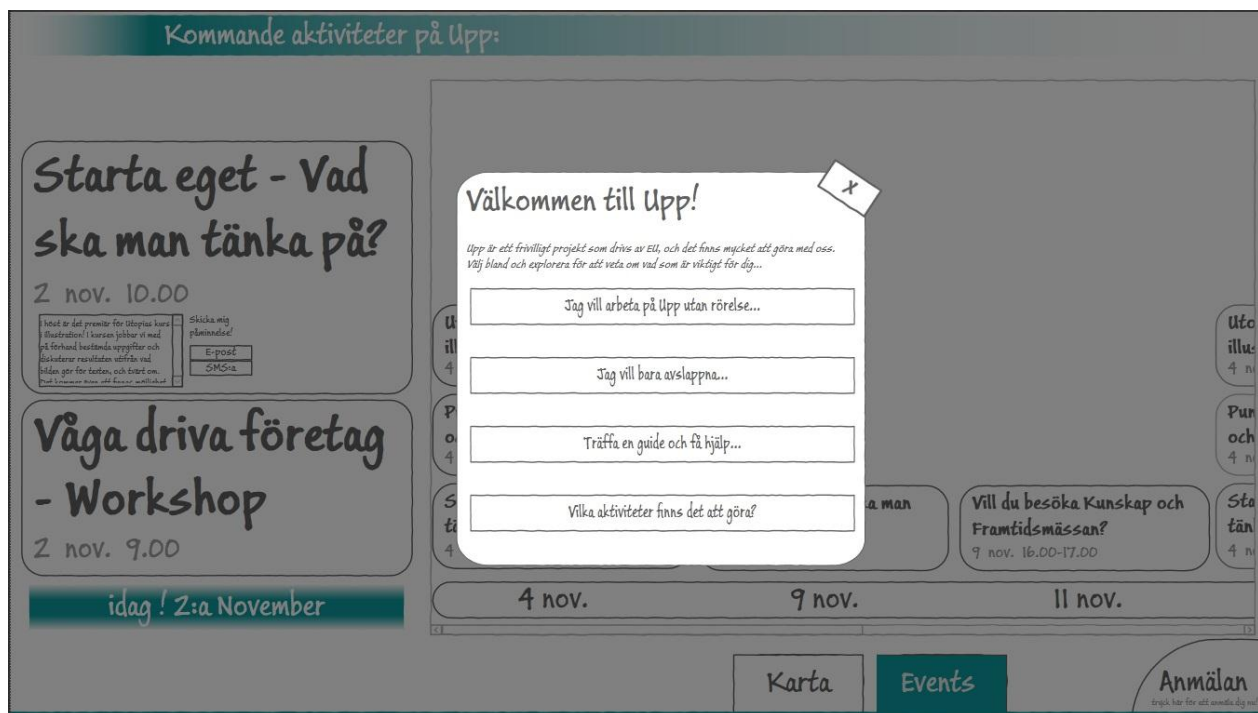


Figure 36: The original idea of the welcome screen, triggered by the top-left logo: clicking a category brings about either relevant events or relevant map elements.

10.10 Appendix: UppQuiz, cooperative version



Figure 37: Welcome view of the quiz: the clouds are responding to touch to provide further engagement.



Figure 38: Quiz choice view: once players have joined, they can choose a quiz to do together



Figure 39: Questions are displayed with a timer, and every player answers individually. When all players have answered, a button appears in the center to validate.



Figure 40: After validation, each members' answer gives or remove points, and the team earns points only if more than half of the players were right.

