Emotion-Centred Design

A Human Factors Approach in Affective Web Design

A Thesis for Fulfilment of a
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Abstract

This thesis hypothesised that a major factor in the failure of many e-Commerce ventures was the lack of emotion imparted into the design, with trust barriers still being to the fore, and a lack of affective human factors like fun, pleasure and joy in the user experience. The human brain often acts emotionally before rationally and this affects initial reactions to experiences and the propensity to purchase online. A key to understanding human-computer communication is that form should follow emotion (as well as function).

A wide range of design concepts and theories are analysed for linkages to human emotion due to the exploratory nature of this thesis. Aspects of New Media design such as video, sound, images, colour and virtual reality are covered along with previous research into affective human factors; transferability of emotional elements from other products; and the importance of trust and prevention of negative emotions. Case examples are provided throughout via screenshots and commentary, including a special section on the way that the Nike site has met many emotional design criteria.

Research into the opinions of designers and users is undertaken via questionnaires to verify literary findings and measure views on emotional appeal within Websites. It was found that there are misunderstandings of human-computer communication – with designers not meeting user expectations in some areas, even though many designers agree that emotional design is important. In particular, there needs to be a better understanding of how to integrate fun, social contact, colour, trust and sound into designs.

Emotion is core to human function, and evolution has seen the emotional parts of the brain grow long before rational areas arose. Given the importance of emotion it is only natural that an emphasis should be placed on it in design philosophies. Whilst some designers are realising the importance of this in consumer products this concept needs to be further emphasised in the world of e-Commerce. Designers surveyed in this thesis were nearly all following a form follows function or a subjective/intuitive design philosophy. However, it was found that there was a good level of support (70%) for emotional design. A gap was established from this fact because only 45% believe they are currently using a high level of emotional design in practice. Chi-square tests showed that there were a number of significant relationships between the level of education and other questionnaire variables such as the importance of colour and recontextualising from car and game design.

Establishing trust helps to overcome the core human emotion of fear. Branding, seals of approval and high quality navigation are amongst the elements that can assist in bridging human-computer distrust. Predispositions and previous experiences can also affect initial trust values. Questionnaire results found that designers still believe that lack of trust is a major psychological barrier to purchasing online. Major

trust dimensions from previous empirical research were all deemed important. It was also found that users and designers rated trust near the top of emotional themes to concentrate on in Web design.

Negative emotions (anger and frustration) can also arise if the design is not inherently usable. Usability was the top-rating design theme amongst designers. There has to be a good balance between the rational and emotional sides. Further negative emotions can be evoked if the site is slow or if there are delays. Speed of loading was amongst the top emotional design elements for both users and designers. It is a difficult line for designers to tread – on one hand using speed to prevent negative emotions, but on the other hand balancing the need for other design elements that generate positive emotions through fun and pleasure characteristics (that might slow things down).

Designers involved in this study were very much in agreement with the importance of choosing colours to match the emotions they wanted to evoke in visitors (based on understandings of colour-emotion stereotypes and 'temperatures'). Colour can achieve harmonious interactions or cause rejection by the human brain depending on its application. The survey of users revealed that almost half of the respondents counted colour in their top 5 emotional themes, whereas designers did not think it was as important as other emotive dimensions.

Different cultures may respond differently to metaphorical images, colours, and dimensions such as power-distance and masculinity. Nearly all designers believed that empathising with target users (a part of emotional intelligence) was very important, as was involving users in the design process (user-centred design). Only 50% of users felt that designers were respecting their demographics and culture, so there is still a large number of people who feel they could be more satisfied in this sense. It is proposed that more user testing be carried out in conjunction with frameworks that rate cultural dimensions based on target audiences.

The use of video and streaming media was portrayed to be a proposition requiring careful consideration and application by previous non-empirical references. Streaming video can connect with people on an emotional level, bringing in a degree of surprise and variation, and fully highlight the appealing characteristics of the product(s) trying to be sold online. Other New Media technologies such as virtual reality (VR) and 3D have been around for quite awhile (in computer games and scientific applications) but are yet to achieve widespread usage in Website e-Commerce. Some literature is against the use of VR and 3D on the Web but several companies have been receiving accolades in this area because of the ability to bridge an emotional gap between brands and consumers. Questionnaire results showed that most design respondents did not think streaming media, 3D and VR were important in order to gain emotional connections. However, higher bandwidth speeds that will facilitate more use of streaming media and 3D are deemed favourable by designers in terms of increasing emotional appeal.

The need for social contact, familiarity and recognition of expressions and gestures led to the proposition of using virtual shop assistants and agents. Contact in the form of live text chat can also fulfil some social needs and plays a big part in portraying trustworthiness since a real person is being interacted with. Designers surveyed in this study were reasonably evenly distributed amongst those in favour, unsure and in disagreement with the use of agents. Surprisingly, given that users would not have had much exposure to virtual agents and characters online, they actually deemed them amongst the highest rating emotional design elements – creating a gap between user expectations and designer actions.

Resources revealed that sound can account for a large part of an overall experience. Sound creates mood and atmosphere, and is present in the physical retail environment. Although literature stresses the importance of sound to Web design, designers in this study were of quite the opposite view. Sound was not deemed to be an important experience (near the bottom of ranked emotional dimensions). Users, however, rated sound amongst the middle group of emotional elements. More use of sound is an opportunity for the future.

Two broad product ranges – automobiles and computer games – were investigated to see what made them such emotion-centred items. Cars and games evoke feelings of pleasure, fun, flow and fantasy because of their design. Designers favoured interactivity, colour use and fun as gaming elements best applied to Web design. More than half of designer respondents believed that the design of cars and games can be recontextualised into Web design, and most users were definitely in favour of seeing emotional elements they like about cars and games placed into Websites.

Dimensions and potential mechanisms for measuring or assessing the emotional intelligence of Websites are proposed, and these include the use of semantic maps to position and compare Websites based on their performance against dimensions such as fun, warmth, trustworthiness, use of colour and the ability to engage users on a social level. The capability of building emotion into a Website is then balanced with the need for high-quality navigation, functionality and usability – as poor efforts in these 'rational' areas can lead to negative emotions and distrust. The design also has to keep in line with the demands of the company wanting the Website built.

This study was exploratory – with the aim of bringing out into the open some aspects of New Media e-Commerce design that could be better utilised in order to match the emotions and feelings of customers – potentially leading to higher degrees of sales success. This thesis is therefore hoped to be a catalyst for further study in this area.

Acknowledgements

As a professional in the Information Technology (IT) industry one must learn to live with change and constantly be open to new ideas and ways of thinking. Given my initial interest in IT, design and psychology, the concept of applying emotional design to e-Commerce and Websites was an endeavour that changed the way I think about software design in a lot of respects. Research in this area is relatively challenging and new, and so I was delighted to obtain help and support from a large number of people, without whom this thesis would not have been possible.

Over 70 people were involved in surveys with Web designers and users. Thanks must be passed to all respondents because of the high response rate and for setting aside the time to complete the surveys – leading to the collection of extremely valuable and rich data.

A number of workplace colleagues, friends and family members were involved in proof-reading questionnaires and other aspects of this thesis. Their help was very much appreciated.

My supervisor Professor Leong Yap (Massey University) was very supportive of this thesis – providing invaluable direction, logic and guidance throughout the duration of study. My horizons and understandings of design concepts has grown remarkably under the supervision of Leong, enabling me to create a Master of Philosophy thesis that was design-centred, even though it incorporated previous experience in business management and technology.

Grateful acknowledgement must also go to WestpacTrust. As a relatively new employee I was delighted that they had the vision to provide financial support and show real interest in the topic of study. This support made life a lot easier when combining the pressures of full-time employment and study.

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1. Introduction

This thesis examines the need for e-Commerce site design to take into account the emotions of visitors in order to succeed in sales. The Web is very important to the infrastructure of today's business world. With the extra complexity of information and globalisation factors, any design aspect that can increase the level of response to commerce efforts must be seen as extremely valuable. The premise of this thesis is that there are major benefits to business through using emotion-centred design. A focus on the psychological needs of humans when interacting with computers creates benefits for all – more profits and more satisfied customers.

With an increased focus on emotional factors in current literature, much can be taken and applied to all aspects of life – including that of e-Commerce design. One reason for failed e-Commerce ventures and poor customer conversion rates is likely to be the complete functional/rational thinking behind design – with a failure to realise that humans are emotional and seek pleasure and gratification. Purchasing decisions are often emotional as well as just rational. Fun and pleasure elements of design should come to the fore. While functional design can not be forgotten, it should be supplemented with emotional design.

This thesis covers a wide variety of design aspects that can be related to emotion – correctly using New Media, soothing fears and distrust, reapplying traditional shopping aspects that appeal to emotions, and recontextualising affective human factors research in consumer product design. While a major proportion of this thesis is dedicated to literary, academic and business references, original research is undertaken with designers and users to verify literary statements and examine any misunderstandings or opportunities.

As a good analogy for the direction of this paper, the design of the iMac computer range, which embodies fun colours, desire, expression, and biomimicry can be used – but reapplying these notions in terms of Web software design, complemented by other psychological factors such as relieving distrust and frustration.

fig 1.1 Apple iMac – an example of emotional appeal in a consumer product, gaining popularity through desire and the user's need for expression

1.1 Research Questions

The aim of this research was to discover if more emotion-centred design aspects are appropriate for e-Commerce, and if so, reveal which elements should be concentrated on. In particular, the main research questions were:

- How can e-Commerce be better designed to meet customers on an emotional and psychological level; increasing the probability of sales?
- What are the characteristics of an emotion-centred Web design?
- What do literature and designers think about emotion-centred design? How does this differ from what users perceive they are receiving? Is there a misunderstanding of the human-computer interaction?
- What framework can be used for assessing emotion-centred design (ECD)?

1.2 Thesis Overview

This thesis consists of six chapters. A summary of each chapter is presented below:

Chapter 1	**Introduction**
	This chapter reveals the direction of the thesis, main questions and aims, and the structure of the thesis document.
Chapter 2	**Literature**
	An in-depth analysis of literature is undertaken with the goals of highlighting thematic aspects of emotional design, critiquing previous empirical research, and presenting pictorial case studies of products and Websites that have elements of emotion-centred design.
Chapter 3	**Research Methodology**
	This section outlines the detailed methods used in this thesis to grow on previous research and further answer the research questions at hand.
Chapter 4	**Results and Analysis**
	Results of surveys undertaken with designers and users are displayed in the form of charts, statistics and initial analytical commentary.
Chapter 5	**Discussion**
	Themes identified throughout this thesis are summarised – drawing conclusions from the comparison of literary and survey findings. Implications for future research are proposed.

Chapter 6	**Conclusion**
	Summations of the current state of affairs with emotional design are provided, along with recommendations for future research in this area based on the platform built within this thesis. The degree to which each research question has been answered is revealed.
	References
	A list of academic, literary, business, and Web-based sources of material cited within this thesis.
	Appendices
	Copies of the user and designer questionnaires used to collect data.

2. Literature

2.1 E-Commerce Issues & Definition

E-Commerce embodies a concept for doing business online (Business Town, 2001). E-Commerce often refers to purchases from online stores on the Web, otherwise knows as e-Commerce Websites. They may also be referred to as 'virtual-stores' or 'Cyber stores'. E-Commerce can be business-to-business (B to B) or business-to-consumer (B to C).

ITS (2000) defines e-Commerce as a way of doing real-time business transactions via telecommunications networks, when the customer and the merchant are in different geographical places. It is a broad concept that includes virtual browsing of goods for sale and the payment methods.

For the purpose of this thesis, e-Commerce will be restricted to the purchasing of goods and services via interaction with Websites – with a focus on the New Media side rather than the payment systems themselves.

The aim of e-Commerce according to Oki (2000) is the "creation of a balanced new society." This situation and its related elements are laid out below in figure 2.1.1. This thesis looks at some of these elements (like speed and trust) but also brings in the missing design characteristics that evoke positive emotions.

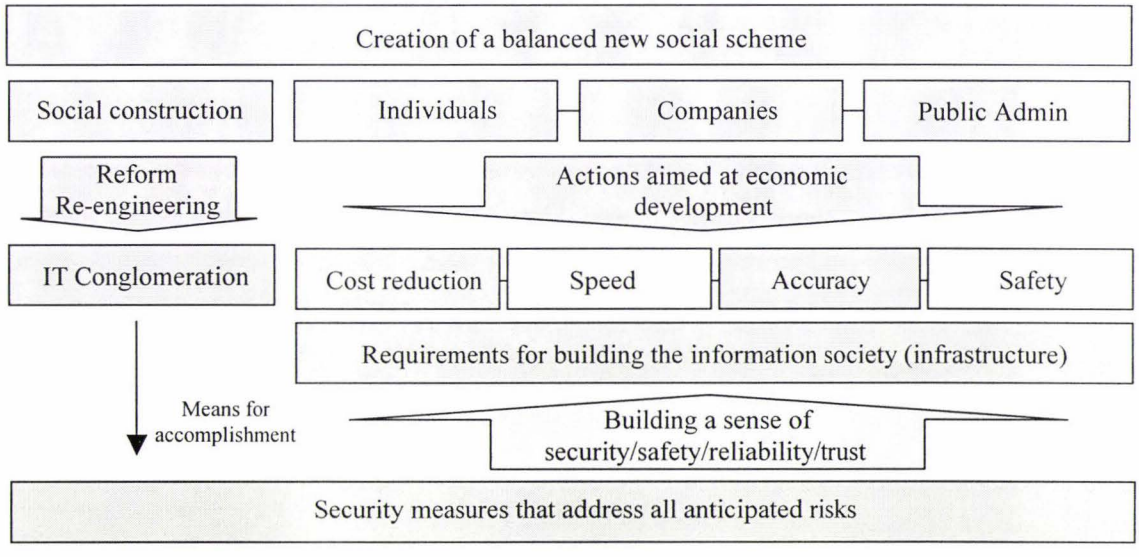


fig 2.1.1 The aim of e-Commerce derived from Oki (2000)

The concept of e-Commerce is all about using the Internet to do business better and faster. It is about giving customers controlled access to computer systems and letting people serve themselves. The

premise of this thesis is that for this to happen profitably and successfully the Website visitors must be met with an interaction that has been designed to excite the users emotionally. Elements such as fun and colour should be encountered, while also relieving potential negative emotions surrounding concerns about overall security.

2.1.1 Web Statistics and Missed Opportunities

There is a myriad of sources on Web statistics available for Europe and the USA and they seem to get out of date very quickly. For example, Spurgeon (1999) states that in 1998 retail sales over the Internet represented about 5% of all sales. It was 3% in 1997 (with every 1% shift representing $27 billion). Caselle (2000) looks at e-Commerce statistics from a UK perspective. 581 million pounds were spent online in 1999, and it was predicted that spending on the Internet and interactive TV will be 7.4 billion pounds by 2004. More recent references like Co-Comp (2001) cite an IDC Research estimate for UK Web-surfers to be just under 20 million, and that the number of worldwide Internet users could reach one billion by 2005. Further bold predictions are cited which state that the European Internet economy could reach one trillion dollars by 2004. Statistics from Shop.org (2001) reveal that there was a 35.6 percent growth in online sales in the USA from March/April 2000 to 2001 – with over half of this growth attributed to the popularity of online travel (up 58.5% to one billion dollars), while clothing and apparel jumped 122.3% to $368 million.

While all of these statistics sound fantastic, other statistics reveal the extent of missed opportunity out there on the Internet. Gordon (2001) cites statistics that 75% of customers abandon their online shopping cart without making a purchase and that 27% of Web transactions are abandoned at the payment screen. Poor user experience fuels these bad statistics. Now that consumers have been exposed to some sites that work well, they have considerably less tolerance for inferior sites. Even companies with smaller budgets can still have a site with a great user experience. Simple things like explaining fulfilment options and procedures can make all the difference (as we'll see in section 2.4 on trust).

Interesting Internet figures on gender must also be taken in by designers. Horrocks (2001) cites Ernst and Young research that outside of the USA, 66% of online purchasers are men, with over 80% being men in Spain, Germany and France. These European figures are supported by Caselle (2000) – stating 72% of online shoppers in the UK are men. Horricks (2001) goes on to show the situation is quite different in the USA (60% women) and an even ratio in countries like Australia and Canada. This creates design issues across genders and cultures. Knowing the demographics of the likely site visitor helps in designing the experience to better meet their expectations. These concepts will therefore be covered in more detail later in this thesis.

The Forrester Online Retail Index (Forrester, 2001) measures online shopping based on data collected from Internet shoppers. The monthly index is based on 5,000 responses to an online survey fielded by Greenfield Online. Growth of online purchases in 2000 was substantial, as was the beginning of 2001,

but as figure 2.1.2 shows, it seems to have slowed down more recently (lower than 2000) – perhaps linked to the overall American economy. Such downturns point to the need for further understanding how to engage customers and entice them to buy.

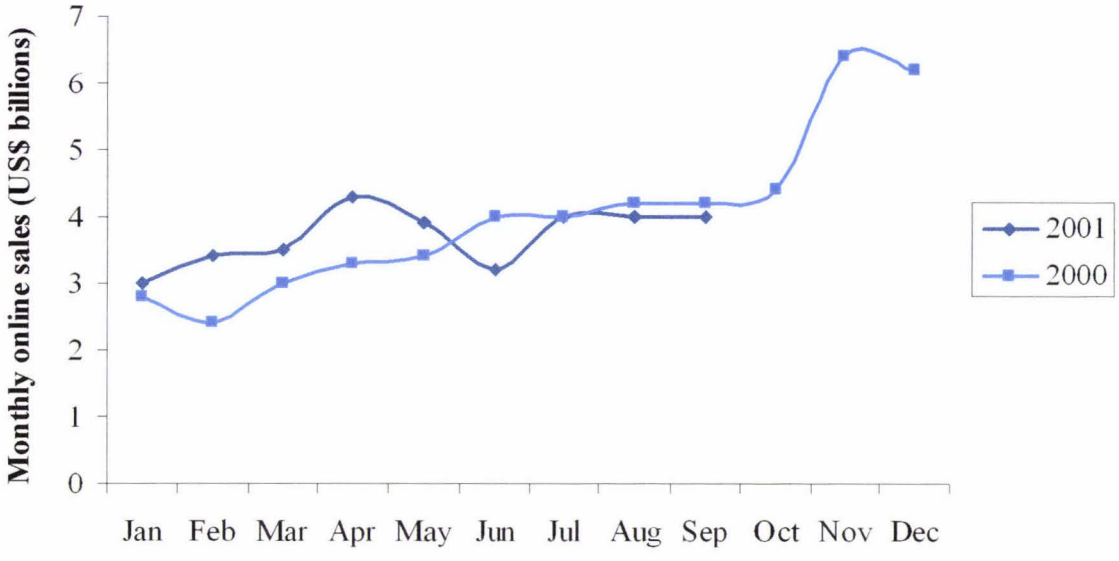


fig 2.1.2 The Forrester Online Retail Index

E-Commerce and the use of the Internet are changing every aspect of a consumers choice on products ranging from home entertainment through to personal finance. It is reshaping the global economy (Cantu et al, 2000). Even though there are massive amounts of business being conducted on the Internet, many e-Commerce ventures are failing, and dot.com stocks have taken recent dives. Nicholas (2001) reports that the sector's downturn has claimed at least 2,000 Australian jobs since June 2000. 1,500 Internet jobs have been lost in Asia and 8,329 in the US since November 2000. Even with e-Commerce ventures that are doing well and going forward, the main problem seems to be that people come to the site and browse, but very rarely do they actually buy. Supporting Gordon (2001), Gantenbeim (2000) states that 75% of all Internet shoppers abandon their trip before purchasing anything. This is because of fears around security and/or an unsatisfactory user experience leading up to the purchase stage.

2.1.2 Popular Products

The order of popularity of online purchases (Caselle, 2000; Horrocks, 2001; ePrairie, n.d.) from most to least is books through to cars. The most popular things people buy online are books, music and video, clothing, travel, computer supplies, flowers and gifts, toys, electronics, and fitness equipment. Common characteristics of these products that make them good sellers are:

- the product is well known (brand);
- there is little or no variance depending on where it was purchased;
- product texture and smell and taste are not essential to the purchase decision;
- they are highly specified products (specifications are easily shown).

It is currently difficult to sell products online if:

- it is a new untried product;
- the purchase is highly subjective or *emotional*;
- touch, smell and other senses are essential;
- the item is expensive.

GVU's Tenth WWW User Survey conducted in October 1998 (GVU, 1998) shows the range of products that are bought over the Internet. This supports the more recent references which show books and music are amongst the most popular purchases, demonstrating a continued trend of their popularity.

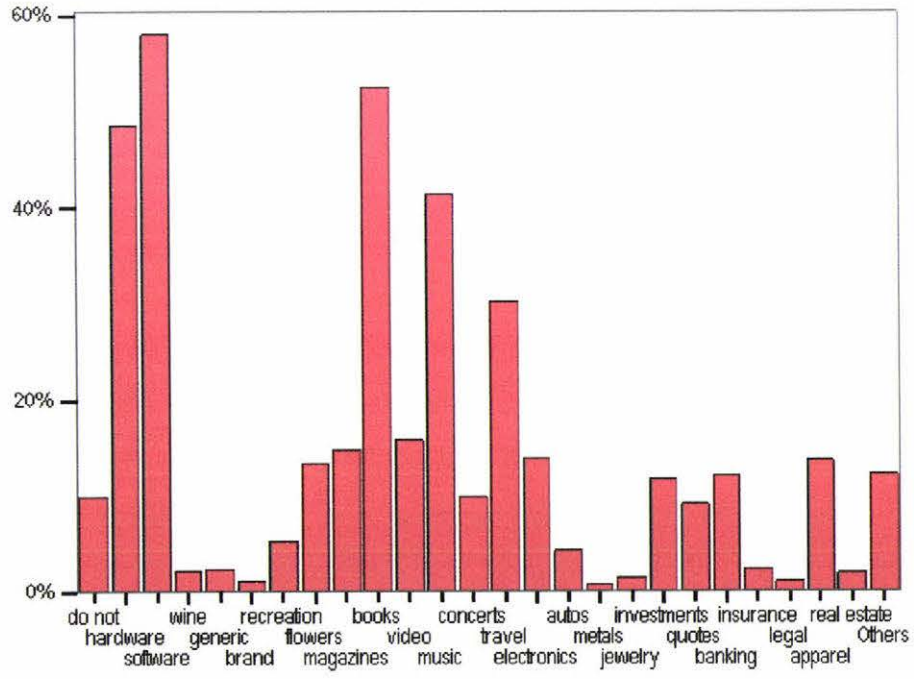


fig 2.1.3 Overall items purchased online (GVU, 1998)

What makes things especially interesting for the topic of this thesis is the same figures broken down into computer skill-levels and amount of experience on the Internet (see fig 2.1.4 and 2.1.5 below). Less-experienced people do not buy as much. If Websites are better designed to encourage more of the new and inexperienced users to purchase by overcoming fears and enticing via positive emotions, then perhaps more sales could occur.

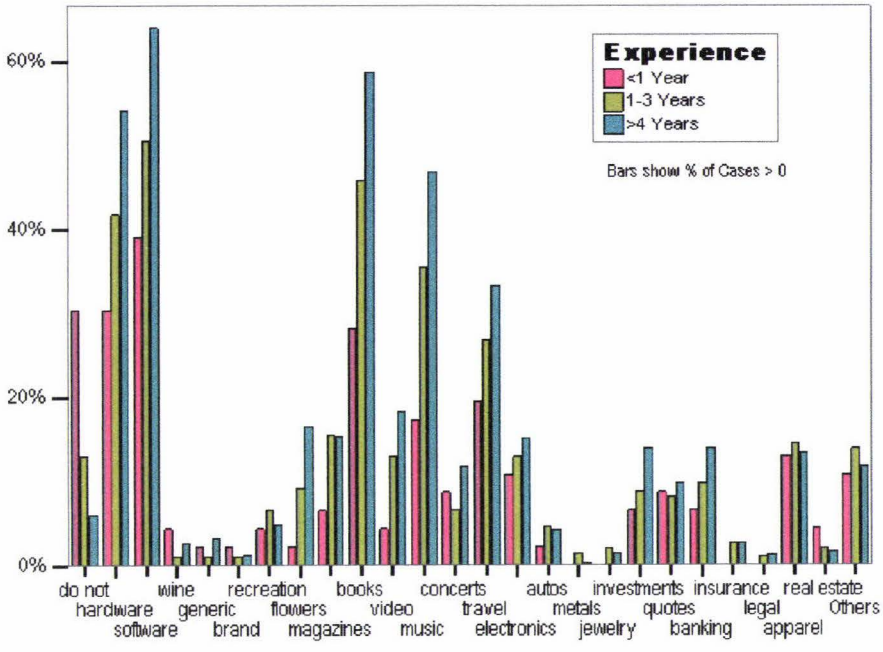


fig 2.1.4 Items purchased online by experience level (GVU, 1998)

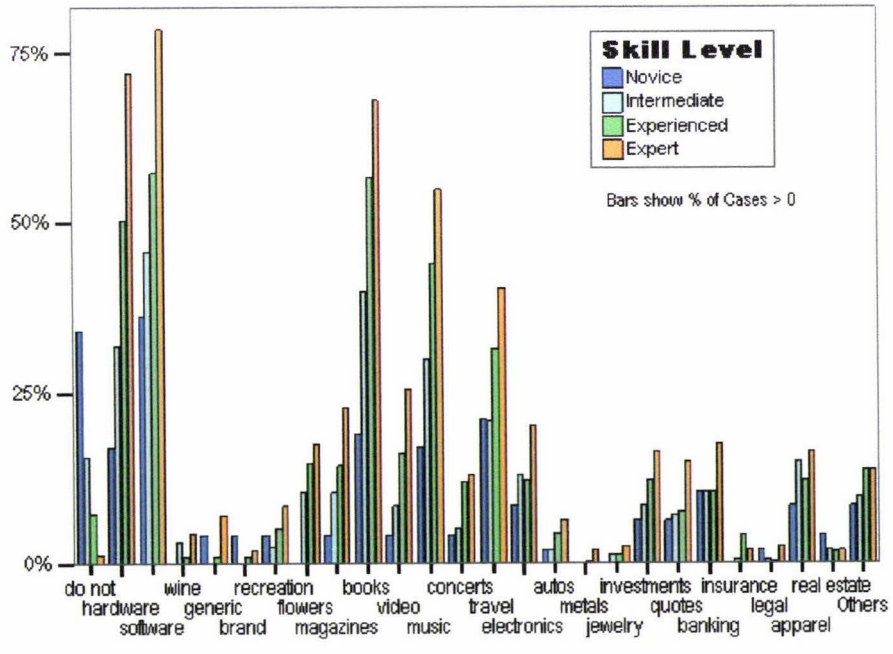


fig 2.1.5 Items purchased online by skill level (GVU, 1998)

It is interesting to see explanations of e-Commerce in a predictive sense from just a couple of years ago. For example, Murray (1997) stated that small businesses can compete with the huge companies on the Internet and that e-Commerce will reshape the business world structure (including a major challenge to the existence of travel and retail stores). This has been proved true to a degree, but not to the extent of physical retail stores closing down yet. Murray (1997) goes on to say that at first e-Commerce may appear unfamiliar and cause a reluctance to participate - but predicted that the majority of buyers will embrace the Internet over the next few years. Some of the statistics cited in this section have shown that complete embracement is not yet underway, and that there are opportunities for improvement. One way of contributing to a design that entices people to use the Internet and purchase goods could be to bring in emotional factors. This thesis undertakes research into how this can be done.

2.2 Biology, Emotions and Emotional Intelligence

2.2.1 Core Emotions

Emotion is a "feeling and its distinctive thoughts, psychological and biological states, and range of propensities to act" (Goleman, 1995:189).

There are hundreds of emotions, along with their blends and mutations. Some main families of emotion are: anger, sadness, fear, enjoyment, love, surprise, disgust, joy, desire, and shame (Goleman, 1995; Cacioppo, 1999; and BDC, n.d.). Psychologists have set themselves the task of trying to list the most important, crucial emotions in our everyday life and to find the relationship between each one. They have proven that it is a challenge to produce a definite list of primary emotions and so the scientific debate on how to classify emotion continues. However, an argument for there being a small number of core emotions stems from a discovery that facial expressions for fear, anger, sadness and enjoyment are recognised by people in cultures all around the world (Think Quest, 1999). If it can be established that emotion is important in the design of e-Commerce and Websites, then understanding these core emotional families could be important in designing to either appeal to or soothe these emotions.

Plutchik (2001) states that emotions are adaptive – they have a complexity born of a long evolutionary history. The colour wheel analogy on the next page (figure 2.2.1) is a three-dimensional circumplex model that describes the relations among emotional concepts. The cone's vertical dimension represents intensity, and the circle represents degrees of similarity among the emotions. The 8 sectors are designed to indicate that there are 8 primary emotion dimensions defined by the theory and arranged as four pairs of opposites. This can be related to an analysis of Karlsson and Garling (2001) later in this thesis, who also use an emotional circumplex as part of their research methodology. It should be noted that the emotional dimensions in Plutchik (2001) do not match those discussed by other literary sources such as Goleman (1995). Consideration should be given to what emotions are consistently identified as being important in literature, and then these need to be analysed for importance in Web design (which is undertaken in the designer and user surveys in this thesis).

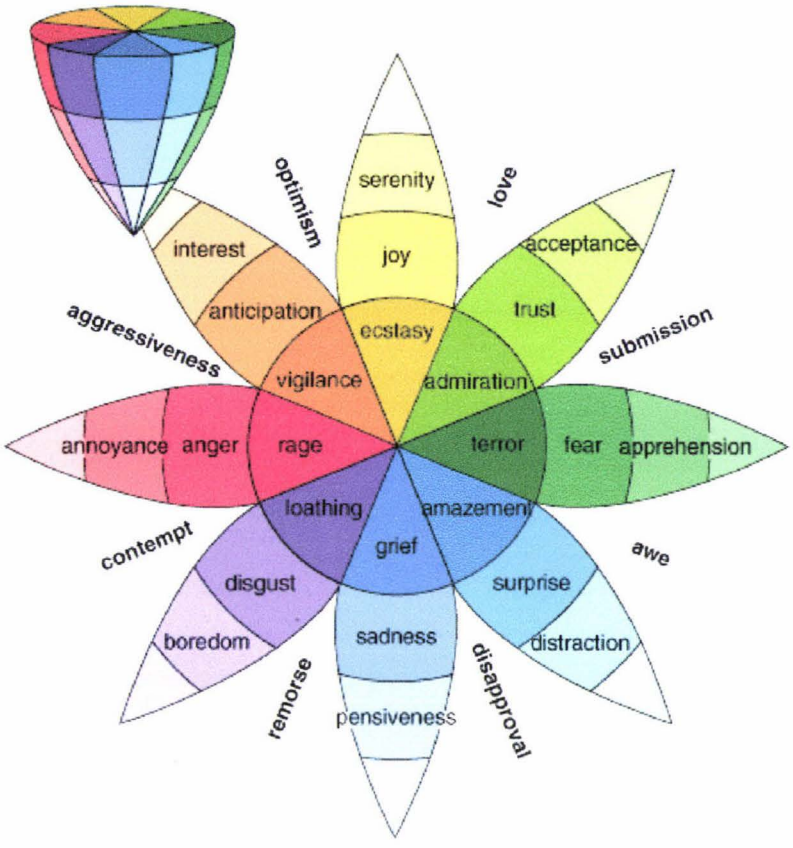


fig 2.2.1 Three-dimensional circumplex model (Plutchik, 2001)

The emotional mind is far quicker than the rational mind – springing into action without pausing to consider what it is doing – it jumps ahead of the more analytic reflection of the thinking mind. Theory suggests this came from the quickness revolving around the decision of what to pay attention to and the need to survive. Actions that spring from the emotional mind carry a strong sense of certainty – the product of a simplified way of looking things – that the rational mind can get bewildered by. "The interval between what triggers an emotion and its eruption can be virtually instantaneous" (Goleman, 1995:292). The emotional mind is our is radar for danger (from evolution) – if we waited for our rational mind to make sense of some judgements we might be wrong. Experiments have shown that subtle changes in facial expression show up within a few thousandths of a second after the trigger event. This swiftness is particularly true of intense emotion, like fear of a sudden threat.

The phrase *first feelings, second thoughts* is coined by Goleman (1995) because it takes the rational mind a moment or two longer to register and respond than the emotional mind. The first impulse in an emotional situation is the heart's, not the head's.

If the fact that emotions are the initial trigger and then rationality follows afterwards is assumed, then it points to the need for human-computer interaction design that appeals to emotions during the experience, not just the rationality behind a task or goal. This statement is supported by traditional

emotional purchase-making (as we shall see in section 2.8), with many people making impulsive emotional purchases of goods while their rational mind is still trying to analyse the need for that good. If customers' emotions are appealed to from the outset by integrating emotional concepts into design then there may be higher chances for success.

2.2.2 The Amygdala

Goleman (1995) looks at how the human brain grew (i.e. from the bottom up). From the most primitive root (the brainstem) emerged the emotional centres. Over millions of years the thinking brain (neocortex) evolved from the emotional parts. There was an emotional brain long before there was a rational one. The neocortex allows talent for strategising, planning, culture, family bonds, and sexual passion. It also allows subtleties for complexities of emotional life – e.g. feelings about feelings. As the newer brain grew the emotional areas became interwined via a myriad of connecting circuits to all parts of the neocortex.

The amygdala is perched above the brainstem. There are two – one on each side of the brain (illustrated in figures 2.2.2 and 2.2.3). The amygdala stores emotional memories – with affection and passion depending on it. The amygdala can take control over what we do even as the thinking brain (neocortex) is still coming to a decision. The conventional view was that the eye, ear and other sensory organs transmit signals to the thalamus, and from there to sensory processing areas of the neocortex where the signals are put together and an appropriate response resulted after going to the limbic brain. However, it has been discovered that there is a link directly from the thalamus to the amygdala, in addition to the longer path to the cortex. This smaller and shorter pathway allows the amygdala to receive some direct sensory inputs and start a response before they are fully registered by the neocortex. The amygdala is a major component of the limbic system located in the temporal lobe, and has been implicated in many brain functions including emotion (Keele, 1997). Increased focus by literature on the importance of the amygdala to our functioning as humans (leading to concepts like emotional intelligence) could signify that aspects of behaviour such as interaction with computer software (and Websites) also needs to be investigated with a focus on emotional concepts.

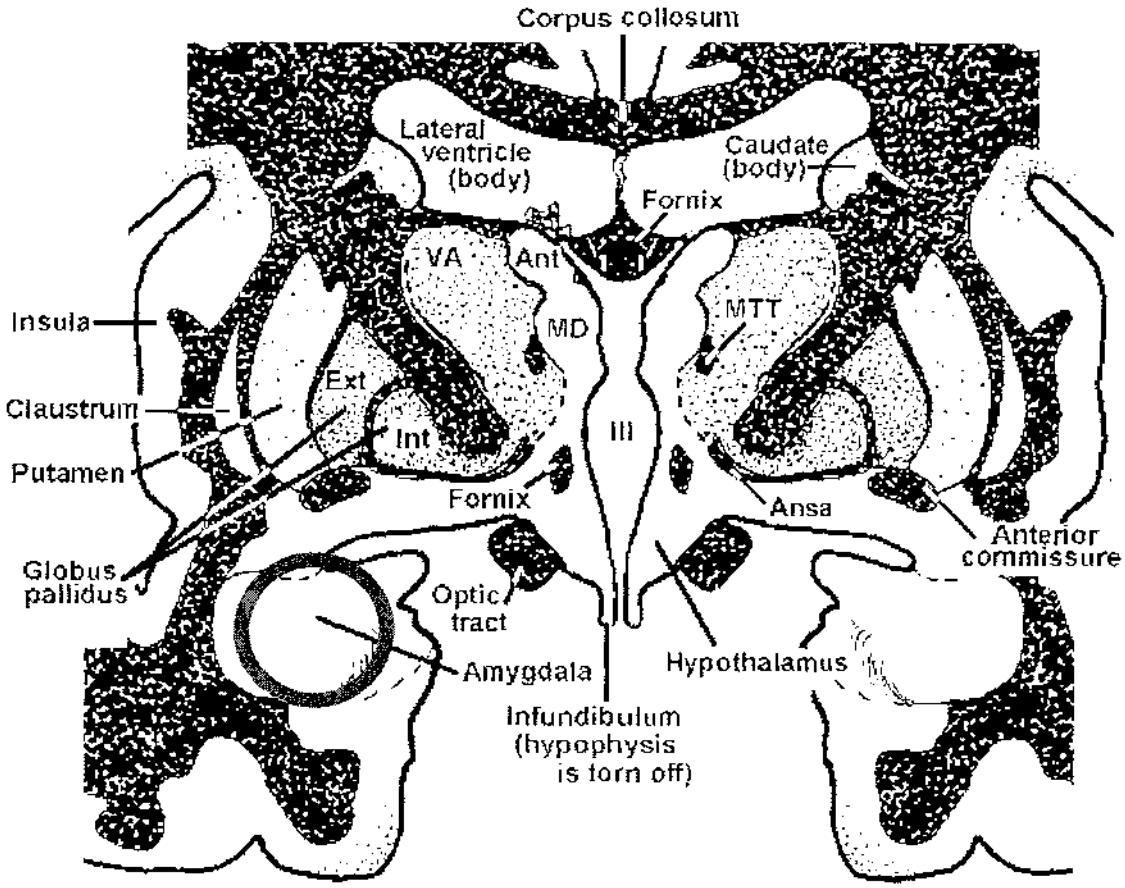


fig 2.2.2 Location of the amygdala (Keele, 1997)

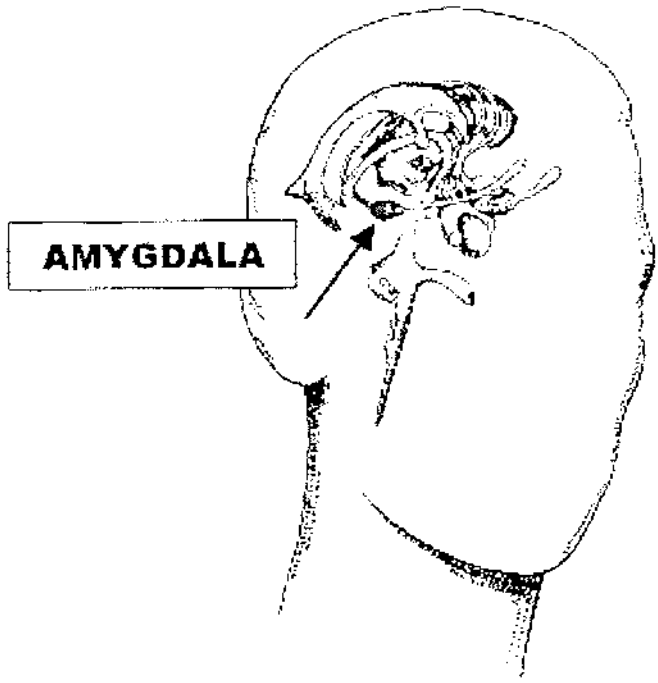


fig 2.2.3 Location of the amygdala (Slade, n.d.)

