Real Life Experiences with Experience Design

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ABSTRACT
Experience Design is an emergent field of study, and various approaches to the field abound. In this paper, we take a pragmatic approach to identifying key aspects of an experience design process, by reporting on a project involving the design of experience-oriented applications of interactive technologies for knowledge dissemination and marketing, in cooperation with public institutions and businesses. We argue that collaborative formulation of core design intentions and values is a valuable instrument in guiding experience design processes, and present three cases from this project, two of which resulted in interactive installations. The case installations range from walk-up-and-use consoles, to immersive, responsive, environments based on bodily interaction. We compare the installations, and discuss the interrelations between the resulting interfaces and the intentions for creating the installations, the core values established to guide the design process and the intended use contexts. We argue that the installations present a broad spectrum of experience design installations that can assist designers in understanding the relations between core values, intentions, use context and interface in the design of experience-oriented interactive installations.

Author Keywords
Experience Design, Values, Participatory Design, Human-Computer Interaction.

ACM Classification Keywords
H5.1. Information interfaces and presentation (e.g., HCI): Multimedia Information Systems.: Artificial, augmented, and virtual realities.

INTRODUCTION

The past years have seen an increasing interest in experience-oriented aspects of user interfaces. This interest is prompted by a number of factors: on a macro-level, consultants hail the advent of the experience-oriented economy, and both companies and governments increase their funding to projects within this domain [24]; on a technological level, the development of existing and new technologies such displays, sensors, projections, and processing power continually increase the potential for creating engaging and immersive experiences; on the use domain level, interactive technologies are spreading into a number of domains beyond the workplace, including leisure, homes, public spaces, retailing, entertainment etc.

There are a number of ways to approach and explore the emerging field of experience design. These approaches include the definition, modification and expansion of theories of experience [1, 11, 12], experimenting with new technologies and interfaces to explore their experiential qualities [15,18], exploring aesthetic aspects of interfaces and user-interface relations [4, 9, 10, 23], and exploring product design that leads to pleasing products [19, 22, 25].

These contributions notwithstanding, there is a need for guidelines in the design process, that are sensitive to the fact that many experience design projects are commissioned by non-academic stakeholders whose primary concerns may not be related to research.

Our approach to the field is experimental, yet rooted in practice, in that for the past 18 months we have worked in collaboration with a number of external commercial and cultural institutions to develop and deploy experience-oriented installations related to knowledge dissemination and marketing. Working with these partners offers the opportunity to evaluate our methods and designs in realistic settings, but also imposes a number of constraints. Our agenda as researchers has thus been persistently confronted with the perspectives and requirements of the various stakeholders, which range from an international chewing gum company, to museums, and a centre for children's literature.

In this paper, we describe the collaborations with three of our partners, and the six interactive installations that are the results of these collaborations. Three of the installations have already been deployed, whereas the remaining three are still prototypes. We concentrate our focus on two central, experience-oriented aspects of the design process,

namely how *the intentions of stakeholders* and *the joint formulation of core values* in interrelation with *studies of the use contexts*, have been crucial in designing the installations.

The six installations and their use contexts are very diverse. We compare them, and identify a number of key characteristics pertaining to the user experience in relation to the stakeholders' intentions and the established values.

BACKGROUND

We address the field of experience design of interactive systems, and are, on the one hand, concerned with the notion of experience in relation to interactive systems, and on the other hand, with how to address experience-oriented aspects in the design process.

