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# Design Experience from Experience Design: Towards Strategies for Enhancements

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# DESIGN EXPERIENCE FROM EXPERIENCE DESIGN: TOWARDS STRATEGIES FOR ENHANCEMENTS

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## Abstract

*Enterprises within the experience-based economy face big challenges when investing in IS applications for their products and services. Especially, organizations and services that offer different kinds of attractions and experiences have realized the emergent use of mobile technology. In this paper we explore in what way an IS (information systems) design can enhance experience-based activities conducted at a Swedish regional museum. The research presents an in-depth analysis of a case study along with requirements and design activities for a location-aware, auditory museum guide, primarily aimed for people with visual and language disabilities was developed. We argue that in order to keep in pace with the on-going growth of experience-based and IS design initiatives, enterprises and designer must consider its value for their businesses. Thus, we have developed a three-level strategy for valuing enhancements of a proposed IS application. The strategy proved to be particular fruitful for both designers and managers when assessing the potential of various enhancements to generate values for the different target groups.*

## 1 INTRODUCTION

There is an on-going change in our economy, going from a service-based to a more experience-based one (McLellan, 2000). Already in Pine & Gilmore (1998) we can read a welcome to the experience economy, where not only delivering services are the most important but to stage experiences as the primary goal of such deliveries. The shift means that people spend more and more time on enjoying and experiencing different kinds of activities and events. Sectors such as entertainment, education and culture are growing rapidly in this emergent economy. It is not needed to say that information systems (IS) have great potential in such sectors as well, and several attempts of Edutainment IS products are current. For instance, interactive media permits its users to engage or enjoy optimally (McClelland, 2005).

Along with this, there are emergent trends of moving mobile IS applications beyond the offices and board rooms and out into the everyday life of people. This places the design of mobile IS applications in fore front (Kristoffersen & Ljungberg, 1998; Berg et al, 2003). However, the design of mobile IS for non-work situations also requires a deep understanding of target groups, contexts and particular locations for which the technology is to be designed. So, according to Harper (2002) there is a need for in-depth studies of the role of mobile IS in various such setting.

The above mentioned changes call for a more integrated approach, so the field of experience design is current. Experience design is an advancing field of IS, that links ideas from marketing, psychology, entertainment, computer science, information systems and interaction design (McLellan, (2000); Grefe (2000)). McClelland (2005) further points out that much research is needed as this is a growing, and

not transient field. There is a call for a more focussed approach encompassing sensations, attractions and impacts of various forms of experience design (Petersen et al (2004); Shedroff (2004)).

The purpose of this paper is to explore and better understand how experiences can be enhanced using IS in experience-based enterprises, by focusing on different strategies for achieving enhancements of experiences. However, experiences and thereby potential enhancements happen within individual actors, and highly depend on, for instance, the individual's interests, preferences and needs. Therefore, strategies for enhancements should be considered in relation to targeting actor groups as well as their contexts, so that the potential enhancement can be designed and judged accordingly. Hence, the questions considered in this study are: In what way can IS applications enhance and support such non-work but location-aware contexts? And, in general, how do we fundamentally understand *experiences* and are there any differences in the design approaches?

We chose a research context where such considerations are highly relevant, i.e. a museum context. Museums are examples of experience-based services, with the aim to provide knowledge and experience in the area of their domain. Previous research indicates, for instance, that art museum visitors are eager for more information about the works of art they take part of (Harakal & Hindman, 2004; Aoki & Woodruff, 2000; Forlizzi & Ford, 2000). There the information is distributed (scattered around) in the environment and often tied to the location where it occurs. Typically, a person wanders around in the environment; the situation and context trigger the desire or need for information. Therefore, our design is built upon a mobile, portable, context-dependent device, which provides auditory information to the user at the location, when desired - just as visual displays do. Information systems of this kind need to be location-aware, as well as interactive.

# 2 RESEARCH APPROACH

In order to explore potential ways of achieving enhancements of experiences and how they can be understood in a specific setting, we applied the case study research approach. Our case was organised in collaboration with Bohusläns Museum, a regional museum in Sweden, with exhibits reflecting the local culture, local handicraft and artworks. The museum is a non-profit organisation and they measure their success by the number of visitors. Their main goal is to be available for public and currently Bohusläns Museum is the most visited regional museum in Sweden. Our research initiative is in line with the museum's further ambition; to develop their business for increasing accessibility and attracting new visitor groups. In this research we focus on to increase accessibility for certain target groups; i) primarily visitors with visual or language disabilities; ii) and secondary on non-native speakers, tourists, youngsters and children. However, as the goals are to attract new visitors, to attract visitors to come more often and to provide enhanced experiences for all visitors, we will further discuss how one IS application can be used for value-adding purposes. An in-depth analysis and design of user groups with visual or language disabilities (people with dyslexia and visual impairment) is reported elsewhere (Pareto & Lundh Snis, 2006).