The amygdala receives signals of potential danger and begins to set off a series of reactions that help people protect themselves (Society for Neuroscience, 1998). Accumulating revelations about this fear system recently led researchers to examine the human brain's response to fear with imaging studies. One study showed that pictures of frightening faces initiate a quick rise and fall of activity in the amygdala. Researchers are also examining the role of the amygdala in less distressing types of emotion such as happiness. This type of research demonstrates that both positive and negative emotions may have to be considered if looking to build more emotion into design.

The medical department of the University of Sydney discuss emotions and brain dynamics on their Website (BDC, n.d.). Emotions are part of our primary motivation as humans – to avoid pain and danger (punishment), and to maximise pleasure (reward). Some responses in the Limbic System will directly trigger bodily reactions to emotions. When there is a reaction (like increased skin sweat rate), activity is seen only in the amygdala (of the limbic system) and the medial part of the frontal brain region. It is suggested that the body reaction (e.g. tension) is 'imprinted' on the medial frontal area – so the next time something triggers our memory of that fearful event or situation, the whole emotional reaction is recreated (BDC, n.d.; Goleman 1995). Bad experiences with Websites (with regard to security/trust scares or a boring interaction) could trigger such a reaction, making future Internet purchases less likely until the emotion is consistently appealed to or relieved.

2.2.3 Emotions in Advertising and Marketing

Websites are a way of advertising and marketing that can also facilitate the actual transactions. Because of this, understanding the way advertising can appeal to emotion should be important in Web design, but keeping in mind that that New Media like Websites will still have some differences to off-line channels. Villegas (2001) undertakes a historical review of definitions of emotion with respect to the advertising world, stating that emotions are responses to environmental stimuli that create an intense but short term affective state. Emotion is a complex set of interactions among subjective and objective factors, mediated by neural/hormonal systems, which can:

- give rise to affective experiences such as feelings of arousal, pleasure/displeasure;
- generate cognitive processes such as emotionally relevant perceptual effects, appraisals, and labelling processes;
- activate widespread physiological adjustments to the arousing conditions; and
- lead to behaviour that is often expressive, goal directed, and adaptive.

Eddel and Burke (1987) found that the feelings evoked by advertisements can be summarised by three factors: upbeat feelings, negative feelings, and warm feelings. Villegas (2001) also discusses appeals, citing a definition from Moriarty (1991): "a message about a need that has the power to arouse innate or latent desires" (76). So it appears that emotional appeal is well used within advertising circles. The Internet takes on aspects of marketing and advertising, but also facilitates new interactive experiences

via New Media. The opportunities for emotional appeal within this new set of technologies is at the heart of the premise of this thesis.

Ekman (cited by Think Quest, 1999) believes that the primary emotion groups should be appealed to or relieved (in marketing) depending on the objective and message. This reference looks in-depth at the facial expressions (such as those in figure 2.2.4) associated with each emotion, and is invaluable background for the design of virtual shop assistants discussed in section 2.7.8 of this thesis. Knowledge of each facial expression-emotion relationship will also assist designers by observing reactions in usability tests. Thurlow (2001) examines facial expressions – stating that we can make up to 7000 discreet facial expressions – although there are 7 basic ones – anger, fear, disgust, contempt, sadness, surprise, and happiness. Facial expressions are a major carrier of emotion and trust and so the photographs or other images used on Websites (along with any virtual characters) need to show the correct appropriate facial expressions and body language for their intended audience and culture.

fig 2.2.4 Examples of facial expressions – Think Quest (1999)

2.2.4 Emotional Intelligence

Following on from the discussion of emotions is the concept of emotional intelligence (EI). Designing an emotionally intelligent Website should be a major goal. If a designer has emotional intelligence about customer needs (i.e. empathy) then they could be more likely to create an appealing Website that will induce selling.

Young (1996) examines definitions of emotional intelligence. Citing Mayer and Salovey (1993), one definition is "a type of social intelligence that involves the ability to monitor ones' own and others' emotions, to discriminate among them, and to use the information to guide one's thinking and actions" (433). Six Seconds (n.d) defines emotional intelligence as the capacity to create positive outcomes in your relationships with others and with yourself. Feelings provide insight, energy, and the real basis for many decisions. It is necessary to create optimism, and to create empathy (recognise and respond to other peoples emotions).

EI involves abilities that can be categorised into five domains (Young, 1996):

self awareness	observing yourself and recognising a feeling as it happens
managing emotions	handling feelings so that they are appropriate
motivating oneself	channelling emotions in the service of a goal, with self control
empathy	sensitivity to others feelings and taking their perspective
handling relationships	managing emotions in others, social competence

If meeting emotional needs is assumed to be necessary, with some literature placing an emphasis on the need to design emotionally intelligent e-Commerce, it is quite surprising to find that there is in fact very little in terms of EI measurement scales (Cherniss, 2000; Young, 1996; and Trochim, 2001).

Cherniss (2000) does mention a small number of tools – the oldest measurement instrument is Bar-On's EQ-I which has been around for over a decade. It was designed to assess personal qualities that enable some people have better emotional well-being than others. Another instrument is the Multifactor Emotional Intelligence Scale. This involves performing a series of tasks that assess the persons ability to perceive, identify, understand and work with emotion. Another is the Emotional Competence Inventory (ECI), which is a 360 degree instrument – with people rating individuals on 20 competencies linked to emotional intelligence. None of these have been adopted to measuring the EI of Websites.

Adsam (2001) asserts that they do have a measure of emotional response (although this is not the same as EI measurement). They state that emotional responses are an intricate part of every attitude and behaviour expressed by prospects/consumers, and that measuring emotional response enables marketers to get inside the heads and hearts of the target audience and obtain direction for product development, product or brand positioning, package design, advertisement development, and purchase experiences – virtually any component of the marketing process. Adsam is a non-verbal, cross-cultural, visual measure of emotional response that enables companies to gather data. It is based on the assumption that there are three fundamental components of emotions: Pleasure, Arousal, and Dominance (PAD) and that every emotion is a combination of these three basic emotions in varying degrees (illustrated in figure 2.2.8). It should be noted that many other references (including Goleman, 1995; Plutchik, 2001; and Cacioppo, 1999) believe that there are a few other basic emotions to be added.

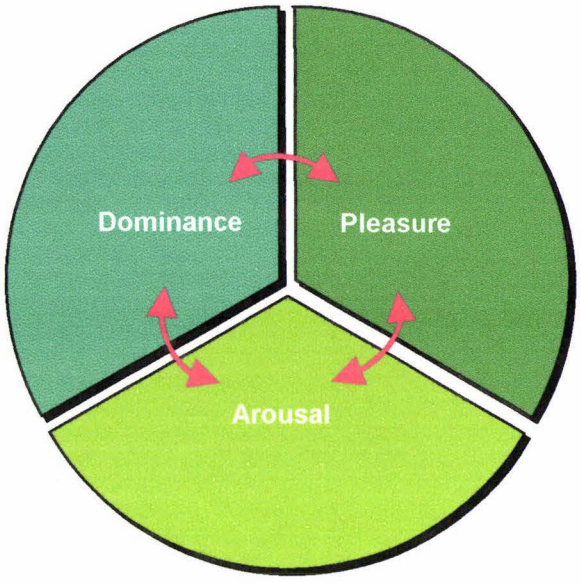


fig 2.2.8 Measure of emotional response implied by Adsam (2001)

Cherniss and Goleman (1998) present a technical report that has guidelines for developing EI in organisations, based on the best knowledge available on how to promote social and emotional learning. They estimate that American businesses lose between 5.6 and 16.8 billion dollars each year by not consistently following these guidelines. This could therefore mean that e-Commerce is potentially losing opportunities too. It could be an idea to use EI training for teaching Web developers empathy and the ability to recognise how to meet the emotional needs of their client's customers.

EI has been defined for human-to-human (1 on 1) interactions but very few literary sources examine EI in terms of human-to-computer interaction. One exception is Pipsqueak (2001), who believes that when people leave Websites their primary impression won't be of the information content, it will be of a vague feeling of a good or bad experience. The emotional IQ of a Website has to be considered. The first step in raising a site's emotional IQ is figuring out who will be visiting, what they want, and how you can give it to them. The designer has to ask themselves whether people leave the site frustrated or satisfied, or if the site is overwhelming, confusing, scary, or intimidating. Two properties that are likely to affect the emotional IQ of a Website are:

- ***Transparency*** – if a Website is opaque then the user feels their identity is shielded from both the site creators and other users, and they feel anonymous. However, if by contrast a Website is transparent, then they feel known to the site creators and other users. Transparency is good for a community site, whereas being opaque would be better for sites where anonymity is desired. Most sites are in-between on a continuum. Amazon.com stores information about its users and

tries to entice them with books related to previous purchases. Although the user is tracked through what they browse, the site is designed so the user is unaware of tracking.

- ***Thickness*** – a site is thin if the user feels the creators are very accessible to them. A site is thick if the user feels far removed from humans. Thick sites feel more formal than thin ones, but thins sites don't feel like barriers have been erected.

These concepts will be built upon and added to throughout this thesis in conjunction with other emotion-centred design attributes like trust, fun and pleasure. For example, Pipsqueak (2001) outlines that Web-site designers can also capitalise on emotional intelligence by:

- Reducing frustration and negative perceptions by having low bandwidth pages that load quickly; links that work; and avoiding technology that might crash the computer
- Relieving feelings of mistrust, being conned, or suspicion over giving personal information
- Always responding to email enquiries
- Being polite using words like please and thankyou – a page on the Web is seen as being more personal than a printed page from a brochure

2.3 Design Theory – from Rational Positivism to Emotional Design

This section will look at definitions of what embodies philosophies of design, starting from principles like positivism and scientific rationality, through to form follows function, and then form following emotion. Some designers might not follow a strict philosophy, preferring a subjective or intuitive approach.

"*How we define design forms the basis of both our theoretical and pragmatic expressions as designers. Without a clear understanding of what we mean by 'design' we are apt to find ourselves the victims of arbitrary thoughts and styles, unconsciously mimicking the misrepresentations of aesthetics, form, and function advocated by others*" (Miller, 1996).

2.3.1 Rational Philosophies

According to the Pratt Institute Website "*positivism is a philosophical movement characterized by an emphasis upon science and scientific method as the only sources of knowledge, a sharp distinction between the realms of fact and value, and a strong hostility toward religion and traditional philosophy - especially metaphysics*" - Pratt (n.d.).

Stemming from empirical traditions, positivism was introduced in the 19th century by Comte De Saint-Simon. It was developed by Auguste Comte, Ernst Mach, and others, and the movement influenced philosophy well into the 20th century. Comte denied the possibility of metaphysical knowledge, which he held to be a stagnant and useless branch of inquiry. Mach regarded physics as the paradigm of knowledge, since he believed it to be based on sensations and abstractions from sensations. He was suspicious of any thought (including scientific hypotheses) that was incapable of being reduced to direct observation.

Positivism redefined the purpose of philosophy and limited it to analysis and definition of scientific language. Design philosophies that use a positivistic approach are those that only rely on the rational reasons for creating the design entity.

Reany (2000) states that Comte hoped to achieve the elimination of subjective elements of knowledge, producing a condition of pure objectivity. This hope sustained later positivists, even though some of them, as in the case of Mach, sought to establish certainty in science through phenomenalism. Then the logical empiricists (20th century) aimed for scientific objectivity based on the applications of the results of logical analysis to the products of the empirical sciences.

Reany (2000) cites a number of other descriptions of positivism, including that the name positivism is due to the fact that thinkers returned to the appreciation of positive facts so as to restore the world of nature, which the Idealists had reduced to a mere representation of the ego.

Friedman (2000) argues that scientific method and instruction should be employed, but that scientific method should not be identified with positivism, although positivistic science also offers valid methods for certain fields of design research. Instead, it is believed that the comprehensive design process is a rich, complex integration of the scientific and the sensual, the intellectual and the intuitive; asserting that the science of design should be a warm, rich science that combines industry and art. Successful design has aesthetic values and qualities that are sensual. All designed objects are mediated through the physical senses, and so sensory quality is a central issue for designing objects that work in a physical world. It is stated that a good design process must embrace the aesthetic as well as the scientific, with the central difference being that one does not start with the look and feel, but rather with the parameters of the problem (i.e. form follows function).

The Bauhaus Group is a group of independent experts in object-oriented software and system development, who market themselves on the Website http://www.system-bauhaus.de/bauhause.html [2001, Jan 2]. Some of their statements indicate their philosophy on design (which do not reflect any emotional quality):

> "*Form follows function was one of the basic messages of the original Bauhaus movement in the 1920s. At that time new materials and construction techniques motivated the change. Today it is our new technologies and methods for software and system development*" (1).

> "*The Bauhaus concept teaches us that the functionality and usability of a product or a system determines the design constraints*" (1).

Dean (1997) cites a number of definitions of design, including those of Akiyama (1991), none of which mention emotion.

- design is an activity that recognises the goals or purposes of products or systems
- design is an activity that shapes its objects – creates their forms – in accordance with the goals or purposes of those objects
- design is an activity that evaluates and determines the forms of its objects and makes their contents universally comprehensible
- the product design process transforms abstract customer demands into specific product drawings
- a process of function allocation that identifies product purposes – such as functions – and allocates them to a structural product
- the product design process is a decision-making process

Andrew Mundi, creator of the http://www.mundidesign.com [2001, May 5] site and its excellent presentation on design principles, states that design is purposeful and is a process. "Design is utilitarian. Design explains the how of things . . . more importantly, design communicates ideas, concepts, and functions to specific audiences" – Mundi (2001).

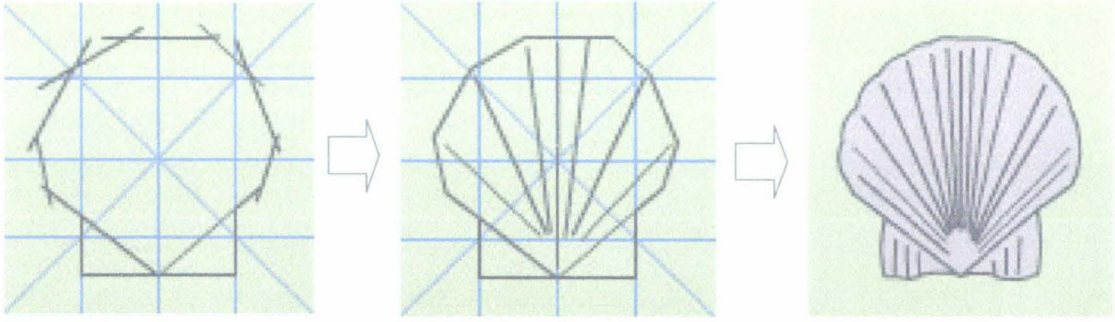


fig 2.3.1 Design as a process – sourced from Mundi (2001)

Further rational philosophies are highlighted by Bradford (1997), who asserts that beneath every clever application of technology and style lies a disciplined process of logic and common sense. Another resource viewing design as a process is Kristof and Satran (1995), with their process for interactive New Media being represented in figure 2.3.2, which follows.

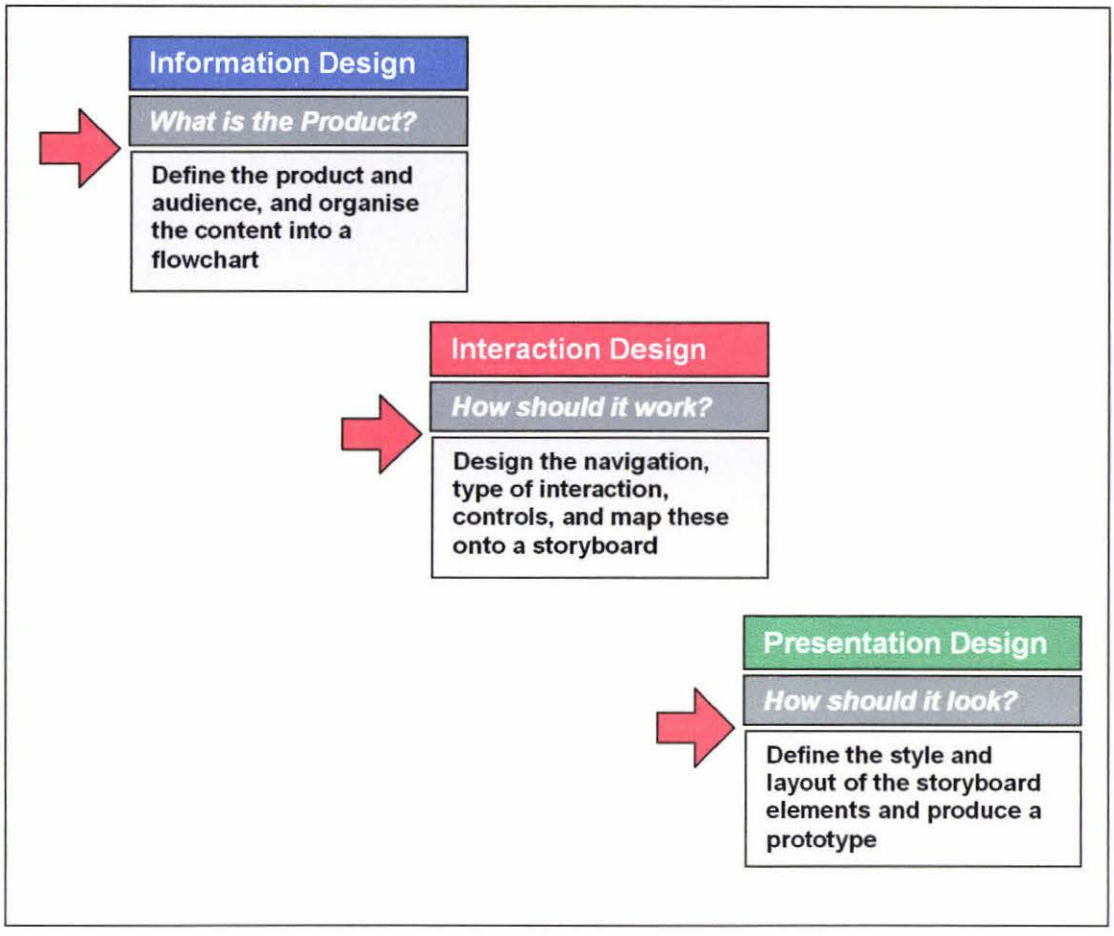


fig 2.3.2 Design as a process (Kristof and Satran, 1995)

Miller (1996) uses a simple definition of design, and then explains each word in the definition in detail.

"Design is the thought process comprising the creation of an entity."

Thought	***Insights***	the potential connection between problem and possibility
	Intuition	that form of subconscious thought that leads us to a deeper sense of knowing, often in the apparent absence of rational confirmation
	Reason	fully conscious form of thought that assesses the problem and analyses the possibilities for solution – method and mathematics
Process	Design is a sequence, or set, of thought-filled events and procedures Design is not "product"; "product" is, rather, the output of design	
Comprising	The whole of design comprises all the individual parts of that thought process leading up to, involved with, and even following the creation of the entity being designed	

Creation	The tangible realisation of a mature completion of the "image of possibility" that originally served to initiate the process Design is incomplete when the process stops prior to creation	
Entity	***physical***	such as an object that occupies space
	temporal	such as an event that occurs in time
	conceptual	such as an idea
	relational	such as a relationship that describes, or specifies, the interaction between entities

fig 2.3.3 Breakdown of the definition of design – Miller 1996)

Figure 2.3.3 does not make much mention of emotion, however it is stated that those who argue that design, or perhaps even creativity, is limited solely to the intuitive, or to the rational, often do so based more on a limitation of their own skills or interests than on any well-founded epistemology (Miller, 1996).

2.3.2 Emotional Philosophies

"A designer can make a compelling design that makes people respond. Design can make someone feel a specific emotion" (DPS Design, 2001).

"Designing for pleasure has become a recent phenomenon made possible by the advancement of new technologies . . . (and) . . . by users' aspiration and fascination for hedonic experiences" (Yap, 2001:156). Designing for delight reflects one of our oldest instincts – a focus on arousal and pleasure. However, communicating feelings of delight in design must not be done at the expense of usability and functionality. Function and meaning can still coexist in good designs.

Kunpyo (2000) discusses 'emotional engineering' and its origin in Japan (Kansei engineering). Emotional engineering is the technology to design goods that appeal to emotion by translating human sensibility and images into design factors. Emotional engineering in its early phase centred on the visual sense, but soon extended to include the highly psychological experiences which external physical stimuli and senses produced within humans to encompass all five senses. For example the Mazda MX5 adopted an artificial sound similar to those of the British sports cars in order to appeal to the ear and give a more authentic effect. Kansei engineering is a kind of ergonomic technology for translating human feelings (kansei) into a new product design (Nagamachi et al, 2001). If the consumer's feelings are implemented into the new product then they will be satisfied with the product. Nagamachi (2001) also mentions the Mazda MX5 Eunos Roadster as a good example of a product developed by Kansei engineering (this is shown in figure 2.3.4). In contrast, a definition of traditional engineering design from a rational non-emotional view implies that "a designed object is one whose form and/or function conform to a set of specifications" (Hamilton, 1998: 1).

fig 2.3.4 MX5 Eunos Roadster – An example of Kansei Engineering cited by Nagamachi (2001)

Demirbilek and Sener (2001) undertake a literature review of recent trends in emotional design. They believe today's world places design in a different framework because of changes in technology, society, and consumer trends. Expectations from users have also been changing. Expected as a given are functionality, attractiveness, ease of use, affordability, and safety. New expectations include objects that inspire users, enhance their lives, evoking emotions and even dreams. Products need an immediately identifiable set of visual clues that reflect function and underlying cultural associations. Product semantics involves a combination of art, ergonomics, communication, philosophy, logic and psychology. This can be related to the work of Liu (2001) who diagrammatically shows the multidisciplinary combinations that form aesthetic ergonomics in figure 2.3.5.

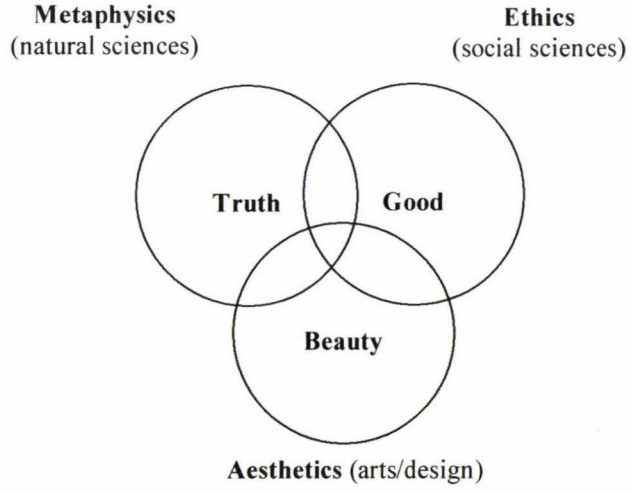


fig 2.3.5 Combinations forming aesthetic ergonomics (Liu, 2001)

Also in the vein of multidisciplinary blending, Gillespie (1998) suggests that there are several parallel and overlapping disciplines involved in Web design. Firstly, a practical, intellectual and functional one where the technology has to be understood to make things work at their most basic level. Then there is the aesthetic aspect requiring a more 'artistic' approach making the design more pleasing to the eye and more marketable. This is called 'styling'. Thirdly, there is a 'craftsmanship' factor that relates to how well the other two aspects have been implemented. These three attributes (symbolised by the 'head', the 'heart' and the 'hand') are at the apexes of an equilateral triangle. Any individual, or their work, can be mapped to a point somewhere inside this triangle.

Gillespie (1998) believes that a critical examination of an Old Master painting or a modern automobile will place it somewhere inside the head/heart/hand triangle. It is stated that Web page design is no different from any other design discipline and you can place any Web page you look at somewhere on the head/heart/hand triangle. There are the ones that have compelling content, ones that look very good, and ones that work very well because they have been hand-crafted. The three attributes are qualitative, but another dimension is introduced to this triangle - height. This means that any designer or piece of work can be quantified by placing them inside this object. A meticulous HTML programmer might be so involved in the mechanics of Web page creation that there is little content or aesthetic value in their work. On the other hand, many 'designers' are so preoccupied with the aesthetics that they score low on the more practical 'head' and 'hand' aspects.

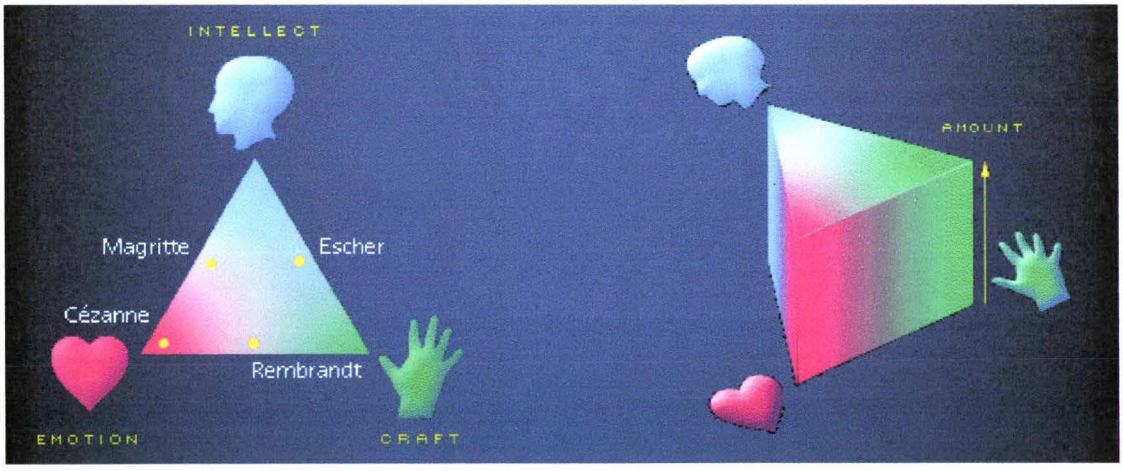


fig 2.3.6 Overlapping disciplines in Web design – Gillespie (1998)

This type of positioning of a Website will be further explored later in this section – looking at semantic map frameworks to position and compare sites according to various dimensions of emotion and usability.

Nielsen (2000) examines Art versus Engineering (i.e. emotional versus rational design). These two approaches to design involve the artistic ideal of expressing yourself and the engineering ideal of solving a problem for a customer. He acknowledges that there is a need for art, fun and a good time on the Web, but believes that the main goal is to make it easy for customers to perform useful tasks. The

engineering approach does have one major benefit – you can pose an empirical question that can be resolved by gathering real customer data, then choosing between one design or another. However, the scientific method can only take you so far – there is still a need for inspiration and creativity.

An emotional product is something you can love, something you are involved with, and has a strong, exciting, distinct and authentic message that tells people who you are and what you do. Today, many product design companies are aware of the power of emotions and are trying to differentiate their products in the competitive marketplace by employing semantics in design and marketing. Examples are Frog Design, Alessi and Swatch. Frog Design advertises themselves with the design motto 'form follows emotion'. It should be noted however, that very few Web design companies are cited by literature as having this philosophy.

fig 2.3.7 Examples of companies where form follows emotion - Frog Design and Swatch

According to Sweet (1999), Frog's founder Hartmut Esslinger says "no matter how elegant and functional a design, it will not win a place in our lives unless it can appeal at a deeper level to our emotions". Consumers don't just buy a product; they buy a value in the form of entertainment, experience and self-identity. People will keep a product longer and take care of it if it is built on emotional value. Hayek (1994) cites the philosophy of Swatch: "we are selling an emotional product . . . Swatch always conveys something very personal".

Sethia (2001) examines Moore's law – the value of design contributions continue to increase as Moore's Law keeps making products smarter as well as cheaper every day. However, it is believed that future systems won't be characterised by their memory size or processing speed. Instead the human interface will be the main measure, evaluated by feelings and perceptions. Is it easy to use? Is it pleasurable? Generative design (coevolution and convergence of human factors and industrial design) is "the generation and exploitation of new interdisciplinary knowledge" (Sethia, 2001:175). This involves new insights into technology and its human relevance.

Muoio and McCauley (1999) cite a number of comments from designers based on their views of what embodies design. Some of these are listed below – highlighting emotion-centred philosophies:

Adrianne Philips	The boundaries between design and art intersect. One of the essential elements that differentiates design from art is function. Function does not have to obviate another essential design element – whimsy and fantasy.
Harmut Esslinger	Lego embodies pure simplicity – to experience the product you have to interact with it. Part of the experience comes from what you bring to it.
Deborah Berke	One of the main criteria for everyday design is sensuality. Something that is sensual evokes a response that's not just visual or intellectual – its suggestive.
Clement Mok	Any well-designed product or experience acknowledges the user. Its respect for the user that makes a design great.
Davin Stowel	We interact with design on 2 levels – the physical and the emotional. The physical part is called ergonomics – what feels good to you. The emotional level, termed 'psychonomics', is what makes you feel good. The baseline of good design is a perfect balance of the two. Form does not follow function, instead, form is function – with the two being intertwined.

The trend towards mixing emotion and design is being recognised by new breeds of organisations such as the Design and Emotion Society (http://www.designandemotion.org [2001, Oct 18]). The society was established by a group of designers and researchers who believe that the emotional experience should be a starting point in design. This society conducts workshops and conferences on design and emotion-related research – looking at new tools and techniques. It looks for new insights and innovations in mixing emotion, design and research.

Cloninger (2000) states that there is an unarticulated war currently raging among those that make Websites. This war is between usability experts and graphic designers. The divide between these camps existed long before New Media and will continue to exist long after the Web has become commonplace. The differences can be listed as:

Usability & information architecture	**Graphic design**
masculine	*feminine*
left side of brain	*right side of brain*
doing	*being*
math science	*art*
rational	*emotional*
logical action	*intuitive action*
articulatable	*inarticulatable*
Mars	*Venus*

The statements of Cloninger should not be taken as absolute gospel. If something is usable then it should inherently create positive emotions in the users. Both 'camps' need to be in harmony rather than at war.

2.3.3 Critique of Recent Affective Human Factors Research and Methods

There are a growing number of studies and research into affective human factors for consumer products, specifically for fun and pleasure, but there has not been much empirical research specifically applying this to e-Commerce. Affective responses include emotions, specific feelings, moods and evaluations; whereas cognitive interpretations include deeper symbolic meanings and subjective interpretations (Khalid, 2001).

This section examines the latest methods in affective human factors, and uncovers gaps and ideas for use in the methodology of this thesis. This section also obtains dimensions and classification mechanisms for contributing to a framework/taxonomy for emotional design. This framework could then be the platform for future research. Note that other sections in this thesis also have critiques of previous research and methodologies (e.g. trust and computer game recontextualisation).

The primary goal of affective design is to have a close fit between the designed object and its context of use (Chayutsahakij and Poggenpohl, 2001). Wu (2001) believes the design philosophy Form follows Function has been gradually replaced by Form follows Emotion/Fun in developing consumer products. Pleasurable designs have become increasingly important in recent years, they can produce dreams for users, and they help free users from their stressful working environments. Like many other references, the example of the Apple iMac is used as a fine example of fun and pleasurable design.

fig 2.3.8 The iMac – An example of pleasurable design cited by Wu (2001)

As far as a research methodology is concerned, Wu (2001) undertakes both theoretical research and experimental development into pleasurable products. Mechanisms for enhancement of pleasurable products were found to be:

- **Accessing memory** – metaphors to bring back happy memories
- **Natural elements** – humans find comfort and solace in nature
- **Creating fiction** – cartoon images, reminders of childhood, using imagination

- **Colours** – designers should understand the power of colours and use it as a tool to create harmony and be welcoming and warm
- **Organic forms** – biomimicry, natural forms – curves, softness, smoothness – are all soothing

If a Website is considered an interactive 'product' then these dimensions could be used by Web designers too. Elements of familiarity will be covered further in this section, colour in section 2.5, and the use of natural forms and biomimicry is briefly covered below.

Biomimicry is a science that studies nature's best ideas and then imitates these designs and processes to solve human problems. It is 'innovation inspired by nature' (Benyus, n.d.). Nature can be seen as a mentor – as a source of new ideas. Emotion is a natural phenomena that is a response to natural events that have shaped our evolution, so perhaps Websites that display aspects of Biomimicry (e.g. natural curves and forms) will appeal to our emotions (i.e. make us feel at ease with the interaction). If we are relaxed maybe we feel more willing to trust. Industrial society can learn invaluable lessons from the billions of years of experience of living systems in evolving complex, efficient and adaptive systems (Friend, 1997).

fig 2.3.9 Examples of biomimicry from http://www.alessi-design.com/index1.html and http://www.koziol.de/english/prodb1.htm [2001, May 15].

The original research of Wu (2001) was designed to confirm that a pleasurable product can affect a consumer's emotion. A control group was shown traditional tableware, and an experimental group was shown colourful and funny tableware. Both groups were asked questions about the colours, shape, beauty, touch sensation, emotional status before and after, and their preferences. Statistical analysis is performed using paired differences to see if there was a significance difference between the two sets of results in terms of views on colour, form, cuteness, and beauty. This research is a good starting point

but their five measures do not seem to cover the full range of ergonomic pleasure and emotional characteristics that would apply to Websites (but this is understandable because the study was actually about physical consumer products). For example, dimensions like trust will still need to be incorporated into models for this thesis. Web designer feedback on similar feature-based mechanisms will be gathered in original research surveys for applicability to Web design.

Demirbilek and Sener (2001) classify some emotions (involving happy feelings, joy and the evocation of dreams) from literature into a list of criteria such as fun, cuteness, familiarity, metonymy and colour. These criteria will be very useful in gathering together dimensions and frameworks for overall emotion-centred design in Websites.

- **FUN** – fun objects have great humour, humanity, and convey happiness. If something is funny, warm or friendly then it will reach out to people. The flexibility of New Media should enable fun to be incorporated into the e-Commerce experience. Fun could arrive in many forms – colour, sound, humour, animation, or activities and games.

- **FAMILIARITY** – successful products are the intuitive ones where the user knows how it works without any instructions. All things in nature have a shape and that tells us what they are. Designers must build on the prior knowledge of users gained from experience in the real world. This can be done via metaphors by mirroring or abstracting from the human body (referential semantics). This can be related to Biomimicry. Expressive aspects of human posture, gesture and facial expressions can also be used. We intuitively understand the expressive language of the human body. This also lends itself to support the use of virtual characters and agents discussed later in section 2.7.8.

- **METONYMY** – among the factors that can make a product more emotionally desirable is a distinction that makes a difference and adds exclusivity. The definition of a product can be changed by presenting it in a new context. This can be related to suggestions of using surprise and variation in design by Brandtzaeg and Folstad (2001), and by literature in section 2.9.2 on gaming.

- **COLOURS** – have the ability to impact on the emotional well-being of humans by stimulating, tranquillising, exciting or depressing. A colour next to another colour will generate an emotional response. Special combinations of colour are said to produce the best results in terms of appeal. Colours have symbolic associations that are covered extensively in section 2.5.

- **CUTENESS** – (citing Papenek, 1995) – baby features induce feelings of warmth and protectiveness. Variations in proportions and roundness contribute to the 'age' of a product. Cuteness is the resulting attribute that seems to evoke happiness and feelings of protection. This is also mentioned by Chen and Liang (2001) who show the changes in cuteness from a new VW

Beetle through to an older Mercedes Benz. On a Website, cuteness could come in the form of extra use of rounded shapes (static or animated) rather than harsh lines (for example).

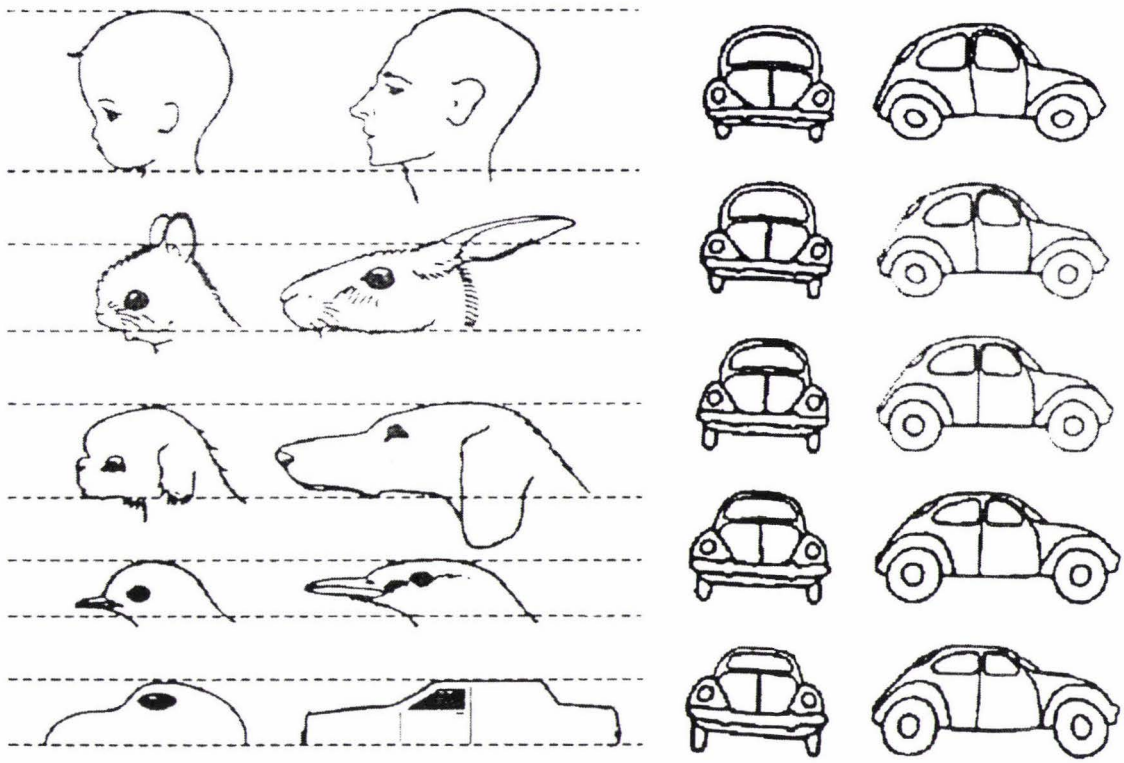


fig 2.3.10 Cuteness variations from Papanek (1995)

Fun is believed to be the most central dimension in future e-Commerce because it supports learning and pleasure (Dorman, 2000). Brandtzaeg and Folstad (2001) propose a theoretical model to predict fun, using the definition of fun as the extent to which the activity of using a computer or application is perceived enjoyable in its own right. They characterise fun by how rewarding, pleasant, enjoyable, and interesting the interaction is experienced to be. According to Brandtzaeg and Folstad (2001), usability looks at the ability of technology to complete tasks, whereas fun is a separate phenomenon, where the technology is used for the sake of the experience. Design must include something beyond traditional task-goal motivation, and must seduce the user to engage in the interaction. Having users face challenging demands (an important aspect of fun) may be one way of doing this. Challenging demands are a well-known means of obtaining curiosity and surprise (but designers must be careful not to place too many challenges in the way of users otherwise they'll go somewhere else out of frustration). Unpredictability is also important for a fun experience.