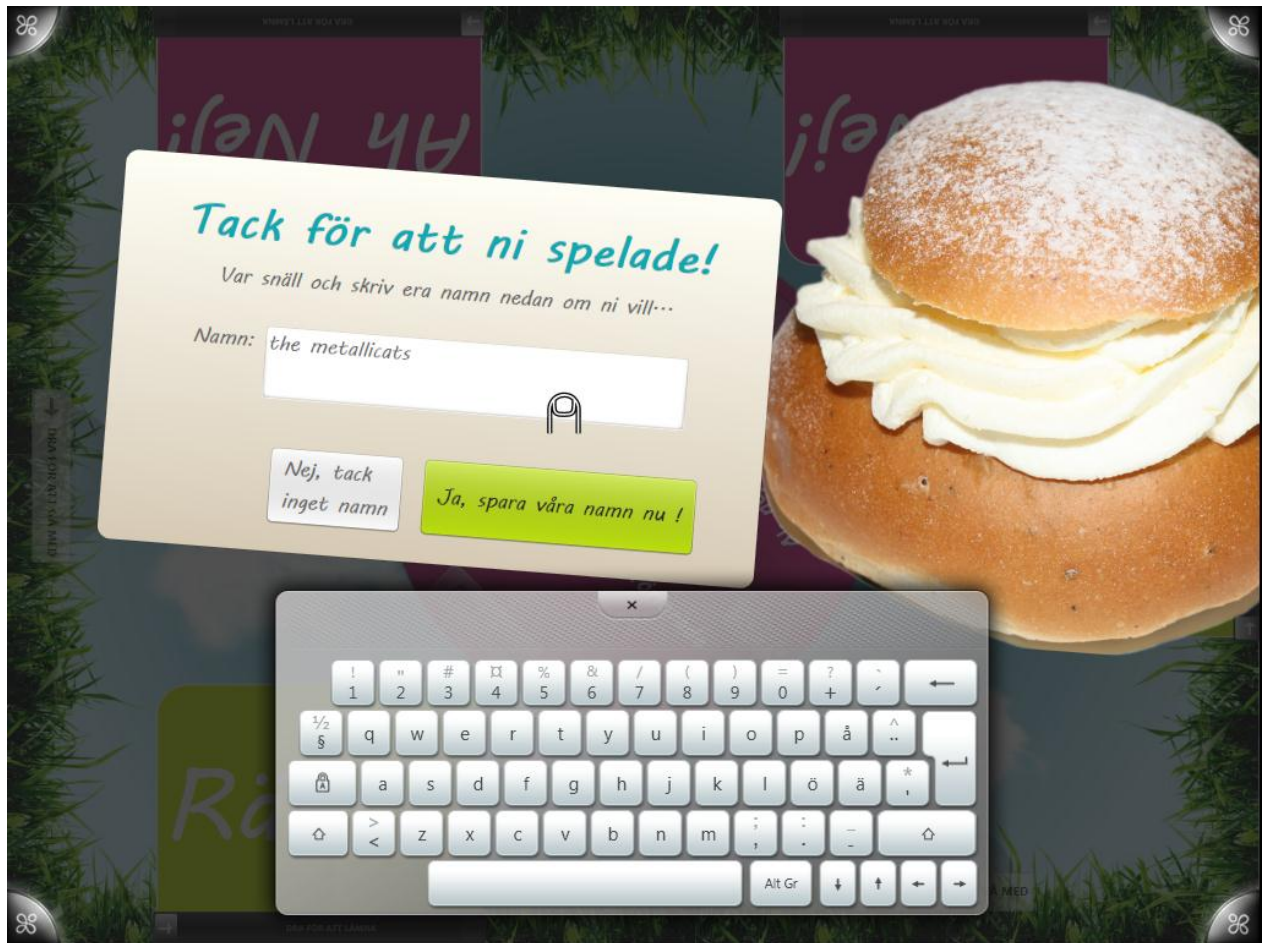


Figure 41: Once all the questions of the quiz are completed, the team has the opportunity to leave their name for the high-score list. They can also play with a giant Semla pastry at that point...

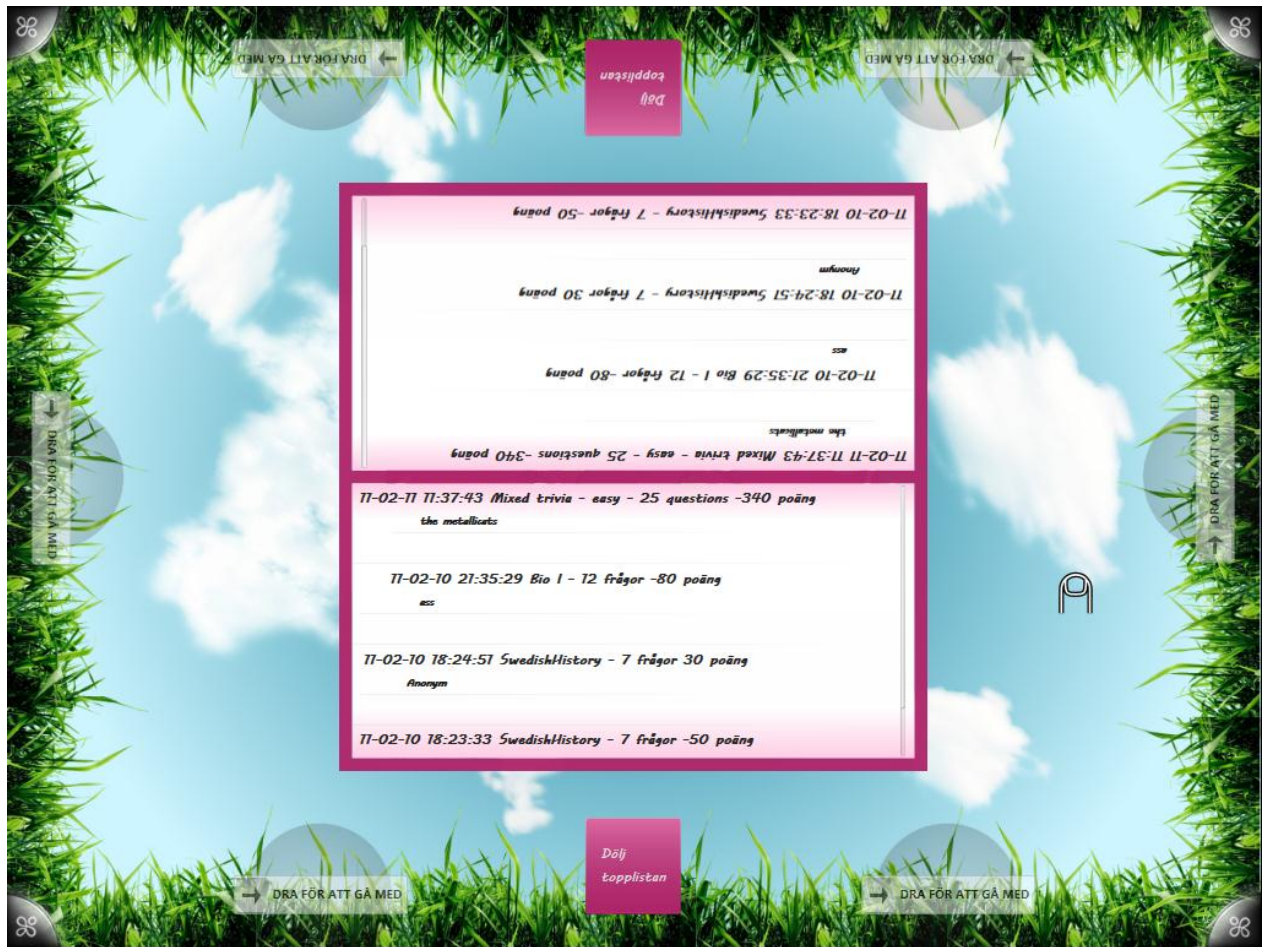


Figure 42: On the welcome screen, players have the option to see the high-score list, containing the team's names. Not entering any name in the previous screen results the team labeled as "Anonymous"

