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DESIGN PROCESS OF A CONCEPTUAL INTERACTIVE ARTWORK

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Abstract: *The design process of artworks is generally considered to be nonlinear and incoherent, and there are few research papers available studying interactive artwork design processes. In this paper, a case study of such a design process is presented. Special consideration is given to the role of an engineer in a team designing an interactive artwork. Although the process was found to be very different from conventional engineering projects, traditional ideation methods were used in generating ideas for the artwork. It was also found that the role of the engineer is largely to guide the design process towards a feasible solution.*

Keywords: artist, user experience, product development.

1. INTRODUCTION

The artwork design process differs greatly from conventional engineering design processes. In conventional engineering projects the vision of the completed product or solution is highly technical including dimensioning and calculations. The focus lays in the “hard science”. One of the biggest goals of artwork in general is to provide the end user strong experiences and feelings. It is important to understand that in order to provide these unique, one-off experiences the focus has to be in understanding the end user behaviour. What generates strong feelings? How do people respond to different kinds of stimulations? The end user approach defines the guidelines on how to carry on with the technical aspect of the product.

The purpose of this paper is to present the design process of interactive elements related to an art concept, as a case study. Design processes of artworks are a relatively unrecognised subcategory, with few scientific articles available [1]. Some similarities may be found in computer science user interface design processes [2]. This may be due to each art project being more or less unique, requiring a specific approach. Therefore, a uniform design process for artworks is difficult to define.

The basis for this project is an art concept developed by artist Kim Simonsson. The concept is based around the character of a little girl named Emma.

Fig. 1. Kim Simonsson: Small Platinum Puddle Girl, edition 30, 2012-14

Presented in Fig. 1 is a previous art piece by Simonsson, which reflects the style of this concept. The new piece is to represent and advertise the Espoo Museum of Modern Art (EMMA), as well as function as a reminder of all the other cultural attractions in and around the Tapiola centre in Espoo. According to the artist, the feelings conveyed by the artwork should be "independence, playfulness, and positive anarchism" [3].

The goals for this design project are to create a number of interactive art elements to complete the concept of the artist and simultaneously investigate the interactive artwork design process characteristics. The elements must be linkable to the main sculpture and the overall concept. Their lifespan must withstand up to five years of operation within the museum.

2. DESIGN PROCESS

The first step to the design process was to define what the concept of the project was. The artist and the museum staff presented their first initial visions and thoughts regarding the concept and frequent meetings were then arranged to carry on with further discussions. Interaction between the authors, the artist and the museum staff at the opening stages of the process was important because artworks in general are often conceived somewhat abstract and ambiguous. The interaction ensured that the vision of the team regarding the art concept was similar to the vision of the artist. Notes were written of the meetings and shared with team members via a cloud service. Furthermore, the environment of the EMMA museum was explored and the background of the artist was researched. Studying the previous works of the artist enabled the team to have a more clear insight of the style of the artist and therefore enhanced the understanding between the team and the artist. A uniform vision was created.

According to the uniform vision of the interactive artwork concept, the created attractions should be interactive, playful, mysterious and cryptic. Also the childfully anarchistic nature of Emma was reckoned. Features of possible art elements, such as vision, hearing and feeling were considered and different ways to implement these features were investigated. Questions like "what triggers an intriguing effect" were debated. The EMMA museum itself was visited to observe what pieces of artwork draw the most attention and how guests moved and behaved in the museum. Potential locations for the attractions were also decided based on the observations of the museum space. "Ask 5 times why" method [4] was used in order to gain deeper understanding of how people react to certain kinds of stimuli. After all, getting hold on the experience of the user enables the designer to identify the key factors and causal connections between different emotions and their effects.

While ideating for possible attractions, conventional engineering methods were used, including the Diverge and Converge [5], and brainstorming methods. The goal was to exploit the best qualities of these traditional engineering tools while giving sufficient space for the artist and inspiration in order not to suffocate the creativeness. Additionally, the tools should not have been used to lower the abstractness of the subject, but to shape the abstract subject into something that can be worked with.