Having a real setting, in which to analyse the activity of experiencing something, i.e. an experience-based activity (a museum visit), gave us rich information as well as a good foundation to follow individual users and identify appropriate user requirements for designing enhancements. We conducted several non-participatory and participatory observations as well as 19 qualitative interviews with selected target groups of the museum's potential visitors. Also we had numerous interviews and discussions with domain experts from the museum. The results from the interviews and discussions were categorised into requirements lists and selected for the design solution. The study took place over a period of five months. The result from the case study has given a rich, but somewhat complex picture of capabilities and limitations of mobile IS support for experiences at a museum. As such, the requirements and enhancements derived from this study are not an extensive list that can be used in

any given experience design setting. Rather, the findings indicate the importance of an understanding of various enhancements IS support aimed for experiences might reach.

### 2.1 Design Approach

The design approach taken in the case study was two-folded: a user-centred, contextual design approach (see for instance Dix et al, 1998; Preece et al, 2002; Beyer & Holzblatt, 1998) was combined with an explorative, experimental, more technology-driven approach to design (see for instance Rogers et al, 2002; Gulliksen et al, 2006). The former approach was primarily used to guide the design work by identifying requirements and design implications for identified target groups, whereas the latter was used in order to explore and experiment with capabilities of new technologies, to provide ideas for further design activities, and to search new, potential target groups as well. The two approaches were intertwined and used interchangeably during the iterative process of forming a usable design solution. We motivate our integrated approach by the following.

On the one hand, enhancements of experiences are related to user groups, a user-centred approach is a natural choice. Moreover, a user-centred, iterative approach to design is crucial when designing for disabled (Dickinson et al, 2003; Dickinson et al, 2002; Wattenberg, 2004) since most designers have little experience and knowledge of the handicaps and their consequences in different situations. Thus, such approach is further motivated by having primary target groups of disabled users. Finally, according to Liffick (2003), technology designed for the disabled (assistive technology) is largely ignored by the HCI field as an important topic, and is therefore of further interest.

On the other hand, an explorative approach is motivated by the aim of designing technology which is usable for a wide range of situations and for a wide range of users. While having the focus on providing support for users with reduced functionality (i.e., provide assistive technology), we strive for a solution which is more of a mainstream product with universal usability (as according to Shneiderman, 2000) by broadening the context to a wider range of users. The lack of practical applications of universally designed IS applications as well as a discussion of assistive technology versus universal design can be found in Law et al (2005). We applied this approach by viewing technology as a source of inspiration (as according to Rogers et al (2002) is called *innovation through technology inspiration*). The opportunity of this relies on our appropriateness of technology as something that is a driving force in both human social and individual history.

## 3 ENHANCEMENTS OF EXPERIENCES

The term user experience has for long been of certain interest in all IS design, in particular HCI interface design (Preece et al, 2002). To understand user experience as a result from interacting with IS products is always of importance when designing IS tools and systems. According to Alben (1996), experience means “all the aspects of how people use an interactive product”; i.e. a prerequisite is a product, a system to be used in a certain context. The fundamental question for such a perspective on user experiences concerns the quality of an interaction design and how it provides people with a successful and satisfying experience.

In contrast, we will in this paper concentrate on experiences “as such”. By experiences we refer to the sensations that results from an activity of experiencing “something”, as a means to enjoy or engage in a certain series of activities, an event. This event needs necessarily not to be experienced through a product or a system. We focus on activities with the main purpose of generating an experience, as defined by Forlizzi & Battarbee (2004), IS-based or not. Essentially, an experience is a kind of totality, engaging oneself (or together with others) in relationship with an object, or in a situation. The technology part, the IS support, is there to support such an experience-based activity. What is even more interesting to know is in what way such a support actually enhances the experience. As we

mentioned earlier there are many different approaches or strategies for using IS to enhance experience-based activities. In this research we consider the enhancement as the point of departure when exploring design issues for experiences. Enhancements are understood as different ways of adding value to, or increase attractiveness of an object or a situation. Values such as knowledge, feelings, and sensations are various examples of what experience-based activities might generate.