As the title of this paper indicates, experience is a broad subject, to say the least, as it includes perceptive, cognitive, aesthetic, and emotional aspects. Although it is not our intent to define a comprehensive model of experience in interactive systems, but to explore dimensions of experience-oriented aspects of interaction design in practice, a number of such models are established, and inform our understanding of the field. Forlizzi & Battarbee [11] group approaches to establishing such models of experience into three categories: *Product-centred models* that focus on the qualities of the interface [1], *user-centred models* that take as a starting point models of human capabilities and motivations [16, 17], and *interaction-centred models* [8, 11, to these we add 23], that which establishes a holistic perspective on the interrelations between users, use context, and products. Our approach to experience design is heavily influenced by our background in Participatory Design, in which the understanding of users and use context is essential. Although Participatory Design may initially be perceived of as a user-centred approach, we argue that the primacy of understanding use practice may place us within what [11] denote the interaction-centred approach. Our experiences from experience design projects, such as those we report on in this paper, however, prompt us to expand on our understanding of designing for experience in relation to some proponents of the interaction-centred approach, namely [23 drawing upon 8 and 26]. Speaking of aesthetic interaction experiences, [23] note that: "aesthetic is not something a priori in the world, but a potential that is released in dialogue as we experience the world." To this we add that although the aesthetic experience of, for example, engaging with an interactive system, only emerges as an individual experiences a situation, we should not exclude the possibility of designing products and systems that invite certain categories of interaction and experiences. Combining understandings of users, use context, and technology in the design process, may result in products and systems that invite comparable experiences among a multitude of users, their subjective past experiences notwithstanding. This may occur on a number of levels: We may, based on an understanding of users and use contexts, design interfaces that suggest behaviour on an interface level, e.g. if we place a computer with a WIMP interface in a public library in Denmark, we can assume that most users will use a mouse and keyboard to input information and expect output on a the monitor. We may expect certain messages to be understood by users, if we present them in certain ways, e.g. on the library computer monitor we may display the information "Available for loan" and expect that most users will understand. We may further make educated guesses as to how users will respond to certain combinations of interface, situation and content, e.g. we may expect many readers to be moved by the tragedy of Romeo and Juliet.(Following these assumptions, our work with experience design is based on the notion that we can to some extent design for systems and interfaces to convey certain experiential qualities.

To further expand on our position regarding the experience-oriented aspects of interactive products and systems, we address a recurring dichotomy, namely that of "functional interfaces" as opposed to "aesthetic interfaces". For the sake of argument, we introduce four interfaces and place them on a continuum: From left to right, the *command line interface*, the Apple Mac OS X *Exposé* feature (which, wrapped in smooth animation, gives an overview of open windows) [2], a Playstation *EyeToy* game (in which bodily movement in front of a camera serves as input) [27], and the *Glitch* browser (which has the initial appearance of a standard web browser but distorts the web sites it displays [20].

Figure 1: A tentative experience design continuum

One way of distinguishing between the interfaces could be to label the left side of the continuum "Functional" and the right side "Aesthetic". With respect to functionality, we contend that all the above-mentioned interfaces may, on various levels, be said to perform functions, whether entering a command, providing an overview of running applications, inputting commands to punch a virtual opponent, or displaying websites. With regard to aesthetic aspects, we - in line with [23] - argue that mundane artefacts, such as the command line interface, have aesthetic qualities, as much as do interfaces in which, arguably, much attention has been put into designing the look and feel, such as Exposé, alternative modes of interactions such as EyeToy, or interfaces that are designed to evoke critical reflection [9, 10] on their workings, such as Glitch. Interaction designers may seek to reproduce the appearance and function of various types of interfaces, as modes of expression in their repertoire, in order to invoke aesthetic experiences related to users' past experience with said interfaces, e.g. by designing retro interfaces such as websites based on command line interfaces [5].

In spite of these contentions, we argue that the movement from the left to the right side of the continuum indicates an increasing attention to experiential qualities in the interface on the designers' part. In fact, attention to experiential aspects of interactive systems is, in our view, the fundamental characteristic of experience design. To tie this perspective in with the points laid out in the previous paragraphs, we approach experience design as a subset of interaction design that should address the following concerns:

- *Establishing an understanding of users*
- *Establishing an understanding of use context*
- *Establishing and formulating key intentions and values to guide the design process*
- *Understanding the potential for interactive systems and installations to convey these intentions and values to users in use contexts*

Our background in Participatory Design is particularly evident with respect to the first two concerns; the key difference lies in identifying key intentions and values for the future interactive system, and keeping these at the core of the design process. In response to the theme of this conference, Changing Roles, we argue that experience design prompts a shift in perspective on interaction design, namely towards exploring and defining core values for interaction design projects, and integrating these into the design process.