10.11 Appendix: UppQuiz competitive version

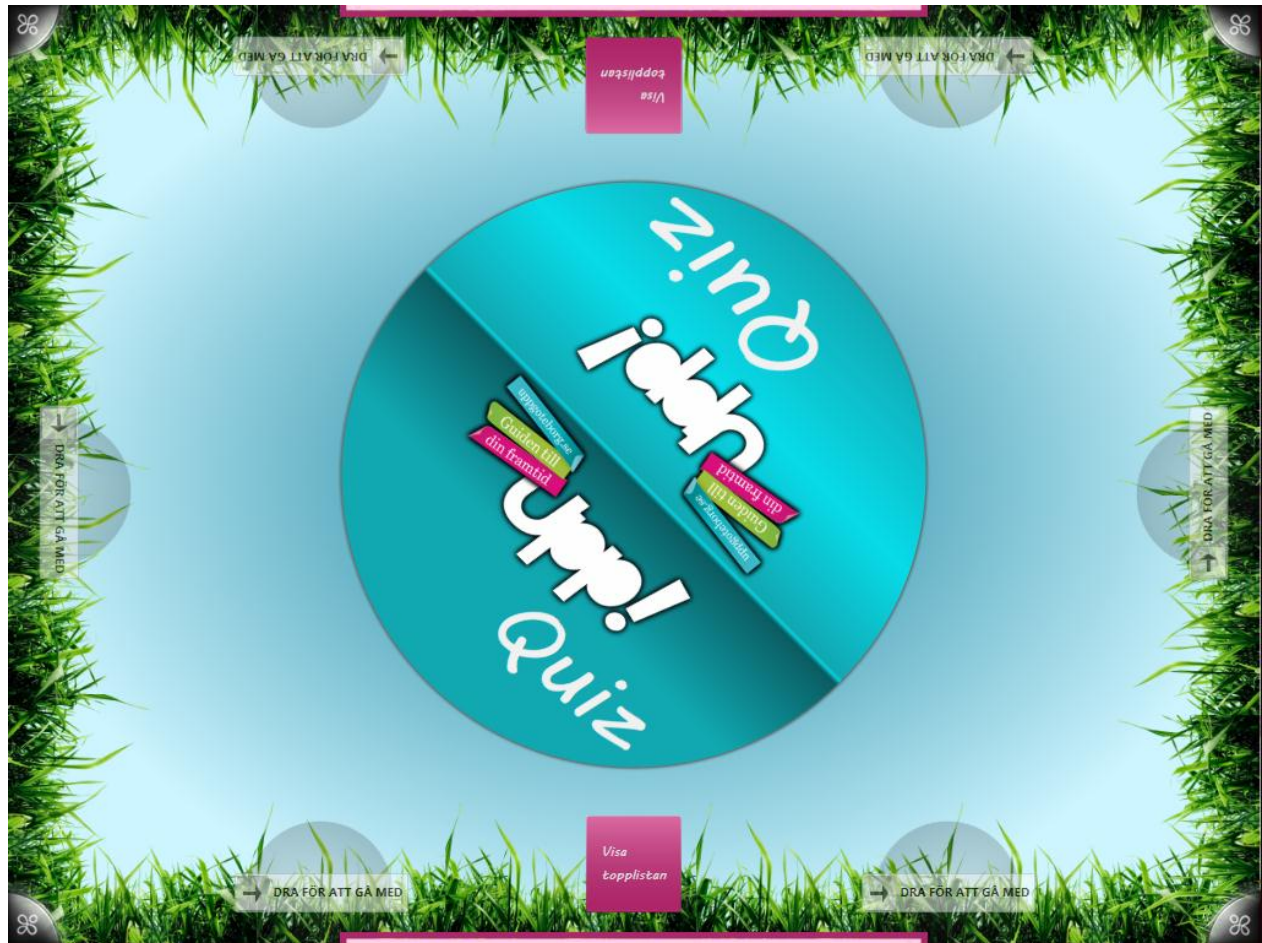


Figure 43: Welcoming view on the UppQuiz competitive



Figure 44: Once players joined, they can choose a quiz in the list (both lists are linked together)



Figure 45: When the quiz is selected, questions comes up, and a timer runs as long as no one buzzes

