A British HCI Group one-day meeting on

"COMPUTERS AND FUN 3"

held on Wednesday 13th December 2000

The Huntingdon Room, King's Manor

University of York

Despite the best efforts of Railtrack and the weather, an enthusiastic band of fun researchers met in York for the third meeting in this series. The first paper was by Peter Wright and Tim Marsh from the University of York with John McCarthy from University College Cork. Entitled "From Usability to User Experience", it explored the notion of the user experience, a key issue in the study of fun. Our hearts went out to Clare Dorman who had travelled all the way from the Technical University of Denmark, in appalling weather, only to get stuck at King's Cross station. You can read her abstract on the use of humour in electronic commerce in the pages that follow.

Norman Alm and Dave O'Mara from the University of Dundee told us about their experiments with activities that could be fun for people with dementia. This part of the elderly population have very little short term memory. The games described utilised spared long term memories to provide joint activities for carers and patients.

Janet Read and co-author Stuart MacFarlane have been developing rating scales for assessing the fun had by children. Renn Scott's presentation put all the others to shame, as one would expect from an author from the Royal College of Art. Her imaginative design concept was a wearable device to provide music according to the wearer's mood. John Mateer, a film producer, analysed what makes for successful television entertainment. Mark Allen brought along a large bag of interactive toys and the remainder of the afternoon was punctuated with the chatter of Furbees and Buzzlightyear. His paper with Blue Ramsay outlined a study he is currently carrying out in a primary school with these toys. Lydia Plowman and Rosemary Luckin are about to start a similar project in Stirling and Sussex. Rosemary was unavoidably detained at King's Cross but Lydia was able to tell us something about the way they conceptualised the issues.

Each delegate had been asked to bring along an object that symbolised some element of fun. These were used as a final entertainment before we adjourned to the pub. Working in groups the objects were utilised to elicit constructs in a Kelly Grid. There was a surprising degree of agreement. Passive fun versus active fun turned up more than once as a dimension as did various attempts at formulating a construct corresponding to how "intimate" or "personal" the fun is.

My thanks: to my co-organisers, Steve Emmott, Marc Hassenzahl and Rachel Murphy; all the people who reviewed abstracts, and the delegates who braved the elements on that December day. I hope to see you all at Computers and Fun 4 next year.

Andrew Monk

From Usability to User Experience

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In collaboration with Siegelgale

Since the inception of Human-computer interaction as a design discipline, the principle approach to understanding quality of interaction has been through the concept of usability, its definition and measurement. Despite the obvious success of this approach to understanding quality of interaction, new technologies and application areas present challenges to this way of analysing and evaluating human interaction with computers.

User experience has recently become a popular term to capture concerns for a more wholistic view of user interaction. There have been a number of recent papers addressing this issue, but this work has not yet led to a coherent framework or set of analytical tools for analysing user experience.

In this talk we wish to ask some fundamental questions about the nature of user experience. Taking Dewey's pragmatist aesthetics as our starting point, we look towards a diverse literature from media, arts and human sciences for inspiration concerning how we might talk about user experience. Our research takes us to Laurel' s work on HCI as Theatre as a natural starting point. She attempts to bring a new way of looking at the interaction of people and computers based on drama theory and identifies *engagement* as a form of user experience in which emotional and intellectual components both play a part. We also visit Boorstin's work on Hollywood movie making. He identifies three ways of experiencing film which open up spaces for talking about visceral, emotional and intellectual experience. We visit Csikszentmihalyi's work on *flow* in sports and games in which he has identified the characteristics of optimal experience in these activities. Finally, we visit Dewey and Jackson's work on *art as experience.* They have identified characteristics which differentiate experience from what they refer to as *an experience.* Despite the diversity of this research, a core set of constructs can be discerned. In this talk we will present our first attempt at distilling those concepts.

First of all we begin by identifying four *foundational elements* for talking about experience. These elements are not divisible independent factors- an experience cannot be without one of its elements. Rather it is constituted by the interplay of them. The emotional element of experience is that which engenders an experience with attributes such as joy, and frustration. The sensual element of experience is concerned with our physiological response to a setting that we variously term thrill, excitement and so on. The compositional element constitutes that which is concerned with the structure of action possibilities and likely outcomes as well as explanations of agency and action. Finally all experience has a spatio-temporal element. Actions and events unfold in a time and space that is both material and virtual.