Intentions and values

To quote Voida and Mynatt 28], the concept of values can be a "semantic can of worms", and the concept can be addressed, defined and discussed on multiple levels. Whereas Friedman's Value-Sensitive Design [13] addresses overarching values for designing interactive systems such as user autonomy and freedom from bias, Voida and Mynatt's values for design for the home concern concepts on a more specific level such as family identity and togetherness [28]. Cockton establishes a framework for value-centred design and gives examples of very functionalistic value statements such as "hiring an appropriate van for a suitable period at an economical cost as regards price and personal effort required to collect and return it" [7]. Cockton however expands this perspective by stating that values may be "political, personal, organisational, cultural, experiential or spiritual" [6].

In the cases reported on in this paper, we have made the distinction between intentions and values. We define *intention* as the purpose for creating the installations in terms of function and use, somewhat similar to the first above-mentioned definition from Cockton 7]. The notion of *value*, as we define it, is experiential qualities that go beyond the functional, somewhat similar to the values discussed by Voida and Mynatt [28]. The line between intentions and values can be blurry. However, we found it useful to make the distinction in our communication with domain stakeholders, in that it made clear during joint discussions which aspects of the installations we were referring to.

The intentions and values for the specific cases were based on use domain studies and analyses, and were formulated in collaboration with our project collaborators. In this sense, the intentions and values were inspired by users and use domains, but finally defined and formulated by designers and industry partners.

THE CASES

The cases on which we report originate from an ongoing research project, "Experience-Oriented Applications of Digital Technology in Knowledge Dissemination and Marketing". The project explores the use of digital technologies in settings ranging from museums to commercial enterprises. Our partners - 7th Heaven, The Danish Electricity Museum, and Gumlink - are highly diverse, allowing for comparative analysis.

The installations developed in the three cases result from similar design processes. Initially, field studies were conducted in the future use context of the installations. These studies were supplemented by semi-structured interviews with potential users. A critical aspect of the design processes, given the experience-oriented nature of the installations, were meetings with stakeholders and project workers from our external partners, to not only determine the over-all scopes and purposes for developing the installations, but, crucially, to formulate the values and intentions that were to pervade the installations. Based on insight into the use domain, and the values and intentions underlying the projects, we then studied technologies that could inspire the design of the installations. For the development of design concepts, we carried out one or more inspiration card workshops [21] with each external partner. In the preparation for these workshops, we condensed the findings from the field studies and technology studies on inspiration cards. A number of stakeholders and domain experts, alongside members of the design group including the authors, then combined the cards in the workshop in order to generate new design concepts. To varying degrees, these workshops resulted in reformulations of the intentions and values as they provided room for reflecting upon the future installations. After the inspiration card workshops, the resulting design concepts were further elaborated and subjected to critiques in meetings between the designers and partner stakeholders, in order to determine which concepts to develop in practice. The concepts were then explored in mock-up sessions, virtual video prototypes [3] and prototypes, before they were eventually constructed as final products. Three of the installations described in this paper, the two Gumlink installations and the single 7th Heaven installation, have been completed and implemented, whereas the three

concepts for the Danish Electricity Museum have been video prototyped and are in the prototyping phase.

The over-all process for the three cases is illustrated in Figure 2:

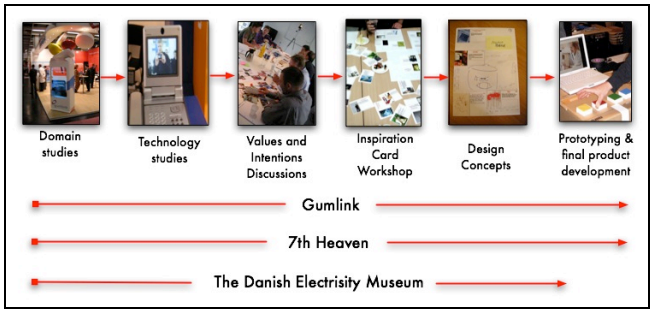

Figure 2: The Design Process

Gumlink

Gumlink is a large, international chewing gum research and manufacturing company with approximately 450 employees. We have worked with Gumlink to create interactive elements for their booth at the world's largest annual sweets convention, which is held in Germany and hosts more than 35.000 visitors. Our collaboration with Gumlink spanned a year, from initial field studies at the convention, through concept and product development, to the launch of the installations a year after the initial studies.