Demands can be categorised 2 ways:

- **Challenge** – users take pleasure from something contesting their intellect (e.g. games and puzzles). A trend is moving away from passive pre-packaged media and towards active collaboration with New Media.
- **Variation** – humans are interested in novelty, fascination for surprises, spontaneity, freshness and unpredictability. Static designs will lose the users interest.

It should be noted however, that concentrating on fun to the extent of reducing usability too much would be unwise. Even though fun and pleasure are an emphasis in obtaining an emotional design, usability is still very important (less usability could cause more negative emotions) and as such, usability is covered in section 2.7.9 of this thesis.

User control is an important aspect of an enjoyable experience. Facilitating the ability to use and develop skills helps make activities more enjoyable. Providing the user with extended powers of decision-making may enhance the fun experienced in a user-technology interaction. Also, since many activities of leisure are characterised by socialising, providing the user with a sort of community is important in design. Sharing of experiences and feelings is rewarding, pleasant and enjoyable. The presence of others is arousing. All of this can be related to the design aspects of agents, avatars and live chat covered in section 2.7.8.

Although Brandtzaeg and Folstad (2001) have some useful dimensions for fun, their suggestions could be deemed hard to quantify and measure. This is also true of Creed (2001), who uses case studies in human factors of pleasure, but doesn't give a substantial platform for building on, especially since there are no detailed methodology or results to learn from.

Pu and Wah (2001) state that most concerns in Information Technology (IT) have been about quality, reliability, and time-to-market but it is also necessary to include human factors. There are many academic models and references on IT product usage but there is still a need to see how human factors contribute to satisfaction. Their research involved using a worldwide questionnaire survey (with nearly 200 respondents using a five point scale) to examine the human factors which influence people to use IT products and impact on satisfaction. Examples of statements that are rated by respondents in the questionnaire are: 'using IT products makes it easier for me to do my job' and 'I believe IT products are enjoyable'. Similarly-framed questions, with a five point response scale, are used in the research questionnaires of this thesis, but delve into more detail (as the example lines of questioning from Pu and Wah (2001) may be too broad to pick up specific causal dimensions behind something being pleasurable to use – rather they pick up if it was or not).

Konrad (2001) researched how to make using Microsoft Office software a more pleasurable experience for users. The method was to (1) identify design elements that relate to pleasure; (2) evaluate design

ideas; and (3) evaluate final design. They gave focus groups a selection of designs that they believed would evoke a specific experience, and asked respondents to judge the designs against dimensions using a 7 point bipolar scale for scoring on those dimensions. These dimensions are presented below in figure 2.3.11.

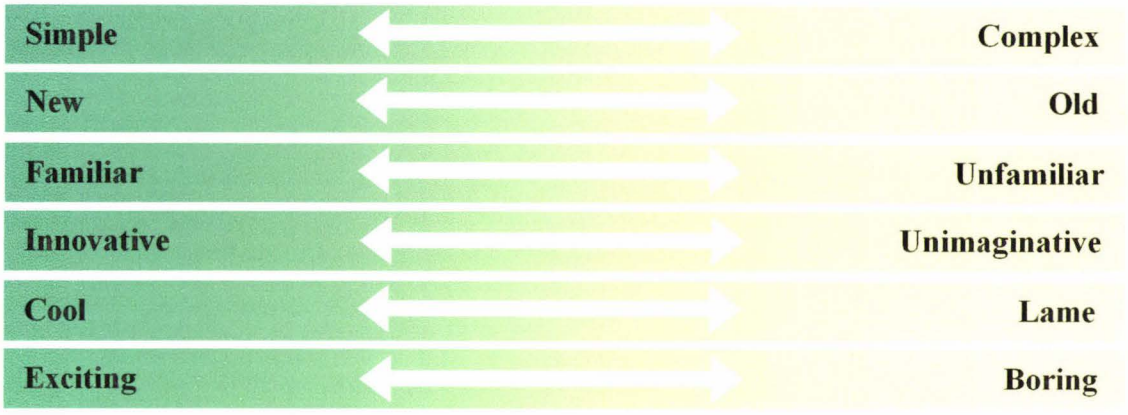


fig 2.3.11 Bi polar continuums for pleasurable software (derived from Konrad, 2001)

This research was about software, and so it is feasible that it could be used for assessing the level of pleasure obtained from a Website. Using semantic maps (two sets of bipolar continuums as axes) may be a good way to view how sites sit in relation to each other on multiple continuums, and what common good or bad emotional attributes they share. Semantic maps are covered later in this section. While using focus groups to rate designs based on pleasurable experiences is an excellent methodology, it could be that the dimensions for e-Commerce have not been developed enough to work from – hence the decision (in this thesis) to undertake extensive literature reviews (and case examples) combined with original surveys of designers and users to strengthen what experiences work for e-Commerce.

Schenkman and Fukada (2001) state that there is a lack of basic knowledge of what makes a Web page appealing. They took the research direction of relating the appeal of Web pages to the attention that users pay to it, and state that the position of an object in the visual field has been argued to have an effect on how we perceive an object of art. Their method was to record eye movements and get subjective ratings on varied Web backgrounds, images and screen positions. They outline their method in great detail, which is good for repeatability by other researchers. They use subjective scales of 1 to 7 (high) to measure complexity, order, conflict, stability/balance, legibility and beauty. The results showed that the total overall impression was closely correlated to beauty and legibility. The colour of background had an effect on most category scales and users preferred photos to sketches or animated images. However, there was no relationship between eye movements and the subjective ratings.

According to Dunston (2000), designers still struggle with clients over the perception of the competing needs of creating a positive user experience and supporting business goals. Rich questioning in questionnaires in this thesis also picks this up – with designers having to do what the paying client says,

not what the designer thinks will be good for the user. Designers must ensure that each interaction (user-triggered event) is as balanced as possible and that the sum of the interactions maintains that balance (as illustrated by the basic diagram in figure 2.3.12).

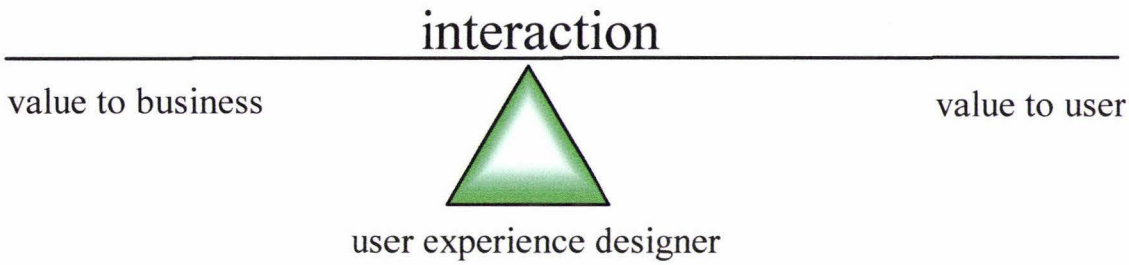


fig 2.3.12 Balance of interactions (Dunston, 2000)

Metrics (rules for measurement of a site's design) are established but there is a gap – no emotional aspects are covered. Metrics for evaluating a site against business requirements include the number of repeat visitors, time spent on site, conversion rate, and average purchase value. Metrics for evaluating a site according to its emotional connectivity are missing.

Our historical experience contributes to the way we view products or services in the present. Cayol and Bonhoure (2001) state that our receipt of pleasure depends on our past. This can be related to the trust-oriented research of Egger (2000; 2001) coming up in section 2.4 and the previously cited familiarity theme from the likes of Wu (2001) and Demirbilek and Sener (2001). The process of interpreting meaning from unfamiliar products is based on both emotions and on customer knowledge (dependent on social and cultural background). Keeker (1997) also looks at evolutionary theory, which suggests that people are hardwired to respond to a variety of stimuli. Designers can take advantage of this for creations to be naturally engaging. People will try to match unidentified objects or events with things that they've previously experienced - thus metaphor can be used to ease understanding. After identifying an object people try to evaluate its relevance to their goals. This determines how much effort the person should spend interacting with an object and when they should spend the effort. The goal value will determine whether an object maintains their attention. Intrinsic rewards (fun) motivate us for a longer time than extrinsic rewards.

Makela and Suri (2001) and Cayol and Bonhoure (2001) take the angle that you can't 'design' pleasurable experiences for users because people are influenced by previous experiences and contexts therefore they propose to support users' creativity. The users' previous experiences and expectations influence the present experience, and the present experience leads to more experiences and modified expectations (as outlined in figure 2.3.13). The design of digital consumer products is encouraged to be open-ended, social, controlled by the user, robust and forgiving, physical/sensory, flexible and personal. The user needs to be able to be creative, enabling them to personalise in a creative way and have social

engagement. While these lines of thought are valuable, the statement that a pleasurable experience can not be 'designed' is probably too all encompassing. A better statement is that design should try and integrate knowledge of predicted target user backgrounds and experiences.

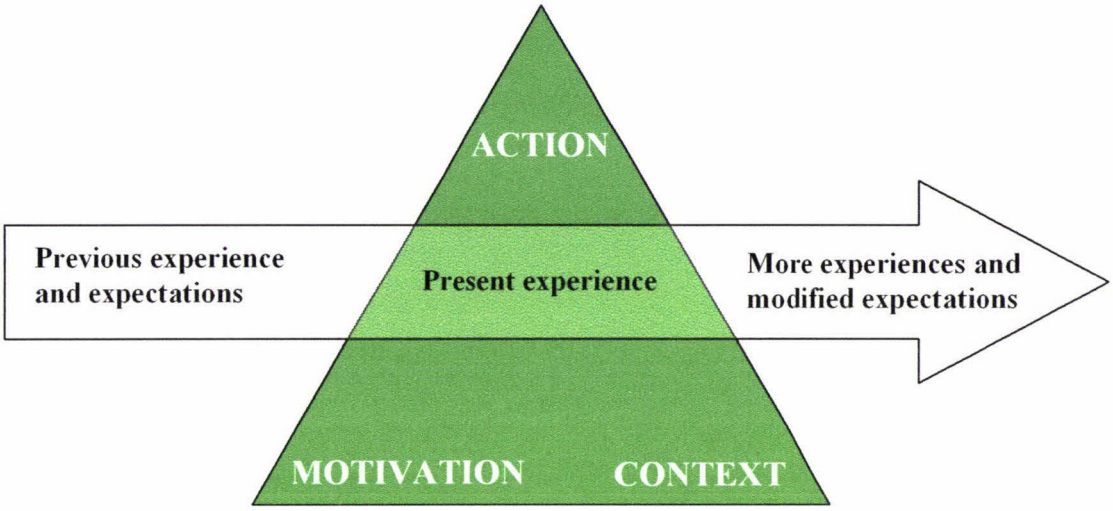


fig 2.3.13 The role of experience in design (Makela and Suri, 2001)

Looking at previous affective factors research methodologies specifically using Kansei engineering, Schutte and Eklund (2001) outline the general Kansei Engineering System (KES) process which translates customers' impressions, feelings and demands of existing products or concepts to design solutions and parameters. While there did not seem to be research into Kansei being used for Web design, the philosophy of the design, as well as the dimensions used (e.g. Kansei words) are both valuable for an overall emotion-centred design taxonomy and classification system.

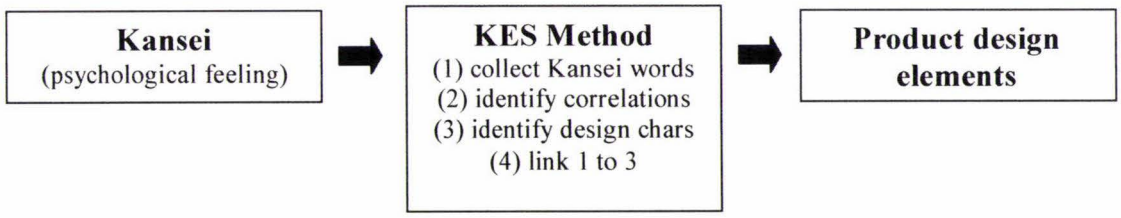


fig 2.3.14 KES Method (Schutte and Eklund, 2001)

Examples of Kansei words (below) from Nagamachi et al (2001) demonstrate their emotion-centred background. Surveys conducted in this thesis investigate what emotional words designers and users come up with.

Showy	***Familiar***	***Active***
Restful	***Friendly***	***Delightful***
Stimulating	***Natural***	***Not tired***
Young	***Happy***	***Elegant***
Comfortable	***Enjoyable***	***Warm***
Gorgeous	***City-like***	***Cheerful***
Pretty	***Attentive***	***Beautiful***
Rich	***Childish***	***Sanitary***

Nagamachi et al (2001) analyses the relationships between Kansei words by looking at the number of other Kansei words that can be included as elements. For example, the words that can be used as components of 'delightful' are shown below. This can be related to the previously stated fact that emotions belong to a smaller number of emotional family groups.

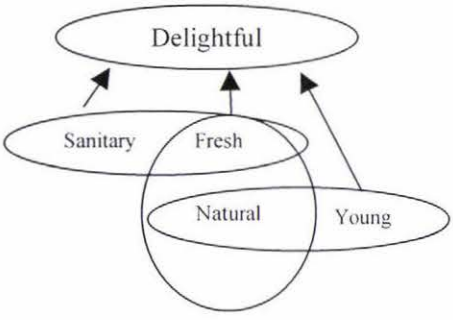


fig 2.3.15 Kansei components (Nagamachi et al, 2001)

Lindgaard and Dudek (2001) did three experiments to uncover what satisfaction meant to Web users. Their methodology was to mix interviews and questionnaires that rated how well the appeal of a site matched the respondents' feelings when performing an emotional purchase task (e.g. sending someone a gift as an apology). It was found that although usability is always important, what is beautiful might not also be usable. As stated earlier though, usability will still form part of the emotional connection (along with the emotional aesthetics side); although Brandtzaeg and Folstad (2001) definitely enforce a distinction between fun and usability. Lindgaard and Dudek (2001) reveal that current instruments intended to measure user satisfaction are quite crude and vague; and given that e-Commerce is intended to attract an increasing number of customers its time human-computer user satisfaction research came out of its infancy.

Han and Lee (2001) present a way of building a model relating product design to user satisfaction. It is proposed that image/impression is dependent on demographics, culture, and education (e.g. past experience), and can be classified into dimensions that explain aspects of user satisfaction (noting that these were originally for consumer electronics products). They used regression models (with resulting R^2 greater than 90%) and found different models of user satisfaction for USA and Korea, highlighting different emotional make-ups for different cultures (explored in section 2.6 of this thesis on culture).

Karlsson and Svensson (2001) use Semantic environment descriptions (Semantisk Miljo Beskrivning (SMB)) as a structured method of measuring people's impressions and experiences of vehicle interiors. It begs the question – can this be used for e-Commerce site ratings and classifications? SMB is a validated instrument that has been used successfully for several years, originally in architecture. It is deemed a customer-centred evaluation method that is good for comparing competitors, and is easy, quick and cheap. The impression of an environment (the insides of cars) is measured via a questionnaire (rated from 1 (slightly) to 7 (very)) with 36 adjectives grouped into 8 factors:

- **Pleasantness** – the degree of pleasantness, beauty and security experienced
- **Complexity** – liveliness and complexity of an environment
- **Unity** – how well the various components in the environment fit and function together
- **Enclosedness** – degree of demarcation
- **Potency** – expressions of strength and force
- **Social status** – economic and social evaluation
- **Affection** – feelings related to age
- **Originality** – unusual/surprising features

They use the mean and standard deviations of the ratings of Volvo cars versus competitor cars as a means of comparison along these dimensions. One limitation to the study is that there were a large number of Volvo employees in the sample – potentially leading to bias against competitor vehicles.

It is interesting to compare this to the work of previously cited literature as there seems to be some consistency and overlap in the set of dimensions they are measuring across (cuteness/affection, originality, familiarity, and social ability). These dimensions will therefore be used in the thesis questionnaires to designers.

A number of previous studies also use semantic maps as part of the research methodology. While these studies were not in the realm of Web design, this could be a great way to classify and rate levels of emotional design on Websites, using questionnaires or focus groups to place different Websites in the same genre (e.g. online bookstores) in relation to each other on a set of dimensional axes. For example, Miller and Kalviainen (2001) state that the level of pleasure achieved from a product is partially related to the kind of person and the social life they lead (this can once again be related to previous discussions on familiarity). Their method was to supply photographs of chairs – with a wide range of styles and

asking respondents to pile/group them into those that were (1) similar in the way they looked, and (2) similar in their social fit. An analogy for the type of results received is shown in figure 2.3.16.

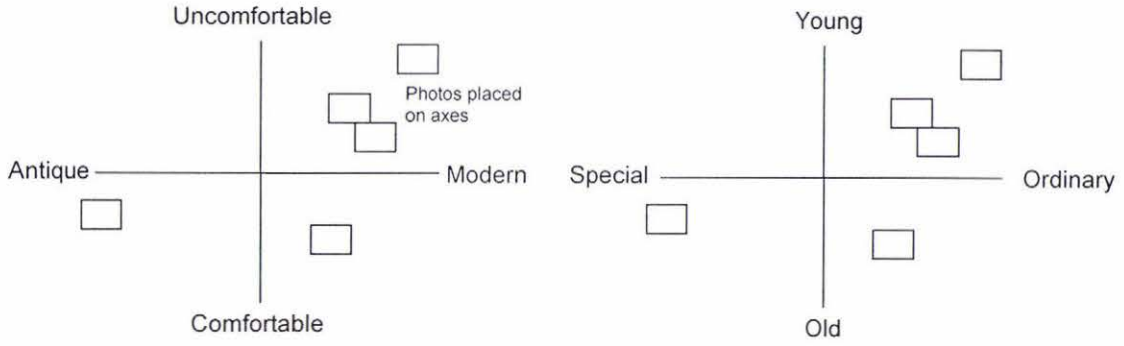


fig 2.3.16 Semantic maps (derived from Miller and Kalvianen, 2001)

Seppala et al (2001) also used semantic maps to study product pleasure, with pictures being placed on the map according to opinions.

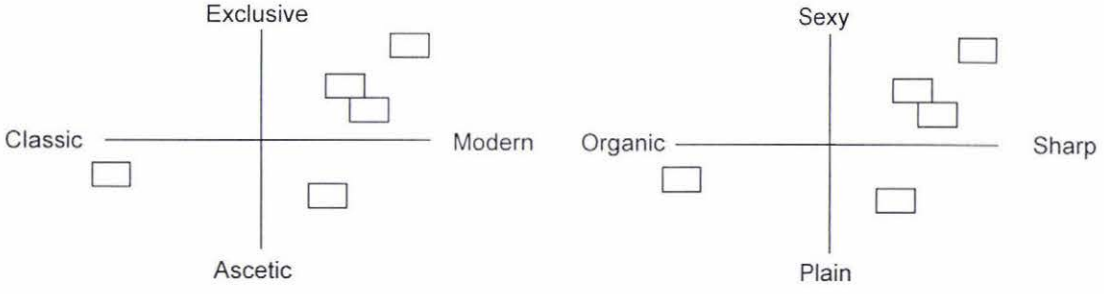


fig 2.3.17 Semantic maps (derived from Seppala et al, 2001)

Karlsson and Garling (2001) cite an 'affect circumplex' which can be used to measure core aspects of pleasure. They studied car sunroofs, not Websites, but future research needs to validate the use of such a method for Website evaluation. This thesis has concentrated on exploring the topic and gauging levels of opinion of designers and users – looking for gaps and opportunities. It is hoped that further research can build on these results by using findings in studies utilising semantic maps and circumplexes of appropriate dimensions.

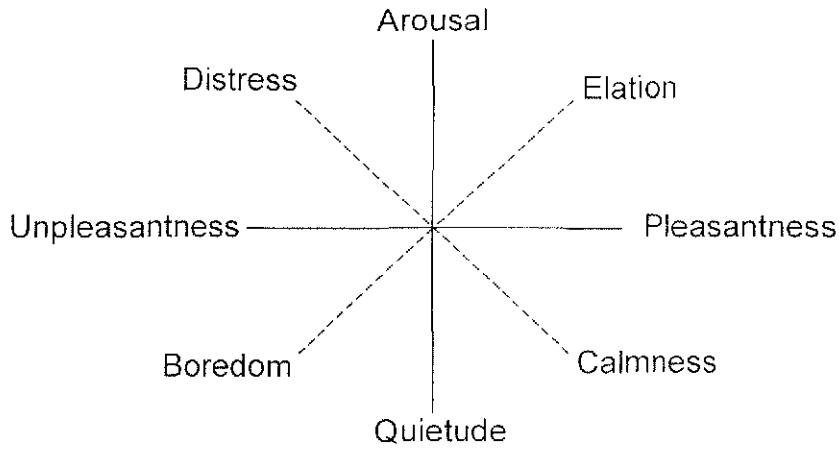


fig 2.3.18 Affect circumplex from Karlsson and Garling (2001)

Finally (with respect to previous methods), Hudson (2001) conducted a survey over email that focused on Human Computer Interaction (HCI) and usability. While they didn't reveal the detail of their questionnaire, which means that other researchers wanting to repeat or verify the research would find it difficult, their results sparked off good ideas for surveying emotion-centred design. These include measuring the use of each environmental medium, examining the degree to which each design characteristic is used, the percentage of time applying certain design techniques and methods, and looking at demographics like job function. As will be seen later, a lot of these aspects have been re-used in designer and user questionnaires. Also, Hudson's idea of ranking design dimensions from most to least popular in the results will be recontexualised into the results of this thesis.

2.4 Trust

The lack of trust with online payment privacy is a real psychological barrier to e-Commerce (Egger, 2000). Although interaction designers should not have to solve cryptography issues, they can still play a role in making sure trustworthiness is communicated in the user interface design. Traditional human computer interaction (HCI) design can be used for e-Commerce user interfaces but it may fail to deliver when it comes to designing trust-inducing features to ensure browsers are converted to buyers. One of the core human emotions is fear (particularly of loss of money or privacy in this context). E-Commerce needs to be designed to soothe and alleviate this emotion.

"One of the main goals of great Web design is to establish your credibility as a professionally run operation" (Nielsen, 2000:92). A way to gain credibility is to specify what you'll do with the sensitive data you ask for.

In terms or e-Commerce, trust is best viewed as an interactive dynamic concept that encompasses elements of subjective user-experience and quality of navigation (Meech and Marsh, 2000). Sites benefit from reputation and endorsements from authorities, but trust can be used in a more personalised form via different modes of interaction, interface personalities and attention to layout. Visitors must also have privacy and confidentiality. The more customers feel they can trust you, the more likely they are to come back and shop again (Roth, 1998), with trust being established through branding and expertise.

2.4.1 Electronic Branding

One of the factors that makes branding an important element on the Internet is consumer confidence. A study has shown that 67% of e-consumers abandoned virtual shopping before closing the sale because of lack of confidence in revealing credit card and phone number information (CCNA, 2000). Sites need confidence cues to show that the site is trustworthy. Branding is important here – a well-known brand is associated with trust (Caselle, 2000). Most marketers blend online and offline advertising. Integrating a company's Internet strategy with conventional off-line branding techniques is called 'brand spiraling'. A strong brand, because it is so emotional and non-rational, is often a company's most important asset (CCNA, 2000). Effectively branded domain names hook users at the emotional level (Thunderlake, 2000).

Branding has been around for a long time. Its first use was to identify ownership and was later used to authenticate and endorse the origin, quality and the value of a product or service (Cheskin Research, 1999).

fig 2.4.1 Early uses of branding (Cheskin Research, 1999)

In recent history, the need to apply branding increased as products and services were made available through multiple distribution channels. Often the supplier had little control over how their products or services were represented. Brand identification was their only means of communicating to their customers directly. With the advent of new technologies, modern practices of branding are diverse and complex and occur in a variety of media including the Internet. A brand is more than a symbol or a name – it is the implication of trust between a company and its customers and partners. This does not change in the digital domain.

fig 2.4.2 Modern branding (Cheskin Research, 1999)

The future success of e-Commerce will largely depend on gaining and maintaining the trust of visitors. The concept of trust is crucial because it affects a number of factors essential to online transactions, including security and privacy. Without trust, development of e-Commerce cannot reach its potential. Understanding the roles of factors that constituent trust could allow online retailers to ease consumers' concerns, and could hasten the maturation of Web retailing.

Cheskin Research (1999) puts forward six factors that can be associated with the emotional design of Websites leading to trustworthiness and a favourable purchase decision. These are:

- **seals of approval** – symbols like VeriSign and Visa, designed to reassure the visitor that security has been established
- **brand** – credibility based on reputation and previous experiences
- **navigation** – the ease of finding what the visitor wants
- **fulfilment** – clear indications of how orders will be processed, and provision of information on policies and recourse

- **presentation** – design attributes that impart quality and professionalism
- **technology** – use of state-of-the-art technology that imparts professionalism

Each of these will be verified for importance to today's designers in the original research of this thesis.

For lesser-known brands, navigation and fulfilment in the Website plays significant roles in establishing trust. Any new Web-based brand must build in excellent navigation and fulfilment if it is to be trusted.

Even though they're universally recognised by consumers, the presence of credit card symbols might not communicate trustworthiness as much as "security brand" seals of approval (such as VeriSign) according to Cheskin Research (1999).

fig 2.4.3 Examples of branding indicating trustworthiness

2.4.2 Models of Trust

Seals of approval are reflected in a model proposed by Cheskin Research (1999) for understanding e-Commerce trust, along with the previously mentioned need for reputable branding, high quality navigation, presentation and fulfilment.

fig 2.4.4 A model to understand e-Commerce trust (Cheskin Research, 1999)

The Usage Experience depicted on the far right of figure 2.4.4 is where emotional design can really add value in the 'trust value chain'. This is further modelled in figure 2.4.5, which depicts the development of trust for Websites over time. Having a design that soothes the emotion of fear will get customers to an intrinsic level of trust in shorter time.

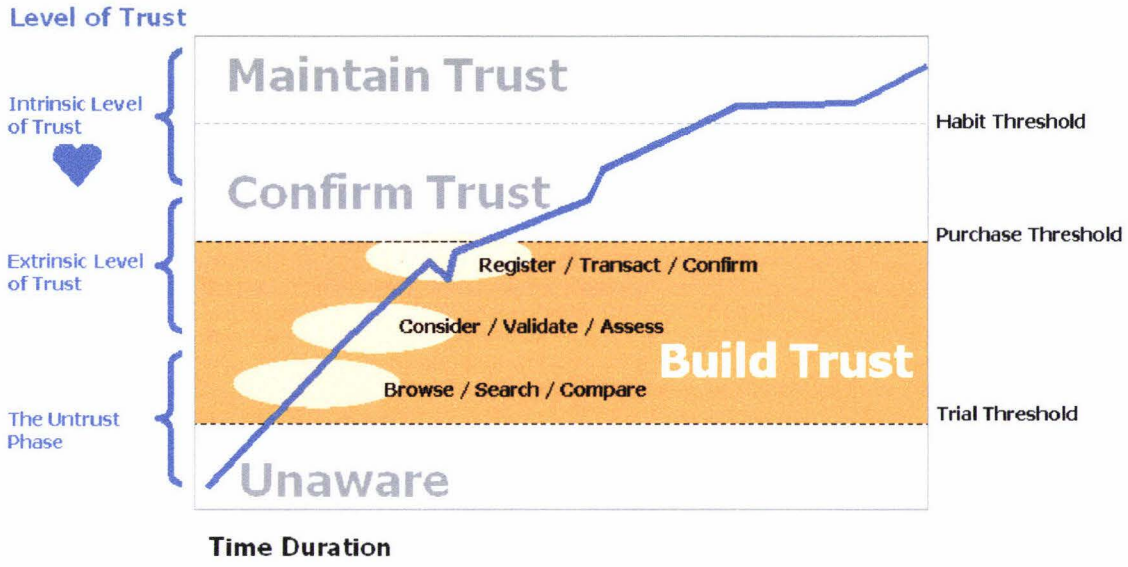


fig 2.4.5 A model to understand e-Commerce trust (Cheskin Research, 1999)

The need for assurance on the fulfilment process has been emphasised. One site that does this well is http://www.shopfast.com.au [2001, Nov 15], which has a reassuring 'what happens behind the scenes' diagram – a good example of preventing fear and confusion.

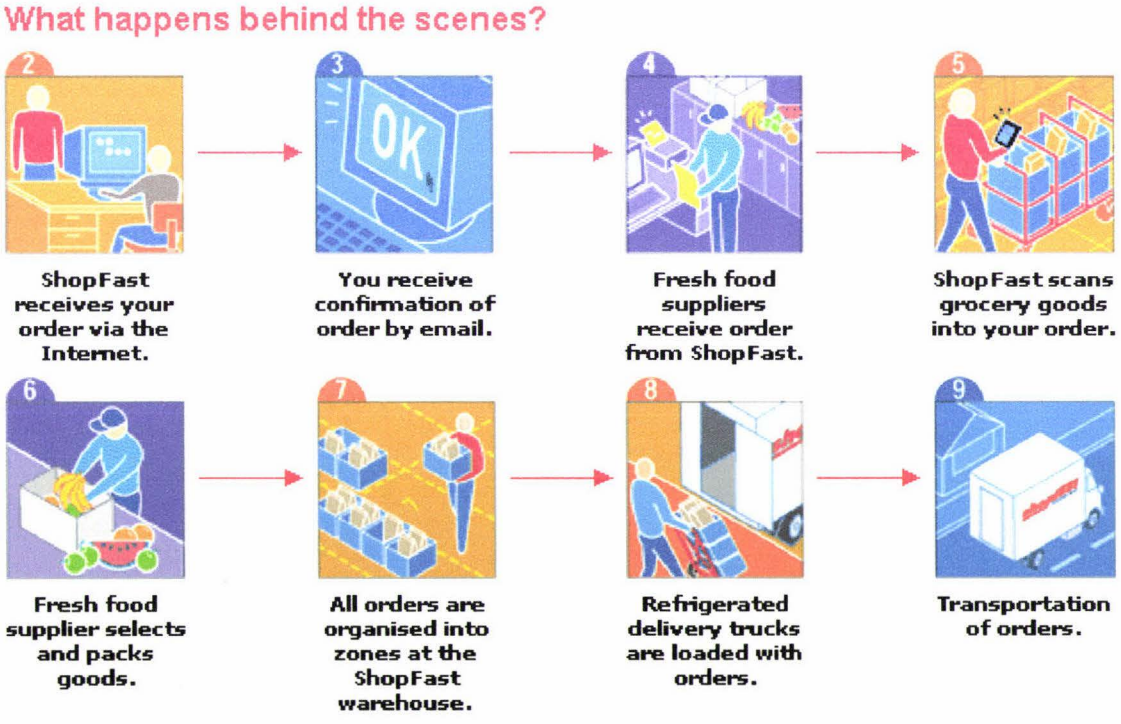


fig 2.4.6 Good example of reassurance of fulfilment (www.shopfast.com.au)

The research methodology used by Cheskin Research (1999) involved four phases:

- a snapshot of consumer attitudes;
- secondary research;
- expert interviews; and
- quantitative evaluations.

They involved over 400 Web users, a wide range of e-Commerce experts, Website developers and academics in their research. Graphs of comparisons between e-Commerce sites in the same industry/sector were presented (for example, showing the comparative trustworthiness of online book stores like Amazon, Barnes and Noble). Overall, the research appears to be very credible – with a large degree of triangulation (varied but integrated methods) and industry recognition for their report. When coupled with other emotional factors like fun and pleasure, research such as this will pave the way for improving Website design through a commitment to meeting emotional needs.

Egger (2000) puts forward a model of trust for e-Commerce, and terms it MoTEC. The descriptive power of this model was tested in an empirical refinement study, where subjects had to rate the relevance of statements about trust and e-Commerce. On the basis of observations, a revised model was proposed. This revised MoTEC model is presented in figure 2.4.7.

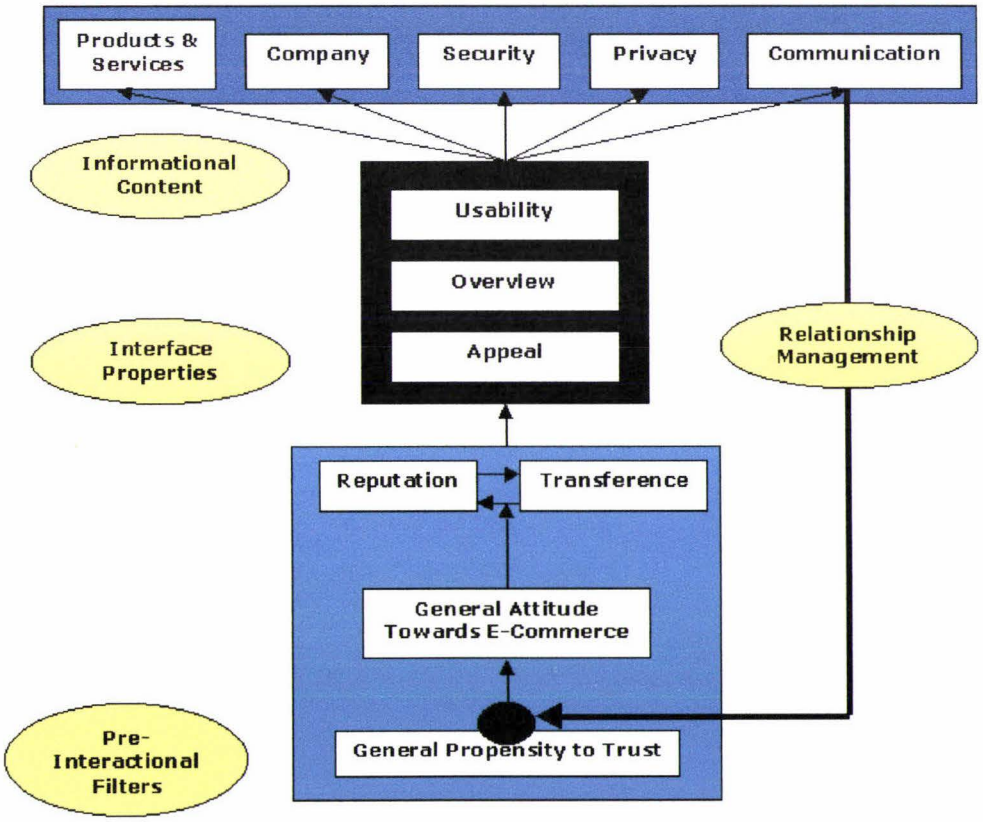


fig 2.4.7 Revised MoTEC Model – Egger (2000)

The MoTEC components are defined as follows, and links can be seen with the 6 factors identified in Cheskin Research (1999).

Pre-interactional Filters: Individuals differ as to their General Propensity to Trust, and their expectations with respect to a certain industry or company (due to reputation and previous experiences).

Interface Properties: Graphic design and layout are included in the Appeal component. 'Overview' refers to the extent to which the site's content is organised in a manner relevant to the end user. The Usability component refers to the system's reliability, ease-of-use and familiarity.

Informational Content: The Company component reflects the need to communicate the history, values and commitment of the company. Security refers to the completeness and the understandability of information about financial risk and guarantees. Privacy describes the vendor's openness with respect to its privacy policy.

Relationship Management: The first type of trust to take place is conversion trust, where users gain enough trust to engage in a commercial relationship with an online merchant. Loyalty will depend on the follow-up to the initial transaction (post-purchase communication and customer service).

Egger (2001) adds to previous work (Egger, 2000), stating that trust encapsulates notions of uncertainty, vulnerability and risk in transactional relationships. The latest work is a refinement of the MoTEC model - based on the fact that people have predispositions and pre-knowledge that determines an initial trust value before the Website is accessed. This can be linked to discussions of familiarity in section 2.3.3. As someone explores a new site for the first time the first impression made by the system (graphic design and usability) will lead to a reassessment of that trust value. The trust value changes again as the person gets to see the company's competence and responsiveness.

One criticism of Egger (2001) is that it states that the model has been tested on various e-Commerce sites but doesn't give a detailed account of *how*. This is more of a presentation of the model without any empirical proof that it works, but reading previous research by Egger does confirm the background of the model – giving credibility.