Secondly, we introduce a way of talking about the *form* of experience. We conceive of experience not as static but as a dynamic form, and the interplay of elements create this form. Firstly we acknowledge that even if the experience is novel, we do not come ‘cold’ to it. Rather we always have some anticipation. For the compositional element this anticipation may be some expectation of what will happen. Secondly, when a setting connects with our senses we

generate some response, pre-conceptually. For the sensual element this first connection might engender an immediate sense of apprehension or perhaps the thrill of newness. Our third component of experiential form is concerned with giving meaning to an experience. For the compositional and emotional elements this involves understanding the action possibilities, what has happened and what is likely to happen. Our fourth component is concerned with reflecting on the experience as it unfolds. Do we notice a sense of progress or movement towards completion? Do we have any sense of fulfilment? Our fifth component is concerned with assimilation. We assimilate an experience by relating it to our sense of self and our personal history and our expected future. In assimilating the sensual element of an experience it may have been just another 'white knuckle ride' or it may have taken us to new heights or allowed us to experience altogether different sensations. Finally when we re-count our experiences to others or self we imbue the experience with certain values. This re-counting of experience shapes our and other's willingness to re-engage in similar experiences.

In our talk, these concepts will be illustrated by everyday examples and 'troublesome' interactions. In collaboration with Siegelgale our research funders, our next step is to further develop and refine this way of understanding user experience so that it can be applied it to an e-commerce case study and to users' experience of brand.

Engaging consumers, using humour in electronic commerce

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Fun consists of elements of humour, chuckles, delight, ecstasy, gags, gaiety, happiness, jests, jokes, joy, laughter, merriment, mirth, play, pleasantries, quips, and witticism, etc.

Consumers are confronted with millions of commercial web pages and hundreds of sites selling identical products. They often face endless rows of products that are, at the least, not very pleasing, nor tempting or conductive to purchase. Boredom is as big a threat in electronic commerce as in advertising. Humour is proposed as a solution to these problems, as a technique to design fun sites and create a pleasant consumer's experience.

Laughter and humour can improve a person's ability to learn and to recall. Humour opens the pathways to more creative thinking and decision making (Miller, 1996). The most enduring property of humour is its ability to create a pleasant feeling or sensation. In marketing, communicators employ humour to encapsulate their views into memorable phrases or short anecdotes. Humour also serves to build support by identifying communicators with their audiences, enhancing the speaker's credibility and building group cohesiveness.

Examples of humour usage have also been found in electronic commerce, such as Joe Boxer, Kilroy and Hothothot (Dormann, 2000). Joe Boxer (www.joeboxer.com) is a promotional site for underwear, based on humorous and provoking messages. Kilroy (www.kilroytravels.com), a student travel agency illustrated its slogan "Go before its too late, for young people under 26 and students under 33", by depicting a male character going through the infant stage to vigorous and active adulthood (21-27) to a decrepit character (at 33). Humour is effective in arousing attention. Humorous pages are thought to blend pleasure and persuasion by providing an aesthetic reward

to the audience, that is, enjoyment of the page itself thus creating an enhanced experience.

There are many ways of creating humorous communication. Examples are found in the field of persuasion with techniques like caricature, pun, or irony or alternatively, in the field of visual comedy. In fact, humour mechanisms have been summarised as incongruity and rhetorical irony (cognitive), arousal-safety (affective) and disparagement (social), (Meyer, 2000).

It is reasonable to expect that not all types of humour will be suitable for electronic commerce. Moreover, from the study of the advertising literature we can also anticipate that individual differences in personality and gender as well as products classes will affect humour effectiveness (Fugate, 1998). Thus in order to learn to use humour effectively, we need to develop a situated framework that will take into account all issues related to humour such as a taxonomy of humour, functions of humour and factors affecting humorous communication, designing a humorous experience, evaluating humour effectiveness and emotional usability.

It is hoped, in this paper, to answer some of these issues, especially regarding the design of humorous experience and raise directions for future research. It is also expected that knowledge gathered within the proposed framework could also be applicable to other areas of web communication including distance learning and, information management.

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Having fun with dementia

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Dementia, which involves the loss of short term memory in elderly people, is a very serious problem for the person and for their family and carers. Severe dementia rules out most social activities and interactions, since these depend on a working short term memory for effective participation.

If the continual experience of people with dementia is one of failure at performing tasks, and of relatives and carers being curt or exasperated with them for reasons which they do not understand, it is not surprising that people with dementia often become restless and agitated.

One of the serious dangers people with dementia experience arises from wandering, and the need to wander can be triggered by a general sense of anxiety and an impulse to find somewhere to feel safe and relaxed.

While efforts to find a cure for dementia continue, it is important and useful to be able to ameliorate its effects as far as possible, both for the person concerned, and for their family members, who may eventually be forced to give up caring for them because of the inability to cope with their relative's unrelieved anxious states.

Thus it is worthwhile to ameliorate the person's distress, frustration, fear, and also it would be valuable to give them fun: enjoyable, relaxing, empowering experiences, where that is possible. Finding ways to accomplish this will be difficult, given the lack of a short-term memory, and the incapacity this causes to take part in structured activity. However, it may be possible to make use of developing computer technologies to enable a person with dementia to capitalise on any remaining abilities and to once again be able to successfully have enjoyable experiences.