Gumlink is divided into a number of branches with specific areas of expertise, and the staff is thus very heterogeneous. We primarily worked with marketing and communications staff in developing the installations. For the final production of the installations we collaborated with Flex Design, a specialized convention and exhibition stand company.

The use context for the installations, the sweets convention, is characterized as being simultaneously bustling and somewhat serious and restrained: A large number of visitors are present, however they are all there for business purposes (the convention is professional and not open to consumers), and as such observe certain formal behaviours, both relating to dress-codes and behaviour, i.e. they wear suits, keep a professional distance etc. The users and the use context, coupled with the Gumlink company values, thus put certain constraints on the type of installations that would fit into the domain.

In our first meetings with Gumlink, we defined the following intentions and values to guide the design process based on input from field studies at the convention and the explicit needs of Gumlink staff:

Intentions:

- Catch the attention of bypassing convention visitors
- Provide an unobtrusive entrance to the Gumlink stand
- Provide an introduction to Gumlink products and services

Values:

- Convey an impression of a serious company
- Emphasize Gumlink's standing as hi-tech company driven by innovation and research

The design process resulted in the following two installations that were part of Gumlink's stand at the 2006 convention:

The gum console

The gum console is a walk-up-and-use interactive console with the following components: a screen on which information about Gumlink and their products and services are displayed, a narrow strip of matte glass under which a camera connected to a computer is placed, and five tangible boxes with colour codes at the bottom, each representing a service or product, which can be slid across the glass to navigate the information on the display. The console is placed at the entrance to the approximately 100m^2 stand. The purpose of the console is to attract visitors who may be hesitant to engage in conversations with sales staff at the stand, but are still interested in getting to know the company. The console serves as a portal between the exterior and interior of the stand. The intended duration of use for the console is 1-5 minutes.

Figure 3: The Gum Console

The gum facade

The gum facade is placed along one of the exterior walls of the stand. It consists of four screens connected to form one large display. Above the display, a camera tracks people who approach or walk past the stand. The video feed from the camera is processed by software that identifies faces. The images of faces of passers-by are then captured and represented live, in the shape of orbs on the display. The orbs exist in a 3D space showered by small gum tablets. By moving around in front of the display, users control the orbs that interact with the showering tablets and other orbs. The purpose is to create attention and attract visitors who may

otherwise not notice the stand. The intended use-time for the console is 10 seconds to 2 minutes.

Figure 4: The Gum Facade

7th Heaven

7th Heaven is a very small organization, with two full-time employees and a number of free-lancers and subcontractors, that organizes exhibitions related to children's literature. 7th Heaven is a democratic organization, in that the staff communicates on a daily basis and makes major decisions based on shared agreement. The staff is accustomed to exploratory and creative processes, and has a good understanding of the domain of experience centres. They are currently building a centre for Scandinavian children's literature, and our role in this process is the development of interactive installations in which visitors experience settings and moods of the stories from Norse mythology. The goal of 7th Heaven is to interest children in literature, using a strategy that stimulates their curiosity by introducing them to various story universes in a playful and engaging way.

During our initial meeting in the joint design project, we identified the following intentions and values for the design process:

Intentions:

- Convey the story of Balder's funeral at sea

Values:

- Instil a solemn mood
- Deliberate slowness
- Room for reflection

Our collaboration with 7th Heaven resulted in the following installation, which is now in use at the children's literature centre:

Balder's Funeral Pyre

The *Balder's Funeral Pyre* installation is a 7 meter long and 1.5 meter wide corridor, in which one of the sides is a 6 meter long and 2 meter high rear projection of fire. The fire is digitally produced using a particle system with hundreds of bit map images of fire, which together with 14 on/off pressure sensors in the floor enable interaction with the fire.