Bailey et al (2001) states that the concept of trust production has received little attention from researchers. Because Computer-Mediated Exchanges (CMEs) are performed without governing social norms, geographic proximity or partner identity, understanding the dynamics of trust production in CMEs is even more important than in face-to-face exchanges. Trust production may be one of the most important factors shaping the future of electronic exchanges. The method below was used:

1. Define trust within the context of CMEs to get a framework for discussion
2. Use of literature to identify 4 sources and 7 dimensions of trust

3. Create a trust taxonomy by enabling the classification and evaluation of trust production methods
4. Case-studies using this taxonomy to compare and classify them

Trust is defined as "the perception of the degree to which an exchange partner will fulfil their transactional obligations in situations characterised by risk or uncertainty" (Bailey et al, 2001:2). It is then modelled diagrammatically with identified sources and dimensions as follows:

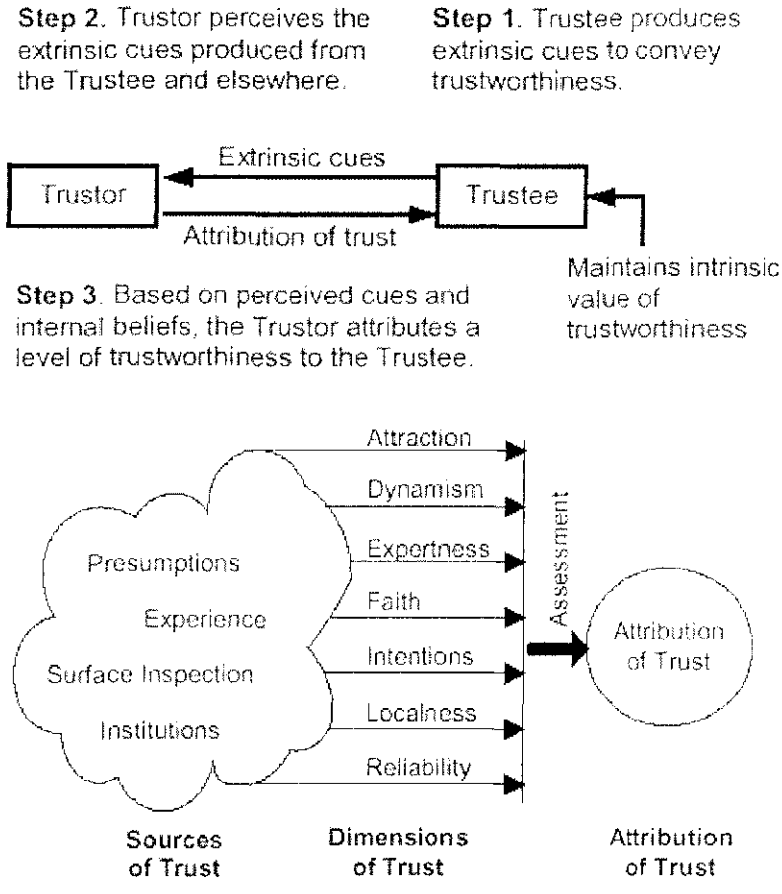


fig 2.4.8 The trust production process Bailey et al (2001)

Sources of trust are:

- Presumptions – e.g. the presumption that a Website is less trustworthy than a bricks and mortar retailer
- Surface inspection – trust through examination of the appearance of the design of the Website
- Experience – more trust develops if you have repeated successful exchanges. Reputations and brands also fall here
- Institutions – e.g. seals of approval from third parties

Dimensions of trust are:

- Attraction – people generally trust something that is attractive more than something that isn't
- Dynamism – via displays or body language
- Expertness – experts are generally perceived as being more trustworthy than non-experts
- Faith – that the seller will act responsibly and fulfil their obligations
- Intentions – an open and honest seller who discloses a genuine interest in the well being of the customer
- Localness – if the company has similar geography, ideals or values to the customer then it is deemed more trustworthy
- Reliability – if there have been previous dealings with the company then they may be more trustworthy

Bailey et al (2001) then used this to classify various retailing sites, like the example below:

Classification of Trust Production Methods for Ebay Exchange Partners

	Attraction	Dynamism	Expertness	Intentions	Faith	Localness	Reliability
Presumed				L	L		L
Suface	P	P, M		P, T		M	P
Experience							
Institutional				A, B, F, I	A, F		A, B, F, I

A = Achievement awards, B = Billpoint payments, F = Feedback profile, I = Insurance, L = Length of membership
M = Member pages, P = Product description/picture, and T = Transaction information

fig 2.4.9 e-Commerce classification according to trust (Bailey et al, 2001)

This provides a good platform for building a similar classification system for emotional design - incorporating aspects of trust (itself a dimension of emotional design) into a taxonomy/matrix based on emotional dimensions and sources from findings in literature and questionnaires.

Some limitations and gaps of the study and methodology of Bailey et al (2001) include the future need for the same people to perform all classifications of trust production to maintain consistency and reliability; the subjectivity of using the coding process for classification; and the ongoing future need for trust metrics (measuring the contribution of a trust production method to an overall attribution of trust).

As far as other research in this area is concerned, an empirical study was conducted by Kim and Moon (1998) who investigated which graphic design elements were most likely to communicate trust in Internet banking. This had some limitations in that the trust-inducing features they identified were

claimed to be specific to their test application and to their Korean user population; and they focused exclusively on graphic design at the expense of usability or content design. Fogg and Tseng (1999) analysed the interrelations between computer credibility, expertise and trustworthiness. They argued that users' evaluation of computer trustworthiness and credibility is a function of both system design features and psychological factors ascribed to the entity behind a system. Tan and Thoen (1999) also proposed a generic analytical model of trust for e-Commerce.

One final thought on trust relating to overall design is the fact that the Web page is a strong reflection of the company it represents. If a Website is poorly designed, customers don't view it as evidence that the company doesn't know how to do a Website, they actually translate their negative experience into a view of how the company conducts business generally. This may not be a true or fair view of the company but it happens (Pipsqueak, 2001).

2.5 Colour Use and Emotions

2.5.1 Colour Theory

The relationship between colour and emotion will be covered in the next sub-section, but first it is worth covering the underlying principles of colour theory and design. Appropriate use of colour leads to harmony or excitement, depending on what impact or response is hoped to be evoked. We live in a world of colour and take colour for granted. The colours we see in nature are reflections of light on the familiar surfaces around us. For example, a green surface will absorb all visible light except green.

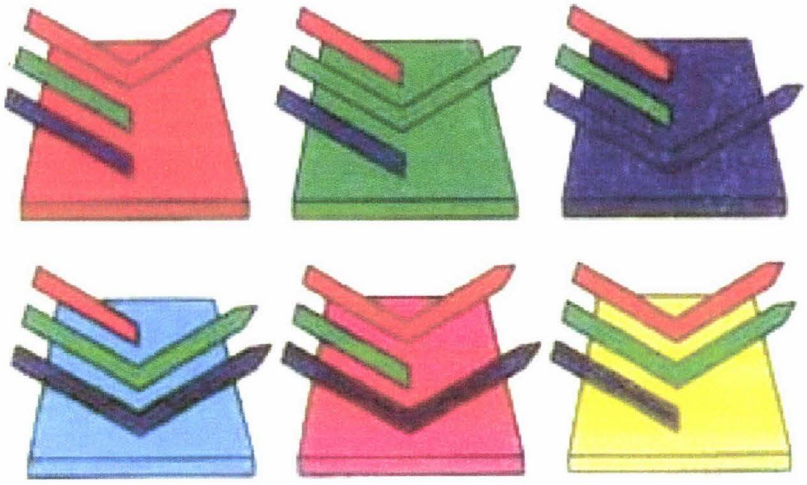


fig 2.5.1 Reflection of colour on a surface (Color Dome, 1999)

The electromagnetic spectrum is very broad, with the visible spectrum only being a small part of this.

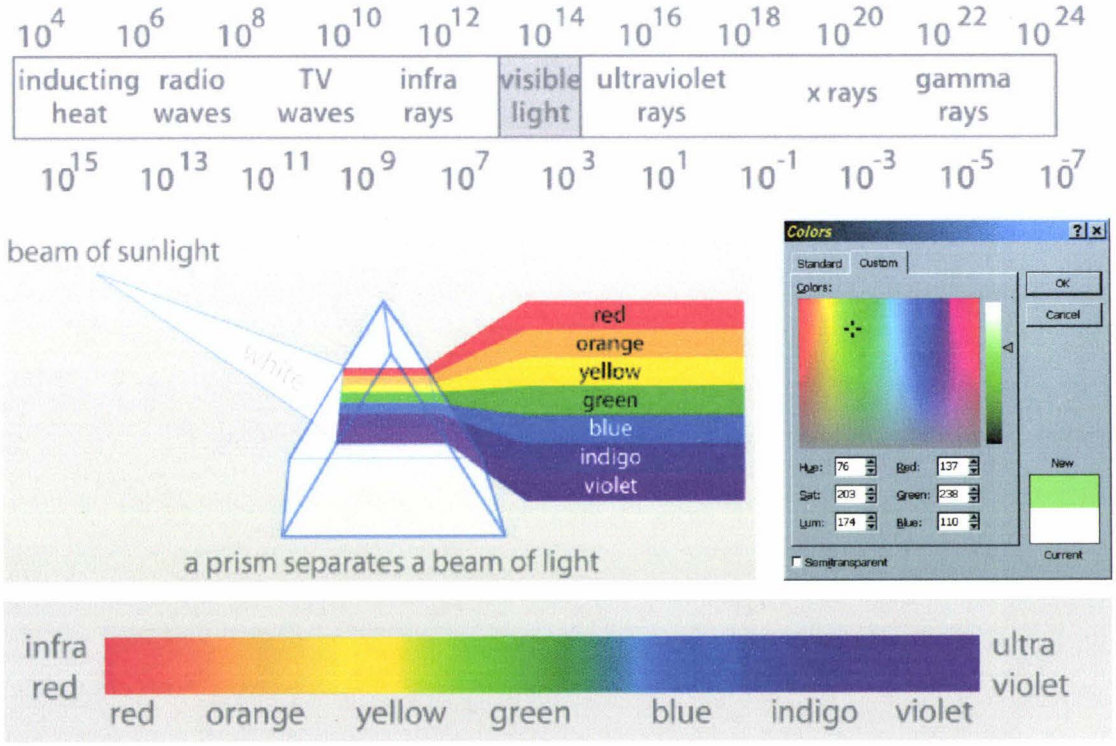
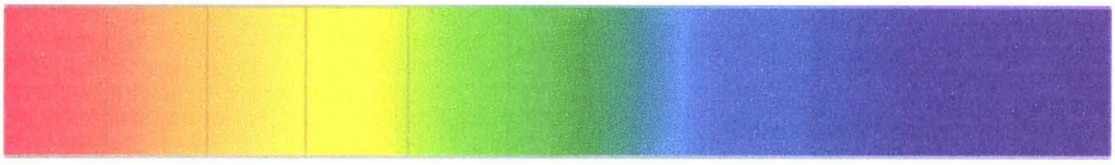


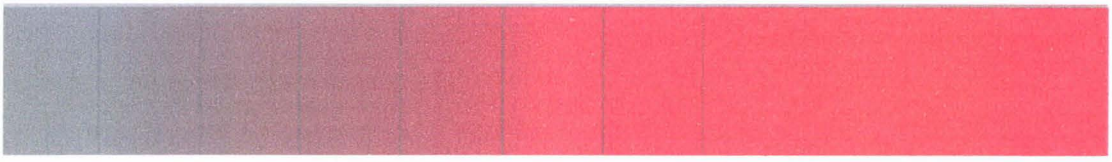
fig 2.5.2 Spectrums of light

Colour has a number of dimensions, which are selected and manipulated by a designer (Mundi, 2001).

Hue – *the name of a colour*



Saturation – *the amount of colour*



Value – *lightness and darkness*

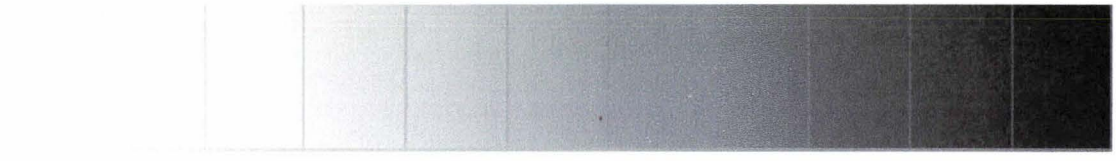


fig 2.5.3 Dimensions of colour (Mundi, 2001)

Designers have to be aware of the differences between additive and subtractive colour. The additive model is used by screen displays (i.e. New Media like the Internet) and mixes colour with light. The subtractive model is used by print media and mixes colour with ink.

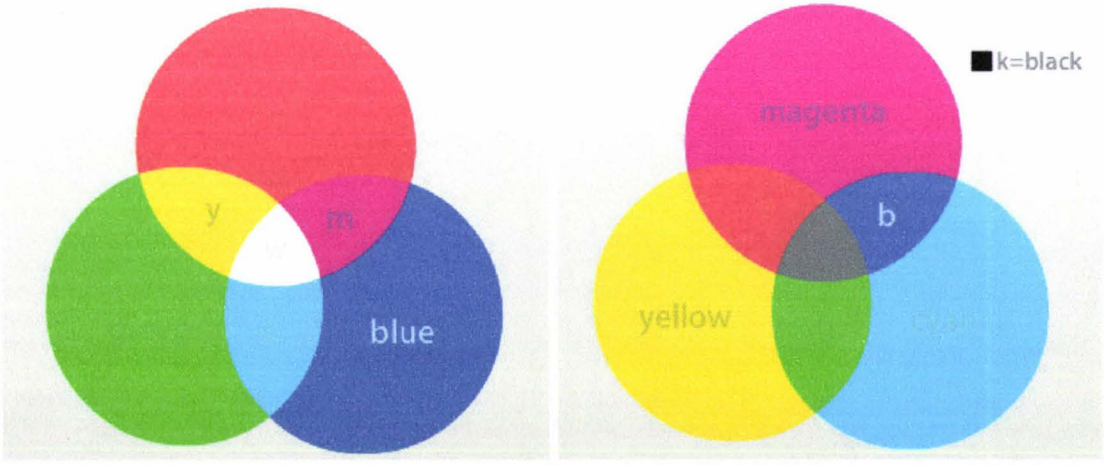


fig 2.5.4 Additive Colour (left) and Subtraction Colour (right) – Mundi (2001)

Mundi (2001) and Parker (1997) look at a number of qualities of colour that should be evaluated against in design. A basic recommendation includes exercising constraint – limiting the design to a few

signature colours. The use of accidental colour should be avoided (e.g. falsely indicating navigational text links) as this creates frustration and negative emotions.

Designers have to be aware of colour ***harmonies*** (Parker, 1997) as they contribute to the emotional appeal of the design. If something is harmonious then it will evoke peacefulness and relaxation. The designer has to ask themselves whether the colours work well with each other. Some basic colour harmonies are shown below in figure 2.5.5.

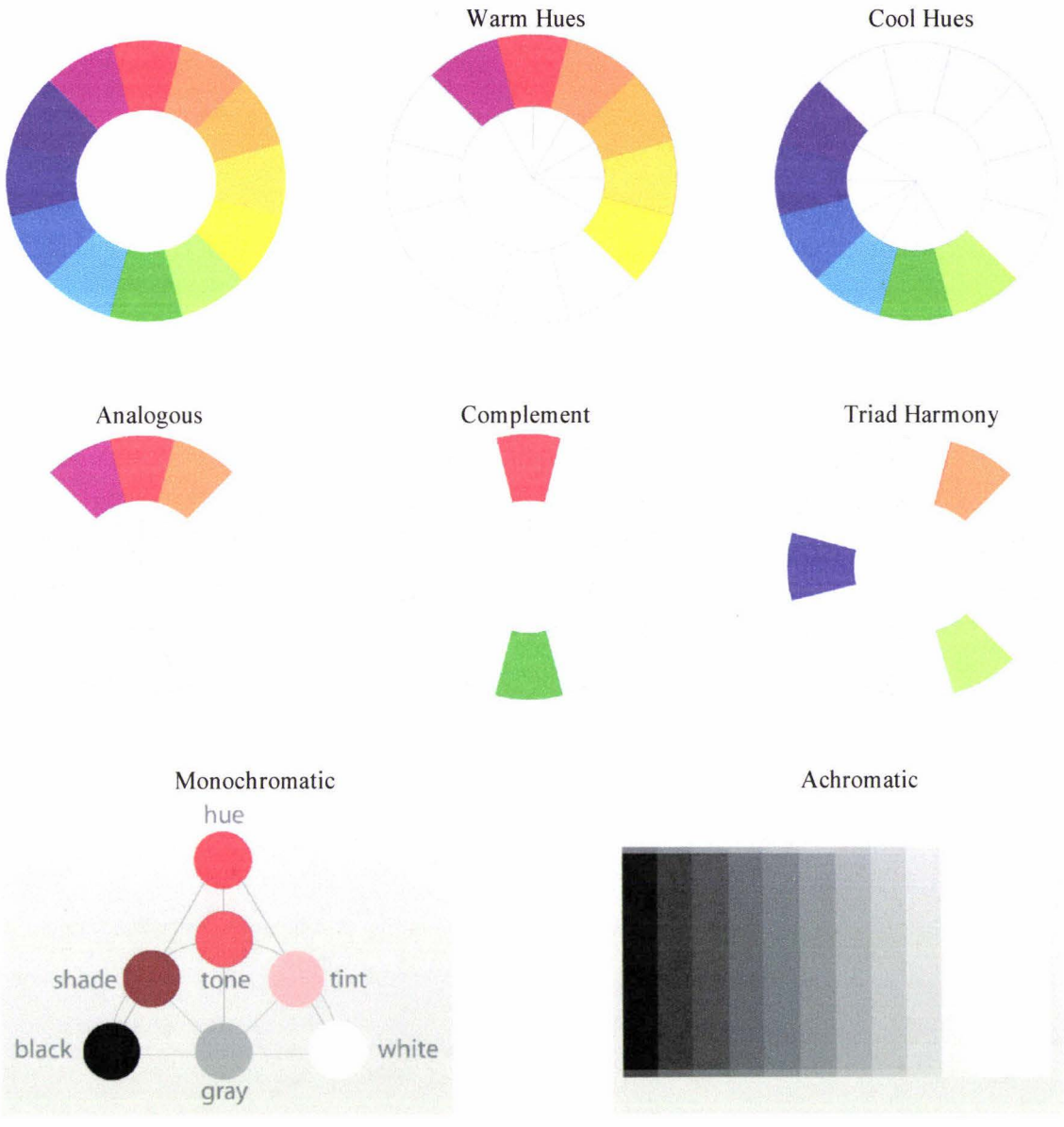


fig 2.5.5 Colour harmonies – Mundi (2001)

Harmony can be defined as a pleasing arrangement of parts in visual experiences (Morton, 2001c). When something is not harmonious, it's either boring or chaotic. At one extreme is a visual experience that is so bland that the viewer is not engaged. The human brain will reject under-stimulating information. At the other extreme is a visual experience that is so overdone and chaotic that the viewer

can't stand to look at it. The human brain rejects what it can not organise or understand. Colour harmony delivers visual interest and a sense of order and equilibrium.

Like Mundi (2001), Morton (2001a) looks at different types of colour harmonies, three of which are show below:

A colour scheme based on analogous colours (any three colours which are side by side on a 12 part colour wheel, and usually one of the three colours predominates).

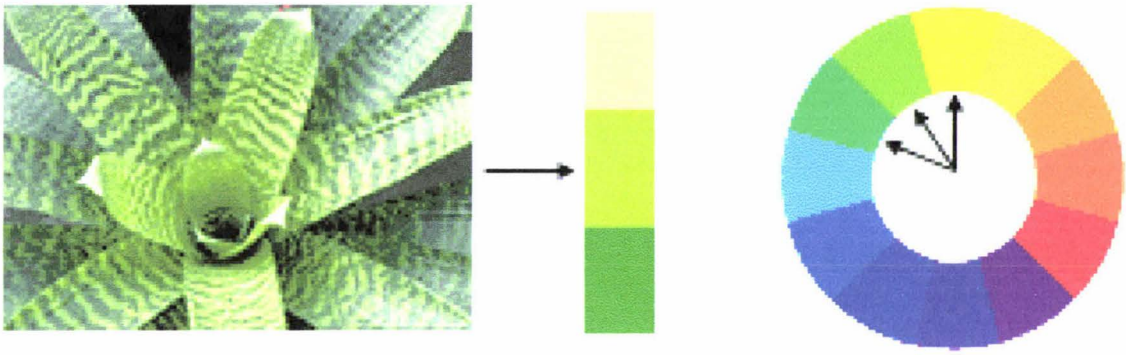


fig 2.5.6 A colour scheme based on analogous colours – Morton (2001a)

A colour scheme based on complementary colours (any two colours which are directly opposite each other, with opposing colours creating maximum contrast and stability.

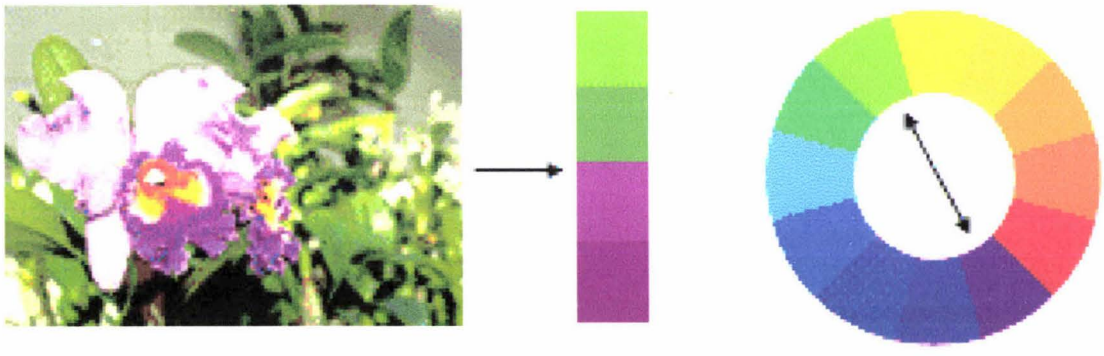


fig 2.5.7 A colour scheme based on complementary colours – Morton (2001a)

A colour scheme based on nature

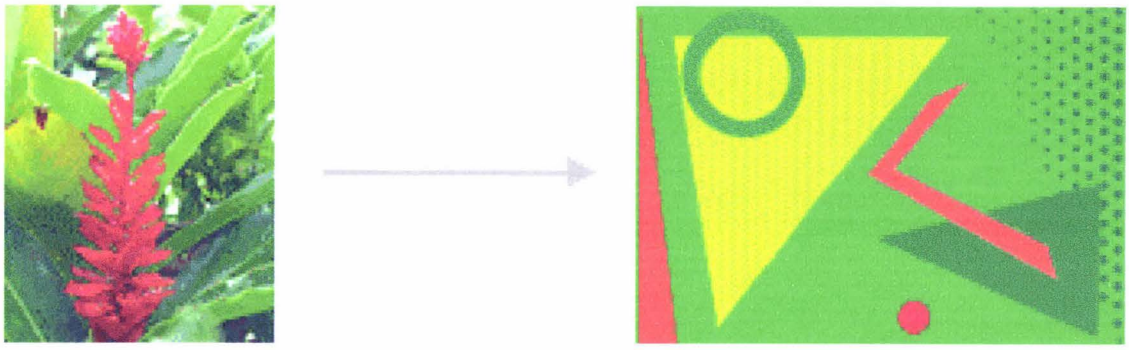


fig 2.5.8 A colour scheme based on nature – Morton (2001a)

Colour ***contrasts*** are based on the colour dimensions: hue (h), saturation (s) and value (v).

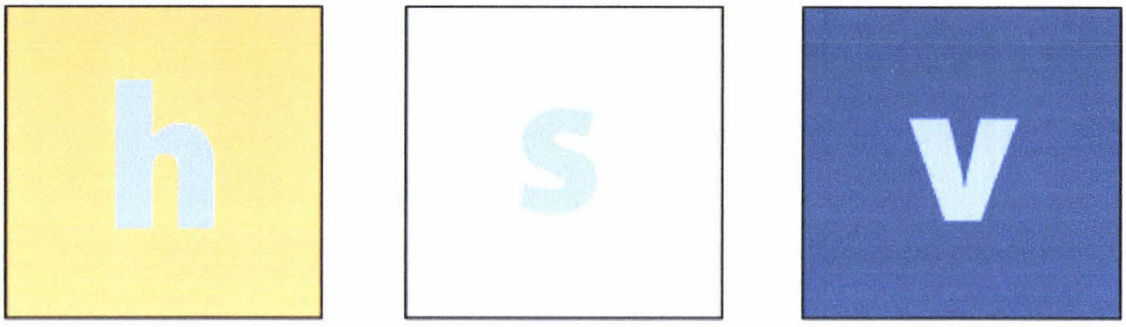


fig 2.5.9 Colour contrasts and dimensions

Mundi (2001) distinguishes between Simultaneous Contrast and HSV Contrast. Simultaneous Contrast refers to the visual influence of one colour on another when placed next to or upon each other. HSV Contrast is the difference in perception due to colour contrasts. Notice that in the fig 2.5.10 sometimes the centre box will appear lighter or darker depending on the field it is on. Morton (2001) demonstrates the contrast effects of different colour backgrounds for the same red square. Red appears more brilliant against a black background and duller against a white background. In contrast with orange, the red appears lifeless; in contrast with blue-green, it exhibits brilliance. The level of contrast should be related to the emotion that is hoped to be evoked.

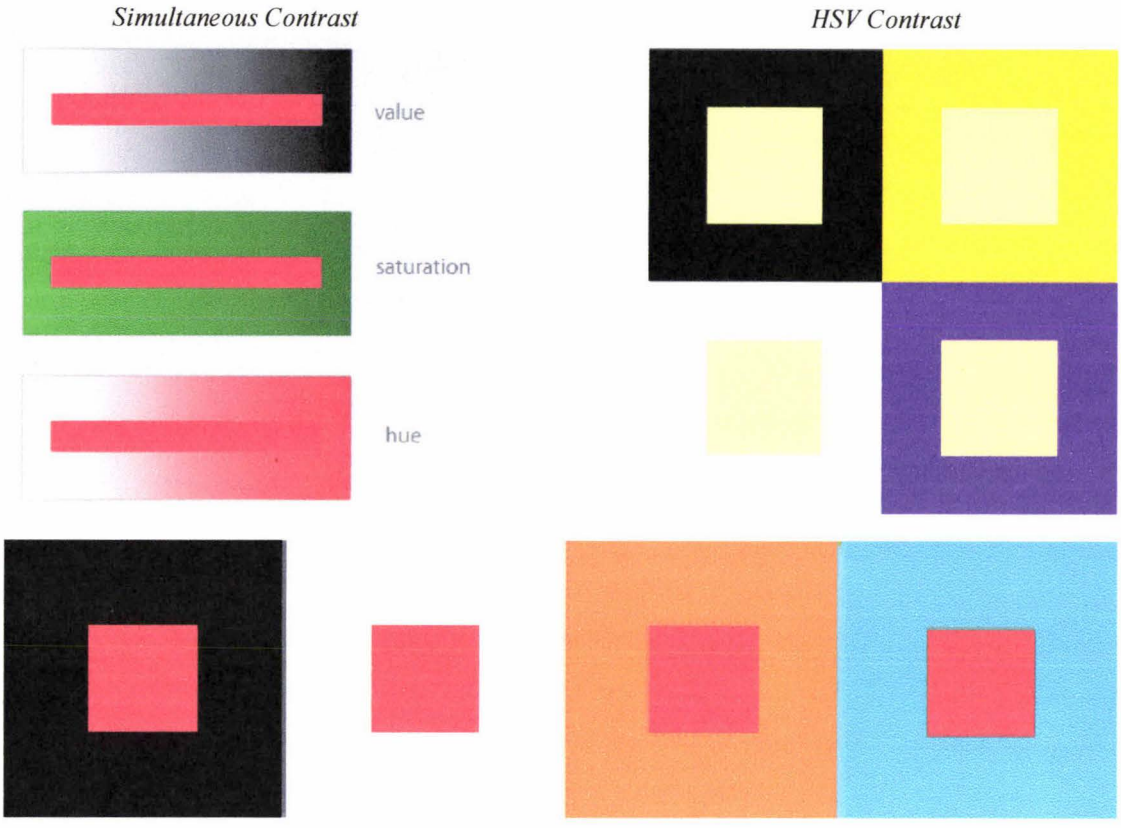


fig 2.5.10 Colour contrasts – Mundi (2001) and Morton (2001)

Further points from Parker (1997) for analysing and using colour include:

- IMPACT – does the overall use of colour contribute or detract from the site?
- HARMONY – do the colours work well with each other?
- CHOICE OF BACKGROUND COLOURS – is it pleasing to look at or does it detract?
- CHOICE OF TEXT COLOURS – is it easy to read?
- CODING – does the colour have a purpose?
- UNIQUE – are colours chosen carefully to project a unique image?

Graham (1999) and Morton (1998) show that vibrant colour combinations convey an expression of energy, and blue colour combinations can be soothing. Images from both sources are shown in figure 2.5.11.

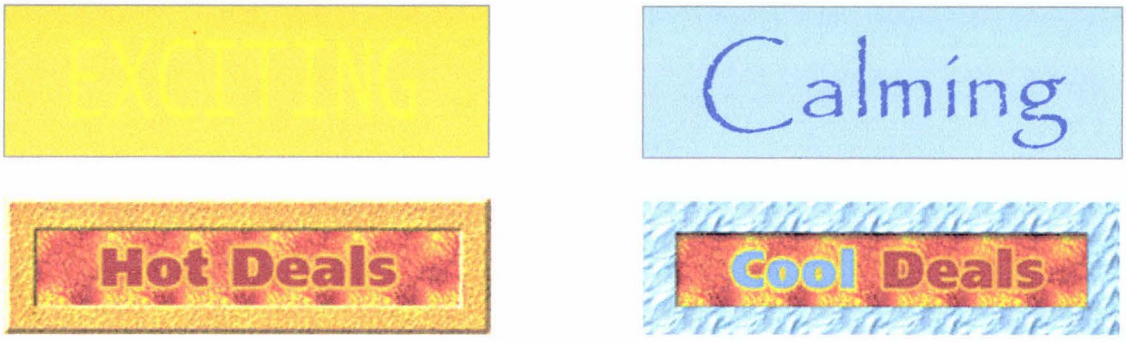


fig 2.5.11 Colour contrast (Morton, 1998; Graham, 1999)

Bright colours convey an impression of emotional energy, while lighter colours seem more subdued:

fig 2.5.12 Colour energy

Another aspect to consider with colour choice in design is using 'Web-safe' colours. Many designers are surprised to see that their Web page looks different on computers other than their own. This is especially true when a Macintosh computer looks at a page made on a Windows PC, or vice versa. There are several 'safe' palettes available on sites like http://www.dtp-aus.com/htmlchrt.htm [2001, Aug 16] and http://www.nedcomm.nm.org/doc/webcolor.htm [2001, Aug 16] to avoid negative emotions. Excerpts from these sources are shown in figure 2.5.13.

fig 2.5.13 Web-safe palettes

Depending on browser-types, monitor types, settings, computer environments, work/home environments and other factors, the appearance of colour on the Web can change – meaning that the chosen colours in a design can actually come out quite differently from that expected. Morton (2001) discusses Metamerism, which is a phenomenon that occurs when colours change when viewed in different light sources. The analogy of buying a product based on its colour in a shop or showroom then using it in a different environment is shown (reflecting the fact that designing colours in one environment might look different in the users' environments).

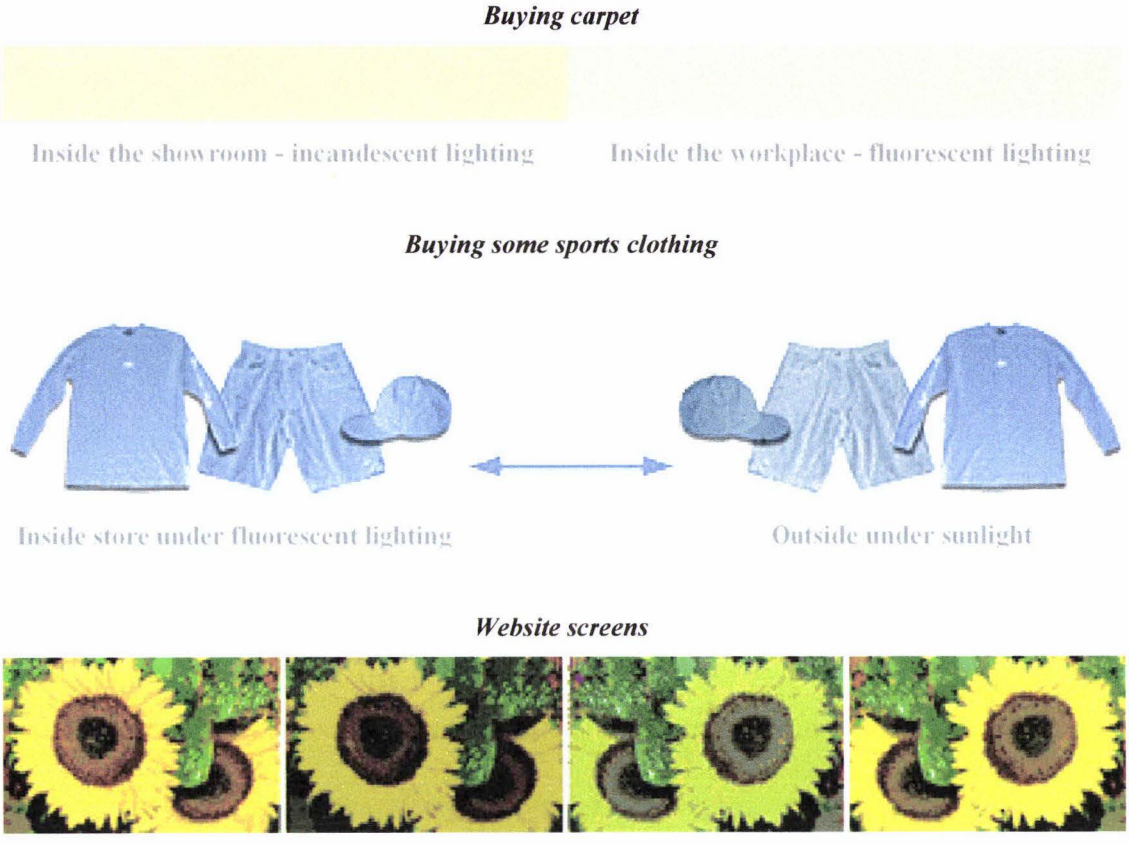


fig 2.5.14 Analogies of Metamerism, demonstrating instability of colour on the Web (Morton, 2001)

2.5.2 Colour and Emotions

Colours play a key part in emotional response, and because of this, Web and e-Commerce design should take careful note of what colours are included and for what purpose. Having the wrong colours will turn people off straight away. But having the right colours that match offerings, objectives, and the needs of the expected target market customers will entice purchases.

Choices of colour can be 'make-or-break' factors (Heath, 1997) because when a consumer encounters a new product or display up to 60% of the first impression comes from colour. Much of the selling power of colour can be traced back to the emotional memories associated with various hues. Colour has the power to communicate emotion and the essence of the product inside. Without words, colour can communicate sexiness, fragility, durability, youth, and freshness.

Colour operates on both conscious and subconscious levels. On the conscious level, colour provides an easy way to add noticeable emphasis to headlines and visuals. On a subconscious level, colour provides emotional clues, which are often based on cultural habits as well as the physiology of the human eye (Parker, 1997). Colours carry strong emotional overtones that send a message as powerfully as the words used to communicate ideas.

Colour preferences vary by culture (which is discussed in section 2.6) but they also vary by gender (Khouw, n.d.) and age. Heath (1997) mentions the popularity of neon green for children. This can be related to the design of the X-Box gaming console from Microsoft (as shown in figure 2.5.15), who have designed to generate fun and pleasure-based experiences in their target market by having glowing neon green features.

fig 2.5.15 The XBox Gaming Console from Microsoft

Colour preferences change over time, and are forecast by analysing lifestyle, politics, art, fashion and technology (Heath, 1997). Three consumer colour preference psychographic groups are:

- Colour Forwards (young and ethnic, or higher income, or educated women over 45);
- Colour Prudents (mainstream, who by the time they accept a new colour, it has become mass mainstream);
- Colour Loyals (who resist colour changes).

Changes according to fashion are also brought up by Virtual Mechanics (2000). Although both colour and music can generate a direct emotional response in people, colour is more easily influenced by fashion. Colours that can remind us of a time or place can evoke an emotion related to that experience. The designer should try and imitate this. This can once again be related to discussions of familiarity and past experience in affective human factors (section 2.3.3) and trust (section 2.4).

Major Websites such as Microsoft have probably undertaken extensive research into the effects of the colours that they have chosen. In addition to using the Web safe colours, they are careful to ensure that they elicit the desired emotional response. They want you to believe that they are big, stable and professional. Disney on the other hand, wants to portray fun even though it contains e-Commerce shopping features (Virtual Mechanics, 2000).

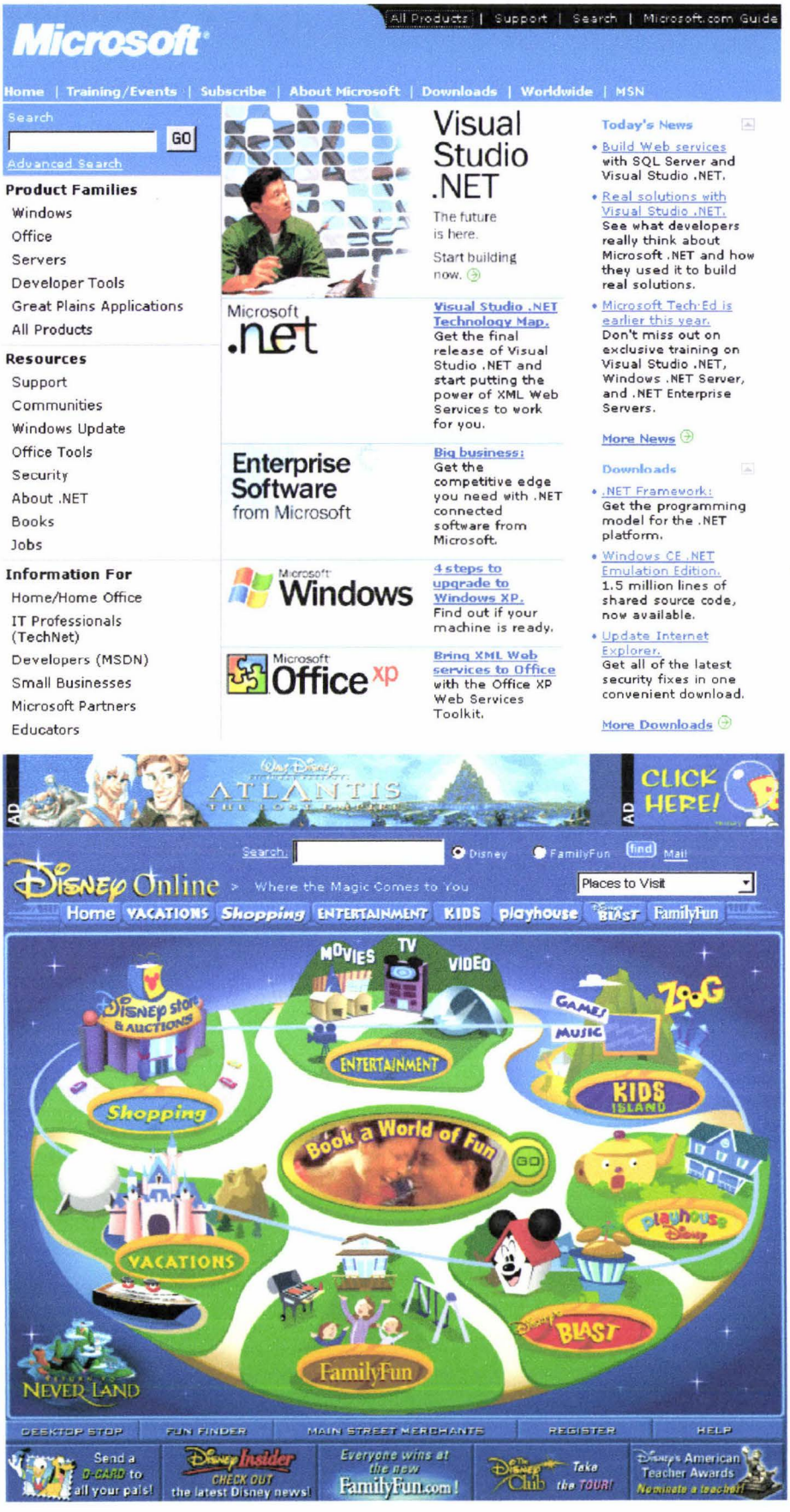


fig 2.5.16 Different emotional responses to colour – www.microsoft.com and www.disney.com [2002, Feb 16]

There are a large number of literary resources available on the use of colour and the universal emotions they invoke (Heath, 1997; Think Quest, 1999; Alley Katt, n.d.; Virtual Mechanics, 2000; ICS, 2000; GameDev, 2001; About, 2001). These have been merged into the table below:

Colour	Meaning
Red	When humans see red, primordial memory kicks in. When our ancestors saw red it was time to fight or flee. Red causes a physiological reaction – when we see red we must pay attention. Marketers have used this for sports cars and Coca-Cola™. Sources associate the following words with the colour red: danger, stop, negative, excitement, hot, warm (makes space appear smaller), fire, heat, blood, danger, Christmas, passion, rage, intense.
Blue	Cold (will enlarge a space), depressing, transparent, wet, cold, water, ice, melancholy, sober, and subdued.
Dark Blue	Stable, calming, trustworthy, and mature.
Light Blue	Youthful, masculine, cool.
Green	Growth, positive, organic, go, comforting, neutral temperature, relaxation, cool, nature, water, refreshing, peaceful, guilt, ghastliness, sedative, hyponotic, eases fears and pain, and calming.
White	Pure, clean, honest, cool, snow, clear, frank, bright, youthful.
Black	Serious, heavy, death, neutral, night, empty, mourning, deadly, depressing, ominous.
Grey	Integrity, neutral, cool, mature.
Brown	Wholesome, organic, unpretentious.
Yellow	Emotional, positive, sunny, cheerful, caution, vital, inspiring, health.
Gold	Conservative, stable, elegant.
Orange	Emotional, positive, organic, warm, autumn, Halloween, jovial, energetic, lively, exuberance, brightens the emotions and stimulates the nerves.
Purple	Youthful, contemporary, royal, cool, mist, darkness, shadow, lonely, dignified, mourning, subduing influence.

