Design Strategies for Enhancing Experience-Based Activities

Lena Pareto and Ulrika Lundh Snis

University West, Laboratory for Interaction Technology, SE-461 86 Trollhättan, Sweden

{lena.pareto, ulrika.snis}@hv.se

Abstract. Enjoyment and experience-based activities are important in today's society. The purpose of this paper is to explore and better understand how experiences can be enhanced using IS in such experience-based enterprises. The research is based on a case study conducted in collaboration with a Swedish regional museum, where a location-aware auditory museum application for experience enhancement is being designed. The results include design approach recommendations, enhancement strategies and a model for estimating the potential benefits related to enhancements features of the system design.

Keywords: design strategies, experiences, enhancements, experience-based activities, value-added, estimation model

1   Introduction

There is an on-going change in our economy: from service-based to more experience-based economies [8]. This change implies an increased focus on enjoyment and experience-based activities and events. Several experience-oriented business sectors, in particular entertainment, education and culture, are growing rapidly with this change. Information systems (IS) have great potential in supporting such sectors, e.g., interactive media can engage or enjoy its users optimally [7], and there are several current attempts of Edutainment IS products. Hence there is a need for in-depth studies of the role of IS in these settings, addressing the following questions: How can IS enhance and support experience-based activities? Are there any differences in the design approaches? How can we understand enhancements and estimate the value added by proposed IS solutions? The purpose of this paper is to explore and better understand how experiences can be enhanced using IS in experience-based enterprises.

2   Experience-based activities

User experience has for long been of interest in IS design, in particular within the field of human computer interaction. To consider user experience as an effect of using IS products is always of importance when designing IS tools and systems. According to [1] experience means "all the aspects of how people use an interactive product", and user experiences thus refer to how well the IS provides users with successful and satisfying experiences. With this perspective, the experience is due to the IS usage. 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 not necessarily be experienced through a product or a system. We focus on activities with the main purpose of generating an experience, IS-based or not, as defined by [4]. 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 system, is there to support such an experience-based activity, with the aim to enhance the already occurring experience.

3   Research Approach

Our research approach is to focus on *strategies for achieving enhancements of experiences.* 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 the attractiveness of an object or a situation. Values such as knowledge, feelings, and sensations are examples of what experience-based activities might generate. However, experiences occur within individuals, and highly depend on, for instance, the individual's interests, preferences and needs. To explore potential enhancements we have analysed activities in relation to user groups, in order to understand different ways of achieving enhancements.

Our findings are based on a case study: an ongoing, collaborative project together with a regional museum. The museum provides exhibits reflecting the local culture, local handicraft and artworks, and is an experience-based, non-profit service. The museum's goals in this project are to attract *new* visitors, to attract visitors to come *more often* and to provide *enhanced experiences* for all visitors, by IS support. The project is exploratory in nature, has proceeded for several years, and has engaged museum staff, researchers, one IT company, and one class of media students. Various user-groups have been in focus; mock-up and prototype systems have been designed, developed and user-tested. Evaluation has been based on attractiveness and enhancement of the experiences using the system in the museum context. From this, a model for estimating the enhancements and its value-adding potential has been developed to judge the different design attempts. Thus, the project is suitable for exploring how an IS application can be used for value-adding purposes, in an experience-based enterprise.

3   The Case: An Auditory, Location-Aware Museum Application for Experience Enhancements

The museum of our case is in many respects traditional: it is open to the public; the building is spacious and exhibitions are spread; visitors wander around; most exhibitions are organized around visual objects and visual displays of text information; guided tours can be arranged. The starting point of our research was to design an auditory, location-aware IS system to enhance the museum experience. The choice of an auditory-based system is motivated by the visual nature of exhibitions, as well as the aim to increase accessibility for visitors with visual or language disabilities, non-native speakers, tourists, youngsters and children. 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 and experiencing objects and exhibitions of their own choice. Thus, an auditory, location-aware system can be used for several purposes: e.g., 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. Our responsibility is to propose a design of such a system; i.e., the principal technical solution, the interaction with the device and test applications of auditory content for various user-groups and use situations to ensure a flexible, usable solution. The goal is to design an affordable system, which is beneficial and can enhance the museum visit for as many visitors as possible.

Our proposed system consists of a generic infrastructure of location-aware technology, together with use- and user-adapted auditory content. The visitor carries a portable device and headsets for the auditory information, in an environment equipped with identification tags which tells the device where it is. The appropriate auditory information is loaded into the device, and transmitted to the user when at the location of an information-equipped object or when entering a room.

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 [9] in accordance with the findings of [5 and 6]. Extensive user studies, requirement analysis, a mockup wizard-of-oz prototype was developed and user-tested, resulting in a InfraRed-based hardware prototype constructed by the partner IT company. The other three test applications are auditory 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.

4   Design Strategies for Enhancements of Experiences

The proposed design strategies are presented in three parts: a design approach discussing methodological aspects, a set of enhancement strategies or classifications of different types of enhancements to guide the design, and a model for estimating the potential benefits related to enhancements features of the system design.

4.1 Design Approach

The design approach taken in the case study was two-folded: a user-centered, contextual design approach was combined with an explorative, experimental, more technology-driven approach to design. 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 for searching new, potential target groups and for exploring additional uses of proposed design solutions. The two approaches were intertwined during the iterative process of forming a usable design solution.