When no one is in the corridor, the flames glow low above the floor, but when someone enters the corridor, a fire explosion erupts beside their location. As the person proceeds down the corridor, more explosions erupt near them. The software controlling the interaction has built-in delays, to prevent the awareness that the person experiencing this is in control of the fire.

Figure 5: Balder's Funeral Pyre

The Danish Electricity Museum

The Danish Electricity Museum is a science and cultural heritage museum. The museum has a number of permanent exhibits supplemented with varying special exhibitions. The exhibits are distributed throughout a number of buildings. Our work with the museum has consisted of enhancing current exhibits, as well as developing new installations for exploring energy production and consumption.

The museum visitors include school classes (1/3 of the visitors) and private visitors who attend lectures, follow guided tours, and explore the museum's exhibits on their own. The exhibits are diverse, and vary from a fully functional water plant to large Tesla coils, small experimental setups, electrical machinery on display, etc.

The museum is fairly small, and the educational staff that develops exhibitions, conducts tours, and teaches classes consists of 10 staff members. Our work has been carried out in collaboration with this staff, which is heterogeneous with respect to fields of expertise, but communicates on a daily basis, and has a high level of shared understanding. This staff is accustomed to developing and organizing exhibitions, and, by extension, to working with creative processes.

Following initial field studies, we held two meetings with the educational staff early on in the design process, to establish the following intentions and values:

Intentions:

- Provide information about natural and technological phenomena that are invisible to the naked eye
- Provide information about energy production and consumption

Values:

- Inspire exploration of exhibits
- Instil a sense of playfulness
- Convey richness of existing museum artefactsand environment

Our work with the Danish Electricity Museum has resulted in the following installations, which are still at a video prototype level, and are intended for production and use at the museum in the future:

The Energy Floor

The Energy Floor is an immersive exhibit environment consisting of a number of physical devices that consume energy (e.g. a television set, a radio), devices that produce energy (e.g. an exercise bike, a water turbine), and a camera and a projector mounted on the ceiling for tracking visitors and projecting visual elements on the floor. When visitors enter the exhibit space, a small halo of energy is projected around them, and follows them as they move. They may increase their energy level, indicated by a flow of energy from the device to the visitor's growing halo, by using the devices that produce energy. They can then use their energy to activate devices that consume energy, resulting in a shrinking halo as energy flows from the visitor to the device. Visitors may combine their energy to activate devices that consume much energy, or to make smaller devices operate more intensely.

Figure 6: Conceptual image of The Energy Floor

The Energy Table

The Energy Table is a full-room installation. At the centre is a table, above which are mounted a camera and a projector. On the table are six miniatures of power generators, e.g. a windmill and a water power plant. Additionally, there are five to ten miniatures of devices that correspond to full-size devices placed around the table. When visitors stand next to a miniature power generator, they activate it, indicated by a glowing aura projected from above. They can now use physical icons, Electricons, to create flows of energy on the table by physically placing and moving the Electricons on the table. They can lead energy to the miniature devices on the table, thus activating the full-size devices in the room. The devices require different amounts of energy, and visitors can collaborate by combining flows of energy. The various Electricons function as switches, resistance, batteries etc., allowing for the execution of a wide variety of scenarios. The table can also be set up for the visitors to meet certain objectives, thus acting as a board for playing power games.

Figure 7: Conceptual image of The Energy Table

The Augmented Observation Posts

The Augmented Observation Post appears to visitors to be a set of binoculars mounted on a pole. However, this augmented version consists of a camera that captures the surroundings, a gyro that senses the direction of the binoculars, a computer that uses the gyro data to determine the direction of the camera and overlays visual data onto the video feed, and finally, a display that the user sees when looking through the binoculars. The user can thus see the surrounding landscape, buildings, and artefacts overlaid with visualizations of various data types. Depending on the placement of the Augmented Observation Post, this data may be geographical, hydrographical, architectural etc. if placed outdoors, or electrical, historical etc. if placed indoors. Using a switch on the post, the visitor may switch between different data visualizations of the same observation, i.e. when looking at a turbine, the user may switch between external views of the turbine with historical or electrical data, and internal views of the water flowing through the turbine's moving parts.