We have elaborated on three levels of enhancements that can be used when strategically valuing how an IS application may impact on various target groups. However, in order to value enhancements at all, we need to relate its value to the target groups in question.

*Compensate*: If you compensate for a lack of something, you do something to make the situation better. This enhancement refer to, for instance, compensating for disabilities and is subjected to people, who lacks some abilities needed to take part of the full experience.

*Complement*: Thing or people that complement each other are different or do something differently in a way that makes them a good combination. This enhancement suggests that an experience could be known in many ways. It allows for other ways the event or situation can be experienced.

*Augment*: To augment an experience we refer to making the experience stronger to its actor, by adding something. By supplying more of actual resources or new resources, the experience is augmented in a way that it provides a richer context.

The strategy list of enhancements was elaborated iteratively during our study. In chapter 5 we consider these enhancements in relation to our case findings.

# 4 THE CASE STUDY: DESIGNING A LOCATION-AWARE, AUDITORY MUSEUM GUIDE

The Museum in question is a regional museum, which houses exhibitions reflecting the local culture, countryside and industries, local handicraft and artworks, as well as temporary exhibitions on various themes such as contemporary art and cultural history. The exhibitions are spread on several floors, and the type of building encourages visitors to wonder around and experience the exhibitions as they appear on their route. Many exhibitions are organized around visual objects and visual displays of text information, with a few exceptions where objects may be experienced by touching and trying them out (especially for children). There is often no auditory information, except for shorter videos that run on demand. The museum provides a quiet, calm and relaxing atmosphere, which allows for (quiet) social communication, and it is open to the public. The museum arranges guided tours on given occasions, and on demand.

There are many different kinds of visitors in a museum, with varying interests, varying goals with their visits and different styles of proceeding during their visits. There is no typical or most natural path or order to traverse the museum, and hence exhibitions and objects within the exhibitions can be visited in any order, depending on the preference of the visitor. A location-aware system, which is a system that “knows where it is” and can act accordingly, can provide context-dependent information without any involvement of the visitor. This allows for a great freedom for the visitor to move around as desired while carrying a location-aware device which delivers appropriate, context-dependent information.

The primary aim from the museums management is to reach new visitor groups by increasing the accessibility of the exhibitions for individuals with visual- or language related function disabilities. The reason for this choice is due to the relative large part of the population with such problems, 8-10% dyslectics and 1-2% visual impaired in Sweden according to Swedish Statistical Bureau (SCB), in addition to the population with reduced vision due to age. Moreover, most provided information in the museum today is visual. Thus, the choice of an auditory based system is natural due to its

complementary nature. Secondary aims include increasing the attractiveness for other visitors, and an auditory, location-aware system can be used for many purposes in a museum: providing context-dependent information in different languages, additional information, predefined guided tours, complementary sound effects or background music, which can augment the visual experience in the museum.

There are related location-aware, auditory systems in the literature, but none of them seem appropriate for our case. The following systems are inappropriate for visitors with visual- or language related function disabilities: Ciavarella & Paternò (2004) because a small visual display is required; Hatala et al. (2004) because it uses complicated, non-adaptable user models to decide which information to provide; Terrenghi & Zimmermann (2004) because it only provides sound illustrations and has a intricate gesture-based interactions style; and Berkovich et al. (2003) because information is broadcasted and can therefore not be adapted to the user. The other two Bederson (1995) and Oppermann & Specht (2000) are system-centred in the sense that information is provided to the user as soon as an objects is close enough, whether the user wants to hear it or not. This is very intrusive to the user, and conflicts with the ambition to enhance the experience of visiting a museum. Therefore, a new location-aware, auditory was designed.

### 4.1 Target Groups and Enhancements of Experiences

The museum is primarily based on visual artefacts and visual information, which clearly limits the accessibility for individuals with reduced vision. Several participants in our user studies were older women who used to visit the museum but had ceased to do so due to their reduced vision. There are many variations of reduced vision, with diverse effects on how the viewer experiences the visual object. Reduced vision can have effects such as seeing a blurry picture, seeing a grey spot while trying to focus (but clear and sharp around it), seeing only light and dark, or seeing the world through a small camera (Tiresias). Particular attributes of a person's disability will make assistive solutions more or less appropriate (Fraser & Gutwin, 2000). For instance, magnifying is not appropriate for users with limited field of view and change of colour or high contrast is helpful for some types of impairment, but not all. However, providing a solution where a visitor's lack of vision is compensated by auditory information, including descriptions of visual phenomena, can change an inaccessible experience to become accessible (provided the visitor does not suffer from severe hearing impairment as well). This is clearly an enhancement.