Pink	Youthful, feminine, warm.
Pastels	Youthful, soft, feminine, sensitive.
Metallic	Elegant, lasting, wealthy.

fig 2.5.17 Stereotypical colour associations

Some of the basic stereotypes from the table above (figure 2.5.17) are represented in the colour continuum below:

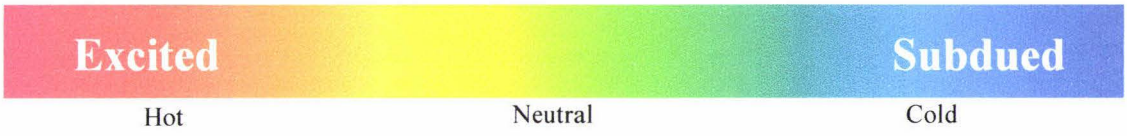


fig 2.5.18 Colour temperature continuum

Some basics in colour theory involve the idea of 'colour temperature', where temperature is defined as colours that would be considered cool, warm or even hot. Colours in the muted blue, green and violet range are considered 'jewel tone colours'. They are cool colours that are restful and tranquil. Warm colours would be defined in a muted range of red, brown and orange. These colours are used to keep the mind stimulated and alert. Hot colours are yellow, pink, bright orange, and pure red. The uses of these colours are for the purpose of exciting the eye (Think Quest, 1999).

The hard colours of red, orange, and yellow are known as warm colours because of the warming effect they have psychologically. They also create a mood which is cheerful, energetic, vital and sociable. People may find them provocative, arousing and even erotic. The energy from these colours can provoke strong reactions. The soft colours of blue, green, and violet are also known as cool colours because of the cooling effect they have psychologically. They have a quieting and relaxing effect, although they can be cold in some way if not lifted by something else.

Sasaki (1991) looks at general reactions to colour. Warmth and coolness in colour are dynamic qualities, with warmth signifying contact with environment, coolness signifying withdrawal into oneself. Red colours tend to increase bodily tension, to stimulate the autonomic nervous system, but green and blue colours release tension and have a lesser physiological effect. Direct connections exist between the brain and the body and reactions take place independently of thought or deliberation.

Another visual representation of the emotional stereotype for each colour is provided by Mundi (2001) in figure 2.5.19, with the facial expression reflecting the emotional quality of the colour (although these don't necessarily match the emotional links cited by other references).

fig 2.5.19 Facial analogies of colour emotion (Mundi, 2001)

Colour has been shown to cause definite physical and emotional reactions in humans and in some animals (Think Quest, 1999). Scientific evaluations have linked the sensations of relaxation or pleasure, tension or irritation, spirituality or passion to the influences of colour. A number of studies over the years have looked at the relationship between colour and emotions. These can have a number of practical applications. Children who are taught in a predominantly red classroom will become irritable. The impact of strong reds could be one reason why so many fast food chains are coloured red, yellow or orange. Cited studies suggest this stimulates the customers making them hungry yet impatient at the same time. The same principles could potentially be applied on the Web.

Shafer (2000) looks at the emotions of colour for interior design, stating that our sight is the most important sense when we enter a room. The atmospheres colours convey instantly make us feel relaxed or uneasy. Colours can define a room and it's purpose. The list below relates the feeling of a room to colour choice and should be understood by Web designers if they are trying to take some positive atmospheric aspects from traditional physical retail stores and utilise them online.

- Clean: whites, creams
- Refreshing: whites, blues, yellows, greens
- Calm: blues, blue-greens, lavenders
- Cool: blues, greens, lavenders, greys
- Warm: orange-yellows, tans, peaches, reds, browns
- Cozy: browns, tans, reds, oranges
- Snug: reds, oranges, greens
- Intimate: reds, yellows, dark blues
- Bright: yellows, whites, greens, light blues
- Dim: creams, tans, reds, dark blues, olive greens
- Modern: whites, blues, greys, bright colours
- Contemporary: pastels, light greens, yellows, peaches, light blues, lavenders
- Country: blues, yellow, whites, reds, greens
- Victorian: dark colours, reds, greens, whites
- Sleek: greys, white, blues

Colours in a Website will evoke an emotional response that could encourage a visitor to explore deeper or to move on faster (Virtual Mechanics, 2000). The correct response depends upon the objective. Colour is a perceived experience. When someone asks you what your favorite colour is, you may or may not be sure but you can be certain that there are some colour experiences that you like better than others. Colour preferences vary by the personality of the user. There are tools (like that in figure 2.5.20), which reflect the fact that colour choice is a very personal thing, with personality types and demographics affecting the way colours are viewed.

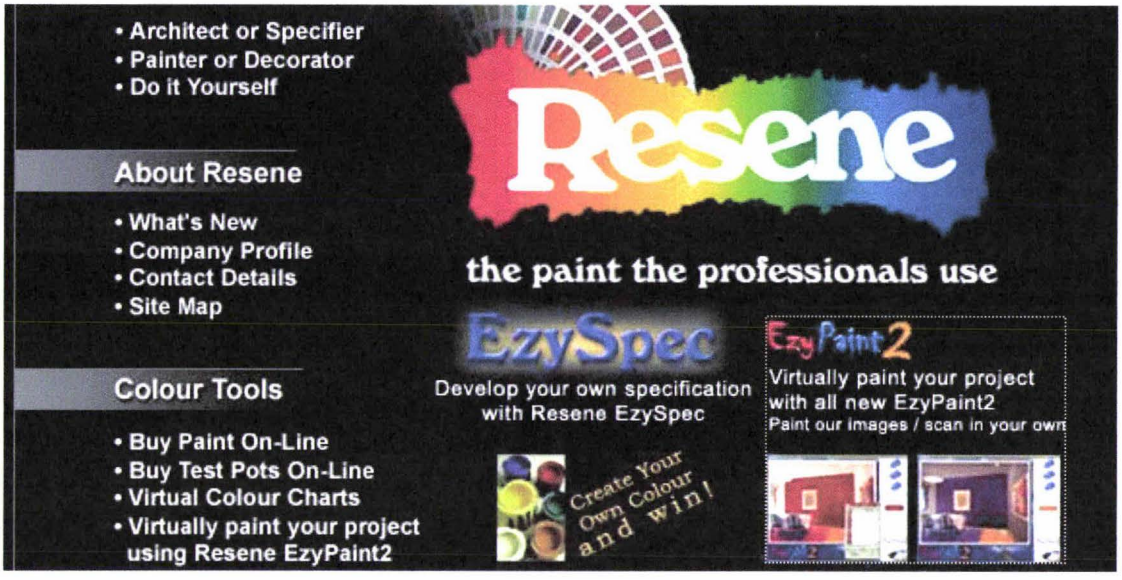


fig 2.5.20 Software facilitating personal colour choice- http://www.resene.co.nz [2001, Nov 30]

Gallager (1996) also cites studies that show that colours affect people in different ways. Using this type of theory properly in Websites may give competitive advantage. Note that there are differences between genders in figure 2.5.21.

CONSUMER	VISIBILITY	RETENTION	PREFERENCE	ASSOCIATION
Blue male	Low	Low	High	Reliable, intelligent, secure
Blue female	Low	Low	Low	Depressing, business-like, leadership
Pink male	Low	Low	Low	Calm, relaxing, feminine
Pink female	Low	Low	High	Therapeutic, feminine

fig 2.5.21 Gender-specific colour theory (Gallager, 1996)

2.6 Culture

A lot of Web-based companies have half of their sales overseas and they therefore need user interfaces that are more international (Nielsen, 2000). Designers also have to make it clear upfront if they are only interested in serving the local market (to avoid wasting people's time). Companies that want to do international business on the Web should consider the impact of culture on the understanding and use of Websites (Marcus and Gould, 2000). Metaphors, models, navigation, interaction and appearance might confuse or offend and alienate a user from a different culture.

Web of Culture (2001) seeks to provide a general overview of New Media objects (e.g. text, icons, graphics and colour) that affect different cultures in varying ways. There is a need to have icons and text that give the site a global feel. Like Nielsen (2000), Web of Culture (2001) mentions that hand gestures and fingers can be considered offensive or rude in different cultures. For example in the USA a 'thumbs up' means 'ok' but is deemed obscene in Italy. Similarly, bare feet are deemed unprofessional in some cultures. Where possible, it is advisable to avoid using images of human body parts on Websites.

According to Nielsen (2000) and Web of Culture (2001), testing is the key to creating a Website appeal to the global audience. There are a myriad of differences between countries and cultures and therefore international user testing is required.

Colours are also interpreted differently around the world. Designers need to make colours, images and icons as universal as possible. For example, subdued Finnish designs for backgrounds may not be suitable in different climates like the Mediterranean (Marcus and Gould, 2000). Khalid (2001) also investigated this area - the symbolic attributes of colour in Asia are quite different from those in the West. To achieve a good design the attributes must be relatively stable across cultures.

Some colours convey universal messages, but others vary by ethnicity. When choosing a colour that represents power, white races are more likely to choose red, while African Americans select black, and Hispanics favour a bright blue. White races select pale pink as most representative of fragility, whereas African Americans select white (Heath, 1997).

Ethnic colour preferences are also discussed by Virtual Mechanics (2000), with the colours used in India being quite different to the colours used in the industrial north and those used in the tropical south. They will evoke different emotions for people from these different regions.

Further information on the cultural symbolism of various colours is presented below in figures 2.6.1 and 2.6.2.

Colour	Cultural Significance
Red	**China** - symbol of celebration and luck, used in many cultural ceremonies that range from funerals to weddings. **India** - colour of purity (used in wedding outfits). **United States** - Christmas colour when combined with green; Valentines Day when combined with pink; indicates stop (danger) at traffic lights. **Eastern cultures** - signifies joy when combined with white.
Yellow	**Asia** - sacred, imperial. **Western cultures** - joy, happiness.
Blue	**China** - associated with immortality. **Colombia** - associated with soap. **Hindus** - the colour of Krishna. **Jews** - holiness. **Middle East** - protective colour. * *Note: Blue is often considered to be the safest global colour.*
Orange	**Ireland** - religious significance (Protestant). **United States** - inexpensive goods, Halloween (with black).
Green	**China** - studies indicate this is not a good colour choice for packaging, green hats mean a man's wife is cheating on him. **France** - studies indicate this is not a good colour choice for packaging. **India** - the colour of Islam. **Ireland** - religious significance (Catholic). **Some tropical countries** - associated with danger **United States** - indicates go (safe) at traffic lights, environmental awareness, St. Patrick's Day, Christmas colour (red and green).
Purple	**Western cultures** - royalty.
Grey	**Western cultures** - loneliness, lifeless and loveless times or settings.
Brown	**Colombia** - discourages sales. **India** - the colour of mourning.
White	**Eastern cultures** - mourning, death. **Japan** - white carnations signify death. **United States** - purity (used in weddings).
Black	**Western cultures** - mourning, death.
Saffron	**Hindu** - sacred colour (orangish peach colour).
Pastels	**Korea** - trust. **United States** - spring, Easter; pale blue (baby blue) stands for an infant boy; pale pink stands for an infant girl.
Rainbow	**United States** - Gay pride; Christianity; cultural unity.

fig 2.6.1 Cultural significance of colour - About (2001)

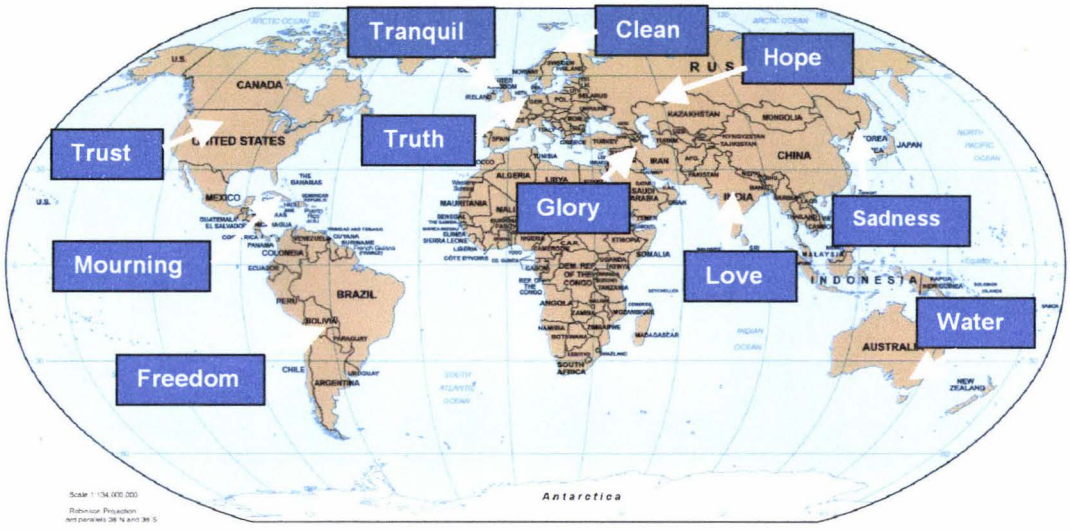


fig 2.6.2 Meanings of the colour blue adapted from Web of Culture (2001) placed in geographical context

Marcus and Gould (2000) define dimensions of culture identified from other literature. These could be included in an overall model for assessing/classifying a Website according to its overall emotional appeal. If a site doesn't have the right cultural fit, then people will experience the emotions of anger, frustration or sadness – and a sale will not result. These demographic and cultural differences need to be investigated via surveys with designers and users – seeing if literary statements are being followed. The dimensions are:

Collectivism versus individualism – in some cultures people are integrated into strong and loyal groups that protect them, whereas in other cultures everyone is expected to look after themselves. On a Website this will affect images of success, emphasis on different life-stages, emphasis on change, and the willingness to disclose information.

Uncertainty avoidance (UA) – the extent to which the culture feels anxiety about uncertainty or unknown matters. High UA cultures would have clear metaphors, limited choices, navigation that prevents you getting lost and models that focus on reducing errors. Low UA cultures would do the reverse and would use colour and sound to maximise information.

Power-distance (PD) – the extent to which less powerful members of society expect and accept unequal power distribution within a culture. On the Web this affects symbol usage, access to information (restrictions and security) and focus on logos and certifications. Marcus and Gould (2000) compare two Websites from educational institutions in different countries. A Malaysian site (http://www.uum.edu.my shown in figure 2.6.3) has a high PD index rating and a Dutch one (http://www.ichthus-rdam.nl shown in figure 2.6.4) has a low PD rating. While the comparative power-distance differences are obvious between the two sites, Marcus and Gould do not show the derivation/calculation formulae of specific PD numbers – making it hard for other researchers to apply the same classification method.

fig 2.6.3 Example of high Power-Distance (cited by Marcus and Gould, 2000)

fig 2.6.4 Example of low Power-Distance (cited by Marcus and Gould, 2000)

Note that the Malaysian site has more emphasis on official seals, monuments and leaders; whereas the Dutch one has photos of both genders and emphasises the power of students.

Femininity versus masculinity – (referring to gender roles not physical characteristics). Japan has a very high masculine culture, USA and France mid-range, and Sweden very low. For Websites, masculine cultures would focus on work tasks, attention via games and competition, and utilitarian graphics and sound. Feminine cultures would emphasise attention via poetry and visual aesthetics and mutual cooperation. For example, http://www.woman.excite.co.jp has a high masculinity value (MAS) according to Marcus and Gould (2000) because it narrows the design towards a specific gender.

fig 2.6.5 Example of high cultural attribution to masculinity (cited by Marcus and Gould, 2000)

Overall, designers must decide between a universal appeal, where the design is 'safe' enough to cater for all cultures; or go for a more targeted design particularly for customers from specific cultures. Perhaps the work of Marcus and Gould (2000) can be used to rate the cultural dimensions in an overall emotional design framework/classification system, with dimensions like MAS, UA and PD having dynamic 'ideal' scores for the targeted customer groups.

2.7 New Media – Principles for Emotional Appeal

2.7.1 New Media Definitions

Interactive design is the meaningful arrangement of graphics, text, video, photos, illustrations, sound, animation, 3D imagery, virtual reality, and other media in an interactive document (Graham, 1999). Successful interactive design depends on user-friendly intuitive interfaces, effective screen layout, and an ability to correctly use New Media to meet emotional needs. The best interactive documents engage the user's interest and participation. Providing fun experiences is one way to gain the user's attention, and ways of introducing fun include using New Media elements like games, graphics and sound.

New Media is "any traditional media that is combined with interactivity" (Holzschlag, 1997:2). It requires and responds to response from the user (interactivity). The World Wide Web (www) is an example of interactive New Media. Another property of New Media is that it is non-linear (e.g. not like reading a book from start to finish).

Sheridan College (1998) asserts that New Media describes any digital media production that is interactive and digitally distributed. Izumi (1998) has an interesting view of the definition of New Media – saying that the term is an impossibility, because whatever we define as New Media now would be old media as soon as we added in new innovations.

Penn State (2001) believes that New Media includes all current emerging technologies of this generation (including the World Wide Web, CDs, and other communications), which play an affective role upon the qualitative values of our personal and collective lives. A similar definition to this comes from TechTarget (2001), which defines New Media as a catch-all term for all forms of electronic communication that have appeared or will appear since the original mainly text-and-static picture forms of online communication.

Although the line is not easily drawn, users of the term New Media often emphasise the visual design aspects of the new digital technology experience. New Media encompasses multimedia, a term originally used mainly for standalone (not online) presentations in various scales as well as hypermedia. Hypermedia refers to the Web's infrastructure that allows for the linking of documents and objects to one another in non-linear ways. This non-linear environment can be described as being similar to the way the human memory works. An example is given of thinking about a favourite piece of music. The melody, name, or some other combination of aspects should be remembered quickly but this information won't always come to you in the same order. The reason is that all the pieces of music are stored in many places in the brain. Using a complex system of biochemical and electrical impulses, the brain retrieves this information as quick as possible and places it into consciousness. This concept of memory storage and retrieval is similar to the hypermedia environment found on the Web (Holzschlag (1997). As a Web designer, it is important to not only understand the parts (e.g. HTML and

programming) but also how they integrate with the whole (technology, art, and the way people interact with the product).

New Media is a sensual environment. As Web technology becomes more sophisticated its sensuality is proven time and time again with the addition of sound, animation, 3D graphics, and virtual worlds (Holzschlag, 1997). Each of these concepts (and their emotional connections) will be further explored throughout the sub-sections of 2.7.

Images, sound, animation, live video, 3D models and interactive elements have all become a normal part of the Web (Koivunen and McCathieNevile, 2001). Multimedia and graphics help users focus on important information, help them understand complicated concepts, and provide an engaging hands-on experience. Multimedia is gaining popularity on the Web, with several new technologies emerging to support the use of animation, video and audio - but Nielsen (2000) warns that although New Media provides design options, it also requires design discipline. Unconstrained use of New Media will confuse the users.

Zender et al (1995) looks at a couple of paradigm shifts involved with New Media. These are represented visually in figure 2.7.1.

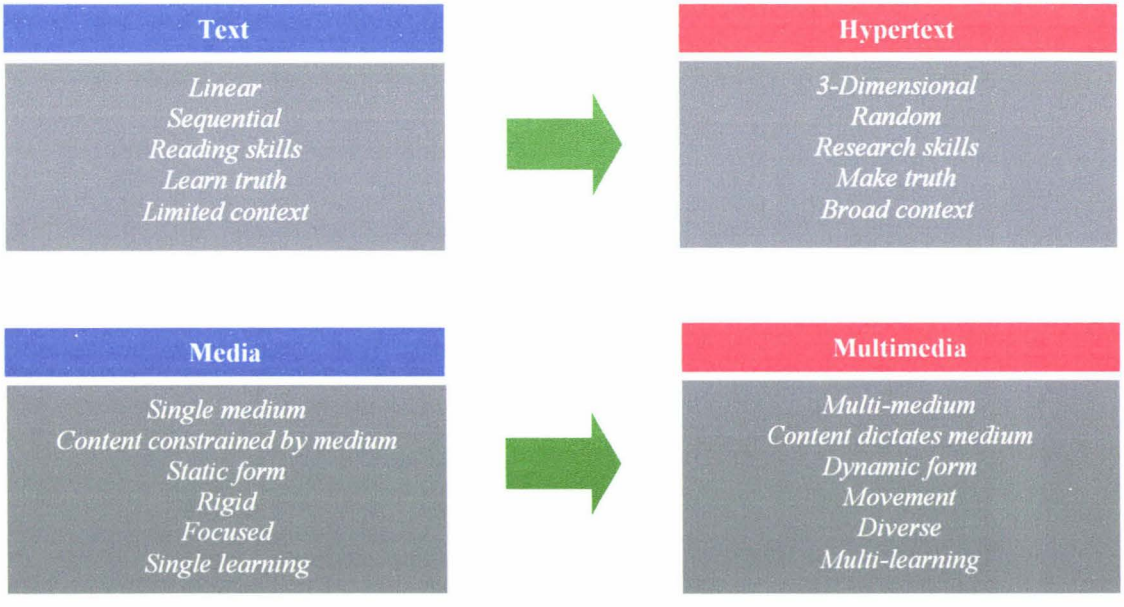


fig 2.7.1 The paradigm shifts from text to hypertext and media to multimedia (Zender et al, 1995)

Nielson (1999) and Parker (1997) look at the differences between print and Web design. Newspapers have a huge canvas to play with. Their designs can pack more impact than a Web page as the entire double page spread is in your face in a fraction of a second. Print design is 2 dimensional – with much more attention paid to layout. In contrast, Web design is simultaneously 1 dimensional and n-dimensional. The n-dimensional aspect comes from hypertext navigation that allows you to move

around. When analysing the look and feel of a Website, the feel dominates the user experience. Doing is more memorable and makes a stronger emotional impact than just seeing. Print is currently superior to the Web in terms of speed, type, image quality, and the size of the visible space. However, there will eventually be bandwidth fast enough to download a Web page as fast as turning a page in a newspaper and screen resolution sharp enough for reading speed. Print can stun the reader with high impact visualisation but the online medium wins because of the user-engagement made possible by interactive and dynamic elements. Print design is based on letting the eyes walk, whereas Web design lets the hands move the information.

Characteristic	Print Media	New Media (Web)
Tangibility	Yes	No (unless printed)
Photographs	Expensive – time and money	Free
Colour	Expensive	Free
Amount of Information	Limited by size and cost	Unlimited
Flexibility	None once printed	Total – can be updated frequently
Distribution Costs	High	Low
Reader Comfort	High – can be read when and where the reader wants. Low eye fatigue	Low – read on a screen. High eye fatigue
Control Over Appearance	Total – can choose size, texture, colour and typeface	Little (but growing) – visitors can control the typeface and size
Control Over Distribution	High – can be posted or hand-delivered to people	Very Little – can not force people to visit your Website

fig 2.7.2 Characteristics of Print and Web communications (Parker, 1997)

2.7.2 Technical Environment of Users

There are some basic factors to consider when designing for the screen and/or new digital media (Kristof and Satron, 1995) including the resolution of the screen and colour depth. Nielsen (2000) states that it is currently impossible to predict the size of the computer monitor that a user has therefore resolution-independent pages must be designed that adapt to any screen size. Cross-platform design is very important, with designers having to consider where users are coming from and what they are using. They may be accessing the Web through traditional computers, a cellphone, or even their car. All have different resolution screens and bandwidths. With the new range of communications devices coming out, screen size considerations are more important than ever. Some examples of these devices are shown in figure 2.7.3.

fig 2.7.3 Different technical environments and screen sizes

On paper it can be assumed that the size is going to remain constant but this is not the case with a Web page (Gillespie, 1998b). On a Windows PC, the browser window will make use of the full width of the screen by default. On a Macintosh, it will usually be slightly narrower so as not to hide the row of icons down the right hand side of the screen. With the growing popularity of larger screens - 800 x 600, 1024 x 768 and more, some Web pages can become unreadable on smaller monitors. The graphics (which are a fixed size) can be too wide to fit. Because of these factors, Gillespie (1998b) presents a browser grid showing the 'safe areas' for different screen sizes and environments (Mac versus PC screens).

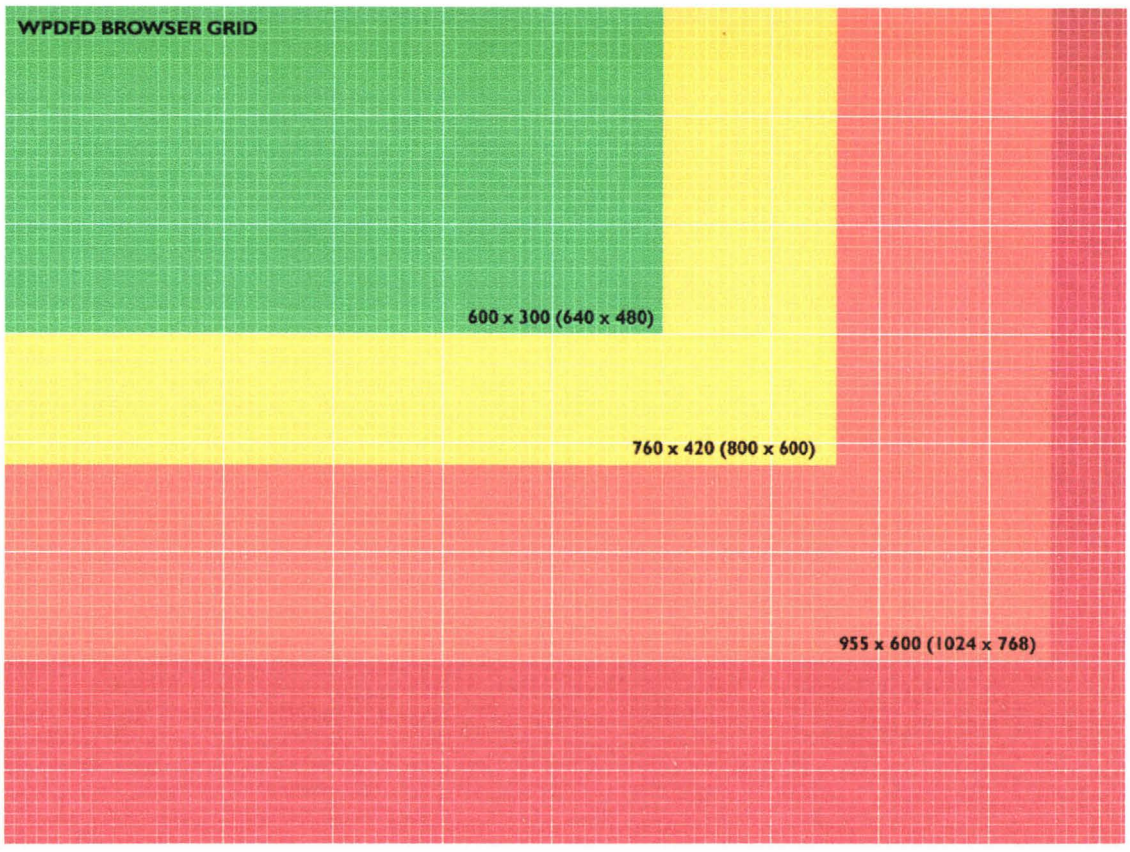


fig 2.7.4 Safe screen sizes across Macintosh/Windows environments (Gillespie, 1998b)

Designers also have to take into the account the number of colours viewable by the user. The setup of the operating system combined with the limitations of the hardware devices (graphics cards and monitors) will facilitate a wide range of colour depths (e.g. 256 colours or millions). A lack of forethought into typical technical environment factors could generate negative emotions and anti-purchasing behaviour.

2.7.3 Use of Video and Streaming Media

Video has an astonishing power to bring the computer screen to life (better than a still image) according to Kristof and Satron (1995), but the novelty will wear off if it doesn't present a compelling message or experience. Because of this there are many crucial decisions that designers have to make to ensure positive emotions last. These include how large the video window should be, and how long the video should play.

With regard to video on the Internet, 'streaming video' is a term being used frequently. This allows the video to start playing before the whole file has been received. According to TechTarget (2001), streaming video is a sequence of moving images that are sent in compressed form over the Internet and displayed by the viewer as they arrive. Streaming media is streaming video with sound. The user needs a 'player', which is a special program that decompresses and sends video data to the display and audio

data to speakers. One restriction about streaming video is that it currently has poor quality, meaning that it is often advisable to also offer a higher quality downloadable version as an alternative (Nielsen, 2000). This is likely to change as bandwidths increase.

Advertising agents have to improve customer response rates by encasing offers in appealing and entertaining content that captures the attention of the target audience (Aberdeen Group, 2000). One disadvantage of online advertising to date is that, unlike TV or radio, an advertiser struggles to capture the attention of the target audience because they can't connect with them on an emotional or sensory level. Advertisers seek to find New Media vehicles that facilitate this sensory or emotive connection. The more stimulating the sensory impact of an offer, the higher the likelihood of response and follow-on interaction. Aberdeen Group (2000) put forward that rich-media advertising represents the best tool for creating online emotive messaging. Advances in the delivery of streaming multimedia now provide advertisers with the potential to connect with online audiences at a higher, more emotive level, without wasting time waiting for a download or opening an attachment.

Keeker (1997) and Nielsen (2000) stated that video should be used to;

- promote television shows, films, or other non-computer media that have traditionally used trailers in their advertising;
- give the audience an impression of a speaker's personality; or
- show things that move or demonstrate physical products.

Rhodes (2000) stresses that the determinant of success is not just the layout and design of the basic site, product offering, or amount of traffic. It is the ability to stand out in a crowded field. This can be related to the use of surprise and variation in order to achieve emotional appeal. The offering must be presented so that visitors will want to stay at the site and make purchases. People want to make their buying decisions easier. Designers can help by learning what the customer wants, highlighting appealing features and benefits, and presenting in a different way from the competition. Utilising streaming media to capture the audience's attention and focus on aspects of the product is one way of achieving this.

Streaming media should not be used arbitrarily. Unless the material is relevant to the visitors and adds perceived value to their purchase, it will be a waste of time. If the streaming media can complement existing material, enhance the offering, and provide additional buying incentive then marketing money should be spent in this area.

2.7.4 Use of Graphics

The appropriate use of text versus images and other display mechanisms is an interesting one. In the first few years of Web popularity the use of photos slowed the download, but now with faster connections for most users and browsers that support compressed graphics, there are few technological reasons to avoid using photos. Allen (1999) asks the question of whether you would rather look at a photograph of a friend, or a table of numbers describing that friend. Although both are accurate descriptions, most of us prefer the photograph. Colour photos convey an emotional message with less effort than text. Some Websites are not utilising photos (especially of people), even though everyone grows up with photos everywhere they turn. Photos of people help convey the emotional understanding that the people in the photos are like us. Seeing people in photos doing things that we would like to do projects us into their situation (i.e. purchasing will make you happy). However, when people in the photos are not like us it is a turn off and we won't use those products. Television and print advertisements have been using the technique of tailoring people in advertisements and marketing material to match the target audience for years. Some Websites are missing an opportunity to quickly set the stage and build an emotional bond with their audience. Even if sites use photos of people effectively, poor attempts at matching the photos to the visitor demographics or interests will result in a weaker relationship.

Humans used sight long before they invented an alphabet and learned to read. Photographs, drawings and graphical representations can communicate at a glance. The key is to choose the right visual at the right time for the right reason (Parker, 1997). Illustrations should be used when you want to communicate mood or image. Illustrations are also helpful to show fine detail that is difficult to see in a photograph. Photographs should be used to communicate specifics.

According to Meads (1999), good graphics direct the viewer's attention to the content and links that are the natural steps toward achieving a goal. Bad graphics direct attention that might take the viewer out of the desired navigation path.

Some sources say that the use of graphics (images and photos) should be minimal because of download times, including Giudice and Stiles (1997) and Nielsen (2000). This contradicts the views of Allen (1999). However, users do want to see photos of the products they are buying because they can't otherwise touch and feel them (Nielsen, 2000). Dul and Weerdmeester (1993) state that the simultaneous perception of a large amount of information by humans is best achieved through the eyes. A middle-ground is for main product photos to have links to larger close-ups, possibly from several angles. This is demonstrated in figure 2.7.5, with images from http://www.davidjones.com.au [2001, Aug 1].

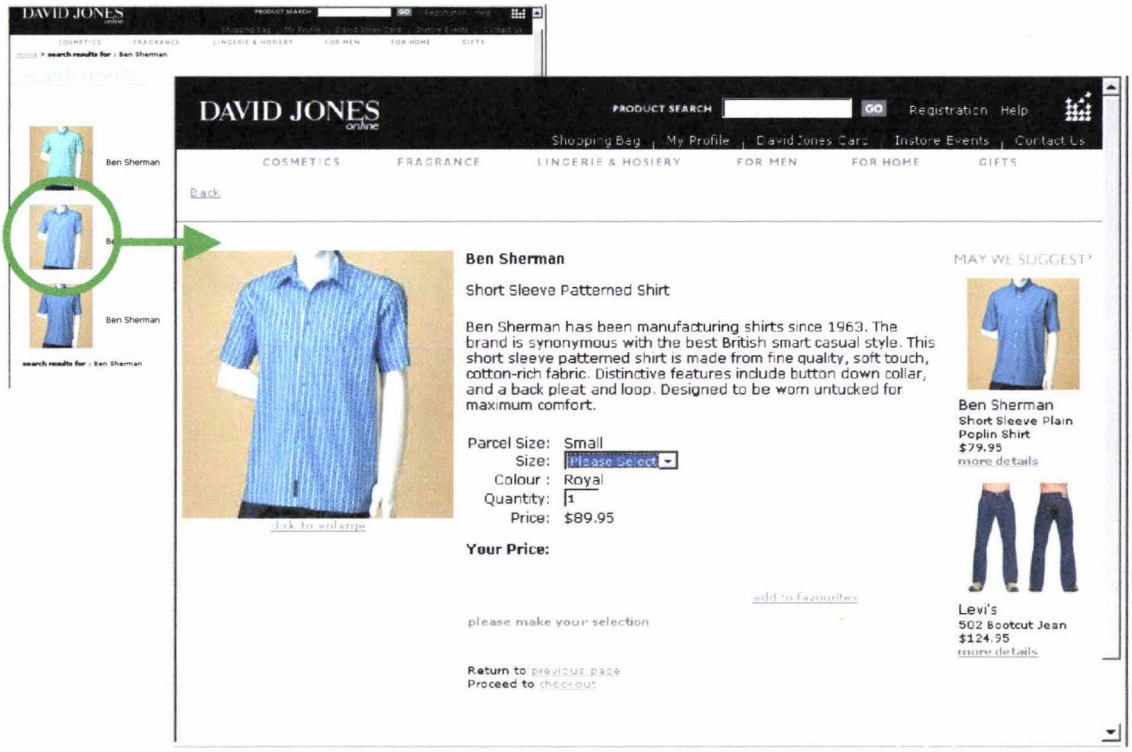


fig 2.7.5 Example of links to larger close-ups in e-Commerce (screens from www.davidjones.com.au)

Web pages that have too many graphics can be distracting and hide important information. A new framework for explaining effective Web design is looked at by Faraday (2000), citing problems with subjective ratings (e.g. poor judgement and idiosyncrasies) and flaws in usability tests in proving pages are well executed. It is argued that the process of viewing a Web page is a cognitive one and therefore these cognitive processes must be understood in order to understand good design. Their aim was to have a distinct visual hierarchy in which certain elements have priority. They have created a Web page critiquing tool (software package) which they claim is a solution leading to better use of images and colour. The tool may well be useful but the source appears too biased (linked to the fact that they want to get revenue from this tool) and their explanation of the methodology for deriving this tool is very limited. Some of their statements are still very valuable for considering overall layout and use of New Media elements though.

2.7.5 Use of Sound

Some designers believe that sound accounts for more than half of the experience of using an interactive product (Kristof and Satron, 1995). "Good-quality sound is known to enhance the user experience substantially" (Nielsen, 2000:154). This is also highlighted in statements from Frog (2001), who believe that sound adds a valuable dimension to interactive projects, and that an inviting audio experience will enrich and reinforce a client's visual message.

Music and sound have large impacts on our emotional well-being. Blood and Zatorre (2001) conducted a study that showed that although it may not be necessary for survival, music taps into the same brain structures that things as crucial to life as food and sex do. They found that the music that research participants said gave them 'chills' also activated the brain's reward and emotion centres - the same areas that have been found to 'light up' when stimulated by food, sex and drugs.

According to Nielsen (2000) the main benefit of sound on Websites is that it provides a channel that is separate from that of the display. Sound has smaller files than video. It can be used without obscuring information on the screen. It can create a sense of place or mood. The example of a computer game called Myst is used to demonstrate mood generation. This also highlights the transferability of principles involved in the emotional design of computer games to Websites, which is looked at in more depth in section 2.9.2 of this thesis.