In the ideation process, 10 interactive artworks were generated and presented to the museum staff and the artist. From these, four were chosen to be developed further on. The decisions were made based on the feedback of the museum staff and the artist and on the view of the design team which attractions had the best qualities regarding to the uniform vision and the best technical conditions to be implemented. The focus then shifted to technical realisation and testing of the attractions. The chosen attractions were

Swing, Interactive Handprint, Shadow on the Wall and Peeking Figure.

CAD-models and prototypes of the attractions were made to ensure their functionalities. Finally, in order to assure that attractions create the wanted experiences to the viewers, they were tested. The final versions of the attractions were put into display in a public space, before eventually unveiling them in the museum. This way the team could test the effects of the attractions on the viewers in more scientific manner and complete final observations and adjustments.

3. OUTCOME

Four different attractions were developed, bearing in mind the underlying focus of understanding the end user experience.

3.1 Swing

One of the attractions is a swing that appears to be swinging on its own (Fig. 2). The swing is hanging from the ceiling in a place where it cannot be reached. The purpose of this attraction is to make the illusion of Emma swinging on the swing even though the viewer cannot physically see her. To support the illusion, the shadow of Emma swinging on the swing appears on the wall while the swing still remains empty. Although this attraction may seem frightening, this is not the intention. The aim is to create a positive and surprising experience to the viewer. The viewer can also link Swing to Emma after seeing this piece. Swing brings out the playful qualities of the personality of Emma.

3.2 Interactive handprint

Interactive Handprint replicates the drawings of Emma on the wall. The idea behind this artwork is to express the childishly anarchistic nature of Emma. Drawing on walls is generally conceived as forbidden but it is not uncommon to see a child drawing on a wall or to see a hand-drawn picture on the wall. Regardless of this being prohibited, it still happens and most adults can identify this phenomenon

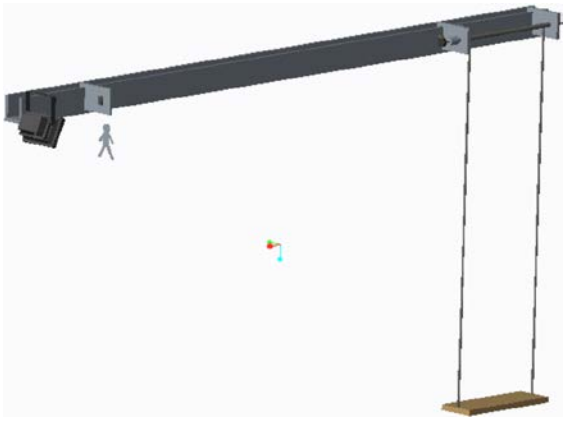

Fig. 2. CAD-model of Swing.

and relate to it. Additionally, depending on the current life situation of the viewer, this phenomenon can raise strong memories from either the own childhood of the viewer as a child or as a parent guiding their own children. Interactive Handprint may generate a very distinctive and private experience while its basic concept remains simple.

The basic concept in Interactive Handprint is that the visitor may gain a strong interactive contact with the concept, and may “paint” their own handprint on the wall for a short time. This is accomplished with a system that detects the hand movements of the visitor and uses the information to illuminate sections of the wall with coloured lights accordingly. This grants the viewer complete control and freedom over the colours and shapes shown, which in turn shifts the focus from the artwork being merely a solid object on the wall to a dynamic display of the creativeness of the viewer. Slowly dimming and variable colour lights add mysticism and an alluring effect to the artwork. This enhances the goal of the artist to create an intriguing and mysterious art concept.

3.3 Shadow on the Wall

Shadow on the Wall continues the theme set by the Swing. The purpose of the attraction is to project the shadow of Emma

to a blank wall near another art piece. The system senses a viewer stopping to look at the art piece, and after some time, the shadow appears on the wall. The effect is amplified by using sound. Another attraction to link the Emma figure to the museum, this piece also adds to the air of mystery created with the other elements. The sound effects are chosen so that the experience is not frightening, but positively surprising.