Most information provided in the museum consists of written text. There are live guided tours available, but only at certain times and at cost. For visitors who are incapable or reluctant to acquire information through reading, this information has limited accessibility. Underlying reasons for such limited capability are reading disorders, minor cognitive disabilities, or reduced skills in provided languages (children, new immigrants, tourists, foreigners). For visitors with language related or cognitive disabilities as well as for children, the provided information need to be simplified linguistically and adapted to their level of understanding regarding content. For these groups, auditory information compensates for their reduced capability of reading, and complements the written information. Adapted level of content can be provided both ways (text and speech). For tourists and foreigners, on the other hand, the information needs to be provided in a language they comprehend and additional information containing cultural explanations may be beneficial. Here, availability of languages for the information is the important aspect, and the information is best served individually, since public information in many languages clutter the exhibitions. A personal auditory system is one alternative to provide such information (written pamphlets another). Making experience-related information accessible to those who want it certainly enhance their experience. Augmenting the information with background explanations to increase the understanding of an artefact, potentially enhance the experience of it.

The museum is frequently visited by children and teenagers, as part of school projects or at the spare time accompanied with adults. Youngsters of today are normally not thrilled over fact-based

information about the local culture, local handicraft and artworks, or contemporary art and cultural history unless it is presented in a way that attracts their interest. Today, most of the exhibitions are arranged around visual artefacts and objects that cannot be touched or felt, accompanied with written, often fact-based information, which is far away from the entertainment this group is used to. A different packaging using the auditory system, i.e. a motivating game based on the exhibitions involving the information, would likely enhance the experience tremendously for this group.

Any visitor could benefit from listening to information rather than reading it, just since auditory information complement visual objects much better than written information --- they do not compete for the same resources. Moreover, visual displays take up space in the room, they cannot be read at a distance and the aesthetics of exhibitions generally do not improve by informative visual displays. With an auditory, location-aware system a variety of information can be provided (e.g., about the artist, painting techniques or history), as well as information at different levels and depths. Finally, sound illustrations accompanying the artefacts or background music can be provided. These examples are augmentations of the physical exhibitions that have the potential of enhancing the museum experience for many visitors.

### 4.2 Requirements and Design Implications

The different user groups have various information needs, regarding language to be used, and the kind, amount, and level of information, e.g., information to support navigation is relevant for users with reduced vision only. For the requirement gathering phase, the focus was on the primary target groups with reduced functionality, since their need often generates higher demands on the technology. Users with reduced vision typically appreciate colourful, metaphorical descriptions, whereas users with limited language skills typically find such descriptions incomprehensible. A strongly simplified language may be considered indigent by the visually impaired, who wants to compensate their lack of vision by descriptive information. A game-based setting can, for instance, require embedding the information in an adventurous story with “treasures” to be sought in the exhibitions artefacts. Thus, the provided information must be adapted to each group, respectively.

The ability to hear and comprehend auditory information and the ability to handle simultaneous sources of sound differ for our primary user groups and so do preferences. Hence, there should be alternatives allowing for private, immersive reception of the information, as well as reception in a more social setting.

As a result of our user studies, we have identified the following requirements on the proposed auditory, location-aware IS application:

*Requirements on the device:*

Functionality: In Dickinson et al (2003) it is argued that only the minimal functionality should be considered, in particular when designing for disabled. The necessary functionality is to provide context-dependent, appropriate information to the user, when the user wants to hear it. The system must provide the possibility to interact with the information. Finally, the system should provide help instructions, and perhaps the possibility to contact human help.

Device: The device should be robust, context-sensitive, discrete, and have controls distinguishable with reduced vision (tactilely or with auditory feedback). It must allow for listening to information as well as communicating with others and must be compatible with hearing aids.

*Requirements on the information:*

Content: The information content must be adapted to the respective user group. For users with language disabilities, this includes a simplified language, short paragraphs and sentences, pauses between passages, and avoidance of language constructs that complicate the interpretation. For users with reduced vision this includes environmental descriptions, descriptions of visual aspects of objects, and avoidance of references to visual impressions that have not been explained.