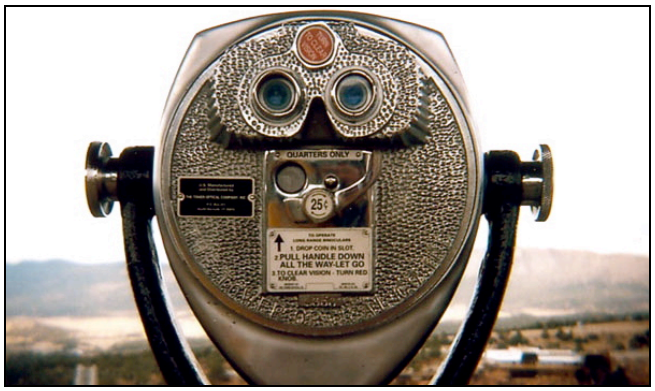

Figure 8: Conceptual image of The Augmented Observation Post

DISCUSSION

The intended users and use contexts of the installations we have designed are quite diverse, as are the intentions for creating them and the values that they are to convey, e.g. the goal of *The Gum Console* is to communicate company and product information in a professional convention setting, whereas *Balder's Funeral Pyre* is part of a museum-like setting intended to stimulate children's curiosity in literature. In the following sections, we will compare the installations and discuss how the various intentions and values have influenced the design processes and the features of the installations. We will also discuss the relationship between the core content and the experiential qualities of the installations.

Comparison of installation features

To compare and discuss the installations, we will focus on six prominent aspects of the installations pertinent for experience design, namely interaction style, element of surprise, time of use, content complexity, prerequisite understanding of the interface, and importance of the installation (ie. is the installation centrepiece or auxilliary), represented in figures 9 and 10. The figures are simplified for the sake of explanation and discussion.

	Interaction style	Element of surprise	Time of use
Console	Tangible	Low	Short
Facade	Bodily	Medium	Brief
Fire	Bodily	Medium	Brief
Floor	Bodily	High	Long
Table	Tangible	Medium/High	High
Observation	Tangible	Medium	Short

Figure 9: Comparison of interaction style, element of surprise and content complexity

The most immediate, distinguising variance between the artifacts are the various interaction styles they make use of. *The Gum Facade*, *Balder's Funeral Pyre* and *The Energy Floor* all make use of bodily interaction by way of tracking visitors. *The Gum Console*, *The Energy Table* and *The Observation Post* interfaces can be construed as forms of tangible interaction, albeit in different shapes. As previously stated, all of the installations have to some extent been designed to attract attention, and to invite interaction. The various interaction styles deliberately diverge from the way that most users in the project use contexts use IT artefacts. Consequently, these specific interface styles may in themselves draw attention to the installations. The aspect of interaction styles is interconnected with the element of surprise, which we consciously brought into play in all of the installations, *The Energy Floor* being the most radical example, and *The Gum Console* being somewhat more conventional. One noteworthy point of discussion in relation to making use of new interaction styles and elements of surprise as means of drawing attention to the installations is whether this type of fascination has a lasting effect. On the one hand, this concerns the time of use of the specific installations which varies from as little as ten seconds in the case of *The Gum Facade* and *Balder's Funeral Pyre* to 30 minutes in the case of *The Energy Table*. If the time of use is brief, the element of surprise will likely have a large impact on the users' experience of the installation. If the time of use is long, the element of surprise is likely to wear off, and the content of the installation in combination with the ways of interacting with is crucial to the users' experience. On the other hand, the fascination with new types of interfaces can be seen in a wider perspective, in that the interaction styles will inevitably lose their newness. We thus argue that in the long run it is not tenable to rely on innovative interaction styles alone, rather the interaction style and the content must constitute a meaningful whole for users.