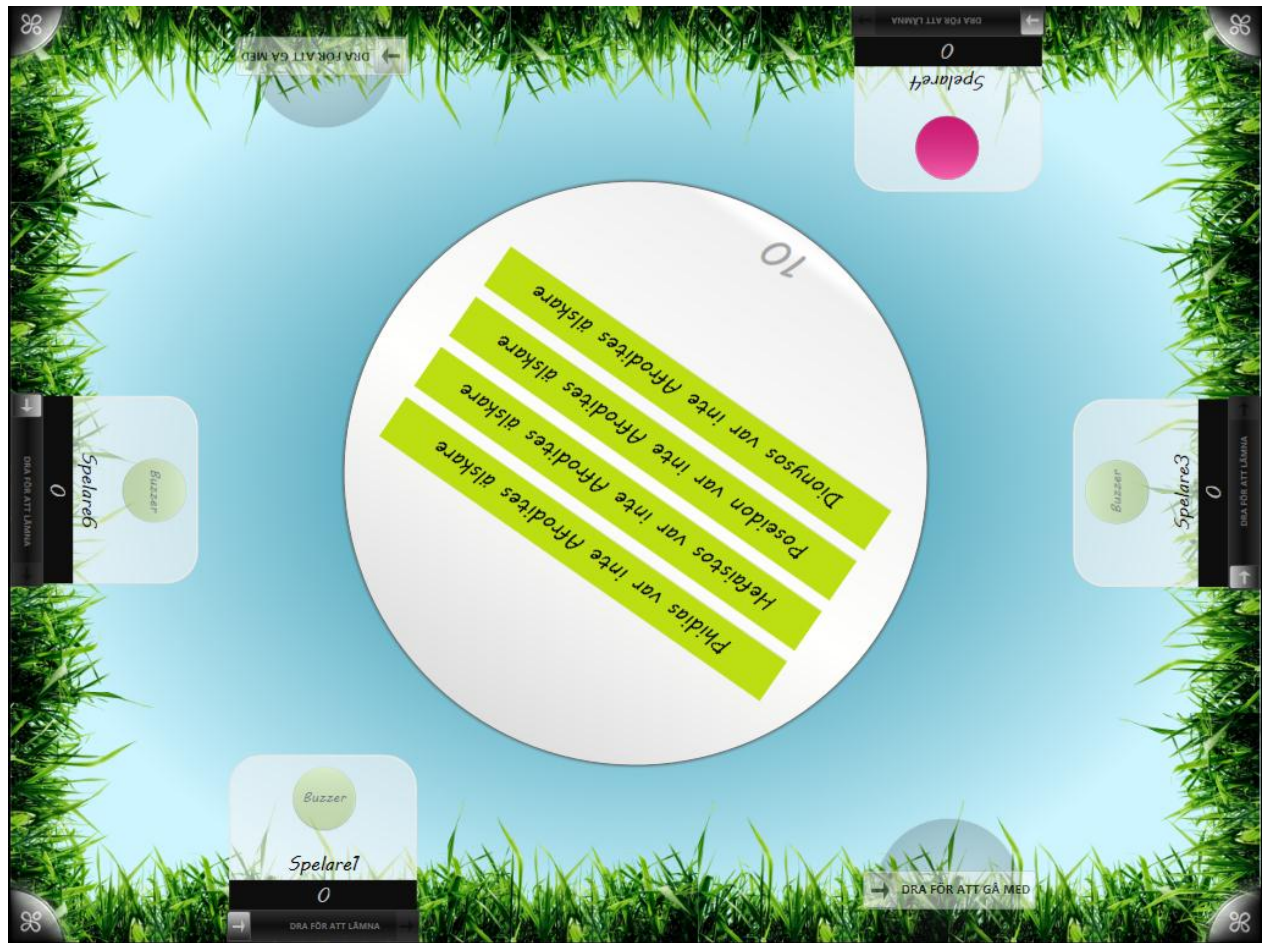


Figure 46: Question answering view on the UppQuiz. The active player is signalled by the pink beacon, and the central pod rotates to face this player