Keeker (1997) also states that animation, sound, and graphics can make content come alive by evoking mood or emotion. It's hard to imagine a favourite game or dramatic film without the music. One thing of note though is that bad music is more aversive to people than poor graphics (perhaps because it's harder to avoid). Computer users often turn their audio off to avoid annoying music, and may not remember to turn it back on. Special care must be taken to coordinate audio and video. Disjunctive or competing stimuli can cause negative emotions in the audience, forcing them to leave the site.

This can be related to discussions on replicating the physical shopping world in section 2.8 of this thesis. Physical retail shops have the sense of sound being appealed to already (e.g. funky music within clothing stores), and perhaps the online world could copy it to increase likelihood of sales. New Media facilitates a more emotional experience that the physical world in some ways as it is even more customisable to the preferences of the user. There is an obvious need for sound to be heard on sites selling CDs or music (such as the band Rammstein's Website in figure 2.7.6), but it could also be used for an e-Commerce site wanting to create the right shopping atmosphere or mood.

fig 2.7.6 Listening to sound on the Web - www.rammstein.com [2001, Aug 11]

Dul and WeerdMeester (1993), however, seem to disagree in this area, stating that the ear is not often used in information perception, except in communicating through speech. Frequent application of auditory signals is not recommended by them, although they mention the use of alarms and warning signals as being good.

Audio's main benefit is that it provides a channel separate from that of the display and people claim improvements in the graphics or picture quality when sound quality is improved (Keeker, 1997). However, a designer must be wary of when it is appropriate to use sound. Audio should be used to:

- Offer commentary or help without obscuring information on the screen;
- Provide a sense of place or mood. Mood-setting audio should employ very quiet background sounds that do not compete with the main information for the audience's attention;
- Demonstrate a piece of music;
- Give a sense of a speaker's personality; or
- Inform the audience about background events such as the progress of a file download or the arrival of new information.

Considerations must be given to when sound should be used. Suggestions include:

- Assessing whether the audio will be pleasing to the target audience culture and demographics;
- Assessing whether it will be enjoyable if a person views the site without audio;
- Not replaying audio or animation introductions on repeat visits to a location;

- Using subtle variations because repetitive audio samples are usually annoying to people;
- Warning people to turn on their audio before important audio segments, cues, or instructions;
- When audio and video compete for the viewer's attention, provide cues that indicate which stimulus should have their attention; and
- For sound effects, low-tone sounds may be more universally palatable than high-tone sounds.

Lucky Penny Productions emphasise their ability to design Websites that involve experience and emotion. Their site highlights some aspects of this – giving the visitor the ability to interact, explore, and encounter music (which can be turned on or off via metaphorical icon controls). Another site that does this well is http://www.nike-women.com [2001, Sep 28], which is covered in section 2.8.

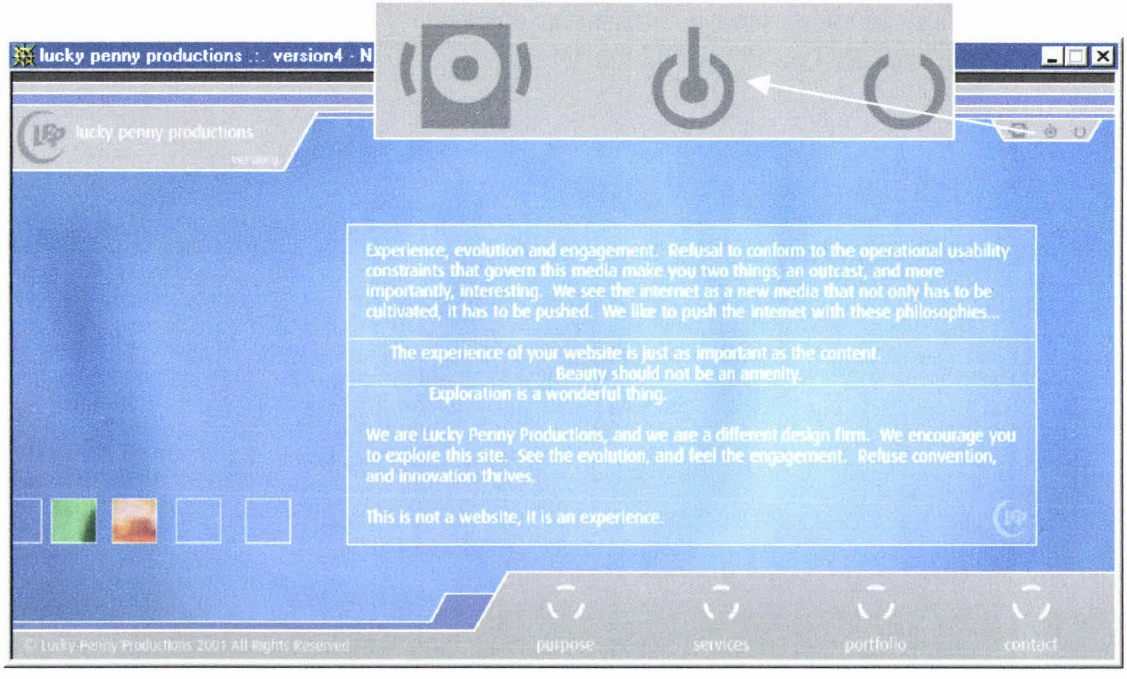


fig 2.7.7 Example of a site with interactive mood music – www.luckypenny.com [2001, Jan 5]

2.7.6 Use of Animation

"Moving images have an overpowering effect on human peripheral vision. This is a survival instinct from the time when it was of supreme importance to be aware of any saber-toothed tigers before they could sneak up on you" (Nielsen, 2000:143). Anything that moves within our peripheral vision dominates our awareness. The use of animations can distract from the content in the middle of the page, and some users find them annoying. However, animation is good for several purposes including visualising 3D structures, attracting attention, or illustrating change over time. The site

http://www.opera-de-paris.fr [2001, Oct 28] is cited as being a good example of animation – being able to choose seating arrangements by moving the mouse over the animated graphics of the theatres.

fig 2.7.8 Animation at www.opera-de-paris.fr

Keeker (1997), Nielsen (1995) and Ravenwood (1999) reveal the following list of appropriate uses of animation:

- Drawing the audience's attention to a single element out of several, or to alert people to updated information;
- Indicating the function of a hot spot;
- Drawing attention to changes from one state to another;
- Demonstrating navigation in a particular direction;
- Creating icons for actions that can't be adequately expressed with a flat, static picture;
- Showing continuity in transitions;
- Indicating dimensionality in transitions;
- Illustrating change over time;
- Visualising 3D; and
- Attracting attention.

2.7.7 Use of Virtual Reality and 3D

One Website design idea to bring in an emotional dimension is the use of virtual reality (VR). Some Websites are currently using this sort of technology to enable users to interact with others and move around a virtual world. This social contact (a proven emotional factor) can take place in a familiar room or in a fun and different way (such as in a futuristic or fantasy city).

There is a continuum of possible degrees of user-interaction and the things that the user can control amongst the various types of New Media. Interaction is very important to the overall e-Commerce experience and to meeting people on an emotional level, so the virtual reality immersion displayed on the right of the interaction continuum (figure 2.7.9) should appeal to emotions to a higher degree.

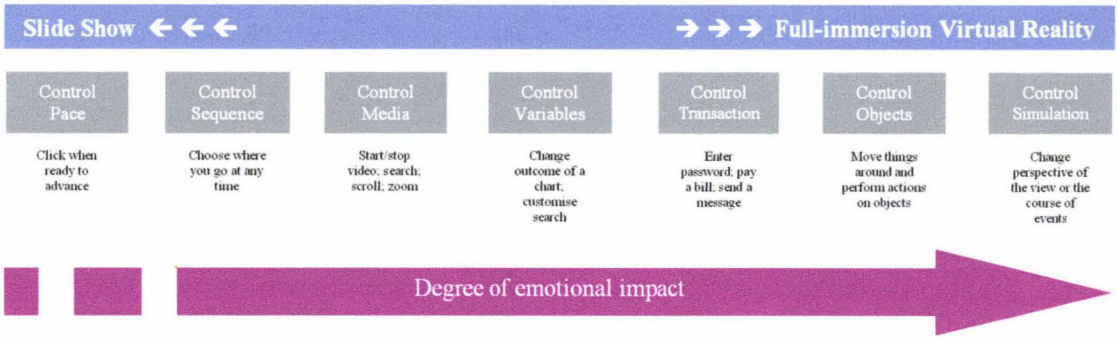


fig 2.7.9 User-interaction continuum adapted from Kristof and Satron (1995)

Because online shopping misses out on the key emotional factor of actually holding a product in your hand and feeling it, perhaps in the future, when pricing allows widespread use, hardware such as VR gloves and headsets will facilitate more life-like interaction. The site http://www.thevrsource.com [2000, Dec 15] outlines such products (shown in figure 2.7.10).

fig 2.7.10 Examples of VR hardware from www.thevrsource.com

Technology such as this allows users to interact with the computer and the Internet in a much more intuitive and expressive manner (using the sense of touch). Latest systems allow users to create, touch and manipulate 3D digital objects with amazing realism. This technology allows doctors to touch and feel virtual tissue, sculptors to create and modify models, and designers to refine and evaluate designs.

Perhaps the same methods could be used for online shoppers to be able to hold and feel articles of clothing or toys to allow their emotional mindset to convince them to purchase.

Kreifeldt (2001) states that of all the senses, touch is the most intimately bound up in pleasure. This is a real limitation with current e-Commerce. The other senses of smell and taste are also difficult to achieve at the moment with computer usage (Dul and WeerdMeester, 1993). Virtual reality on the Web is a step in this direction, with the overall goal of widespread ability to touch virtual products still being a number of years away.

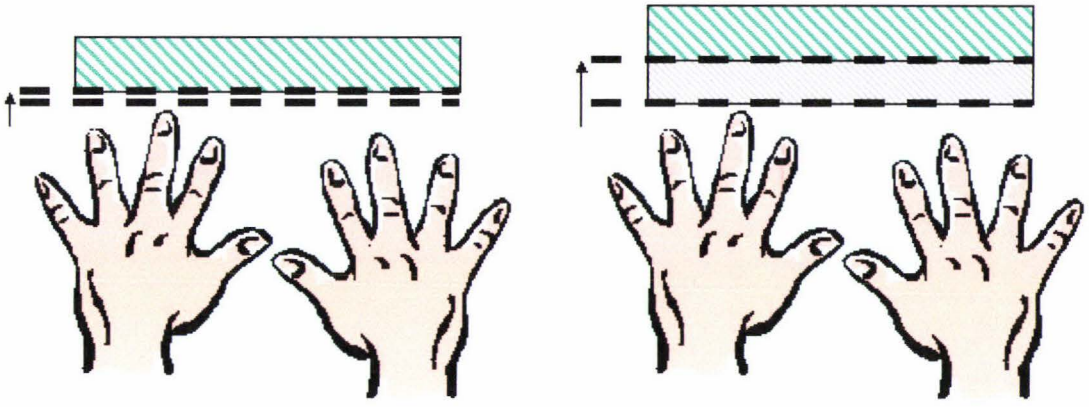


fig 2.7.11 An example of the traditional tactile shopping experience missing from the Web

Blaxxun (2001) has examples of VR products that allow the visitor to move around, zoom in and out, and push virtual buttons on the object to see its functionality. Examples of a video camera and a toaster are shown below. This interaction forms more of an emotional bond than a static image as it is the first step in working towards holding and playing with a product before it is bought.

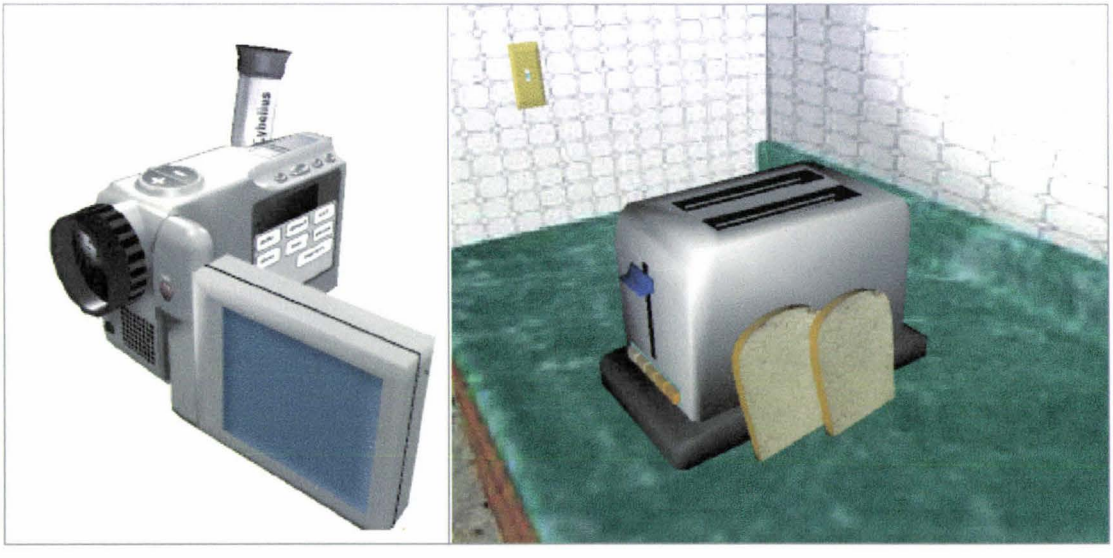


fig 2.7.12 VR enabling exploration of online products from Blaxxun (2001)

This type of interactive functionality on an e-Commerce site could encourage a purchase by appealing to the emotional qualities that are normally reserved just for the traditional physical shopping experience.

Blaxxun (2001) has further examples of using virtual reality in e-Commerce. Designing these aspects into the overall functionality of the e-Commerce site is expected to add emotional appeal through the increased 'immersiveness' and interactivity. Some screenshots portraying this functionality are shown below.

fig 2.7.13 Examples of virtual worlds from Blaxxun (2001)

3D adds a number of difficulties including the fact that the screen and mouse are 2D, meaning that special equipment like strap-on-head gear is needed; it is difficult to control a 3D space with the interaction techniques that are currently in use; and screen resolution needs to be very high in order to render objects in sufficient level of detail (Nielsen, 2000). Navigation in a Website is believed to be confusing in 3D as it causes users to get lost. Virtual reality gimmicks (e.g. a virtual shopping mall) that emulate the physical world (such as www.planetoasis.com, now called www.hugeclick.com) might be better off being avoided by designers.

fig 2.7.14 A VR gimmick cited by Nielsen (2000) – www.hugeclick.com [2001, Jul 14]

Although some references are saying not to use 3D (especially for navigation), Frog Design has recently won awards for doing exactly that – proving that the fun and engaging nature of 3D can be used on the Web too.

frog 3D browser wins 2001 Industrial Design Excellence Award Bronze

frog received a **Bronze Award in Digital Media Interfaces** for the 2CE web browser in the 2001 Industrial Design Excellence Awards. An on-screen room in which web pages are projected on three walls, the ceiling and the floor, the 2CE Browser employs a cube concept to allow users to easily manage multiple tasks and make visual comparisons between the growing numbers of pages on the Web. The interface that controls and navigates the cubes is a combination of mouse and keyboard that is both powerful and easy to use. A floating toolbar palette allows interaction with the individual faces of the cube and a marking menu controlled by a right mouse click illustrates the combination of click and drag commands that navigate the cubes.

2CE Web Browser, IDSA, Bronze

fig 2.7.15 Evidence of the fact that 3D can work on the Web – Frog Design 2CE

Another 3D navigation tool that has had a high degree of acceptance is the desktop management software called Ububu Universe. Customers of Ububu have been quoted as saying: "It's easier, it's more fun, and I get to customize it"; "The most exciting, stunning concept ever"; "Working with my computer has never been more fun"; and "I'm using the Universe to impress my friends" (http://www.ububu.com [2001, Oct 17]). Ububu state that Universe provides the solution to a critical but elusive business challenge: using the PC to create emotional relationships between brands and customers. Roos (2000) states that Ububu.com is the iMac and Volkswagen Bug of desktop management – enabling individuality and self-expression, and making the Web more fun.

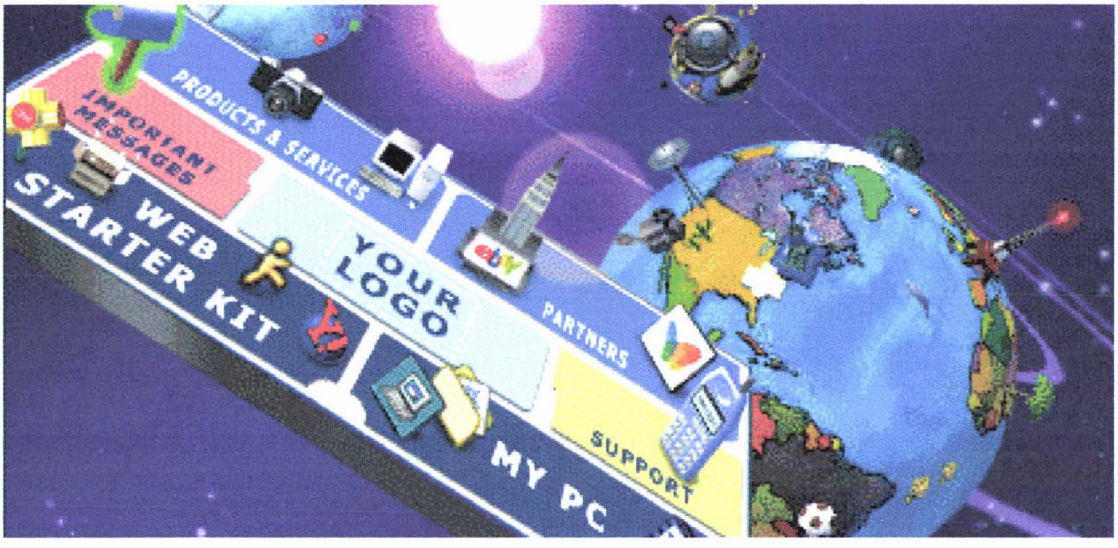


fig 2.7.16 One of many example 3D navigation layouts from Ububu Universe (http://www.ububu.com)

Cooper and Small (1997) investigate a dreamscape (information landscape) with clusters of information objects scattered throughout 3D space, where the user can fly around space and encounter intelligent objects and not get lost. They believe this environment gives context. However, Web navigation currently loses context when going from one layer to another. An ability to fly through space and access representations from many points of view allows users to grasp the complexity of the information. 3D spatial structures are also favoured by Silvers (1997).

While 3D and Virtual Reality can be engaging and generate positive emotions such as fun, it still hasn't been able to gain widespread usage. There is a lack of proof of tangible financial value, and some of these visual qualities need to be viewed through special hardware to gain the most from the experience.

2.7.8 Use of Agents and Avatars for Social Contact

This thesis puts forward that there is the need for social contact when intending to purchase a product or service. This social contact could be in the form of a shop assistant and/or a friend. This is inherent in any shopping experience in the real world, but is very much missing online. With faster broadband Internet access and ever-improving New Media technology, very realistic characters with changing emotions, expressions and looks can now be employed. The concept of familiarity (of human expression) discussed in section 2.3.3 also comes into play.

Human communications are fundamentally social. From the time we are born we react to behaviours such as tone and word order, as well as non-verbal posture, gestures, and facial expressions. These behaviours convey attitudes and emotions. Most software design has focused on cognitive aspects of communication, overlooking most social aspects. Recent research has shown that human beings react to social stimuli presented in an interactive context. Microsoft (1998) looks at how interactive characters can be employed in the user interface as assistants, guides, sales agents, and storytellers – discussing Microsoft Agent technology that enables character interaction.

Czerwinski and Larsen (1998) look at future trends in Web design. They state that because the amount of information on the Web continues to grow at a fast pace, for a Website to add value to the user it must provide an overview of accessible information to users of varying Web expertise. They write an overview of the research techniques and methods that are most advantageous to Human Computer Interaction (HCI) professionals working on Web designs. Their research is based on what they subjectively feel will catch on in the future, using a method of collecting and studying sets of new Web browsers along a variety of interaction dimensions. The dimensions were generated from research into novel HCI techniques and technological breakthroughs. One aspect particularly related to emotional design is their discussion of agents and conversational user interfaces. They believe that social psychology, sociology and anthropology are critical to this area of research and design (in addition to standard HCI techniques), highlighting the need to understand emotion. They state that debates over whether virtual agents should be used during Web interaction will end, and that their use will proliferate in the years to come. They assert that there is a 'middle ground' perspective that is emerging that can help HCI professionals in this area but they don't actually say what this new perspective is, which is disappointing. They imply that there has not been very much research in this area up until now and they hope more studies of the effectiveness of agents and their designs will be made available in the near future.

One criticism of Czerwinski and Larsen (1998) is that they refer to studies undertaken in their laboratory, but don't divulge what type of studies they were or how they were conducted. However, this could be due to the fact that their report was meant to be an overview rather than a comprehensive research paper.

The site http://www.cantoche.com [2001, Dec 1] defines an agent as a "3D animated character with the ability to speak and to listen". Visitors can be welcomed by a virtual character with the capacity to listen and to understand you as soon as you open the Website. The character can be realistic or cartoon-like. With Microsoft Agent and Living Actor technology an Agent can now speak in several languages, understand and react to vocal prompts via word recognition, and integrate artificial intelligence so that it can understand users' questions.

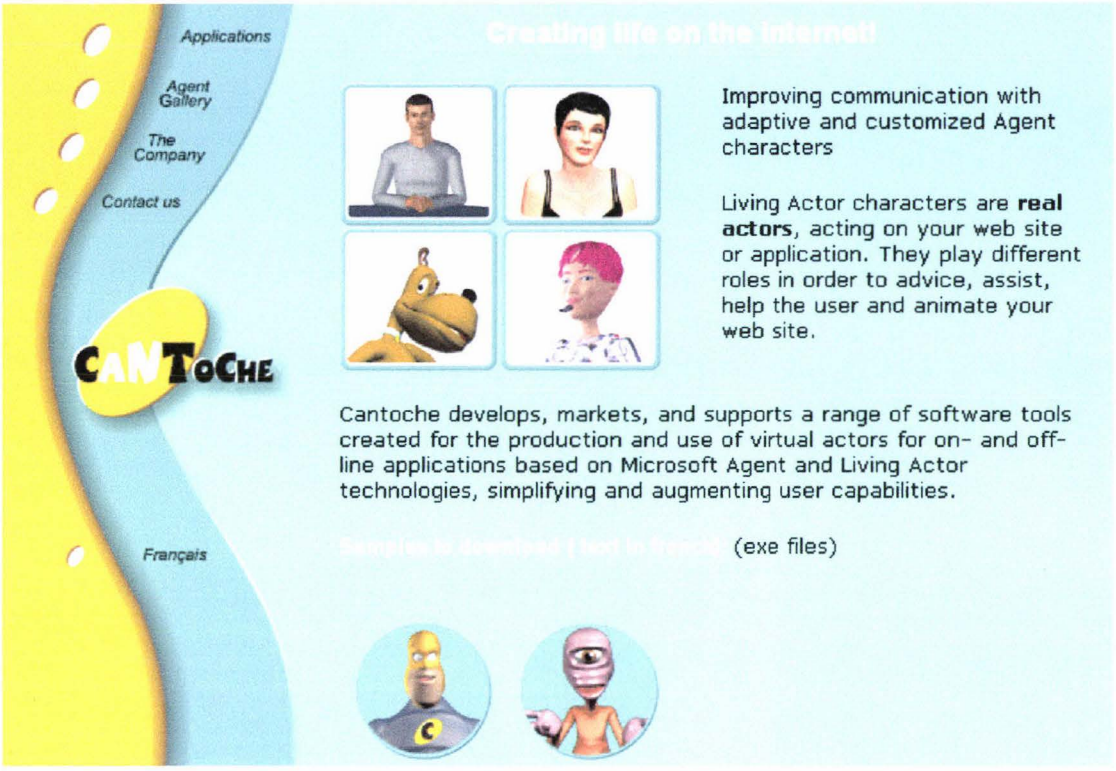


fig 2.7.17 Using Microsoft Agent technology – www.cantoche.com

Meech and Marsh (2000) discuss the use of agents, personalities and user preferences. E-Commerce is increasingly recognising the importance of giving additional value to users by providing personalised transactional experiences. This personalisation can take the form of an adaptable and intelligent interface where users can select information and structure themselves. Once preferences have been set they can be used to automatically change the information content provided to a user and the form it takes. As tasks become more complex and human-like (e.g. recommending, buying/selling, comparing) the range of context expands to include interpersonal/social communications. This is especially true as agents become animated talking head characters, and users expect forms of communication grounded in their real world experiences (familiarity). Interaction with agents is rapidly reaching the point where they are represented by life-like characters that possess elements of personality and emotion together with physical experience qualities. Social qualities are important because they maintain a consistent and believable interaction. If online agents can be related to having a friend or toy, then this will lead to fun and pleasure. Work on investigating the effect of these elements is still at the phenomenological level, but it is mentioned that one study found that subjects prefer to interact with a computer having the same

personality as themselves. This statement could be the impetus for further original research into 'agent choice' according to personality and physical looks.

Ito et al (2001) conducted a subjective experiment to test what elements of personified agents are important to realise affective communication between humans and computers. They developed a story and got a computerised personified agent to narrate it with changes in facial expression and voice types. They classified emotion into 35 words that expressed different Japanese emotions. Because emotion has social and cultural diversity, they chose their focus group to be people with the same cultural background. They constructed a system that associates facial expressions with each emotion category, and the subjects evaluated the appropriateness of each expression. The results of this research were not that promising. The subjects were unfamiliar with the face, which caused problems and only 6 basic facial expressions were recognised – happiness, surprise, fear, sadness, disgust and anger.

According to Lyons et al (1998) an 'avatar' is the visual representation of the self in a virtual world. It can also be defined as the "the visual form of the online visitor in multi-dimensional worlds, or chat communities on the Internet" (Blaxxun, 2001). It is desirable to incorporate personal information (such as an image of a face), about the user into the avatar. Avatars are distinguished from intelligent agents and other digital life forms in that they are specifically designed to convey a personal image to other users. End users must be able to customise their avatar to differentiate it from those of other users. The Egaokun Automatic Avatar Building Tool is discussed, which uses facial recognition technology to customise avatars – good for accentuating emotions. The face is one of the most easily recognisable, characteristic and expressive features of the human body. Important facial characteristics include gender, age, race, and emotional state. Egaokun from Lyons et al (1998) not only attempts to convey a photorealistic but also a 'Kansei-realistic' image of the user.

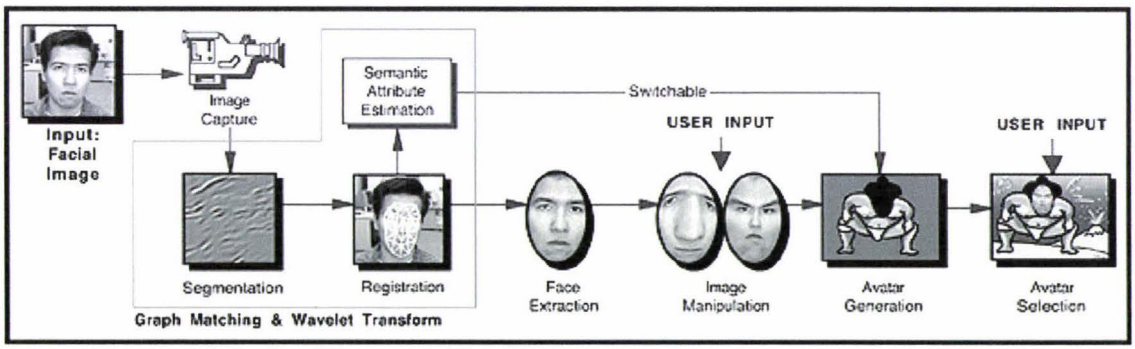


fig 2.7.18 Major functional modules of the Egaokun avatar generation system (Lyons et al, 1998)

Semantic attributes similar to those highlighted in section 2.3.3 of this thesis are employed to demonstrate their techniques (in figure 2.7.19). An automatic semantic analysis of the face into facial categories allows the system to generate intelligent suggestions of avatar body type. Important facial characteristics include gender, age, and the emotional state at the time the picture was taken.

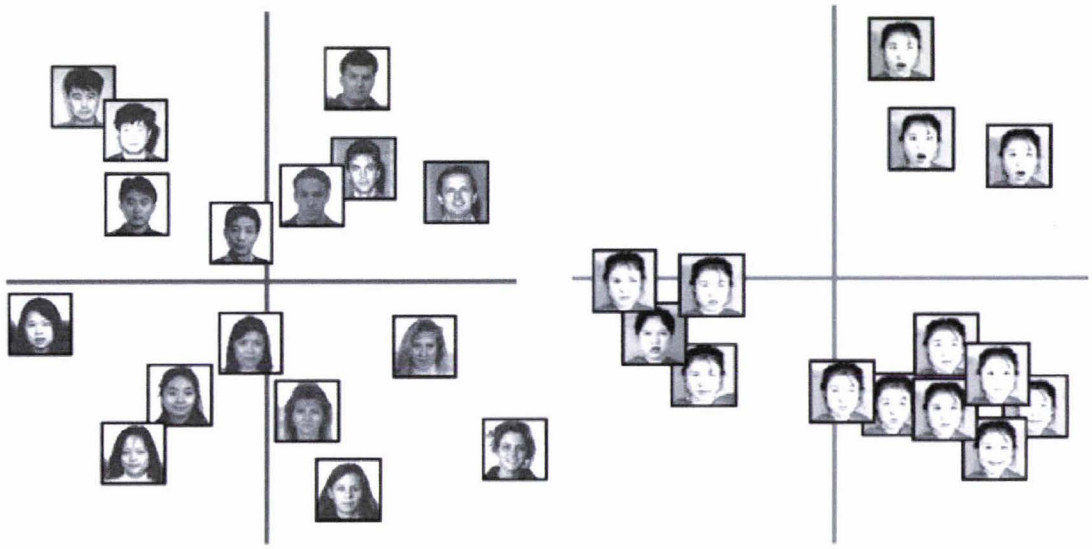


fig 2.7.19 Semantic maps clustering gender and race, and expressions (Lyons et al, 1998)

Amongst other tools for the Web designer to employ is the downloadable Avatar Studio 1.0 from Blaxxun Interactive. This is a great example of users being able to interactively personalise and therefore attach emotion to the experience on the Internet. Customisation features bring a 'fun' and pleasurable aspect. "With their very own personalized avatar, your customers or community members will return to your site again and again" (Blaxxun, 2001).

fig 2.7.20 Avatar Studio 1.0 from Blaxxun (2001)

The site http://www.haptek.com [2001, Oct 15] has the perfect way to appeal to the emotional need for social contact while shopping online with their VirtualFriend and Putty Makeover products. These can be used by designers to meet the social expectations of the target demographics of site visitors. The virtual charcters automatically give emotional meaning to every glance, blink and movement.

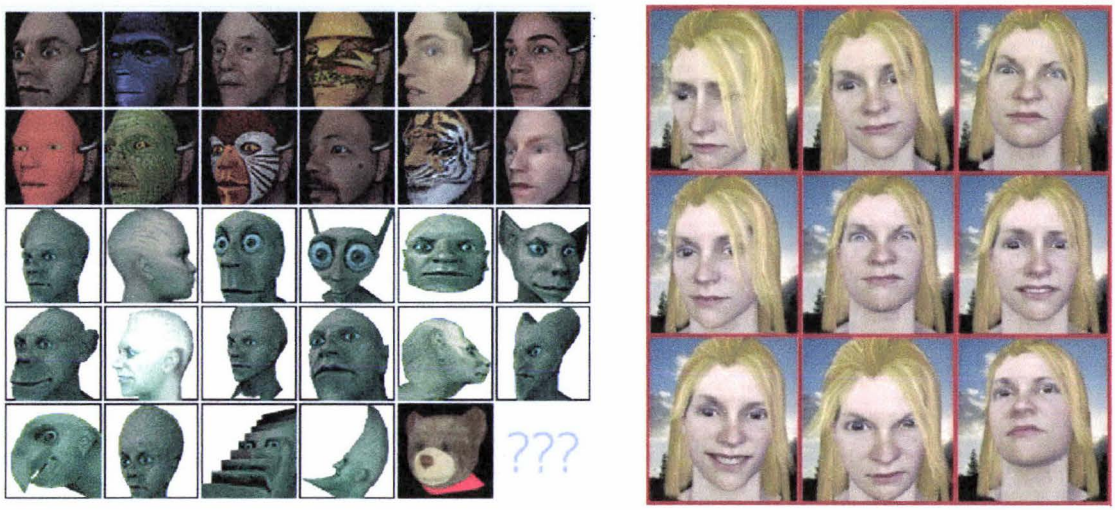


fig 2.7.21 Virtual character products from Haptek

We quickly classify the personality of people we meet based on the simplest of social cues such as posture, gesture, appearance, word choice, and style. So the first impression a character makes is very important. If the character's purpose is to direct users toward specific goals, a dominant, assertive personality should be used. If the character's purpose is to respond to users' requests, a more submissive personality should be used. An approach is to adapt the characters personality to match the users. Studies have shown that users prefer interaction with personalities most like themselves (Microsoft, 1998). A number of simple rules to follow when designing and using such interactive characters in New Media include:

- do not break the design principle of keeping the user in control;
- let the user decide when they want to interact with the character;
- when adding a character to a Website use it as an enhancement rather than a replacement of the user interface;
- quality, appropriateness, and timing are important factors to consider;
- animation and sound should be minimal when the user is not directly interacting with the character;
- should position the character in a convenient location when not directly interacting;
- use natural variation (don't always use the same words, greeting or movements);
- should obey social etiquette;
- use praise; and
- consider gender issues and stereotypes.

One final example of emotional design in this area is that of 'live chat'. In this case, the agents are real people who are spoken to in a text chat format rather than seeing them as animated virtual characters. Whilst appealing to the emotional need for social contact, this also has emotional impact in terms of the trust it invokes. The site http://www.liveperson.com [2001, May, 4] has a Customer Interaction Suite

(chat and email) that improves Customer Relationship Management (CRM) on the Web. It facilitates the ability to chat online with customer service representatives – adding to emotional design aspects by adding a 'human' element back into the equation, and it also relieves tension surrounding lack of trust in dealing with a cold and geographically distant e-Commerce business.

fig 2.7.22 CRM at www.liveperson.com

Carton (2000) states that the human touch is the key to converting visitors into buyers. Where most e-travel sites have a conversion rate of between 2 and 5%, http://www.lowairfare.com is cited as claiming that 18% of visitors to the site end up making a purchase. It seems that this is largely due to an online feature that allows users to talk with a travel agent. Similar results have been achieved in other e-Commerce sectors by highlighting the 'human touch' via tools from liveperson.com and icontact.com (now called !heyinc.com).

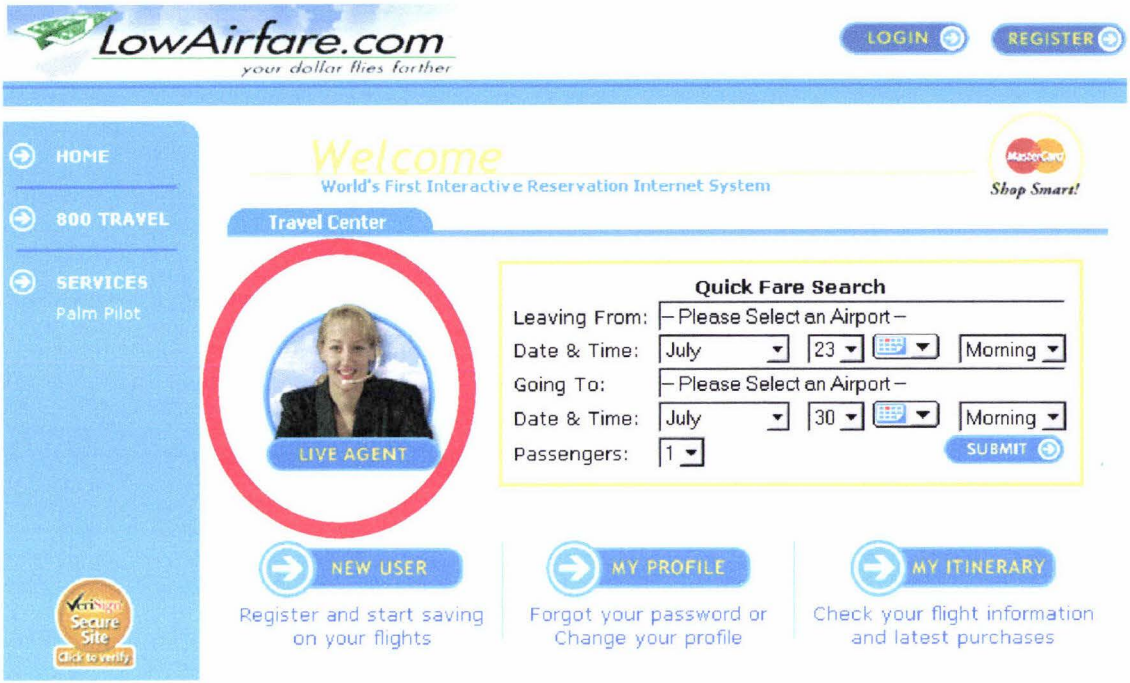


fig 2.7.23 Example of facilitating a 'human touch'

Carton (2000) goes on to say that sites need to have a human touch partly because many new Internet users are not very computer literate. Since the Web is becoming a mass-media tool it is clear that most new users are less familiar with computing than the first Internet users were. Newcomers to the Internet world want an increasing amount of online help – and sites will need to be able to provide this service in order to convert visitors into buyers.

One final aspect to consider for the future comes from Matthews (2001), who discusses a computer that can detect signs of a range of emotional states in the voices of users, including anger, fear and disgust. Using neural networks computers can be programmed to behave as if they are made up of crude brain cells that are trained to recognise patterns through repetition. Maybe the same principle can be used on virtual Website agents in the future.

2.7.9 Usability and Understanding the User

Because emotional needs include the need for personalisation and recognition of target user demographics and culture, user-centred design (UCD) is needed. While usability could be deemed a 'rational' design aspect, it will generate positive or negative emotions depending on its quality. According to Torrens (1998), user-centred design is a design methodology that utilises the target product users as a designing resource to increase the understanding of the designer. "We need the technology to work in the same way average people think. We need a revolution to restore our sanity" (Cooper, 1999:inside cover). With regard to programmers, "their frame of reference is themselves, so they make it easy to use for other software engineers, not for normal human beings" (Cooper, 1999:17).

Meads (1999) states that usability means being able to make the viewer continue on in the Website and perform actions such as purchasing.

There are a number of quotes from Nielsen (2000) which reflect the importance of usability to Web design:

> *"Usability rules the Web"* (9).

> *"The Web is the ultimate customer-empowering environment. He or she who clicks the mouse gets to decide everything. It is so easy to go everywhere: all the competitors in the world are but a mouse click away"* (9).