Reminiscence is a useful starting point for this effort, since it can make use of the person's remaining long-term memory. The usual way of providing a reminiscence experience is to create a scrapbook of photos and other memorabilia, and use audio and video tapes. It is difficult to exploit these materials as successfully as they might be, given their separate formats, and, in the case of tapes, the serial nature of the way the material is held. Providing a multimedia reminiscence experience might give the user a more engaging, immersive, and pleasant experience. A structure that allowed multiple paths through the material would help keeping the carer's interest in the activity. There could also be the possibility of bringing in a wide variety of material from the WWW. Such a system could act as a conversation prop, by provided the structure to allow an interaction to proceed, rather than just going around in repetitive circles. We have developed and evaluated a number of prototypes to explore what will make a multi-media reminiscence system work successfully. The evaluation of our prototypes has underlined the need for an extremely simple interface, the grouping of various media items by topic, and has highlighted some limitations of the use of video. The items which thus far have provoked the most fun have been songs, which encourage user to sing along with them.

Another way in which computer technology could help people with dementia to regain the experience of having fun is through games designed to be playable by someone with no short term memory. Work done in the U.S. has demonstrated that a board game based on reminiscence produced a decrease in agitation and an improvement in mood. The game is non-competitive, but provides an interactional structure that helps people with dementia to enjoy themselves, and enables family members to be able to spend time interestingly and pleasurably with them. We have developed a prototype computer-based game for people with dementia based on a quiz format. Pictures, sounds, and videos from the past are shown and the player is invited to identify them from a short menu of possibilities. No penalties are given for wrong guesses and correct guesses are rewarded. In trying this game out in practice, we found that it worked best in fact as a group experience, with the computer screen projected onto the wall. Playing in a group meant that the correct identification came up almost every time, with the group all taking part, and helping each other out. It is difficult to find activities for people with dementia which produce an enjoyable group interaction, so this was a particularly welcome outcome.

The multimedia reminiscence 'scrapbook' and the reminiscence game are actually two aspects of the same idea : providing a structure for interaction, which partially replaces the person's lost ability (short -term memory) while taking advantage of their intact abilities (long-term memory, being able to participate in a familiar activity or a game). The purposes served by such technical assistance will vary, but having fun, and thereby interacting enjoyably with

others again is certainly an important goal for such assistive technology.

Measuring Fun – usability testing for children

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This paper considers the ways in which fun can be defined, measured and justified as a reliable usability measure for the evaluation of interfaces for young children. Children differ significantly from adults in their cognitive and perceptual skills, suggesting that evaluation techniques which work for adults, may not work as well for children. Microsoft researchers (Hanna et al., 1997) have published guidelines for usability testing with children, but these are quite general and fail to address specific issues about the metrics which can be used.

Satisfaction and Fun

This paper is concerned with that branch of usability testing known as 'satisfaction measuring'. Adults have become used to the idea of 'satisfaction'; it is a concept that they can relate to, suggesting that things are okay. This 'okayness' can be measured by observations and questionnaires. It is not surprising that 'Very satisfied' is used on Likert scales to refer to the best that one can get. As adults, we use the word fun cautiously, almost apologetically, believing it to be something we ought not to have. Watching children in a school classroom, it soon becomes evident that 'satisfaction' is not a good enough word for what they are experiencing. Fun is something that children know about; they are experts. They experience it; therefore they can talk about it, describing it as excitement, play, laughter, and feeling good.

Fun Attributes

We wanted to measure the responses of children aged between 6 and 10 to a range of novel interfaces for text entry. It was decided to focus on three key 'Fun attributes'; these were defined as, expectations, engagement and endurability.

To measure expectations a repertory grid test (Fransella and Bannister, 1977) was used before and after the activity. This used pictures, and enabled us to measure the effect the activity had on the child's prior and subsequent perception of it. This also enabled us to establish how much desire there was on the part of the children to return to this task. During the task, observations of facial expressions, utterances and body language were used to establish a measure for engagement, and after the task, the children themselves were asked to rate the interface using a Likert type scale as developed by (Risden et al., 1997), using a smiley face vertical funmeter. A week after the task, children were asked to recall the activity. It was hoped that this would give some indication of how memorable the activity had been. This gave an endurability score which was a measure of the impact of the experience. It was noted that children were likely to remember both a very good and a very bad experience, and this was taken into account.

Having established this test mechanism, we are now investigating how the three fun attributes correlate with the child's own measure of fun as registered on the funmeter.