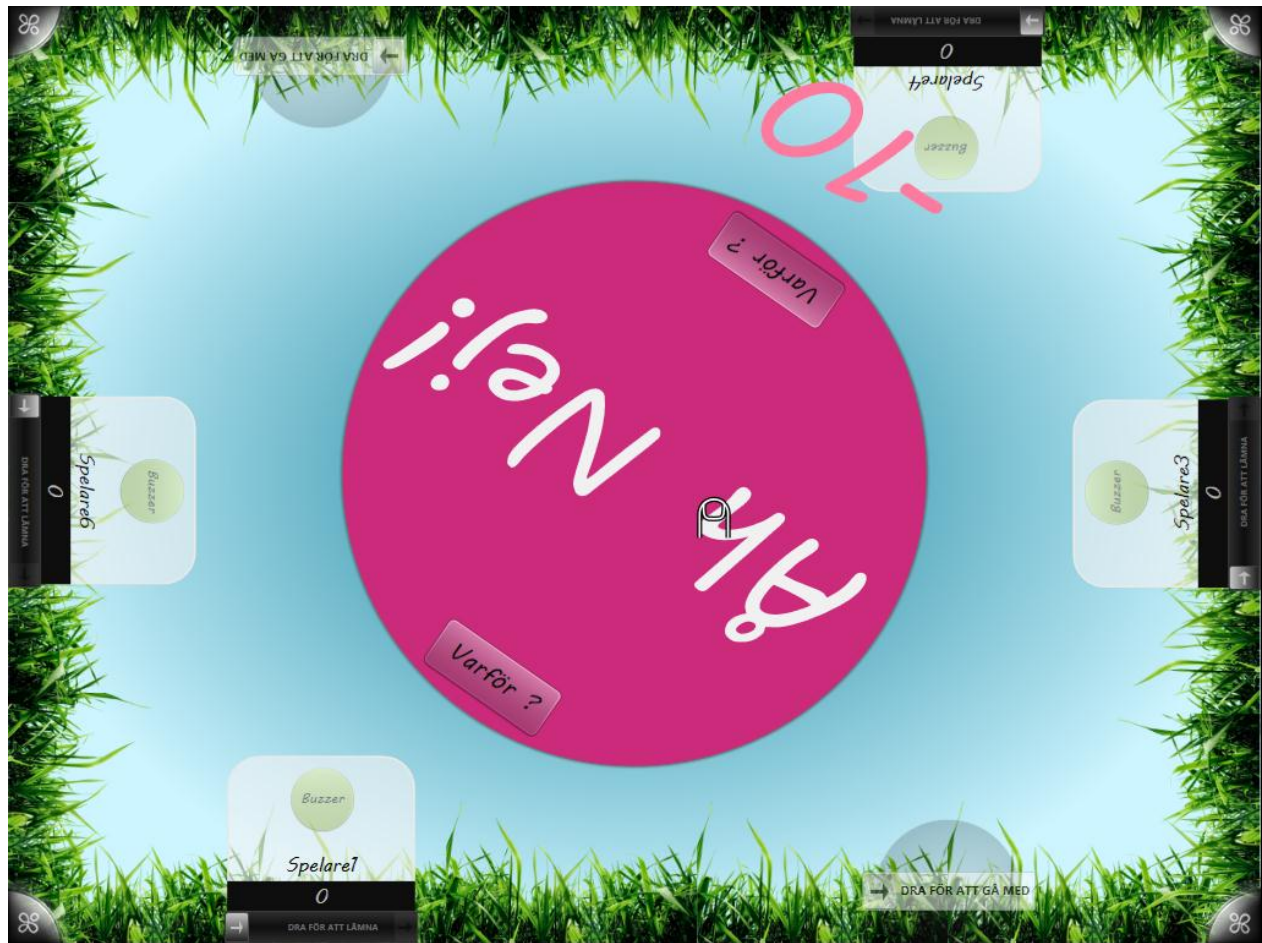


Figure 47: The player loses points when he/she answers wrong, or when the timer elapses.

