Designing Engaging Experiences with Children and Artists[1]

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The belief motivating the 4D Experience research programme is that the experience evoked by a computer system can be (at least) as important as the ostensible functionality of the system. In this report, we describe three case studies that explore the experiential approach to system development: Zap Scan, A Walk in the Wired Woods, and the Soundscape Workshops. In each case, we adopted a form of participatory design in which potential users and/or experienced artists were recruited into the development process. We discuss how the success of the resulting experiences might be explained by an underlying theoretical model and conclude with comments on the positive value of participatory design.

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[1] Funology: From Usability to Enjoyment, Kluwer, Spring 2003

1 Introduction

Product (and service) designers have long been concerned with the user's direct experience of their offerings, with ease-of-use often the primary design goal. However, we believe that the indirect experiences evoked by a product are at least as important to many users. For example, a comfortable bicycle seat is valued by most cyclists but the fun of speeding through the open country with good friends is more likely to motivate the purchase of a bicycle in the first place.

The 4D Experience project at Hewlett-Packard Laboratories is concerned with exploring experiences of this second kind, particularly in the context of ubiquitous and wearable computing. We ask two key questions:

- What constitutes a compelling consumer experience?
- How can we deliver such experiences through emerging computer technologies

Our research methodology combines technology development, experimental prototype deployments, and user research. In this chapter, we will sketch three attempts to develop systems that evoke engaging experiences in their users, review those exercises in the light of an underlying model of experience, and discuss the positive involvement of users and artists in the design process.

2 Zap Scan

Our first exercise involved the development of an exhibit for the Explore@Bristol hands-on science museum [1] intended to demonstrate that engaging, fun experiences can be made from everyday office technology. The resulting exhibit, Zap Scan, allows users to draw a picture with supplied paper and crayons, scan that picture (or anything else) through a one-button interface, and see the scanned image appear on digital picture frames on either side of a vertical screen. Separately, if they wish, they can move to a nearby print station, select their image on a touchscreen, enter their name, insert a pound coin, and produce a glossy greetings card with their image on the front and their name on the back. Figure 1 shows Zap Scan in place at Explore.

Figure 1. Zap Scan deployed at Explore@Bristol

Zap Scan was targeted at children aged between 3 and12, many of whom were recruited in a multi-stage, participatory design process as users, testers, and informants [2, 3]. At the outset of the project, we visited Explore to understand the environment, observe visitors, and review operational matters with staff. Based on these early observations and our previous research in image sharing, we chose a concept and value proposition – electronic display of scanned drawings – that would appeal to children in this age range. Then at various stages of development, we solicited input from the potential users as follows (see figure 2):

- Pre-school children at a local play scheme helped to test the concept using a standard display, scanner and printer
- Older children at a local primary school explored user interaction, flow and timing issues with an integrated prototype
- Children at a local junior school provided feedback on the overall system behaviour and appeal.

Figure 2. Testing the Zap Scan concept and prototypes

The completed exhibit was deployed in April 2001. Despite (or because of) its deliberately simple functionality, Zap Scan has turned out to be very popular. For example, nearly thirty thousand images were scanned between April and October 2001, and between 17 and 37 cards were printed each day of the summer holidays. Users often spend a considerable time working on their drawings. Parents sit beside their children watching them draw or joining in themselves. Friends sit together and share in the excitement of seeing each other's drawings on the digital picture frames. Young children nudge their friends and point excitedly when a picture appears. Children also gaze in anticipation into the printer and watch the cards appear bit by bit.

So, lots of people, usually children, had lots of fun using a computer-based exhibit that actually did very little. What they seemed to enjoy was the act of drawing, social interaction, the joy of seeing their creative work on public display, and the attractive cards. In the later discussion, we will begin to explore why this might be so.

3 A Walk in the Wired Woods

A Walk in the Wired Woods is an art installation in which an exhibition of woodland photographs is augmented by a digital soundscape. Equipped with headphones connected to a small shoulder bag, visitors typically spend around twenty minutes wandering around the exhibition, viewing the photographs and listening to audio pieces chosen to enhance the images (see figure 3). The particular sounds heard by a visitor at any point are determined automatically by a small computer system in the bag that monitors the visitor's location within the exhibition space [4, 5]. For example, when standing close to certain photographs, a visitor might hear atmospheric music fitting the scenes depicted. As she moves on to other images, the music might be replaced by natural woodland sounds, or by a spoken fragment of woodland mythology. The overall effect is of a situated soundscape that might be characterized as "what you hear is where you are".

Figure 3. Images of A Walk in the Wired Woods

The content for the installation was developed in parallel with the underlying wearable computing technology with the deliberate intention of allowing each to influence the other. We formed a multi-disciplinary design team with artist Liz Milner and musician Armin Elsaesser to explore both what might be done with this new technology and how it might be achieved. This resulted in a number of possible technology enhancements, some of which were incorporated into the installation. For example, as it became clear that different soundscapes would require different audio characteristics such as mixing, looping, and fading with distance, we developed a HTML-like mark up language for specifying the behaviour of the visitor's wearable client with respect to particular content [4].