> *"Usability has assumed a much greater importance in the Internet economy than it has in the past. In traditional physical product development, customers did not get to experience the usability of the product until after they had already bought and paid for it"* (10).

> *"The Web reverses the picture. Now, users experience the usability of the site before they have committed to using it and before they have spent any money on potential purchases"* (10).

> *"Bad usability equals no customers"* (14).

Epifocal (2000) states that making systems more usable has substantial economic and social benefits. Difficult to use systems are more stressful for the user. The costs of user-centred design activities can be balanced against the penalties for failing to meet usability objectives. At each stage of design, user-centred activities are essential in order to understand and specify the business, user and organisational needs, so that potential design solutions can be evaluated against these needs. If usability evaluation is left until just before release there will be no chance to make any significant changes in design to correct deficiencies. In order to achieve a usable product, it is important to begin the cycle of understanding, specifying and evaluating usability by using simple mock-ups at the earliest stages of design. User-centred design processes are characterised by:

- an appropriate allocation of function between user and system;
- iteration of design solutions;
- the active involvement of users; and
- multi-disciplinary design teams (including both technical and human factors personnel).

The Hiser Group (2001) presents a collection of tools and techniques to facilitate user-centred design (figure 2.7.24). When designing e-Commerce sites, some of these techniques (including observation of the stresses that a user encounters in their surrounding environment) should be used to make sure needs are being met.

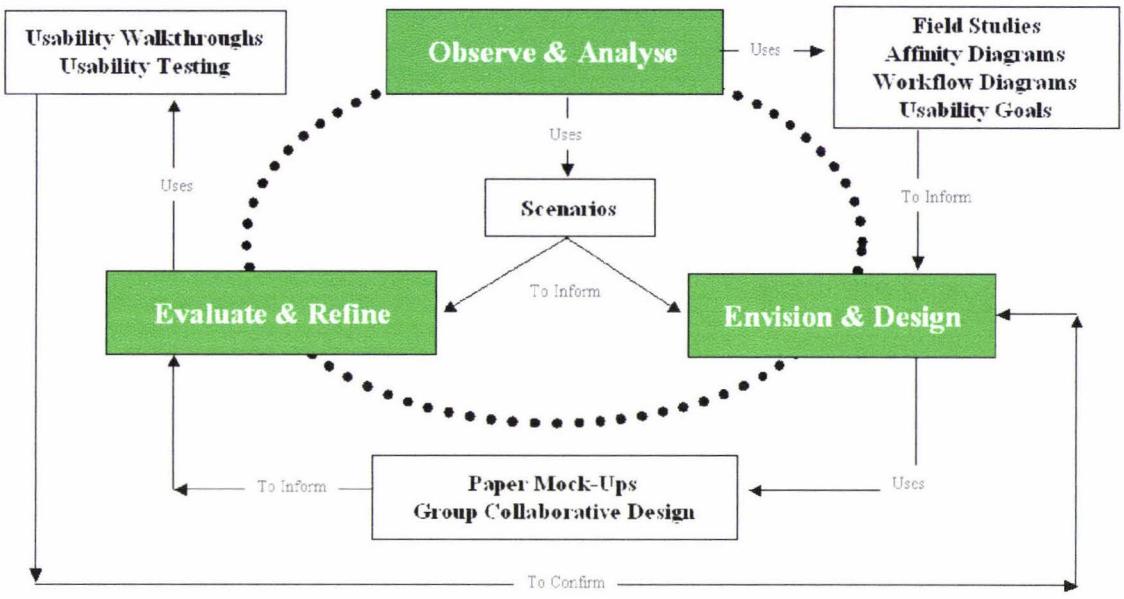


fig 2.7.24 User-Centred Design (Hiser Group, 2001)

Effective planning involves four aspects according to Parker (1997), and this includes finding out what the user wants and what their environment is. This is best achieved by involving users in the design process (shown in figure 2.7.25). Similar design principles are demonstrated by Mok and Zauderer (1997), who state that in general, every designer should consider four basic principles: problem definition, target audience, information organisation, and user interface execution.

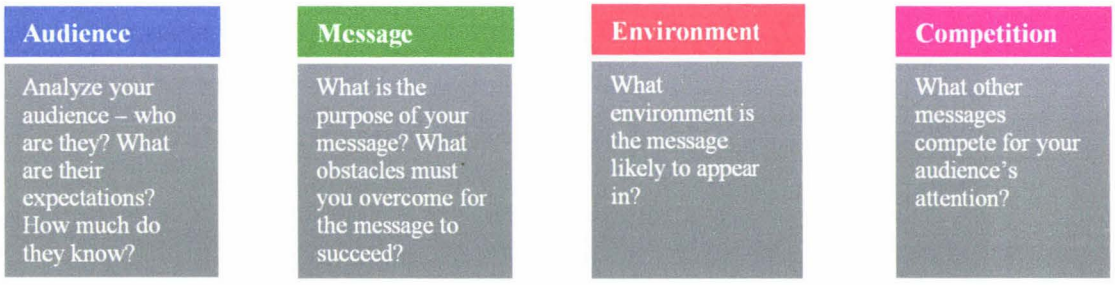


fig 2.7.25 Aspects of planning a design (Parker, 1997)

The site http://www.lookandfeel.com.au [2001, Jul 23] gives an analogy for classic problems in interface design. You're in the lift and someone's rushing to get in before the doors close - which button should you push? Lift door controls are typical of many Websites - the icons depict a technological perspective on the task, rather than matching the user's goal - in this case, making the door become either open or closed. By designing with the user's goals in mind, Websites are much easier to use.

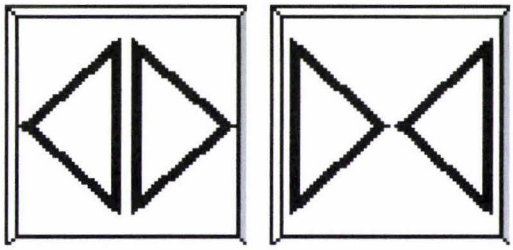


fig 2.7.26 Icons with a technological perspective

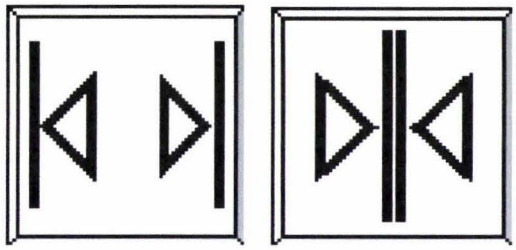


fig 2.7.27 Icons matching the user's goal

Kristof and Satron (1995) also believe that user goals should drive design. Figure 2.7.28 shows their recommendations in this area. Elements with a '*' are of particular relevance to emotional design for e-Commerce. It is essential that the design facilitates having fun, gives an interactive pleasurable experience, and from the business end – gives incentive to buy.

If you want users to . . .	Then your design might need . . .
Learn and retain	Clarity, repetition, reinforcement
Have fun*	Variety, surprises, randomness, wit, unpredictable events that change each time the product is used
Understand	Conceptual explanations, illustrations, simulations
Experience*	High levels of interactivity, user control of actions and events, realistic sights and sounds
Act or buy*	Well defined features and benefits, option, toll free phone numbers and interactive order forms

fig 2.7.28 User goals driving design - Kristof and Satron (1995)

UCD requires that people's feelings as well as their thoughts be taken into consideration. Many ergonomic studies still only use non-affective criteria for evaluating designs. The significance of emotions and their centrality to human experience has been established so now it is time for designers to acknowledge the role that emotions play in their discipline. "Emotions are at the foundation of human experience, and permeate all aspects of our lives . . . (and) . . . understanding the emotional or affective responses people have to products, services and systems is essential to creating good designs" (Detenber, 2001:124). Absence of negative feelings like frustration determines whether a design is successful or not. There is a curvilinear relationship between level of arousal and performance. If arousal is too low the people do not attend to the task at hand. If arousal is too high then they become anxious. Van Der Veer (1989) also believes HCI can be improved if psychological considerations are taken into account in the design of the user interface.

2.7.10 Speed

Long waits are detrimental to usability as people hate waiting around for a Web page to download (Meads, 1999). Aberdeen Group (2000) shows that an e-Marketer has only 4 seconds to capture the attention of a prospect.

Many multimedia elements are large and take a long time to download so users need to understand what they will be getting. According to some, fast response time is the most important design criteria for Web pages. Because speed is a main determinant of Web usability, a fundamental error is creating pages that look gorgeous and evoke positive emotions when demonstrated inside the office but actually experience response-time delays when used on the Web.

Another way of looking at speed on a Website is to analyse how long it takes for the user to get the information they need. Unless the Web content gives immediate benefits to the users they will allocate their time to other sites.

When making decisions on the inclusion and quality of digital media, the Law of Digital Media should be followed – choosing only 2 of the 3 dimensions represented in figure 2.7.29. Maximising speed (performance) can mean skimping in the other design areas. This limitation will decrease as bandwidth capabilities are improved.

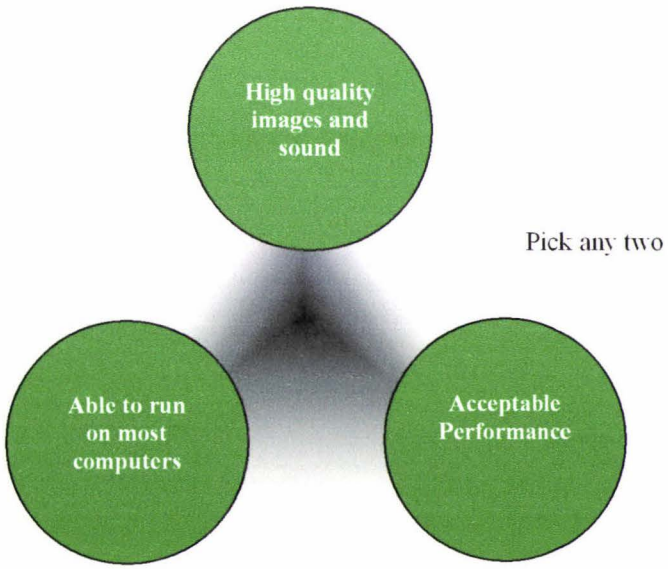


fig 2.7.29 The law of digital media (Kristof and Satron, 1995:67)

Slow downloading and PC crashes bother online shoppers (Caselle, 2000), causing much frustration and generation of negative emotions. CCNA (2000) mentions the importance of not making the site too sophisticated as it slows down customers on modems. While computers themselves are increasing in performance at incredible rates, the Web remains one of the few areas where speed is hard to come by (Bickford, 1997). Although speed matters, *perceived* speed matters even more. For the most part, the thing that makes users angry and frustrated is not the amount of actual time that goes by, but the feeling of waiting. This is in the form of delays before the computer reacts to their input, or the long seconds they spend sitting around with nothing to do while the computer works to complete a task. Although Web designers can't control the computer's absolute speed, they can employ a number of tricks to make the computer feel faster. At the same time they can also keep the user better informed of what is happening. The result is Web pages will seem faster to users, although the actual speed may not have changed at all.

If a computer program responds less than 200 ms after the user's actions, it will seem fluid and responsive. Any more than 200 ms and the computer will seem frustratingly sluggish (Bickord, 1997). When the user performs an action, the Web page needs to respond immediately. If there are going to be longer waits then the user should be given a message to let them know what is happening. If users are not informed then it will take only about 8.5 seconds for them to give up and look elsewhere.

A couple of recent studies have examined what to do in situations where waiting times and delays cannot be avoided. Fischer and Blommaert (2001) investigate the effects of time delay on user satisfaction. Their methodology was to create a home-shopping supermarket Website (they give a detailed account of procedures, steps, and control variables), vary the time delay and then get respondents to rate their level of satisfaction. It was found that lower performance is accompanied by negative emotions (e.g. frustration and anger), and that there are almost linear relationships between physical time, subjective time and user satisfaction. Kunze (2001) looks at how to get rid of boredom in waiting times. Similar to Fischer and Blommaert (2001) they constructed a simulated grocery-shopping terminal, but they then did something different – trying several 'fillers' in the time-delay when a purchase was being processed. Fillers were in the form of animated cartoons, animated objects, and proverbs. They investigated via questionnaire how filler types were perceived, whether people wanted them, and what they preferred. It was found that they were appreciated, but that one filler was preferred rather than many. The researcher suggested that cats be used as the filler but this would not be practical in all situations. For example, banking transactions, for a more adult user, would need a more formal filler that portrays trust for example, not a cartoon cat. Keeker (1997) also looks at wait-time feedback (fillers), suggesting their use in distracting people with subtasks during long wait times to minimise frustration.

2.7.11 Navigation

Navigation in e-Commerce is critical – requiring careful consideration during design and planning (Zender et al, 1995). As per section 2.4 on trust in this thesis, navigation forms a major part of the trust equation. Designers have to answer 3 fundamental questions with navigation – Where am I? Where have I been? Where can I go? (Nielsen, 2000). Websites are designed for jumping around. Visitors are more than likely wanting to jump to the page that interests them, and they have to be able to move quickly and easily from topic to topic. Websites are non-linear, which means they are not necessarily designed to be read from start to finish (Parker, 1997).

For most Websites, ease of use comes down to letting people know what they should do and how to do it (Keeker, 1997). Right away people should know the point or theme of the site. They also need to know how and where to get started with the site's primary features. As they move around the site they should know where they are and where they need to go. The audience will move on if content is not easy to locate or use.

Kristof and Satran (1995) states that the immediate frustration with an interactive product is that you can't pick it up and thumb through it to determine its usefulness. Whether users invest the time to see if it has what they need depends on getting them oriented right from the start. The first screens need to tell them what they are going to do, see, or experience. The right balance of images and words is needed without being overwhelming. Good navigational design leading out of initial screens should prevent frustration and ensure emotional calmness by having an interface that helps people understand where they are, where they can go, and how to get there. Some suggestions are to:

- Minimise travel – create the simplest and shortest routes;
- Minimise depth – create the fewest possible levels of hierarchy; and
- Minimise redundancy – avoid creating multiple paths to the same place from the same screen.

Another guideline for navigation from Nielsen (2000) is the use of breadcrumbs which show where the user has come from in the navigation. This principle is demonstrated at http://www.amazon.com [2002, Feb 22] in figure 2.7.30.

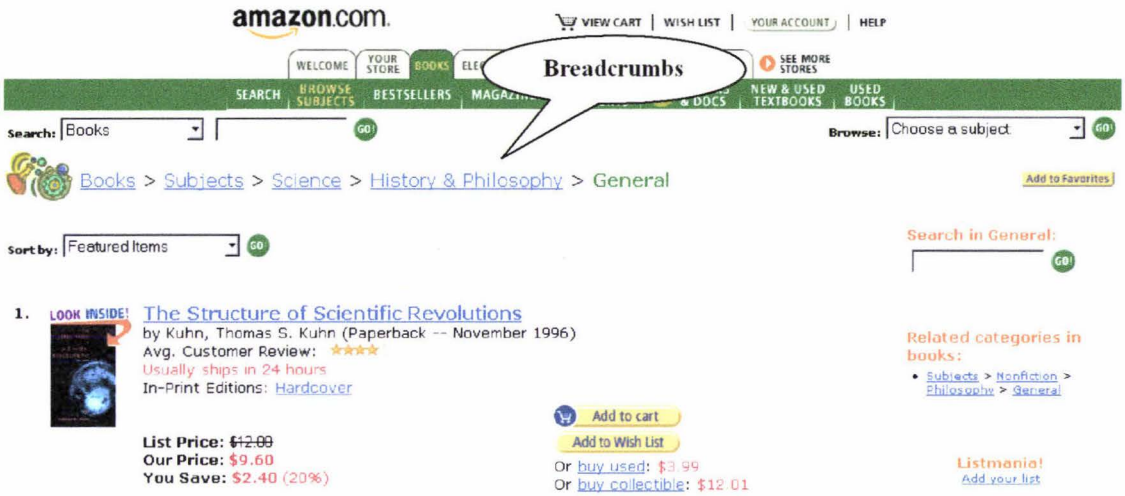


fig 2.7.30 Navigational breadcrumbs at www.amazon.com

There have been a number of experimental designs into navigation structures including the previously referenced 3D browser from Frog Design. Czerwinski and Larsen (1998) examine new ways of visualising large amounts of data, using ideas such as a hierarchical tree control user interface (Hyperbolic Browser) shown in figure 2.7.31. There does not seem be any tests to check if this will work in an e-Commerce shopping setting.

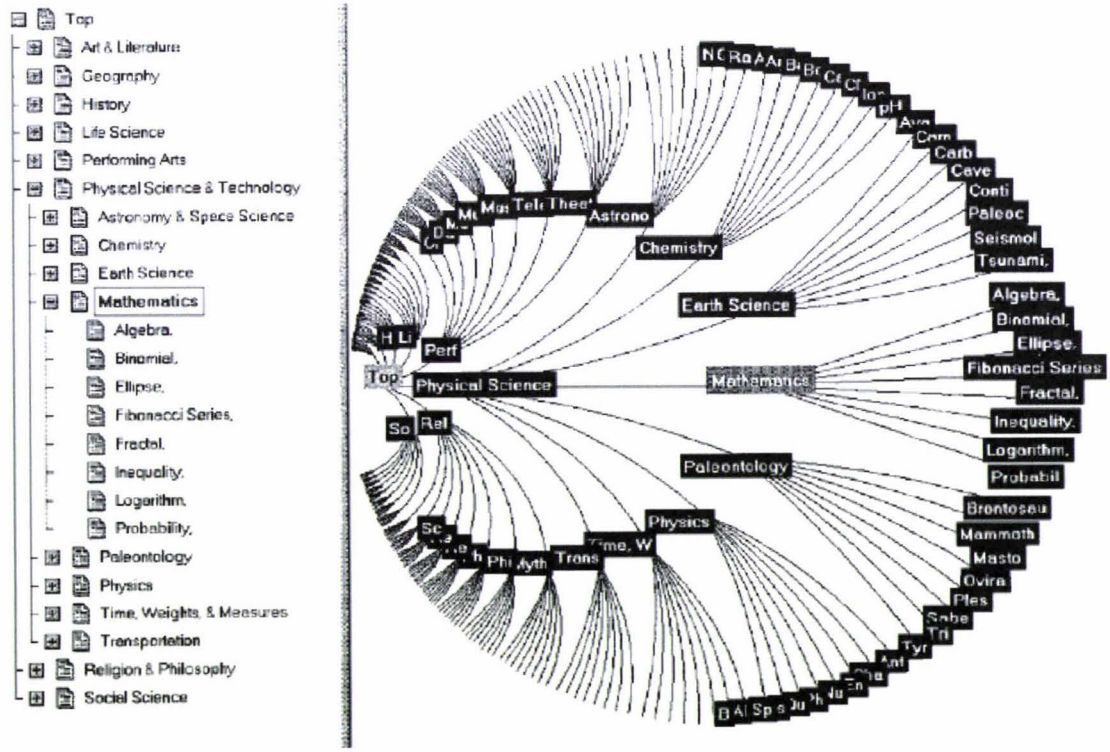


fig 2.7.31 Experimental navigation – the Hyperbolic Browser - Czerwinski and Larsen (1998)

This section does not undertake to present a full overview of Web navigation as the principles are hugely varied and have been mentioned in other areas of this thesis such as trust. It should be noted however that other design elements can support navigation.

A concept sometimes used in navigation is that of metaphors. A metaphor is an image used on a Website that assumes the place of text by trying to present a shape or picture that is recognised as being the same as the text it replaces. Nielsen (2000) states that metaphors are sometimes overused. The weakness of metaphors is that they entice designers to be overly clever and push the site in directions that seem fun but leave the users' real goals behind. However, metaphors can be useful when trying to have a unified framework for the design, or when facilitating learning via drawing on knowledge the user already has. A balance has to be found between Nielsen's emphasis on user goals along with need for fun.

Kristof and Satran (1995) state that metaphors are a special kind of image map (content navigation mechanism made up of images) that places images in a meaningful context that people already use outside of the computer environment. They only work properly if the audience is familiar with them. Dul and Weerdmeester (1993) cite the use of pictograms, which are similar to metaphors. Sometimes it makes sense to use a symbol instead of text, especially if you are expecting people from different language groups to visit the site. However, these symbols must bear in mind cultural differences. For example, a knife and fork might mean a snack in one country or a luxury restaurant in another.

2.7.12 General Design Principles

It is well worthwhile examining the general underlying theories of generic Web-design as many of the principles apply to emotional appeal if used in the right way. Getting the universal design elements correct lends itself to meeting emotional needs by preventing frustration and confusion, creating ease-of-use, ease-of-read and overall pleasure derived from the experience.

Toganazzini (1998) believes that of late, many Web applications have reflected a lack of understanding of many basic principles of design, to their great detriment. Just because an application or service appears on the Web, some generic design principles do not change. If anything, applying these principles become even more important. Aspects of traditional design like layout, contrast and use of text and graphics are covered below.

A designed object that has a good layout will appeal to the emotions by creating the right mood and state for a message to get across. Conversely, a bad layout will cause emotions like mild disgust and confusion. Mundi (2001) has a presentation on design elements for composition and layout, and some of these images are presented in the discussions below. The placement and proportion, balance and imbalance, shadow and light, contrast and unity, subtlety and surprise are extremely important.

Crucial to an emotional and harmonious composition will be correct use of **emphasis** (leading the viewers eye to make certain elements obtain the first read). Examples of emphasis and leading the viewer's eye are represented in figure 2.7.32 below.

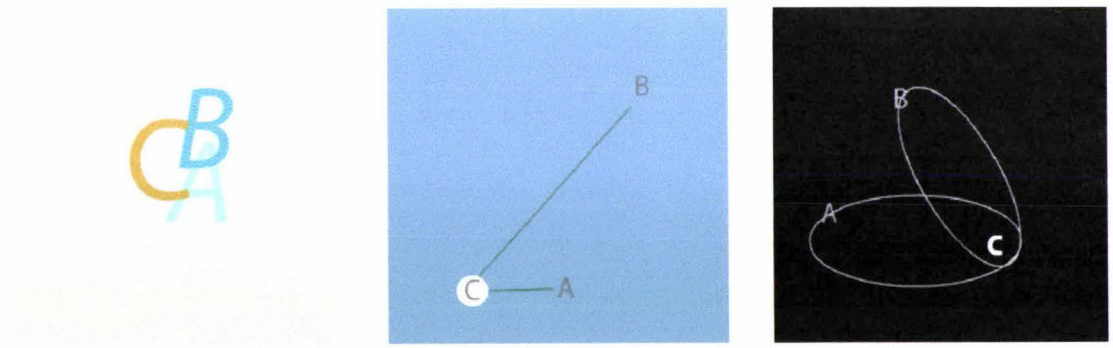


fig 2.7.32 Examples of Emphasis – Mundi (2001)

Balance is another element of harmonious composition design. It means achieving an equal distribution of weight in the layout.

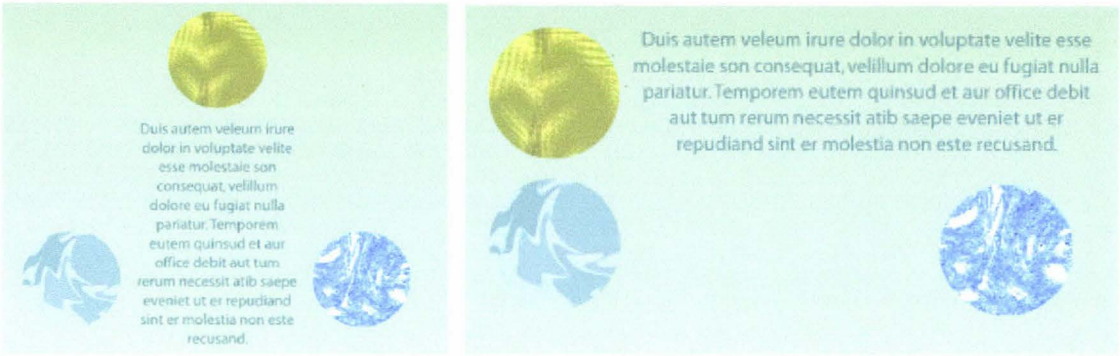


fig 2.7.33 Examples of symmetrical (left) and asymmetrical (right) balance – Mundi (2001)

Rhythm is a pattern created by repeating elements that are varied. Rhythm definitely affects the emotional design of a site by changing the psychological mood. Elements placed at regular intervals (a smooth rhythm) produce a calming effect, whilst abrupt changes in the size, shape and position of elements (a lively rhythm) produce an excited mood.

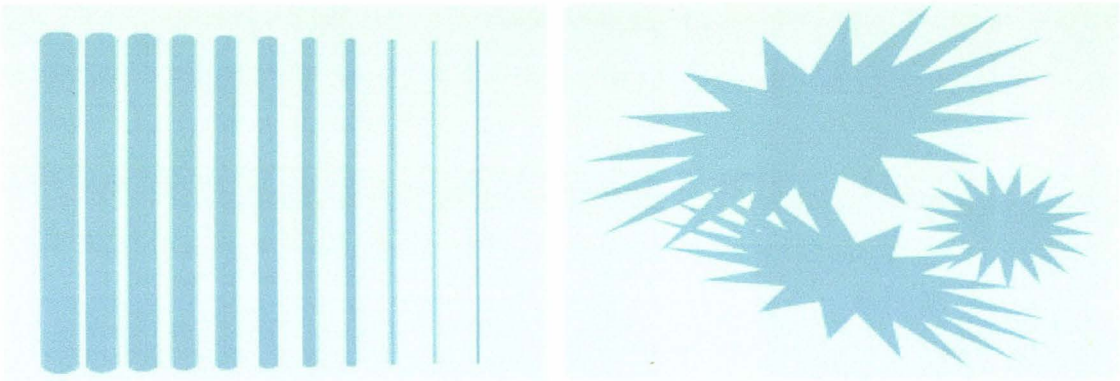


fig 2.7.34 Examples of calming (left) and lively (right) rhythm – Mundi (2001)

Unity refers to elements that look like they belong together. Unity can be created by grouping, repetition, or placing elements on a grid.

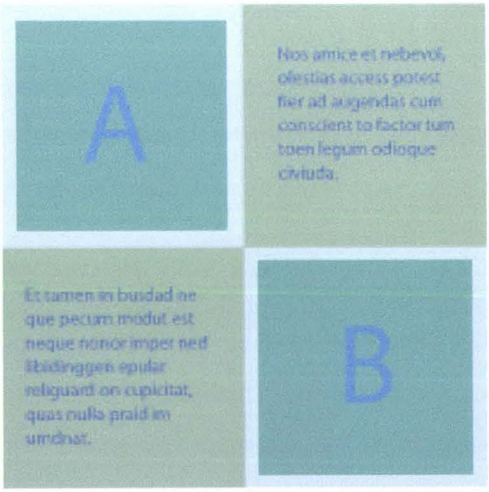


fig 2.7.35 Example of Unity – Mundi (2001)

Parker (1997) states that there is a need for unity and consistency for corporate identity. An example of this is shown below in figure 2.7.36, with the two Web pages on the left having unity as opposed to the two on the right. It should be noted that absolute unity would probably lead to a boring and *un*emotional design, but some degree of unity and consistency is definitely needed to avoid confusion, and to maintain branding (related to trust).

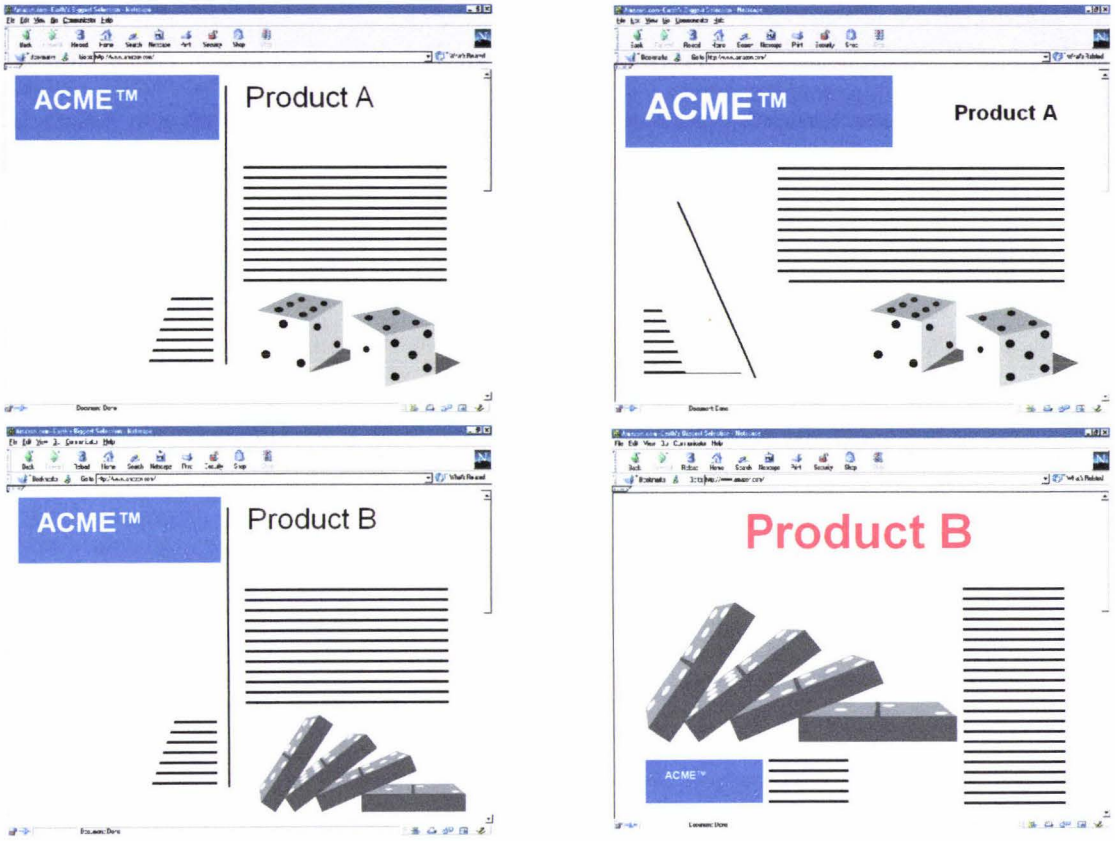


fig 2.7.36 Good and bad examples of unity and consistency

Type is one of the areas in which you see significant differences between print and Web publishing. When a brochure or newsletter is published there is total control over the typeface, type size, line spacing and letter spacing. A great deal of this power is lost when publishing on the Web (Parker, 1997). How the Website's typeface appears depends on the technical environment of the visitor. In most cases it will be the visitor's chosen browser font or computer default that determines the typeface. This is changing with the use of software like Macromedia Flash (which does not necessarily rely on HTML). Designers can also get around this by using graphics instead of text, but this can slow download times.

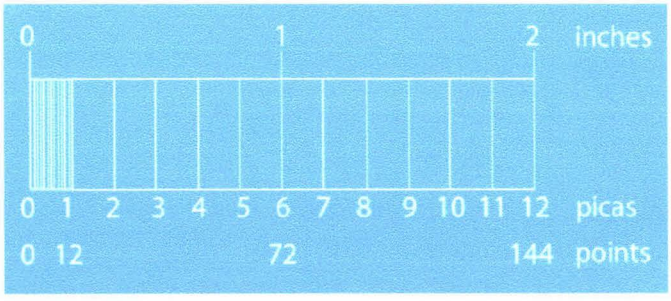
There are a couple of text-related definitions that need to be known by designers. Typeface is the design of characters unified by consistent visual properties, whereas a Font is a complete set of characters in any one design, size, shape, style or type.

Spiekermann (1997) makes a good summation of things to aim for in font selection for graphic communications:

- legible in small sizes
- neutral design
- available on all systems
- economical (space-saving)
- available in several distinguishable weights
- unmistakable

Quite a number of sources emphasise the fact that text should not be used with ALL CAPS (Parker, 1997; Nielsen, 2000; Meads, 1999). This is not as legible.

Text size is yet another aspect that has to be considered in preventing frustration and creating readability. Toganazzini (1998) suggests using font sizes that are large enough to be readable on standard monitors. Particular attention should be paid to the vision needs of older people. Point sizes for type measurements are demonstrated below.



6 picas = 1 inch
12 points = 1 pica
72 points = 1 inch

Monitors have a screen resolution of 72 pixels per inch which closely matches point sizes.

fig 2.7.37 Type measurements (Mundi, 2001)

As covered in section 2.5 of this thesis, colours play a major role in determining the image of e-Commerce sites. Deep blues and maroons against a gray or ivory background project a rich, elegant impression. Bright colours like yellow, greens, and reds against a bright white background project an exciting, youthful image. Backgrounds carry the greatest load because they fill so much of the screen. They provide the location and context for all the action. Backgrounds should be made interesting by having creative areas of emphasis rather than uniform coverage (Kristof and Satron, 1995; Parker, 1997) – perhaps using variation from left to right.

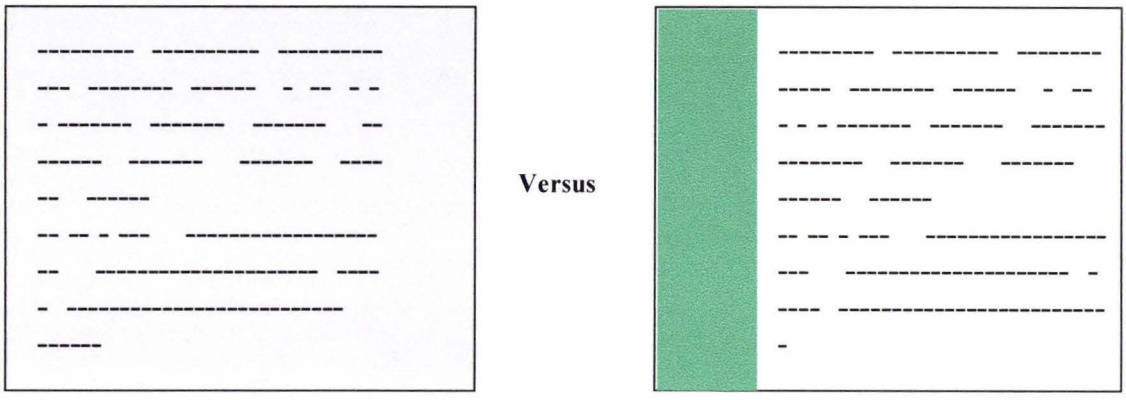


fig 2.7.38 Background variation

Backgrounds should be strong when there is a need to make a design statement, but toned down when making way for other elements. It is better to avoid backgrounds that are:

- too bright – overwhelms the message, and limits choice of typeface colours
- too dark – can't see the message, feels gloomy, and limits typeface colours
- too busy – everything fights for attention
- default gray – dull and somber

A number of resources also emphasise the need for proper contrast when using text, as this also has great influence on legibility (Parker, 1997; Nielsen, 2000; Toganazzini, 1998).

fig 2.7.39 Choice of contrast

According to Parker (1997), contrast refers to a significant difference from one area to the next that attracts the attention of the audience. Contrast is both aesthetic and functional. It can be used to add visual interest to the Web page, transforming blandness into excitement and emotional pleasure - projecting a more professional image. It should be used to make Web pages easier to read and more visually inviting. An example of bad colour contrast is seen at http://www.autobytl.com.au [2001, Sep 5] on the right, which has blue navigational links on top of a blue background – making them very hard to identify and use.

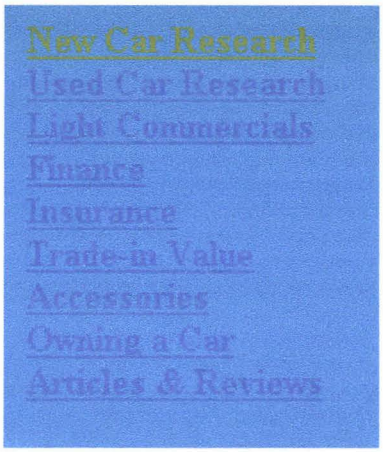


fig 2.7.40 Poor colour contrast

Busy background patterns should be avoided according to Nielsen (2000). If they are to be used then it should be noted that subtle variations in the image used for a background can affect the readability of the interface (Graham, 1999).

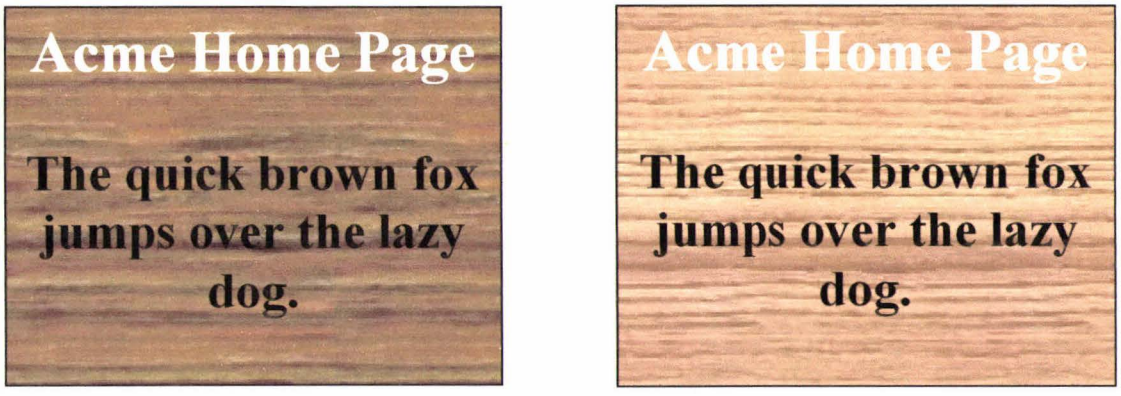


fig 2.7.41 Subtle background changes that improve readability

Several type and background colour combinations are shown below. While all are readable, some combinations are more difficult to read than others:

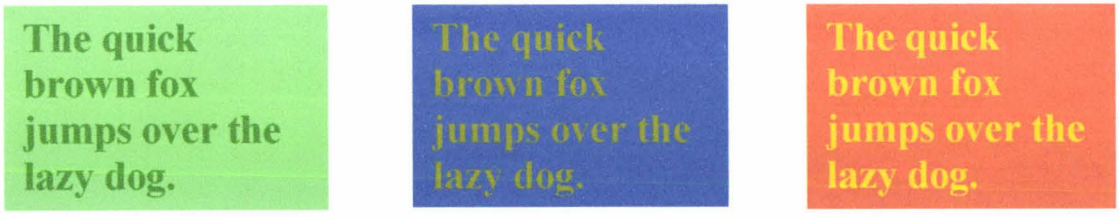


fig 2.7.42 Type and background colour combinations affecting readibility

There has to be an awareness of the different default background settings of the user's browser – as this can affect legibility of type.