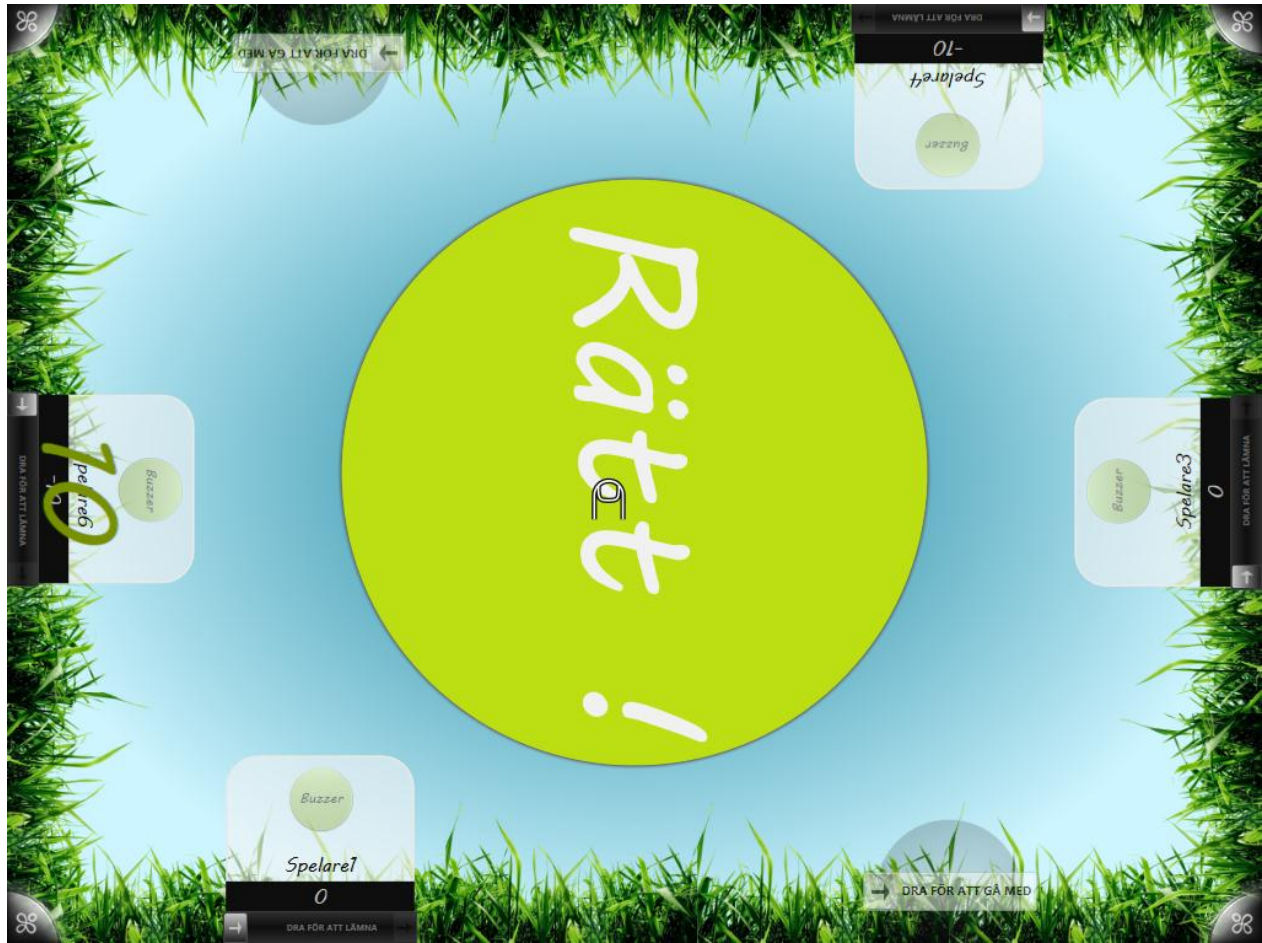
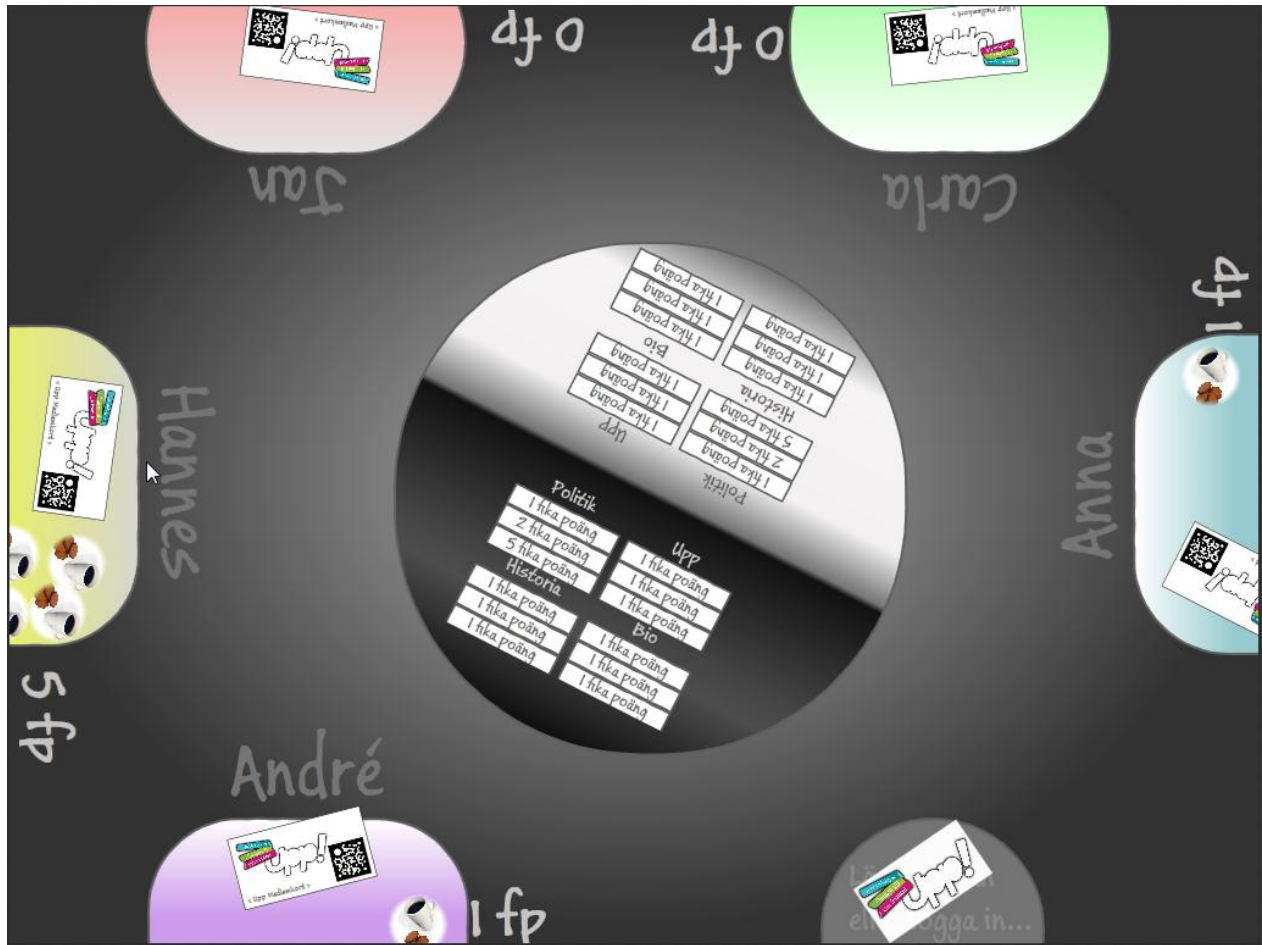


Figure 48: The player earns points for a good answer in time

10.12 Appendix: UppQuiz prototype









10.13 Appendix: UppQuiz A/B test questionnaire

Upp Quiz - Usability Evaluation

Thank you for playing Upp Quiz! Please fill in the following survey so that next version works even better!

Upp and you

First, just some general information about you and your situation :)

How long have you been an Upp member?

- ☐ Less than 1 month
- ☐ 1-3 months
- ☐ More than 3 months
- ☐ I do not want to / cannot be a member

What are you primarily interested in at Upp?

- ☐ Participating in events
- ☐ Guidance
- ☐ Work in groups
- ☐ Relaxing
- ☐ Nothing in particular, loitering

How often do you come to Upp?

- ☐ Less than once a month
- ☐ At least once a month
- ☐ Several times a month
- ☐ Several times a week
- ☐ Everyday

How many other people do you know at Upp?

This concerns other members that you know, not your guide or other Upp staff.

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ more than 3

1.1 The competitive quiz game

These questions are about the COMPETITIVE quiz you've just completed, and your interaction with the other players.

The duration of this quiz was adequate.