Form: Auditory information must have clear and distinct articulation and facilitate language comprehension as much as possible. The voice can be synthesized or recorded. However, synthetic speech is less intelligible and less preferred (Tiresias), and can be problematic for dyslectic users.

All requirements have been reviewed and tested relative to the other target groups and applications, to identify if there are any conflicting usability goals. None of the requirements above are in conflict with the other ambitions.

### 4.3 Design Solution

Our design solution is split in two parts: a generic infrastructure consisting of location-aware, context-dependent technology, and specialized content which provide the user-groups with adapted information, respectively.

The infrastructure consists of a portable device together with a headset for auditory information, and an environment in which objects and information displays are equipped with identification tags. The location-awareness in our prototype is provided by IR (InfraRed light) tags close to objects with information, an IR transmitter in the device, and a database with object-related information. The IR technology can be replaced by RFID (Radio Frequency Identification), when the technology lives up to its claims (RFID was tried and turned out to have too many limitations as yet). This solution is flexible as new tags can be added to the environment; new information can be added or changed in the database and since the context-dependent information is any auditory information. Hence, the same infrastructure can be used for various applications. The system includes a hand-held device to interact with, and different kinds of headsets to support different needs: isolating headphones, ear plugs, or small speakers for group interaction.

The information is organized in a database, coupling the pieces of information to the identification of the corresponding objects or displays. Content must be provided, in our case by the museum, and adapted to the user groups. The content can either consist of sound files to be transmitted directly, or by text that is transformed into synthesized speech. The design solution allows various kinds of auditory content to be transmitted to the user, when at the location of an object or when entering a room. For instance, an interactive “treasure chase” embedded in an adventure game related to the content of an exhibition can be implemented using the technology. The idea is to motivate youngsters to be involved with the museum artefacts by seeking and identifying “treasures” in them, and organize the auditory information as an adventure.

## 5 ENHANCEMENTS OF EXPERIENCES IN OUR CASE

In this attempt to understand how to design for enhancements of experiences, we have focused on the enhancement, i.e., ways of improving the value, quality or attractiveness of an experience. Experiences are highly personal and involve complicated aspects such as emotions. The enhancement focus means that we are interested in the relative values of experiences rather than absolute, which is easier to judge. A relative judgement involves only ordering two experiences, whereas an absolute judgement involves some scale of measurement (see Desmet (2002) for an interesting measure instrument concerning emotions). However, comparability between answers is troublesome. Our approach was to analyse enhancements by considering what is changed, what the value increase consists of and why, and for whom is it of value. From this analysis, we identified different ways of achieving enhancements, which we refer to *compensating*, *complementing* or *augmenting* an experience. All design proposals in our case study can be described using these concepts, and we have used them as explorative tools during the design process. The analysis is presented in table 1. The table describes what is changed/new (Auditory content), what the value increase consist of (Enhance experience by), an exemplary estimation of the enhancement, target group (For whom), and what

needs to be done (Cost to produce). The last column is examples of how an estimated value of the proposed change can be calculated by combining the estimated enhancement and the estimated size of the group it applies to. Other aspects may be of interest, such as value of new visitors or educational aspects.

| **Auditory content** | **Enhance experience by:** | **Estimated (EE) Enhancement** | **For whom:** | **Cost to produce:** | **Estimated Value (EV): (examples)** |
|---|---|---|---|---|---|
| general info about exhibitions and artefacts | *complements* written info and augments visual artefacts | medium: complements visual experience | All (hearing visitors) | make general information auditory | EV = Estimated Enhancement EE* estimated % of All |
| additional info for users with reduced vision | *compensates* users for lack of vision | high: from inaccessible to accessible | Visitors with reduced vision | add navigation info & auditory descriptions of visual artefacts | EV = value of new visitors + EE * estimated with reduced vision |
| simplified information | *compensates* reduced capability of reading, *complements* written information | medium: makes accessibility better | Visitors with limited language skills | simplify general information | EV = value of new visitors + EE * estimated % of target groups |
| additional information about artefacts | *augments* both general information and visual artefacts | medium: gives deeper information | Visitors with special interest | create additional information | EV = EE * estimated visitors special interest |
| general information in other languages | *complements* written info | medium – high: from inaccessible to accessible | Tourists, foreigners, immigrants | translate general information | EV = value of tourism + EE * estimated visitors |
| additional cultural explanations | *augments* the exhibition with better understanding | medium | Tourists, foreigners, immigrants | create cultural explanations | EV = value of education + EE * estimated visitors |
| adventurous game | *augments* entire exhibition and information about it | high | Youngsters | create auditory game-like environment | EV = value of education + EE * estim. youngsters |
| sound illustrations | *augments* visual artefacts | low | All (hearing visitors) | create sound illustrations | EV = EE * estimated % All |
| atmospherically background music | *augments* exhibition | low | All (hearing visitors) | choose suitable music | EV = EE * estimated % All |