The completed installation, incorporating around thirty pieces of situated audio, was deployed in the atrium in the atrium of the Hewlett-Packard Laboratories building in Bristol in the early part of 2002 [6]. During it's residency it was visited by several hundred people from a variety of backgrounds whose responses were overwhelmingly positive. Of course, the high quality of the photographs and music contributed significantly to this outcome, However, most visitors reported that the extra dimension added by the contextual juxtaposition of the two media adds significant further value. A simple ranking exercise revealed that more visitors likened the exhibition to a walk in the woods (something that it attempts to evoke but really is not) than to a museum tour (something that it really is) [4]. This reinforces our belief that it is possible to create a convincing and compelling experience with the kind of mobile technology that we can expect to become pervasive over the next ten years. Moreover, our own experience of the design process confirms our belief in the power of collaboration with artists to drive innovation in both technology and content.

4 Soundscape Workshops

In the Zap Scan exercise, children played the roles of user, tester, and informant, while the Walk in the Wired Woods explored the use of creative practitioners as full partners in the design process. Recently, we put those two elements together in a pair of workshops in which children were invited to take on the lead design role in the creation of digital soundscapes. The participants were 11 to 12 year old children drawn from two local secondary schools.

The first workshop involved ten pupils from John Cabot Technology College in Bristol and ran over two consecutive days. Pupils were first introduced to the technology, the idea of the soundscapes, the authoring tools, and the process of production. Then they were divided into working pairs and let loose. Each pair was assigned an adult enabler who encouraged, helped and observed but did not interfere with the creative process. At the end of the workshop, the pairs had produced five diverse soundscapes:

- a trip to the beach that starts with sounds of the car journey and ends with the sounds of sea surf and happy play
- a tiger cub riddle where audio clues were distributed along a visually marked path
- music from different parts of the world
- a walk-around radio station with different kinds of music in different areas
- a game to match flags from different nations to the appropriate music and sounds of that country.

Though these did not have the depth of professional works, they were a lot of fun and showed creativity, technical proficiency and hard work. One interesting aspect was that all five pairs had to use the same physical space for their soundscapes, leading to negotiations over physical props or visual signs that were used to anchor pieces of audio (see figure 4). It also forced the technical team to provide mechanisms for navigating between multiple digital soundscapes occupying a given space.

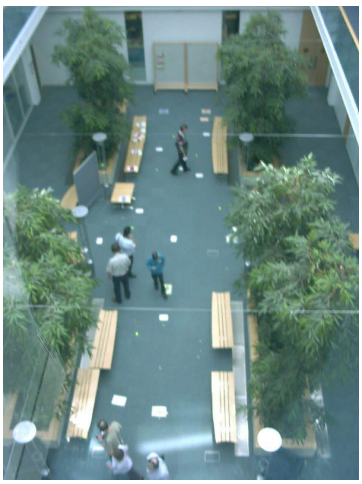

Figure 4. Pupils from John Cabot creating a soundscape

The second workshop, involving pupils from St Gregory's school in Bath followed a similar structure except that the two days of the workshop were separated by a week to allow time to explore design ideas and prepare materials. In particular, the participants spent two afternoons in school working with an artist in residence. The result was a single design based on a haunted house that involved hand painted props, a tent and a video loop (see figure 5). The second day of the workshop was spent implementing as much of the design as possible in the time available. Again, the end result was imaginative and rich with content, and the workshop as a whole was considered a success by the participants and visiting staff.

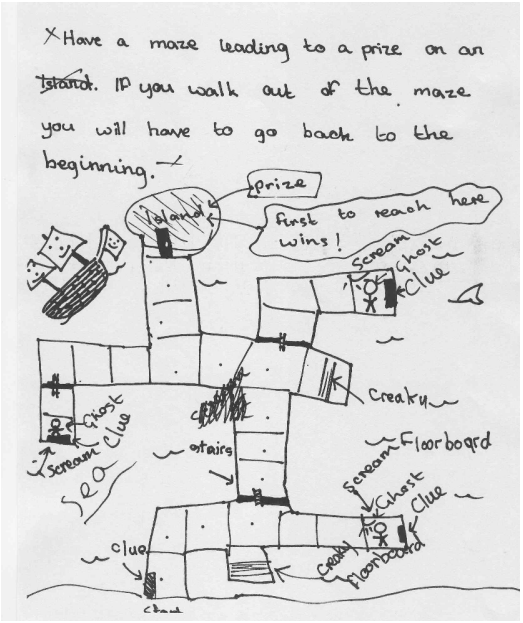

Figure 5. Plan of the St Gregory's soundscape

The workshops confirmed that children are capable of adapting quickly to new technologies and creating novel and engaging applications. They are able to respond to the responsibility of the design partner role with ingenuity, creativity, and enthusiasm. On the other hand, both groups tended to produce soundscapes that had echoes of the examples that had been used to introduce them to the technology, though this may simply reflect the severe time pressure under which they worked. The pupils seemed very engaged in the design process and very satisfied with what they produced.