Did you feel that the game leg lasted too long? Too short?

- ☐ Far too long
- ☐ Too long
- ☐ Too long somewhat
- ☐ Adequate
- ☐ Too short
- ☐ Too short somewhat
- ☐ Far too short

You got to know other players.

Do you feel the game has helped to get to know other players? Do you feel like belonging to a group? Do you feel attracted to any other player or on the contrary repulsed by some other players?

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Why did you feel so?

You discovered other players' abilities through the game.

Do you feel like you know more about other player's capacities, strong and weak points?

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

You discovered other players' personality through the game.

Did you pay attention to other players' reactions to wins and losses? Did you discover something about their personality?

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Some positive actions were reciprocated between players.

Did you and other players cooperate? Did you receive help and helped others in return? Did you observe other players doing that? f.ex: discussing the right answer, rotating the central pod for other players, inviting people to join the game, etc...

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Which positive actions did you notice?

3/9

Some negative actions were reciprocated between players.

Did other players perform negative actions on you? Did you reproduce those negative actions in return? Did you observe a situation of sabotaging other players? For example, giving the wrong answer or answering something wrong for another player, not rotating the central area to prevent from reading questions or instructions, etc...

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Which negative actions did you notice?

You felt actively included in the game.

Did you feel like a part of the team? Do you feel your contribution was significant? Valued by others players?

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Why did you feel so?

1.2 The future of COMPETITIVE Quiz

These questions concern your future intentions...

You would play this game again....

Would you play this game again spontaneously? Does it attract you to play again?

- ☐ Very frequently
- ☐ Frequently
- ☐ Somewhat frequently
- ☐ Neither frequently nor seldom
- ☐ Somewhat seldom
- ☐ Seldom
- ☐ Very seldom

You would be interested in saving your score through an electronic card and share your score online.

This could enable to automatically remove the quizzes you've already done, and sharing your score through social websites including Upp's website.

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

You would be interested in a physical reward for playing this game.

(e.g. semla, coffee or kanelbulle for every player upon highscore)

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Do you have any other comment? Something you liked or didn't like?

5/9

2.1 The COOPERATIVE quiz game

These questions are about the COOPERATIVE quiz you've just completed, and your interaction with the other players.

The duration of this quiz was adequate.

Did you feel that the game leg lasted too long? Too short?

- ☐ Far too long
- ☐ Too long
- ☐ Too long somewhat
- ☐ Adequate
- ☐ Too short
- ☐ Too short somewhat
- ☐ Far too short

You got to know other players.

Do you feel the game has helped to get to know other players? Do you feel like belonging to a group? Do you feel attracted to any other player or on the contrary repulsed by some other players?

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Why did you feel so?

You discovered other players' abilities through the game.

Do you feel like you know more about other player's capacities, strong and weak points?

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

You discovered other players' personality through the game.

Did you pay attention to other players' reactions to wins and losses? Did you discover something about their personality?

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Some positive actions were reciprocated between players.

Did you and other players cooperate? Did you receive help and helped others in return? Did you observe other players doing that? f.ex: discussing the right answer, rotating the central pod for other players, inviting people to join the game, etc...

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Which positive actions did you notice?

7/9

Some negative actions were reciprocated between players.

Did other players perform negative actions on you? Did you reproduce those negative actions in return? Did you observe a situation of sabotaging other players? For example, giving the wrong answer or answering something wrong for another player, not rotating the central area to prevent from reading questions or instructions, etc...

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Which negative actions did you notice?

You felt actively included in the game.

Did you feel like a part of the team? Do you feel your contribution was significant? Valued by others players?

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Why did you feel so?

2.2 The future of COOPERATIVE Quiz

These questions concern your future intentions...

You would play this game again....

Would you play this game again spontaneously? Does it attract you to play again?

- ☐ Very frequently
- ☐ Frequently
- ☐ Somewhat frequently
- ☐ Neither frequently nor seldom
- ☐ Somewhat seldom
- ☐ Seldom
- ☐ Very seldom

You would be interested in saving your score through an electronic card and share your score online.

This could enable to automatically remove the quizzes you've already done, and sharing your score through social websites including Upp's website.

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

You would be interested in a physical reward for playing this game.

(e.g. semla, coffee or kanelbulle for every player upon highscore)

- ☐ Disagree strongly
- ☐ Disagree
- ☐ Disagree somewhat
- ☐ No opinion
- ☐ Agree somewhat
- ☐ Agree
- ☐ Agree strongly

Do you have any other comment? Something you liked or didn't like?