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the automated emotional DJ

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Downloading music through the internet has become incredibly popular. Technology has provided people with the ability to obtain and listen to music they previously couldn't acquire. However, this technology hasn't really improved the experience of listening to music, and in some ways is inferior to the way we have listened to music in the past. We could even say that listening to music isn't as fun as it used to be.

There are various online applications that exist today to download music, however none give the illusion of being "personalized". Radio stations today are limited to being one genre of music, however, no person enjoys the same music all of the time. The goal of this conceptual project, entitled the "automated emotional DJs" is to provide people music according to their mood.

issues/problems/opportunities confronted

With the automated emotional DJ project I wanted to explore if it was possible to create a radio system that could be initiate station and music selections purely by voice and sound. It was key that the interaction lead to the user believing that he was choosing a station according to his or her mood. This seems to be possible. However for advanced users, and for a richer user experience, the development of a product in which the system could live proved to be an alternate and I believe overall a better approach for all users.

The biggest issue was how to define the choice of moods. A system can monitor Anger, Fear, Sadness, Disgust, Happiness, and Surprise. However, the stations were not best defined by these descriptions. People considered emotions differently than moods, and when asked why they listen to music, for the most part they would say they choose a station according to how they wanted to feel. All said that many times they listen to music to change their mood. For the most part agreed that there would be up to 6 different types of moods they may want to feel, and that one additional station; "Background", would be ideal as many times they just wanted music to listen to that wouldn't interfere with what they were doing.

People say they identify with stations that they like based on a DJ personality. Due to this each mood station has be assigned a DJ. The DJ names has been determined by the most popular keywords that people used to describe the types of moods they are in when they want to listen to music. The default number of stations is that of 6 moods, with one additional 'Background' which all users that was an ideal addition as in many cases you only play music in the background while you are doing something else. This created an opportunity to further develop the mental model of the radio.. The DJ gives the system a personality that the user can identify with, and serves as the agent – a modular system that acts on behalf of the user. The DJ is what provides the system with information about the user, answers questions about the user, and negotiates on behalf of the user.

what I did and why

Seven scenarios were designed around 2 focuses

1. Initial Set-up – Introduction to the system, Create My Stations, Choose a DJ

2. How the System Learns – Help Mode, Training the System, Training the User, the Personified Interface

The second scenario focuses on the needs and expectations of an experience user. As well, it shows how the system can approximate the mood and suggest music accordingly. This time in addition to voice and sound, images of the user show the experience of using the system. The user is listening to the system's suggested station while wearing the 'emotional DJ coat' through earphones inserted on the ends of the hood strings. The wrist, elbow, shoulder and next area have sensors encased in the fabric which monitor the body data changing the coat's underlying color according to the user's mood. The 'emotional DJ radio' attached to the coat's zipper, is where the microphone that receives the user's voice commands.

As users become more experienced, they will want to be able to cut through the interface to complete common tasks more quickly. The radio device itself can be used for the most common commands, as is also for quick access to mood stations, and for re-setting the system in the case of the mood being read incorrectly (i.e. the user could be running across the street to catch a bus, the system may think the user is stressed and suggest music accordingly, the re-set button allows the user to over-ride the system, setting it back to the desired mood).

As the overall goal was to provide music according the mood, the expert user needed to be defined quite well in order to make sure the user model was designed appropriately. To help with the definition of the user model, I designed a questionnaire that each user would fill out before tuning-in for the first time. This would allow the system to set up the default stations most appropriate for each individual. As well, I designed a quick access user guide, which represents itself currently as the coat's tag.

Access hours to the system are 24 hours a day, 7 days a week. Due to this, within the second scenario I wanted to show how the system has the ability to analyze tasks. The system can locate, sort, and store song information, and make any routine decisions. For example, if the user is always depressed, and constantly asks to be more 'happier', the system will play messages reminding the user of this desire. In some ways, the user may even begin to rely on the radio as a self-help system and therefore be more motivated to use it.

conclusion and iteration

Review and discussions of the first two scenarios led to the following conclusions:
- It appears that moods would be considered weak combinations of basic emotions
- It is difficult to sense fine gradations since the signals would probably be weaker than for strong emotions
- It is more productive to find ways to help the user to perceive body factors (like heartbeat) having a relation to mood, and to easily express commands or reactions
- The DJ coat and body sensors are more convincing than a purely voice activated interface

Ladies and Gentleman, Boys and Girls, Children of All Ages:
Multiple Layers of Fun in Entertainment