User-testing with simulated or real prototypes in the proper context is crucial for experience-based design. Since the values of applications are more concerned with sensations and emotions than actual needs, it is difficult to predict user reactions and experiences. Moreover, requirements gathering related to the experience aspect (in contrast to ordinary usability issues) need to be experimental and suggestive, since experience-based sensations are difficult to value in advance. This calls for a design approach which combines contextual, user-centered methods with experimental, explorative design in short iterative, cycles with frequent user tests and evaluations.

4.2   Enhancement Strategies

In this section we will describe some of the features we have designed and evaluated, as well as the underlying rationale in terms of enhancement discussions. We conclude by summarizing our experience in three general enhancement strategies.

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. 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, which 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 these groups, simplified auditory information *compensates* for their reduced capability of reading, and *complements* the written information. For tourists and foreigners, information provided in a language they are accustomed to *compensate* for their language incomprehension and additional explanations may *compensate* for a lack of cultural understanding. Making experience-related information accessible to those who want it, certainly enhances their experience. *Augmenting* the information with background explanations to increase the understanding of an artefact, potentially enhances 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 by facts about local culture, handicraft and artworks, or contemporary art and cultural history, unless presented in a way attractive to them. 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. The auditory edutainment games *augment* the exhibitions to become a physical adventure arena with motivational, playful information which engage these users groups into an informative and entertaining experience. Our user tests indicate that such games can result in a great enhancement of the museum visits for these groups of visitors.

Any visitor could benefit from listening to information rather than reading it: auditory information *complement* visual objects much better than written information, and does not compete for the same cognitive 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.

We have identified the following enhancements strategies as useful tools for exploring potential enhancements features:

- *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*: Things 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 *augmenting an experience* means to make it stronger, by adding something. By supplying more of actual resources or new resources, the experience is augmented in a way such that it provides a richer context.

The enhancement strategies can also be used for categorisation of enhancements in the value-added estimation model below.

4.3   Value-Added Estimation Model Related to Enhancements

Exploration and experimentation is fruitful for generating ideas and seeing possibilities, but there comes a point in the design process where convergence is needed and generated features must be analysed and judged against each other and against their corresponding costs. For this purpose we have developed *a value-added estimation model*, to guide the convergence phase, in order to estimate the relation between potential benefit and cost of the proposed features. In this attempt to estimate the enhancements of experiences, we have focused on the *enhancement,* i.e., ways of improving the value, quality or attractiveness of an experience. The enhancement focus allows us to compare relative values of experiences rather than absolute, and this is easier to judge. A relative judgement involves only ordering two emotional experiences, which most users are able to do, whereas an absolute judgement involves some scale of measurement [2] which is problematic to compare between subjects. For this analysis, we used the enhancements strategies as categories of different ways of achieving enhancements. The model consists of a table with the following entries:

Table 1 – The value-added estimation model

Enhancement feature content	Enhancement category of feature	Target group	Estimated Enhancement (EE)	Estimated Value (EV)	Cost
Which information that needs to be provided	*Which type of enhancement the feature refer to*	*For which target group this is likely to be an enhancement.*	*An estimation of how much value the enhancement may add. Should be guided by user tests.*	*EV = Estimated Enhancement EE* estimated % of attracted target group*	*Estimation of production costs*

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.

6   Discussion and Future Work

Choosing the *enhancement* of experience to be the main unit of analysis in our study was useful in order to better understand different kinds of enhancements, as well as classifying design attempts. It resulted in the three enhancement strategies: *compensating* for something missing, *complementing* something or *augmenting* something in the experience. The museum management found the strategies "mind-trigging" and promising for valuing its IS initiative. However, the suggested design strategies need to be used in other settings to further verify its usefulness.

References

1. Alben, L. 1996. Quality of experience: defining the criteria for effective interaction design. *interactions* 3, 3 (May. 1996), 11-15.
2. Desmet, P. Designing Emotions. Doctoral thesis, Delft University of Technology, Netherlands, 2002.
3. Dickinson, A., Eisma, R. and Gregor, P. (2003). Challenging interfaces/redesigning users, In *Proceedings of the 2003 conference on Universal usability*, P 61-68, Vancouver, British Columbia, Canada 2003. ACM Press.
4. Forlizzi, J & Battarbee, K (2004) Understanding Experience in Interactive Systems. *Proc of the 2004 conference on Designing interactive systems: processes, practices, methods, and techniques.* 261-268 ACM Press, NY.
5. Law, C., Jacko, J., Peterson, B., and Tobias, J. (2005): Universal designs versus assistive technologies: research agendas and practical applications. In *Proc of the 7th international ACM SIGACCESS Conference on Computers and Accessibility* (Baltimore, MD, USA, October 2005). Assets '05. ACM Press, NY, 2-3.
6. Liffick, B. W. (2003). Assistive technology as an HCI topic. *J. Comput. Small Coll.* 19, 2 (Dec. 2003), 142-144.
7. McClelland, I. (2005). User Experience Design: A new form of design practice takes shape. *CHI 2005*, April 2-7 2005 Portland, Oregon, USA.
8. McLellan, H. (2000) *Experience Design*. Cyber Psychology & Behaviour. 3.1. 59-69
9. Shneiderman, B. (2000). Universal usability, *Communications ACM*, vol. 43, no 5, 84-91. ACM Press.