	Content complexity	Prerequisite understanding	Importance of installation
Console	Medium	Required	Supplementary
Facade	Low	Nice to have	Peripheral
Fire	Low	Not required	Primary
Floor	Medium	Nice to have	Primary
Table	High	Required	Medium/High
Observation	Medium	Nice to have	Supplementary

Figure 10: Comparison of time of use, prerequisite understanding and importance of the installations

In the cases presented in this paper, the aspect of interaction styles is interrelated with the complexity of the content of the installations. Bodily interaction, as in the case of *The Gum Wall,* seems to suit content with low complexity, whereas high complexity is better suited to tangible interaction, as is the case with *The Energy Table*. We do not

argue that other installations may not succesfully combine complex content and bodily interaction.

The complexity of the content is tied to the importance of the installation and the prerequisite understanding of the interface that users have to have in order for their experience of the installation to be meaningful. In the cases of *The Gum Console* and the installations from the Danish Electricity Museum, understanding the interaction is crucial, whereas *Balder's Funeral Pyre* can be experienced without being at all aware of the interaction. In some cases, the installation on its own is the centrepiece of the experience, such as *The Energy Floor* and *The Energy Table*, whereas in other cases the installations are auxilliary to a larger totality of installations and surroundings, such as *The Gum Console* and *The Gum Facade*.

All of the installations in the three cases reported on in this paper seek to communicate core information to visitors that reflects the intentions identified early in the design processes. In the some cases, this information is minimal, eg. in the case of *Balder's Funeral Pyre*, whereas in other cases it is more extensive and complex, eg. in the case of *The Energy Table*. In the cases of installations that convey simple information, understanding the core information constitutes a small part of the experience, eg. in the case of Balder's funeral pyre, the installation seeks to immerse the visitor in flames and instil a solemn mood. These experiential qualities go beyond the core information conveyed by the installation, which could be formulated in one sentence: "Balder's body is engulfed in flames." In this way, the installations can be compared in terms of the balance we have strived for in the design process between core information and what we may call experiential qualities, as we have sketched in figure 11 with the core information in the centre of the circles relative to the surrounding experiential qualities.

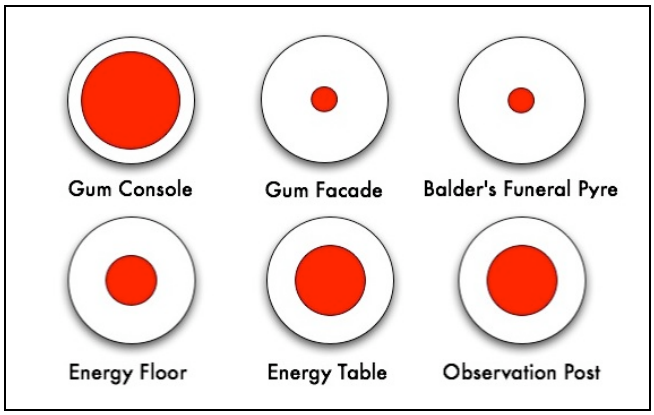

Figure 11: Comparison of core information and experiential qualities of the six case installations.

Whereas the experiential qualities are crucial for *Balder's Funeral Pyre*, the product and service information is key for The Gum Console on the other side of the spectrum. That is not to say that the core information is not important for Balder's Funeral Pyre, on the contrary it is vital for understanding the installation. Likewise, The Gum Console's core information is more extensive, but the experiential qualities are nevertheless important for the installation to serve its intended purpose. The figures are best understood as guiding lines when faced with design choices in the same way as the values and intentions established in each of the projects.

Intentions and Values

The values and intentions identified in the early part of each of the projects were essential in guiding the design of the installations. All of the installations to some extent share the common intention of attracting attention and fascinating users/spectators, and the value of supporting exploration in new ways. This is however accomplished in very different ways, as illustrated in figures 9 and 10.

The intentions driving the Gumlink project were realized in two distinctly different installations, in that *The Gum Wall* is meant to catch the attention of convention visitors, whereas The Gum Console provides introduction to services and products and serves as an unobtrusive entrance to the stand. For Gumlink, innovation is an important value, making them receptive to new kinds of interfaces, but professionalism is equally important. This clearly influenced the design of *The Gum Console*, which appears fairly traditional, yet utilizes a tangible form of interaction new to many convention visitors. *The Gum Wall* uses a bodily and playful mode of interaction. The installation is designed in this way to both attract visitors and to underline Gumlink's focus on technological innovation. To comply with the value of professionalism, the installation implemented in a visual style that does not break the overall appearance of the stand.