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An essential tenant in designing any type of entertainment application is to know the target audience – their needs, their wants and their expectations. Successful feature film, television and theatre producers have an accurate understanding of how the audience will experience their work. As technologies evolve and computers play an ever-growing role in all types of entertainment, programming and application design specialists need to gain a similar level of audience knowledge. Traditionally this targeting has been achieved by framing an experience around established narrative conventions taking advantage of the audience's understanding and expectations for a given genre (e.g., first person conventions in shoot-em-up computer games, third person conventions in passive television programmes, etc.). In each case, the notion of the *protagonist* is central, be it a game show contestant in a television show, a hero in a feature film or a user in a computer game. Concepts such as *stakes* (the risk involved with a protagonist's actions), *rooting factor* (the ability for the audience to cheer for or against the protagonist), *empathy* (the ability for the audience to identify with the protagonist) and *landmarking* (the means by which an audience can keep track of the physical and / or emotional path of the protagonist) are all vital in the success of both fiction and non-fiction programmes. Likewise, they are equally important for designers to consider in the creation of next-generation computer-based entertainment applications. I explore these issues as they pertain to both conventional and new media programmes, as well as the ideas of *cueing*, *real-world correspondence* and *presence* as well as the tradeoffs between *story and experience*, *story and technology* and *story and game play*. I will also explore the concept of a *universal demographic* in creating entertainment applications and the critical factors in tailoring audience experiences. Beyond interactive versions of conventional programmes, new media technologies are also enabling producers to explore uncharted territory by blurring the boundaries between traditional narrative constructs and develop completely new types of experiences. I examine new approaches to television programme design involving interactive technologies where audience genre knowledge and expectations are being treated in innovative ways in attempts to engage users on multiple levels. Several examples from cutting-edge projects, including my work on a groundbreaking virtual reality based broadcast television series, and recent shows such as Fox Family's *Paranoia*, Channel 5's *Jailbreak*, Channel 4's *Wanted* and Endemol's *Big Brother* serve as indicators of how traditional experiences are being modified, combined and reformed to create new types of entertainment involving computers. Whilst these can seem fresh and exciting to audiences, the methodology behind many of them is often a clever reworking of age-old presentation ideas. As interactive technologies mature, show formats such as these will grow increasingly more complex, placing a heavier reliance on user input and control. Commercial pressures and the increasing cost of development also have an impact on the manner in which new applications are being developed. I conclude by discussing emerging trends in mass-market product design and potential implications for both traditional and computer-based media. I then pose questions concerning the evolution of media-based experiences, how producers are changing audience expectations and knowledge of genre and other areas that would benefit from further exploration.

An Initial Investigation of Tangible Interfaces in Smart Toys

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This paper reviews current research in the field of haptics in Smart toys, and a preliminary study of children at play using existing toys. The term 'haptic' is defined as 'relating to the sense of touch', and is finding increased use in the field of Tangible User Interfaces (TUI).

One of the most important things a child can do is play. Play is an essential joy of childhood and is the way children learn about themselves, their environment and people around them. Play is defined as a pleasurable, voluntary activity that involves much repetition and variation as the child explores possible activities, actions and results [1]. Toys have been shown to aid the development of mental problem solving [2], enabling a child to move to higher levels of thought as he/she plays in a stimulating environment.

Smart toys can be defined as toys that leverage computing power. This includes toys that connect to a PC (Personal Computer) and toys that contain sophisticated sensors and electronic circuitry to enhance play [1]. Recent Smart Toys include Furby, Shelby, Poo-Chi, Interactive Yoda, Interactive Barney and Me Barbie. In Smart toys most of the design and development has gone into the visuals, audio and electronics; there is little evidence of haptic design. The sense of touch and its ability to produce pleasure and fun appears to have been overlooked.

The sense of touch plays a major role in the development of cognition and social interactions [3]. Touch can be construed as the most reliable of the sensory modalities. When senses conflict, touch is usually the ultimate arbiter [4]. Research [5] has shown that the sense of touch, with stimulus training, can be made more acute due to the neural plasticity of the somatosensory cortex [6][7]. Haptics have been researched for accuracy, for example, of tactile stimulation identification [8] and as a means of data input/output, but little research has focussed on pleasure and fun.

The step from kindergarten to early-elementary classrooms coincides with a tendency to move away from manipulative materials to advanced and abstract concepts. The MIT Media Lab [9] have extended the successful concept of manipulative learning by using *digital-manipulatives*, computer based systems. This has enabled children to continue pleasurable learning with the kindergarten approach through school and indeed their entire lives, and helped young children learn concepts that were previously considered too advanced [10].

Our preliminary study commenced in September 2000 and is primarily video based. A group of 20 children aged five to nine years old have been observed during free play at an after school club. The experimental group were given toys with varying degrees of electronic interactivity. Seven hours of video evidence was collated followed by a structured but informal question session involving 14 of the children and their teacher. During this study three observations were made: the children tended not to interact haptically with the toys, but rather remotely; secondly, a disparity was found between the child's favourite toy and the one they found most haptically simulating; and thirdly, it was observed that the children do not discover the full functionality of the toys.