5 Discussion

The exercises demonstrate that it is possible to deliver engaging experiences through systems with only simple functionality. We can begin to explain the positive responses of their users through the model of experience shown in figure 6.

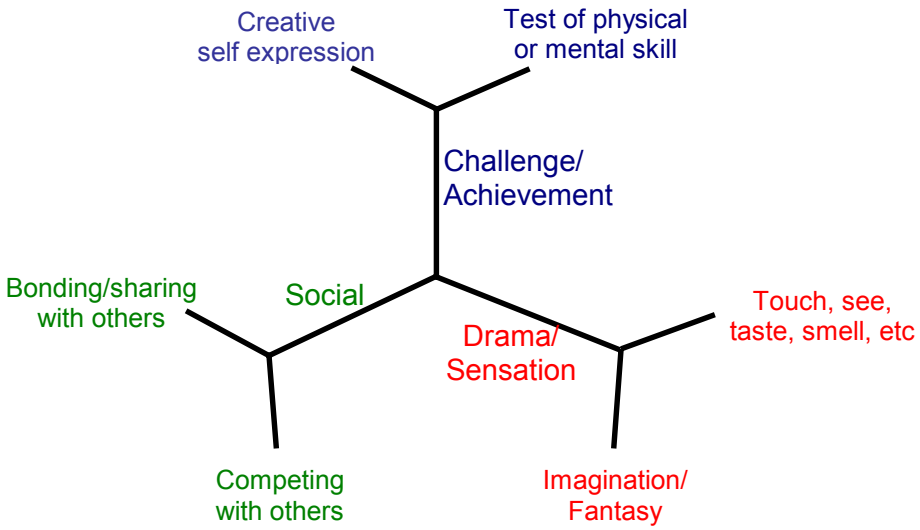

Figure 6. A provisional model of consumer experience

The model is the result of a study at the Explore@Bristol science museum in which we observed visitors interacting with the exhibits and explored their responses through discussion groups, interviews and questionnaires [7]. It attempts to unpack the nature of engaging experiences by identifying three key dimensions that are likely to play a role in those experiences:

- Challenge, achievement and self-expression
- Social interaction, including bonding, sharing and competing with others
- Drama and sensation, including stimulating sights, smells and sounds, and other cues that trigger the imagination

The model is inevitably partial and provisional, but we can begin to use it to interpret the success of our prototypes in terms of the elements that they provide. Our hypothesis is that experiences that contain some mix of these dimensions *will* be engaging. For example, Zap

Scan scores highly on the social dimension as users congregate around the drawing area and display, and also provides an opportunity for self expression. In contrast, the Walk in the Woods emphasizes the Drama/Sensation dimension by stimulating the visitor's senses and imagination through music, sounds, images and narrative. Moreover, the exercises suggest that emphasizing a single dimension may be sufficient to engender a good experience, although some recent work based on a desert island soundscape suggests that adding a second dimension (challenge) to an experience with a strong single dimension (sensation) can further enhance that experience [8].

The exercises also illustrate different types of user participation in the design process. Zap Scan is the most conventional example, with primary and pre-school age children playing the roles of user, tester and informant [2]. Their input helped to confirm our belief in the value proposition of the system, and refine its presentation and operation. Overall, we consider that Zap Scan confirms the value of participatory design as espoused by many over the last two decades. Furthermore, one of the children was responsible for the exhibit's cool name, which was far better than any of the technical team's suggestions!

The Walk in the Wired Woods exercise was motivated by a desire to discover what artists would make of *and* with wearable computing technology. We work with artists because they tend to be imaginative, creative, demanding, meticulous, and extreme users of technology who are used to asking what-if questions. Given this perspective, we encouraged the artists to act as full design partners of both the experience *and* the underlying technology. Naturally, the artists tended to have more influence on the content, and the technical team on the technology, but both elements of the design clearly benefited from the collaboration. The participation of the artists ensured that the resulting installation was fascinating and that the technology evolved appropriately.

The children's workshops enrolled secondary school age children as full design partners, again to see what they would make of and with new technology. In this case, we provided prototype wearable computing technology, tools and training but left the experience design activity completely to the children. Naturally, the resulting experiences lacked some of the depth of more experienced practitioners, but the systems they managed to produce in a few hours were a great testimony to their creativity and application. The main result from our perspective is that it does seem possible that users will be able to create their own contexts for experiences using this technology much as people create their own websites today. This is crucial if the emerging technology is to be rapidly adopted and shaped towards its eventual meaning and value.

In conclusion, then, we believe that the exercises show that compelling consumer experiences can be evoked through applications of computing technology, that it is possible to model experiences in such a way as to inform their development, and that the involvement of users and creative practitioners in the design process greatly increases the likelihood of success.

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