In the case of the design for *Balder's Funeral Pyre*, we sought to convey emotional qualities and a sense of slowness, which guided the design toward a subtle interaction with very simple content, the fire. During the design process, a more complex visualization, with dissolving imagery from Norse mythology, was discussed as an alternative that would stimulate children to play with the fire. A number of user tests of prototypes were carried with children in order to evaluate use patterns and the impact and impression of the installation. These tests made it clear that the more complex visualization would encourage playful interaction from visitors, whereas the simple version would result in a relatively passive and reflective usage. The established values of instilling a solemn mood and making room for reflection consequently made it clear that we should opt for the simple version of the installation.

The three installations designed for the Danish Electricity Museum all realize the intentions of providing information about energy and visualizing phenomena that are invisible to the naked eye, although in very ways. *The Energy Floor*

and *The Energy Table* most openly seek to fulfil the values of engaging visitors and instilling a sense of playfulness through bodily and tangible interface environements respectively. *The Augmented Observation Post* immediately gives off the impression of being rather conventional, but offers visitors an added bonus if they take a closer look at devices, buildings and the landscape. The three artefacts seek to fulfil the value of conveying to visitors the richness of existing museum artefacts, buildings and surroundings, either by inviting users to generate and use energy, or by visualizing hidden aspects of them.

Across the three design projects, we found ourselves using what may be called *anti-values* in our design discussions, ie. statements that reflect the opposite of the intended values for the installations. Altough we have not worked with anti-values in a systematic way, retrospective analyses indicate shared anti-values were formulated and referred to throughout many of the design processes. One example of an anti-value can be found in the case of Balder's Funeral Pyre, in which we deliberately steered clear of the anti-value "Spirited playfulness" since it would likely conflict with the solemn and reflective values that we aimed for.

CONCLUSIONS AND FUTURE WORK

In this paper we have presented six installations from three cases, which, from a process and product perspective, represent instances of what we identify as experience design. As indicated by the discussion in the first part of the article, and by the diversity of the six installations, which reflect a range of values, intentions and contexts of use, experience design as an emergent field of study is very broad.

Our approach to the experience design projects laid out in this paper is characterized by integrating not only knowledge about the user and the context of use, but also by taking into account intentions and values, together with technological possibilities. We have the distinction between intentions and values fruitful in design discussions and decisions, and we have furthermore observed that the defined intentions and values serve as common reference points between designers and industry partners throughout the design process. The six case installations are diverse and present a broad spectrum of experience-oriented interactive systems in terms of their potential use context and users, their interaction styles, content, and the intentions and values they are designed to convey. We have compared and discussed the interrelations between the content and interfaces of the installations.

In the specific cases, the intention and values constituted an underlying driving force throughout the process, and were eventually crystallized in each of the individual installations. We argue that interaction designers may use the values and intentions presented in the cases as inspiration for exploring and defining guiding principles in future experience design projects.

This being said, we lack a comprehensive framework and language for experience design in general and values in particular. Our work on defining values has been based on domain studies and discussion with industry partners. This may be expanded to include more ways of eliciting values and experiential phenomena from potential users, for example by emplying methods such as cultural probes [14]. A systematic approach to evaluating the experiential qualities of the installations is furthermore necessary for the approach to be comprehensive.

Although our approach springs from Participatory Design, it may be considered rather un-participatory from the perspective of prospective end-users. The realization of the intallations relied upon the acceptance of industry partners. End-users have had no final say in the definition of intentions and values, and affected the product development only cursorily through encounters such as prototype evaluations, usability testing etc. Since our approach differs from traditional Participatory Design on a number of counts, we cannot conclude whether or not Participatory Design is the better way to approach experience design. The cases have however led us to consider that studies of use domains and input from users alone do not constitute a comprehensive method for experience design. Pracitioners venturing into the field may need to supplement these understandings with insights from other fields, for example creative design approaches [29]. We intend to further explore these considerations in future experience design studies.

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