The expected effect encountered during the study was the inevitable qualitative nature of the experiment, as a large number of variables are present; this is likely not to produce statistically significant results. Conventional reduction of the variables would control the task to such an extent that the child isn't playing any more, and as a result all external validity of the study has been lost. For this reason our initial work in this area will be qualitative rather than

quantitative.

This has led us to believe that it is necessary to define the operational variables for playability and pleasure-based toy design. As a first step we are considering creating a taxonomy of children's exploratory procedures as they play with various interactive toys in various games. The protocol would cover the issues of improved motor skills; counting and cognitive skills; reasoning about physical objects; social skills; self image; and, of course, fun!

The ultimate objective of this research is to improve the cognitive value of smart objects. This in turn may promote creative play and the continued use of manipulative learning by utilising the primary skill of direct locomotion / manipulation, touch and natural feedback.

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Exploring interactivity with smart toys

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The toys that are the focus of our study appear like traditional soft toys but are 'smart' in the sense that they can respond to a child squeezing their hand or wristwatch by asking questions, playing games or demonstrating an activity. Typically, they have a vocabulary of about 4000 words. But what distinguishes them from toys such as Furbies is that the toy can be used in conjunction with compatible software on a computer that has a special transmitter. In this mode the toy's vocabulary increases and it can guide the child, commenting on their interaction with the software and offering support.

These toys provide a new form of interface: one which is not televisual or text-based, does not use a desktop metaphor and does not rely on a keyboard or mouse input. Used in conjunction with a computer with a traditional interface there is a three-way interaction between the child(ren), toy and computer that has not yet been explored in any detail and prompts fundamental questions such as 'what is interactivity?' and 'what is an interface?' We are particularly interested in the ways in which the child's interactions are mediated by a toy that can take the place of a teacher, parent or friend. This has enormous potential for the future development of educational software, as well as the 'edutainment' market where the toys are currently positioned, but there are also ethical dimensions to be taken into account. Do children attribute human intelligence and emotions to the toys because they appear able to talk and act? What effect does that have on their behaviour? How do they perceive the differences between these toys and other dolls and soft toys they play with?

We will consider some of these questions in our forthcoming project (funded by the EPSRC/ESRC PACCIT (People at the Centre of Communication and Information Technology) Programme) and we will also discuss a small-scale pilot study that informed its design. This pilot study was conducted as part of a software design and evaluation course run during Spring 1999. Groups of Masters students were set the challenge of exploring the possibilities offered by novel interfaces such as those provided by smart toys. One group developed a small software application designed to encourage pairs of young language learners to engage in conversation. The children were asked to help an on-line screen character called Wodjit put various objects in his bag as part of a game that involved identification, recognition and guessing activities. They had to complete drag and drop activities and were encouraged by a stuffed toy called 'Owly'. This was nothing more sophisticated than a soft toy with a microphone inside it tethered to a computer.

An initial empirical study of teachers' and children's reactions was encouraging. The children expressed considerable delight at the presence of a toy that 'spoke' to them while they used the computer and were certainly motivated to talk to each other about and with Owly. In addition to the motivation and enjoyment revealed in children's interactions, something of an unforeseen success was seen in children's

motivation to keep a game score for Owly as well as for themselves. The fact that the toy was connected to the computer by a wire did not stop children from picking him up and giving him a cuddle. There were also unexpected issues raised by our method of implementation. The subject matter of the software required a focus on aural interaction between the children as they discussed which object to place in Wodjit1s bag. Owly had no gesturing capabilities and whilst this had been seen as a disadvantage of a low-tech prototype the conclusion of teachers and researchers was that gesturing could well have been a distraction to the desired mode of interaction. This finding suggests that there may be advantages to developing smart toys that have less sophisticated functionality than that displayed by Actimates such as Arthur. Whilst this was a small exploratory study with a low-tech prototype the results were encouraging with respect to children's acceptance and enjoyment of Owly.

There has been other interesting work in the area of children and electronic toys but it has mainly focused on design methodologies and implementation. Much of the existing literature on toys that can communicate with a computer has emanated from the Microsoft research laboratories but Microsoft are currently the main producers of these toys. We intend to construct an explanatory framework of new forms of interaction and mediation engendered by smart toys in their social, cultural, emotional and ethical contexts and to analyse how to create positive emotional and cognitive engagement.

Abstracts - Posters

Designing a virtual fridge

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Is your fridge a pristine expanse of white enamel, or is it covered in multi-coloured magnets, photographs, postcards and notes? As Norman discovered several years ago, the fridge phenomenon is global and anecdotal evidence suggests it is common across cultural and social groups.