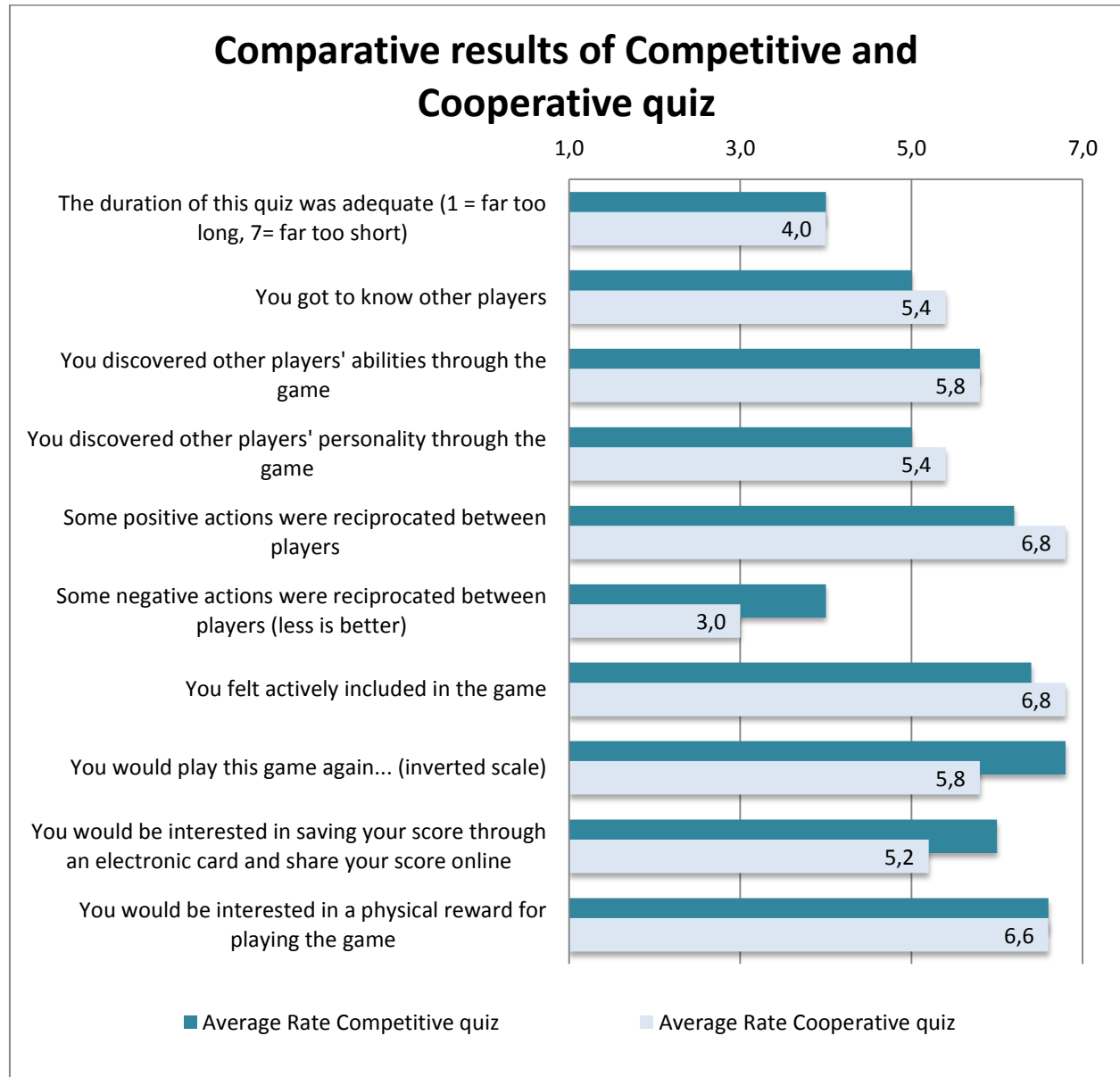
9/9

10.14 Appendix: UppQuiz A/B testing results

10.14.1 Questionnaire results

N=5, average of individual answers on each proposition, using a rated Likert scale from 1 (Disagree strongly) to 7 (Agree strongly). For example, if two people answer "Agree strongly", and three people answer "Disagree Somewhat", the average of their opinion is $(2 \times 7 + 3 \times 3) / 5$.

One proposition used a reversed rating compared to the order of the questionnaire: "you would play this game again", with ratings going from "Very Seldom" (1) to "Very Frequently" (7).



10.14.2 Composition of quiz questions

10.14.2.1 Competitive

- 11:00 minutes to complete
- 29 questions, in total, of varying difficulties and themes,

CATEGORY	COUNT
astronomy/physics	2
enigmas/maths	2
geography	3
history	3
music	3
movies	2
art	2
sport	2
trivia (food, general knowledge, culture)	10

10.14.2.2 Cooperative

- 13: 20 minutes to complete.
- 16 questions, various disciplines with accent on enigmas, and harder questions

CATEGORY	COUNT
astronomy/physics	1
enigmas/maths	4
geography	2
history	1
music	1
movies	2
art	1
sport	1
trivia (food, general knowledge, culture)	3

10.15 Appendix: Integrity-heavy users

From Lynn Upshaw, (2009):

Here are a few things to look for when you are designing research to search out integrity heavy-users:

- They may be willing to **pay a bit more** for what they see as a **lot more in quality**. They seek **longevity** and **durability** over flash and empty style.
- They scan the marketplace for options like everyone else, but they don't jump for the sake of trying something new. They **are thoughtful more often than they are impetuous**.
- They love the **genuine** article. They are attracted to all things authentic that don't necessarily rely on enormous marketing budgets to prop up the brand. Some of them are specifically drawn to brands that are understated in their marketing communications.
- They tend to **stay with a brand they like longer** than their more fickle fellow buyers, especially if that brand has found ways to specifically reward them for their loyalty by providing them with even greater value for superior quality. They may be willing to try new products and services, but they are considerably more likely to stick with new products from companies and brands that have proven they can be **trusted**. Because of that, they are more likely to try brand extensions from trusted "partners" than to seek the same products elsewhere.
- They are attracted to brands that more frequently market with **a focus on performance rather than price**, although they are more than willing to purchase lower-priced items if they believe they are a good value.
- They are **more aware of the context of the product or brand**, such as its **history**, the **reputation** of its parent company, the **quality** of its people who have contact with buyers, and what kind and level of **customer service** is offered.