3.4 Peeking figure

Peeking Figure presents Emma peeking from behind a door. Emma appears when the viewer least expects it and then disappears when the viewer tries to approach the figure. To enhance the effect of this attraction, sound is added to the piece. The goal of this attraction is to create a mysterious experience to the viewer. Peeking figure appears only when the viewer is far away. This makes the viewer wonder where Emma has gone and why she is not appearing when the viewer approaches the figure.

3.5 Technical implementation

Interactivity of these attractions were created by sensing the surrounding environment and then performing an action according to the protocol. All of the attractions had this same baseline as working principle (Fig. 3). Sensing function was achieved by both passive (PIR) and active infrared (IR) reflection and also by sonar. Small micro controllers were used to carry out the processing of the data and controlling of the actuators. Small servos, direct current (DC) motor, solenoid and relays were used as actuators. Basic electronics like transistors and resistors were also utilised.

Building processes of each attraction consisted of design, prototyping and finalization phase. In design phase the working principles for each attraction were created. Prototyping phase was used to gain practical knowledge on working

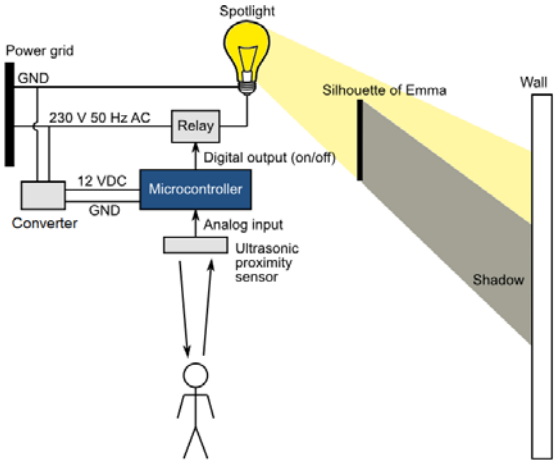

Fig. 3. Schematic of the Shadow on the wall attraction, which reflects the functionality of all attractions.

characteristics of each individual component i.e. sensitivity of IR transistor. Also decisions of how to accomplish minor details and functions were made. In finalization phase all attractions were tested for reliability and adjusted for final settings before ultimately unveiling them.

4. DISCUSSION

In more traditional engineering processes, the objectives and requirements of the final product are well-defined and very objective (required output force, voltage, speed etc.). When designing artwork however, the starting point is very abstract since it is, essentially, based on the imagination of the artist. Designing an interactive artwork nearly always requires some kind of mechanical and/or electronical design, which in turn requires the involvement of an engineer or such person with knowledge in those fields. The role that the engineer then must take in the design team is somewhat special. The engineer is probably the design team member with the best ability to understand the limitations and possibilities regarding the technical aspect of the artwork. It is therefore mostly their responsibility to guide the ideation towards a feasible design. However, this guidance should not restrict creativity, which can be a challenge. Also, in order to give this kind of guidance the engineer

must assume a leader position of some degree. The concept, however, belongs to the artist and therefore it can be difficult to determine who the leader of the project really is.

Generally in product design processes one of the most important steps is the evaluation of the result. In order to evaluate the result, clear objectives and requirements must have been set in the beginning of the project. It is then examined whether the result fulfils those objectives and requirements. One of the greatest challenges that emerged during this case was that since the initial concept was very abstract, objective evaluation of the end result was difficult. Instead, only subjective analysis could determine the success of the project. This evaluation mainly consisted of the opinions of the museum staff and the artist, as well as feedback from the visitors. In this process, the effects of the attractions on the viewers were tested before the final unveiling. This is not the common practice in art design.

Better understanding of processes like the one described helps participating in a design team with members from very different fields of study, and having insight into the inner workings of exceptional product development processes is an important tool for any engineer. In this paper, the authors have attempted to convey to the reader experiences and information on the design process of an interactive artwork. Since every artwork design process is mostly unique, further research of the topic could simply be conducted by examining more case studies. With multiple case studies available it would then be possible to start identifying common factors between the processes, and ultimately to create a methodology for engineers about working on artworks.

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