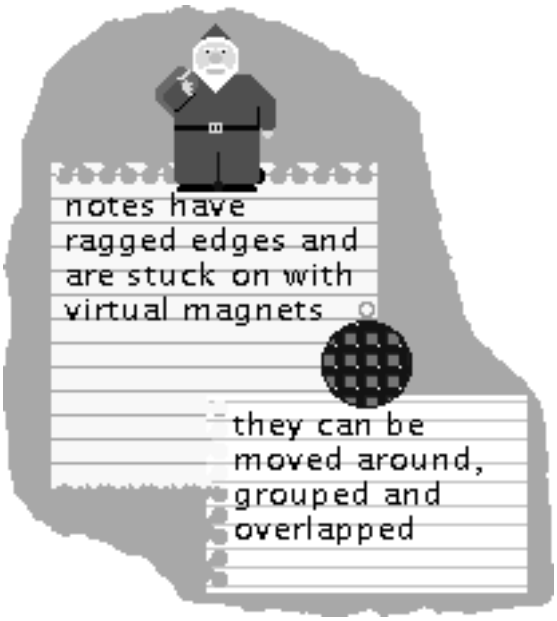
Appliance manufacturers are aware of the power of the fridge, incorporating wireless networking and splash proof LCD screens into fridge doors. Soon it will be possible to email, surf the net and control the microwave from the fridge – yes you won't have to walk across the kitchen!

Over the last 18 months there has been an explosion of web-based communication services aimed at families and informal groups (e.g. Yahoo clubs, Adobe eCircles). However, the majority of these simply take 1960's bulletin board technology (originally designed by technologists for technologists), add a few graphics and label themselves a family area.

Virtual Fridge (vfridge) is a commercial web service designed for informal communication and sharing amongst families, school children, and groups of friends. In contrast to the externally structured, text-oriented, hierarchical bulletin-board, vfridge instead takes the metaphor of the fridge giving users a shared 2D surface on the Internet where they can stick notes, photos etc. with 'magnets'. This builds on experience over many years (e.g. Xerox Whiteboards, York Conferencer), that given 2D shared surfaces, users create their own structures using the intrinsic affordances of space (overlapping, grouping, alignment).

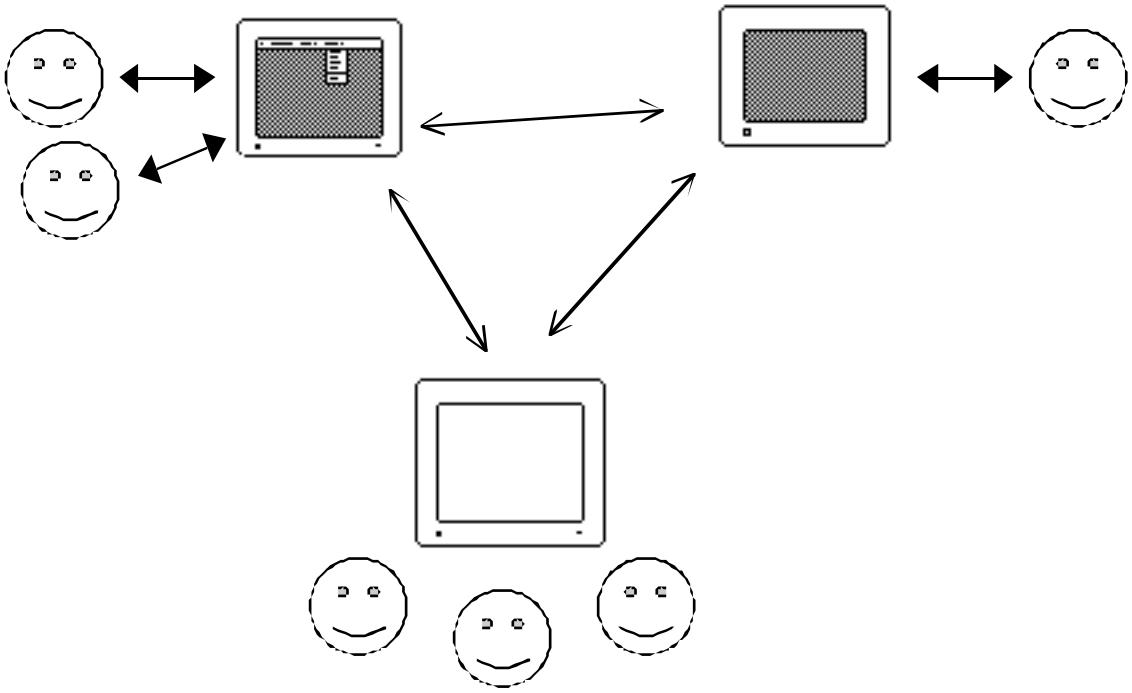
Of course the crucial thing about vfridge is that it is fun. Little Tommy in Taunton can decorate his vfridge, fuzzy-felt style, and then Granny in Glasgow can see what he's done. And not just little Tommy, grown computer scientists given a palette of Christmas magnets have been known to densely decorate a fridge with mini-Santas!