*Table 1 – Analysis of enhancements of experiences in case study*

To break down a complex concept such as enhancement of experiences, helps in understanding its components and their relations. A more grounded estimation of the enhancements value can be done, and the points of uncertainties become explicit. Thus, it can be used to make strategic decisions before the technology is developed.

Five different test applications have been developed so far. The first two were primarily designed as assistive support for users with reduced vision and language comprehension disabilities, but nevertheless we strived for a mainstream application with universal usability. Extensive user studies, requirement analysis, a mockup wizard-of-oz prototype was developed and user-tested, resulting in a InfraRed-based hardware prototype, which this paper have described in detail. The other three test applications are auditory, adventurous games based on the exhibitions in the museum: a treasure hunt for children and families, an enigma for Swedish-learning immigrants, and a guess-who puzzle for teenagers developed by digital media students. The games run on a PDA-based prototype, and we have conducted user-tests with representative users and teachers of the corresponding groups. All five test applications have been evaluated, using non-participatory and participatory observations during test, directly followed by individual or group interviews, right after each test. Each application was

evaluated by between five and twelve test persons from the various target groups. These evaluations cover most dimensions of enhancements mentioned in the table above. The preliminary findings indicate that the actual enhancements are in line with the previous estimated enhancements.

In general, we also want to discuss the strategies of how enhancements might be reached when designing for experiences in a wider perspective. We have learned that experiences and experience-based activities are extremely situated and can be difficult to talk about (practically as well as emotionally) during the creation and engagement of it. Analysing the enhancements was also helpful when trying to judge the potential of a proposed IS application for experience-based activities: for whom, in what way and why would it enhance the experience, or the potential of particular features of a system. We also understand that evaluating experiences is highly subjective and can only measure the user's perception of a future experience (expectation, not prediction), or it can measure their perception of the past. Evaluating experiences requires a common language for articulating, communicating and evaluating the creation of experience. It should work independent of objects, products or medium and we assume that the assessment goes beyond usability issues (Alben, 1996; Wattenberg, 2004) towards issues of experience-based values and sensations (McLellan, 2000; McClelland, 2005). Rather the usability goals are to be pre-requisite and transparent to the core values of enhancing experiences. We agree with Hekkert et al (2003) that such enhancements need to add something of deeper value to the experience, and not ruin the original experience.

# 6 CONCLUSION AND FUTURE WORK

The aim of this study has been to explore how experiences can be enhanced by a location-aware, auditory information system in a specific case setting. Enhancements of experiences are of particular interest when designing IT-support for experience-based activities. In particular, we have presented what can be learned about a case study aiming for an experience design of a location-aware, auditory IS taken place at a museum. Furthermore, we have developed design strategies for enhancements as well as a model to estimate the predicted value of the enhancements. The strategies were applicable to the designers and proved to be very fruitful for the explorative approach. The museum management found the strategies "mind-trigging" and promising for valuing its IS initiative. The design strategies could be used strategically by enterprises or designers as a guiding tool for a better understanding of the inter-related effects that concern various target groups.

The contributions of our case were discussed on a more general level, as input to further develop theories and approaches to experience design. We have learnt that explorative research methods are needed to better articulate the relationship between what we feel and what we do. We have tried out an integrated approach that provided us to interchangeably shift views (user-centred and technology-driven) on the process and take different standpoints for various outcomes of it. The use of such an interchangeable approach gave rich insights of both user groups' needs and requirements, as well as explorative knowledge of new features of the proposed technology.

We are not claiming that this research include completed lists and tools for measuring enhancements of experiences, but it is a first attempt to understand how to design for enhanced experiences, in the sense of seeking for reasonable strategies that can be used to explore various aspects of enhancements of IT-supported experiences. One way to continue this research is to follow the implementation and actually try to measure the enhancements on the different target groups. Future work would also concern similar case studies of design experiences, where these strategies could be used, verified and further developed in order to deepen the knowledge in experience design.

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