The fridge metaphor sets high standards: how do you achieve the fluidity of physical human-fridge interaction, when all you have is a web interface!! We haven't solved all the problems yet, but where we have succeeded, the mastery is in the detail. One example is the mechanism used to generate torn off notes in a variety of styles. Another is the user authentication mechanism.



Most distributed groupware uses the model of individual users interacting with individual computers (remote meeting room systems are an exception). However, if you watch a family using standard 'family' web software something different happens, two or three people hang over the screen at the same time. When Ann claims the keyboard from Jane, one of two things happen: you may see messages of the form "This says its from Jane, but it's really Ann.", or, alternatively, Ann logs out, logs in

again as herself, navigates to the appropriate message board and then enters her message ... then when Jane wants to say something ... For chat systems the latter is particularly



families work several to a computer
vfridge allows multiple simultaneous logins at the same machine

disconcerting for the remote participants as all they see is a system message saying "Jane has left."!!

vfridge allows multiple simultaneous users with fast swapping of the 'current user'. It recognises that we are moving from a one-man-and-his-computer world to one where multiple people (of all genders and ages) interact with multiple devices in different locations.

vfridge is part of a broader perspective that the Internet can be used as a medium for sharing. This is in sharp contrast to the publish and consume model of traditional web pages. This demands the creation of private but commonly owned spaces for open and closed groups. vfridge is one such space, an early homestead in the claiming of cyberspace for the masses.

virtual fridge can be found at: http://www.vfridge.com/

It is currently in final devlopment, but if you would like to try out pre-release versions please contact Alan <alan@vfridge.com>

Fun, work and affective computing: can psychophysiology measure fun?

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This poster explores issues in the relationship between human psychophysiology, computers and fun.

It has periodically been suggested that human psychophysiology can help in evaluating software usability [1, 2]. Phenomena such as skin conductivity, heart activity, blood pressure, respiration rate, eye movements and electrical activities in muscle and brain have long been known to vary in response to mental events. These phenomena are both involuntary and surprisingly sensitive, and could therefore be useful in recognising occurrences of mental effort, frustration or fun experienced during human-computer interaction.

There is however a problem. Whilst there is no doubt that psychophysiological responses to mental events do take place, or that they can be observed, it is not clear to what extent they can distinguish between different kinds of mental events. On the one hand the literature is rich in studies in which psychophysiology has been used as a measure of mental workload [3], thereby indicating when users are having to work hard, say, to overcome usability problems. On the other hand, other researchers have used psychophysiology as a measure of emotional response [4], thereby indicating when users are experiencing, say, stress or frustration brought about by usability problems. This second approach might also help indicate positive emotions such as fun. Obviously we do not need complex psychophysiological measurements to identify strong reactions of frustration or fun, but they might help us detect subtle events leading up to strong emotional reactions.

Often mental workload and emotion are simply two different sides of the same coin, reflecting emotions that occur along with the expenditure of effort. But there are circumstances in which emotion and mental effort are not concurrent, e.g. as illustrated by the classic experiment in which the same film is shown with different narratives of different emotional emphasis [5]. This gives us difficulties if we wish to use human psychophysiology as a measure of fun. How would we know whether we were measuring positive emotion such as fun, negative emotion such as frustration, or mental workload?

Taken together, the concepts of mental workload and emotion may provide a useful perspective on the fun element in IT products. Different genres would appear to require users' to engage in mental workload and emotion to different degrees in different combinations. Users of office software would seem to be required to achieve high workload with low levels of emotion. Some games might demand high workload and generate high levels of emotion. Promotional web sites might involve low workload but aim to evoke strong positive feelings about particular products. Learning Technology seems to need to encourage high workload with medium levels of emotion as a motivator. These things will all vary according to individual differences and circumstances. The fun element of some games may be attributable directly to the effort involved. Many hobbyist web sites evidence considerable effort, presumably for fun. Users of office software might experience pleasure on completing a difficult task One persons' fun is anothers' hard work.

If psychophysiology is to be of help in measuring fun, then it would be helpful to be able to distinguish between emotion and mental workload. Recent projects suggest this is possible. Studies of electrical activity in facial muscles have found that some muscles respond to workload but not to emotional stimuli, whilst in others the converse seems true [6]. The MIT

Affective Computing Project claims an 88% success rate in discriminating between 3 different emotions through the combined analysis of 5 different physiological readings [7].

Whilst the above ideas have been applied in research into software usability, mental workload and performance in safety critical situations, they rarely seem to have been related to the concept of enjoyment in IT products. How this might proceed is as yet unclear. We need to develop paradigms for research in this area.

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