2.8 Getting the Best of Both Worlds

The Internet offers a new range of efficiencies and opportunities for retail but some of the proven emotional aspects of shopping in the traditional retail world need to be captured too. There is much debate on whether the Web should try to imitate the physical world because of the inefficiencies present in traditional retail (that the Web is meant to replace), but if sales are to take place, surely some emotional elements need to be recontextualised from the physical world to the online world.

Websites and New Media could be looked upon as a form of advertising that also facilitates transactions. Because of this fact, aspects of advertising that appeal to emotions, as well as overall theory on the emotional purchase behaviour mechanism need to be considered.

Williams (1998) challenges people to try and think when they have made a purchase where their emotions haven't played a major part in the decision process. We use our emotions to help visualise ourselves benefiting from the purchase of a particular product or service. It is claimed that if you are not using Emotional Response Marketing techniques then you are losing possible sales and profits. After the buying decision has been made, we begin using the analytical part of our brain to reassure ourselves that we made the right choice. People could spend twice as much to buy a particular house or car when lower priced ones would fill the need. This is because of the emotional benefits they receive. Even food purchases are emotionally-based (remembrance of past experiences). There is a three-step process to define the benefits and emotions for the product or service that is being sold:

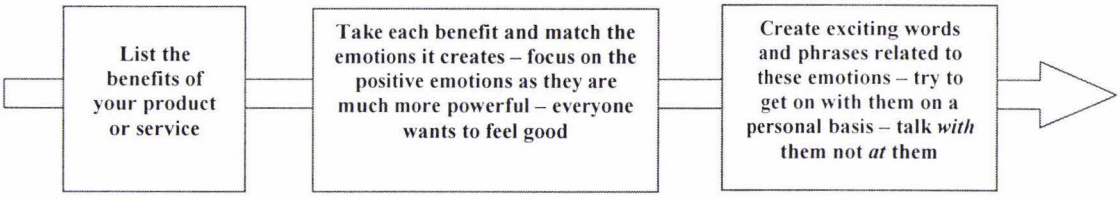


fig 2.8.1 Defining benefits and emotions for sales (Williams, 1998)

The title of the work by Peery (1997) is *Double Your Sales With Emotional Direct-Response Marketing*, paving the way for the statement that we buy on emotion. It is put forward that we rationalise the purchase after the fact with logic, but its emotion that gets us to whip out our wallets. No matter what personality traits we show externally, we respond to the basic wants and emotions such as fear, greed, desire, lust, respect, praise, self-esteem, wealth, beauty, and attention. Language must be used that makes people identify with you – showing that you are one of them – portraying an empathy at the heart of emotional intelligence (as discussed by Goleman, 1995). Customers should be told how they'll feel, how much they will enjoy it, how it will give them credibility and improve what others think of them.

Kapoor (2000) states that e-Commerce is slowly encouraging a new Economic Purchase Behaviour (EPB) – pay what you think the value of this product is (e.g. bargaining-based purchasing). While bargaining may be good economically or psychologically, it has traditionally been very inefficient – but the Internet has changed this with intelligent agents and near perfect information. Because of this new EPB, in the future, brands will have to deliver more on emotional benefits.

Usborne (2000) belives that there is a common motivation to do certain actions. This motivation is because it makes you feel good. The best way of holding customers is by making them feel good, but poor financial results show this has not been done well on commercial Websites. Offline shopping has elements of happiness, smiles and laughs, but not online. The décor in a restaurant makes you feel warm and welcome, the music in a clothes shop might make you feel good - emotions sell. The question is asked of why hardly anyone is building their Websites to make us feel good. It is not necessarily a technological limitation – rather it is a human limitation in the face of learning new technology. We have all become involved in learning how new technology works but now we have forgotten how humans work. There is a need for emotional design.

Traditional retail has a competitive tool – involving the customer in a memorable experience upon entering the store (Vescovi, 2000). Atmosphere is a natural strength for traditional retail. The buying experience is derived from the immersion in store atmosphere – the deeper the immersion the greater the experience and satisfaction. There is a new experience economy based on the experience content of products and services. A great percentage of online consumers use the Internet to research the goods and services which they then purchase off-line. A Website is structurally in a weaker position compared to the real polysensorial experience one can live in a store. In a retail store people experience aesthetics, perfumes, rich social relations, sounds, events, and comfort.

Structural Advantage	Traditional Retail	e-Commerce
Logistics	X	X
Information		X
Price		X
Atmosphere	X	

fig 2.8.2 Structural advantages of traditional versus online stores (Vescovi, 2000)

The Web increases accessibility and defies geographical barriers but sometimes e-Commerce sites erect more barriers than you'd have in a local store (Nielsen and Tahir, 2001). Individual Websites often don't give customers the flexibility that a physical store provides. Customers in physical stores have more power because they can approach an expert and ask questions. Good stores know that it is not enough for the store to look nice – it must act nice as well – supporting the total customer experience. Most Websites don't have a user experience that feels like shopping. Users want to shop or find information in a way that seems natural to them. People like to comparison shop (compare items side by

side). If a company has a large amount of products online then it must provide a mechanism for people to quickly narrow down to the ones that fit their needs without giving them pages and pages of items.

Designers should think of a Website as a way for the business to relate to the customer (Internet Week, 1999). Information Technology designers and professionals must not show off, but rather emphathise and sympthasise with consumers. The concept is that the Web experience is emotional. The functionality should match, offset or change the emotional disposition of the visitor, depending on the need. This is true even when the site is for a bank – which seems rational and emotionless – it is not.

There are many differences in the emotional experience of shopping online versus shopping in traditional shops. Caselle (2000) brings up the idea of researching offline store buying behaviour (asking questions of customers and salespeople) and then taking that experience online. However, not everything offline should be replicated online. One of the biggest pains about going into stores is having to walk down 3 aisles of products you don't want before finding the one you need. Caselle (2000) believes the concept of the virtual online store is wrong – the advantage of e-Commerce is that you efficiently go straight to the product you want. Many would disagree with this statement though as it is not taking into account the emotional aspects of an actvity. Some people like to be 'just browsing' and having interactive social contact along the way.

Dubowski (2000) warns of the pitfalls of ignoring the emotional aspects of sales, stating that most e-tailers have not tapped into emotions. Just because a Website offers quick delivery and low prices does not guarantee a healthy profit. The Andersen Consulting 2000 CRM Survey is cited, showing that customers place relationships at the top of the list when dealing with an e-Business. Web vendors would gain from more interactive relationships with consumers, but how can they recreate the warm, fuzzy feeling of walking into a familiar bricks and mortar store? The site http://www.landsend.com [2001, Aug 1] shows a way of doing this – allowing people to input the measurements of their body into a user interface and see how they look in the clothes before they decide to buy. In the physical world the actual trying on of the clothes and seeing how they look on your own body is very important to the purchase-decision, so the Lands' End design is very clever and emotionally intelligent. Screenshots from the Lands' End Website are shown in figures 2.8.3 and 2.8.4.

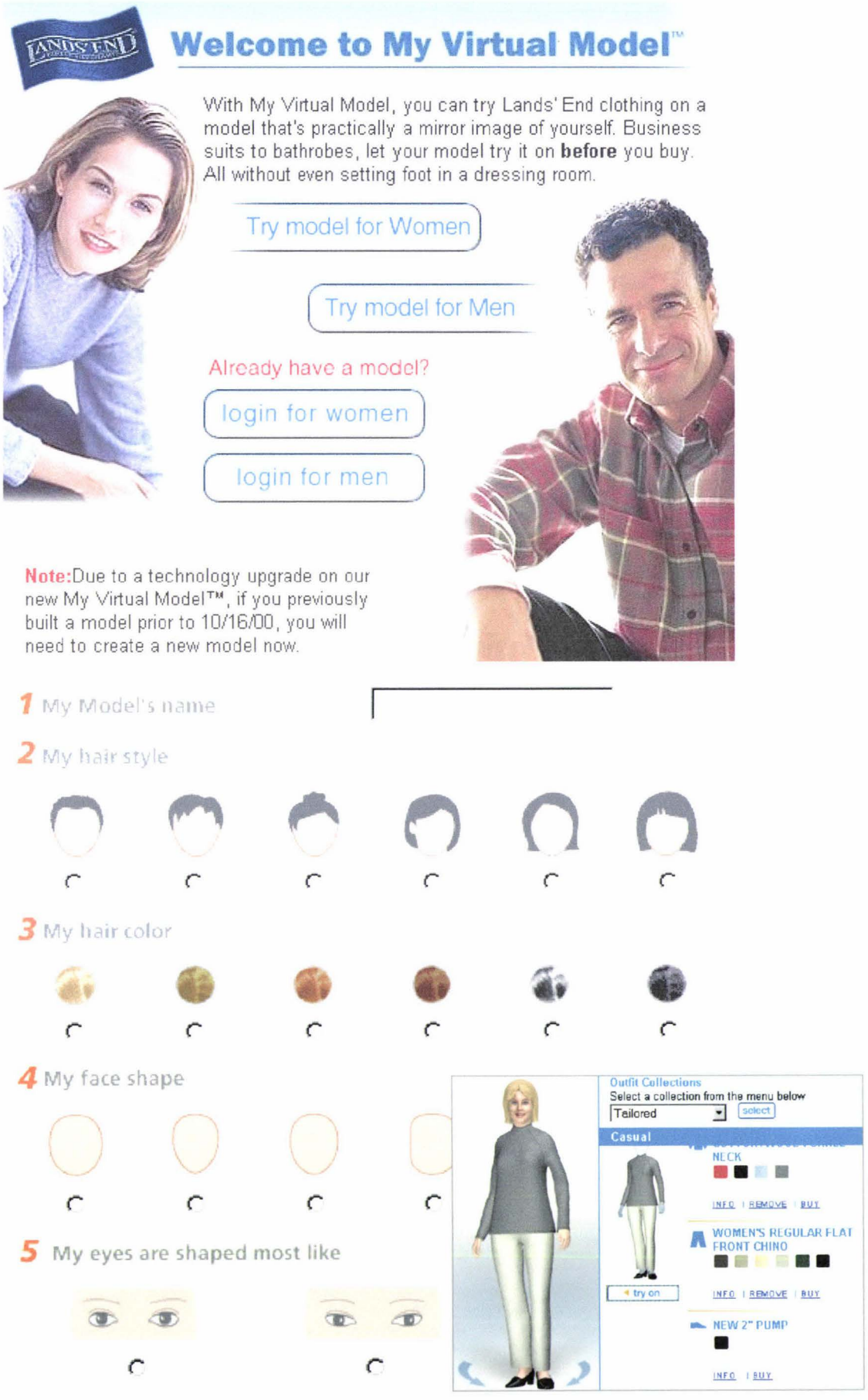


fig 2.8.3 Imitating the experience of trying on clothing - www.landsend.com

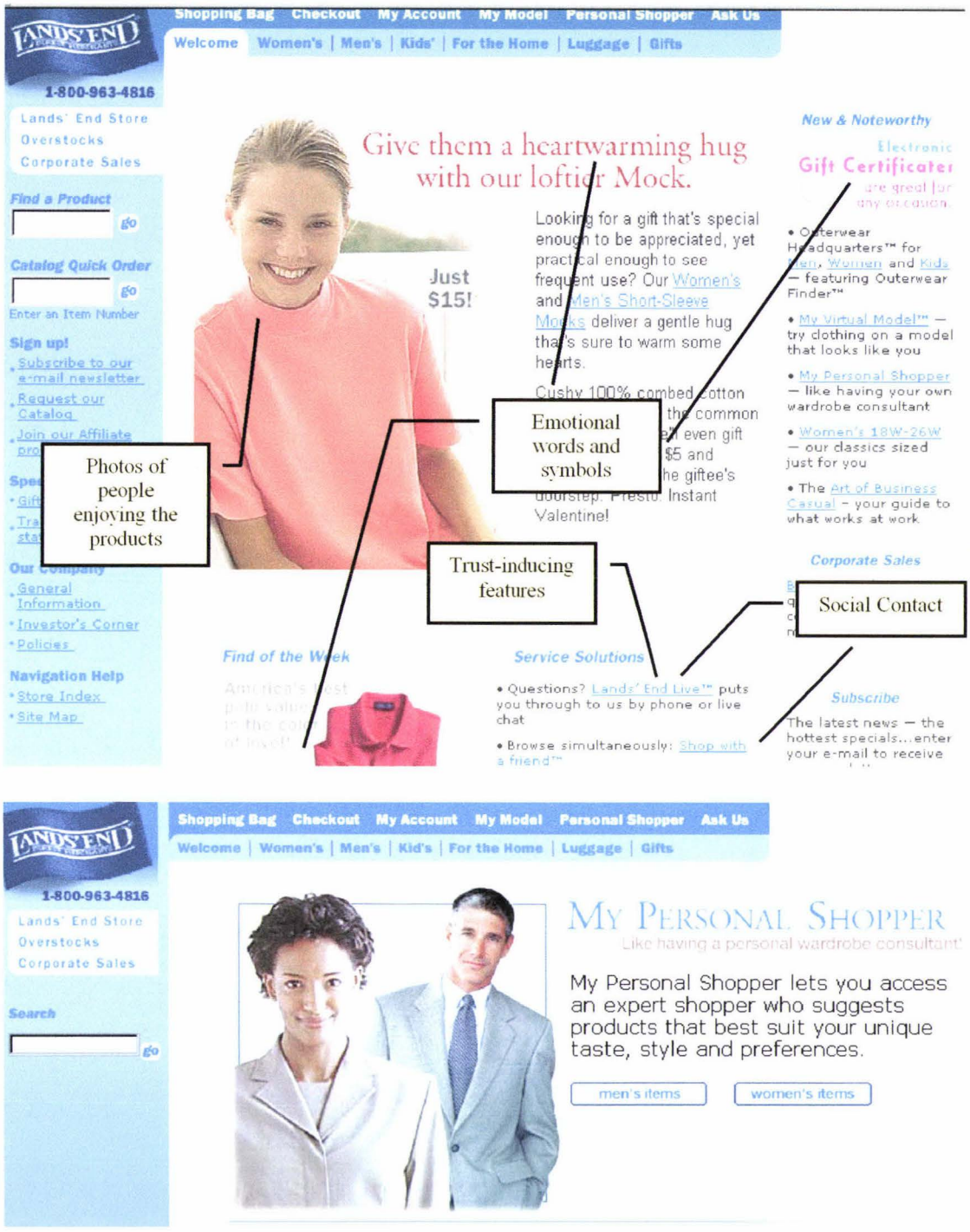


fig 2.8.4 Emotional elements of www.landsend.com

As highlighted above, the www.landsend.com site also enables you to shop with a friend – a proven emotional factor. Roth (n.d.) cites the Mitchell Madison Group (consulting firm), predicting that the next wave of Internet shoppers will be window shoppers who like to shop with friends. Further evidence of the clever 'social' emotional design by www.landsend.com in terms of shop assistants is their 'personal wardrobe assistant' functionality.

Building on this coverage of e-Commerce sites selling clothing (a quite emotional and personal purchase in the physical world), www.countryroad.com.au [2001, Aug 1] makes good use of photographic images with people and an ability to easily browse and locate clothing items of interest, drilling down for more detail. Whilst not offering the same level of interactivity as www.landsend.com with respect to seeing what different sizes and body shapes look like, it still has warm emotional appeal.

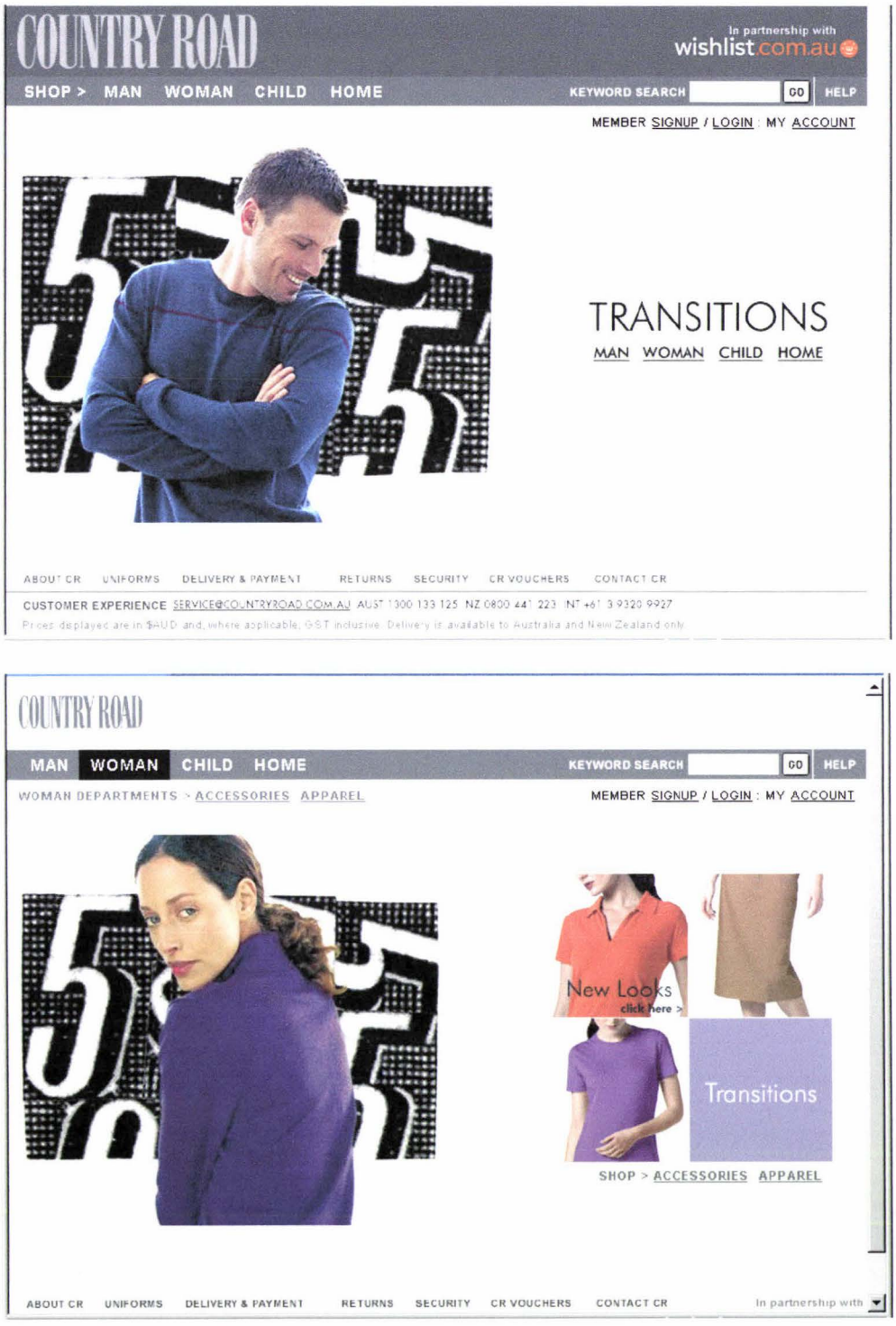


fig 2.8.5 Emotional elements of www.countryroad.com.au - people enjoying products

Another example of a well-designed (emotionally) site is www.davidjones.com.au [2001, Aug 1]. Similar to www.countryroad.com.au it has the ability to search and browse based on specials and latest fashion ranges, but it also improves emotional appeal via personalisation and set-up of a personal profile (like www.landsend.com does). Other well-designed aspects of the site include adding more 'physical-world' objects like a handy sizing chart. Once again, nice bright, crisp images of people enjoying the products are used effectively, especially since they load very quickly.

fig 2.8.6 Emotional elements of www.davidjones.com.au

Riedman (1996) states that traditional advertisements (Coke and McDonalds) have emotional appeal, but many Websites are more cold and sterile than warm and creative. Successful Websites need engagement and invitation. One way of engaging the consumers is via digital story-telling which can direct the feelings people have towards a product or service. Empowering with interactivity is another engagement tool. Mention is made of the www.ragu.com site – which has the intent of creating a face and personality on the net, with the emotional familiarity of an elderly grandmother sharing her cooking secrets.

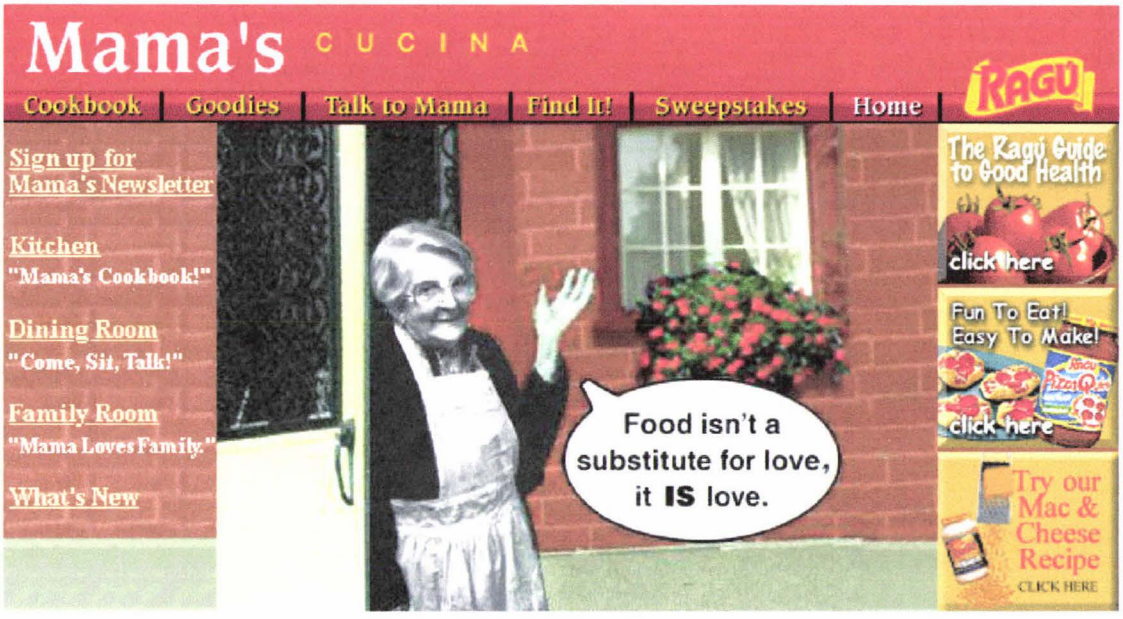


fig 2.8.7 Emotional elements of www.ragu.com [2000, Dec 15]

Riedman (1996) emphasises the importance of an entertaining or involving Web environment that goes beyond using technology for technology's sake. As the Web gets more fragmented and competitive, the sites that use interactivity to engage will be the ones that attract and keep users.

More discussion on the lack of essential human connections in e-Commerce comes from Gray (1999) who asks how many people are willing to forgo a centuries old practice, rooted in our collective psyche, that guarantees regular social contact and gives us reasons to remember why we are human. Customers like to walk in, look around, *maybe* buy something, but sometimes they meet someone they know and stop and talk with them. Other times they become involved with people they don't know, study a face, listen to a conversation, exchange a smile or laugh, talk about the weather, make a joke, share a complaint or courtesy, assist a stranger or greet a child – and by doing so they become part of something greater than themselves.

Websites can't match the pick-it-up-and-hold-it appeal of bricks and mortar stores, but smart Web retailers are finding that the online world offers plenty of opportunities in terms of product presentation (Gantenbeim, 2000). Designers should look to offline counterparts for the best ways of guiding

customers through the shopping experience. Most e-tailers have ignored many of the time-tested rules of retail including clearly marked product departments and someone on hand to offer assistance when required. Websites need to recognise how little online shopping currently resembles shopping in the physical world. Online sites offer little in the way of pre-sale assistance, although companies like Hallmark seem to be addressing this issue.

Roth (n.d.) states that site developers have to create sites that are tech-savvy but wrapped in small town service. Hallmark adopted this service approach by listening to its customers and responding to their needs – creating areas on the site for collectors, and having bulletin boards for questions and answers. In addition to catering for loyal customers, Hallmark presents more casual shoppers with targeted ideas on what to buy. When consumers come to Hallmark they are looking for direction – and they need focus. In response they don't only chat or look at products on the site – they buy.

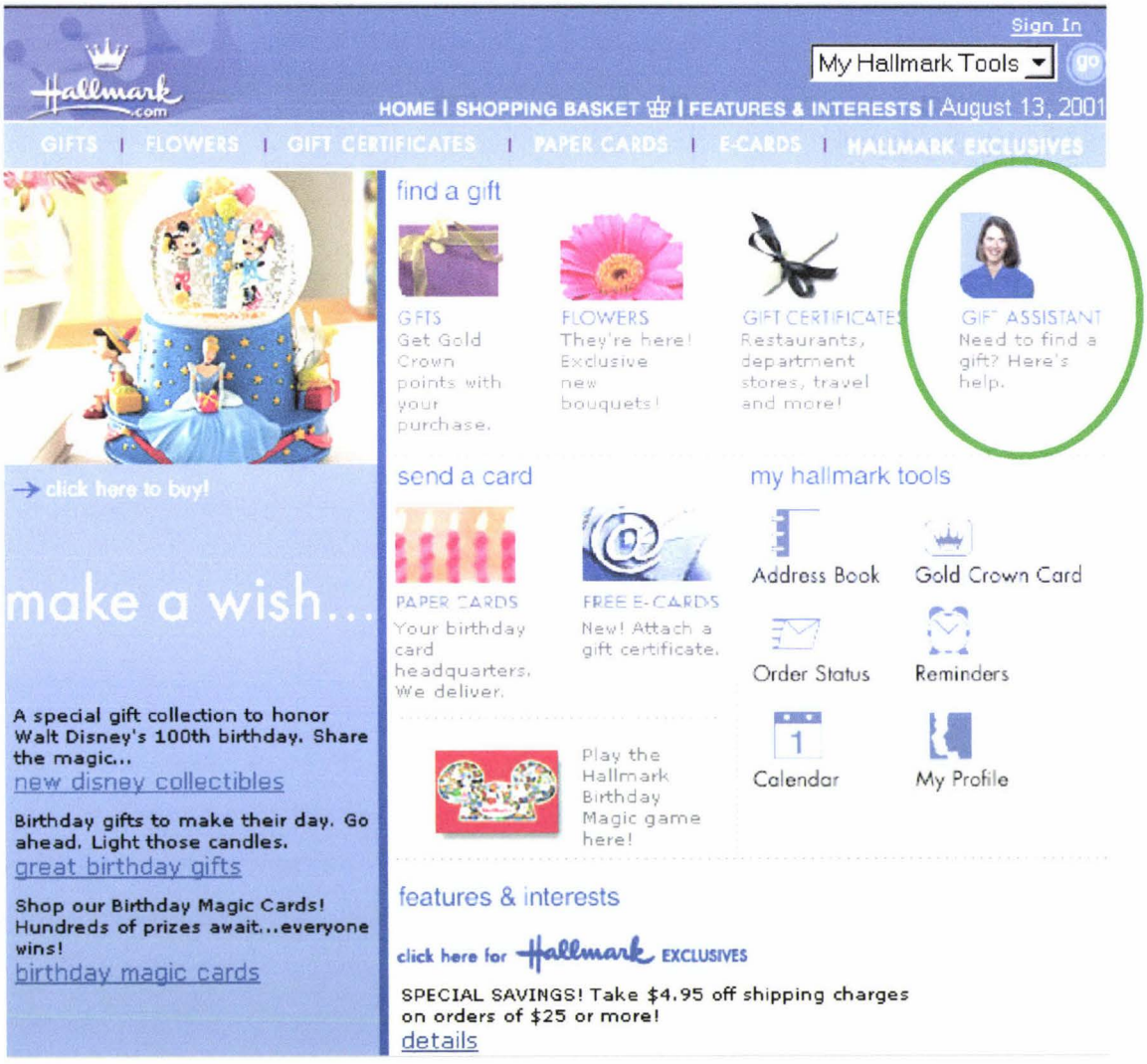


fig 2.8.8 Emotional elements of www.hallmark.com [2001, Aug 13]

Sites are being designed by technology people who don't necessarily understand retail, and retailers who understand shopping might not understand the Web so there is the need to bridge the gap

(Gantenbeim, 2000). Online customers have to be greeted effectively and guided through the site. The homepage is a key handshake point with customers and so it should be warm and inviting. Websites should be another store and therefore have the same look and feel and imagery. Technology has its limit and can distract an e-tailer from the task of presenting products and enticing people to buy them.

Roth (n.d.) argues that smart e-tailers are realising that to sell over the Internet their sites need to look like the stores in the real world – where people are prodded into making purchases that they didn't know they needed but found they couldn't live without. The question of how you can emulate the real world shopping experience while still leading shoppers to what you want them to buy is asked (a challenging task for Web designers). Solutions to this question include allowing customers to window shop – the best of the old world – but create window displays customised separately for each person – the best of the new world. People should not be made to wait at the door and then be made to fill in forms. They should be brought into the shop and then told what to shop for. The site must be quick and offer solid customer support – both during and after the sale. The more urgent the request (e.g. drugs or food) the less likely people are to trust automation – they want to deal with a real person.

Going against the trend of stating that designers have not been using proven offline experiences, Badre and Laskowski (2001) research the question: are we wedded to the culturally established attributes of the real world when designing for the Web? They believe designers of Websites often draw on culturally established bricks and mortar practices to decide what the style and content of the sites should be. Related to this, Nielsen and Tahir (2001) have developed 222 usability guidelines for design of a shopping site, some of which are based on analogies from the brick and mortar world. Badre and Laskowski (2001) use a simple methodology of comparing users' performance and preference for shopping versus news-styled sites. Their experiment involved selecting people to perform tasks on sites that were news presented in the style of shopping, shopping as news, shopping as shopping and news as news. Their sample of shopping sites (as opposed to news sites) had clear tree based structures, images including retouched photos, and the appropriate use of colour. On the whole, users liked the 'shopping' layout better than the news layout (67% of respondents), even when viewing news content.

Case example - Nike

Internet technology also permits shopping in a way not possible in the traditional world, and this should be emphasised in design. What follows now is a pictorial case study of how a sports/shoe retailer has combined emotional interactivity and customisation (facilitated by New Media technology) along with meeting emotional design criteria that has been covered in this thesis – culture, demographics, colour, sound and fun.

The site http://www.nike.com [2001, Sep 28] is an excellent example of a company that has brought in a large number of emotional design aspects into their Website – combining the best of both worlds (online and traditional retail) to hook the users and entice a purchase.

The quality of the site is evident from the home page – with amazing use of colour, 'sex appeal', visual appeals to the target 'sporty' users, and intuitive navigation which immediately gives insight into what can be undertaken at the site. Also of note is the emphasis on branding (along with the trust and reputation connotations that come with it) and the ability to 'play' – emphasising that this site is *fun*. This Website also loads very quickly, which is impressive due to the amount of graphics shown.

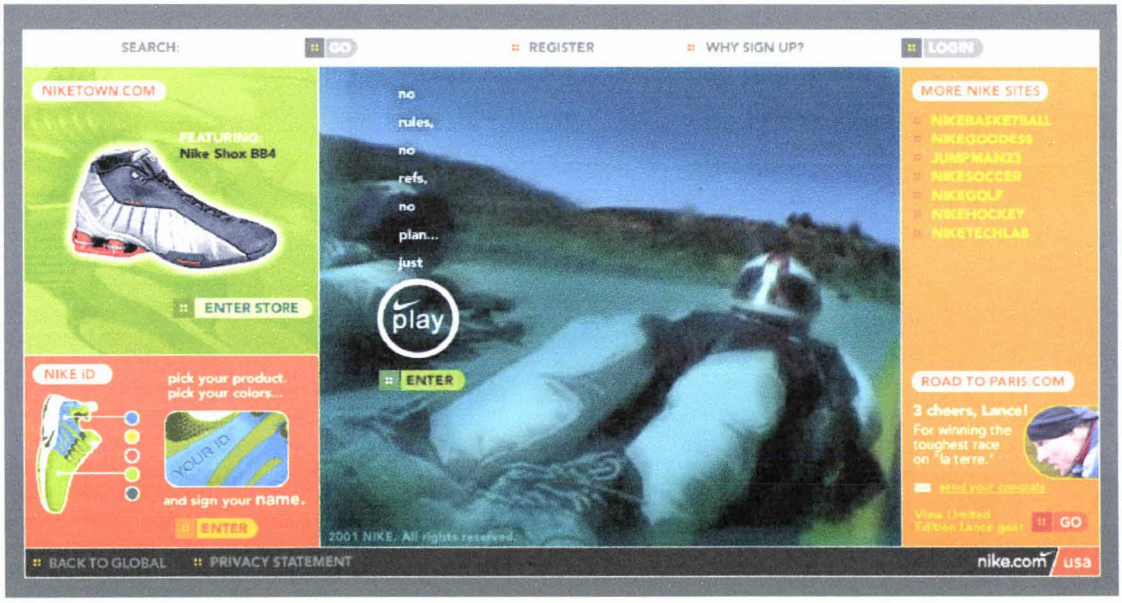


fig 2.8.9 Home page of www.nike.com

Users have the ability to create their own shoes, choosing customised styles, colours and features. The process of building this shoe online is almost like a gaming activity – yet another emotional appeal (see section 2.9.2 of this thesis).

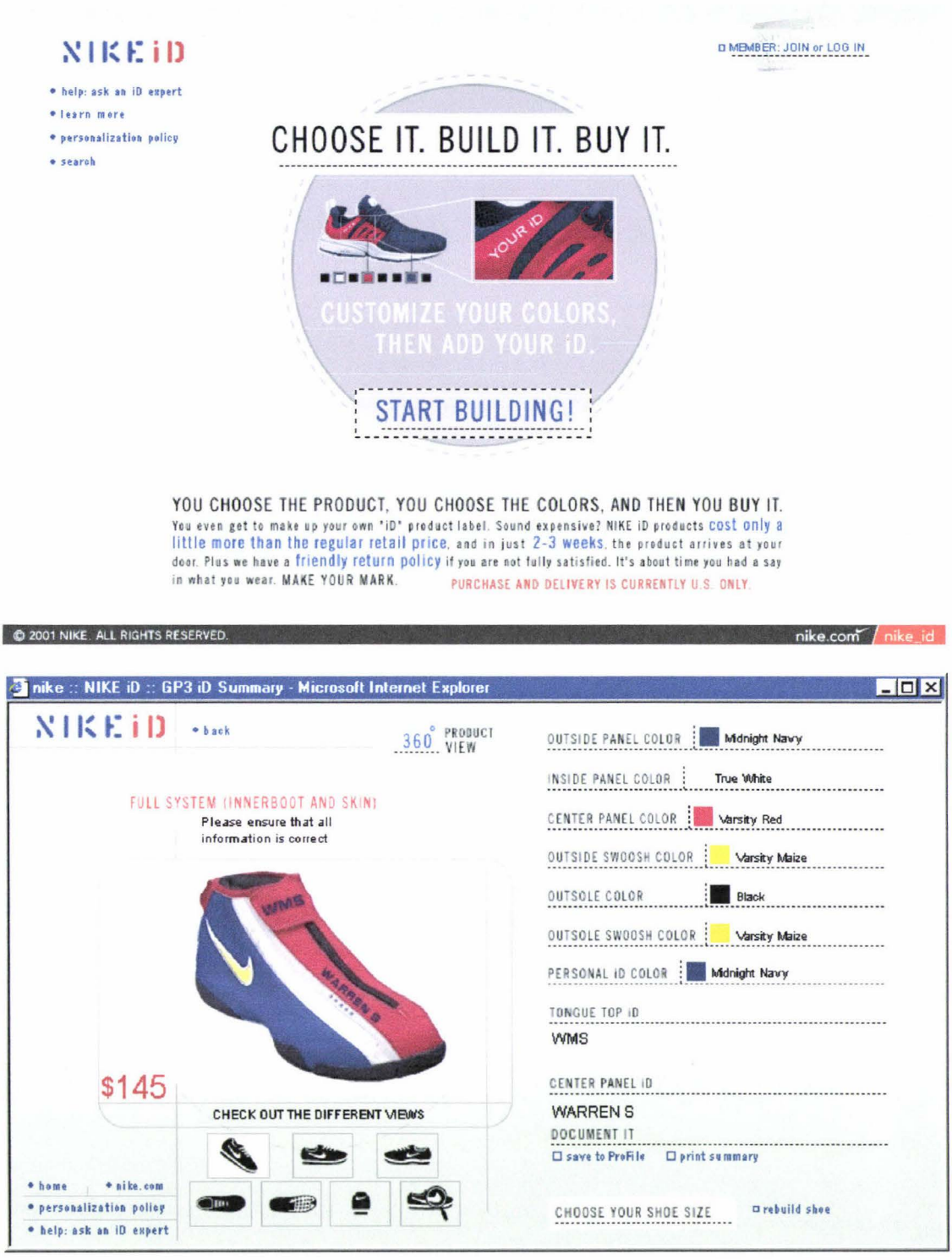


fig 2.8.10 Fun customisation on www.nike.com

While waiting for virtual reality views of the customised shoe to appear on screen, time fillers appear which have sound and animation to occupy the user and prevent them from getting bored or frustrated.

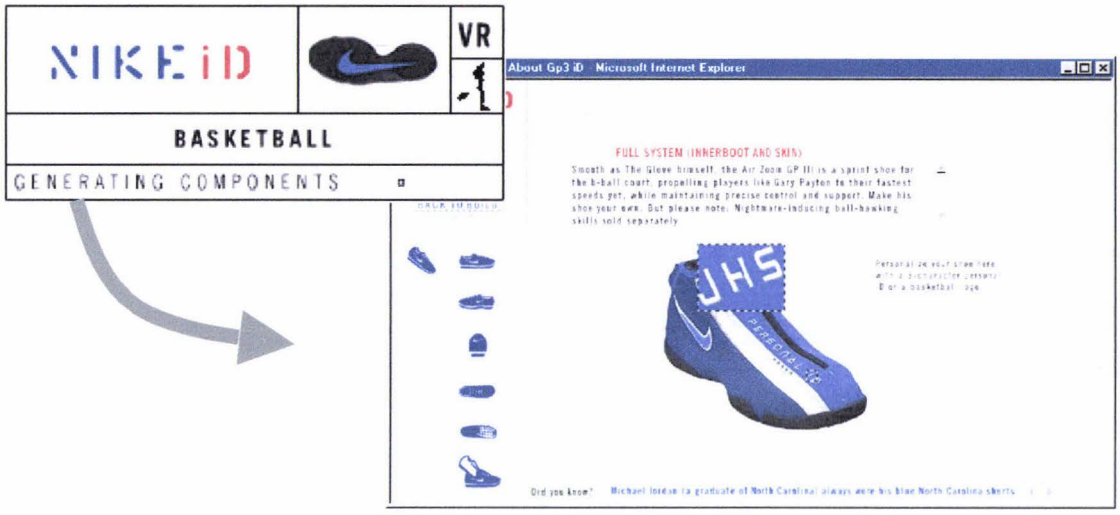


fig 2.8.11 Sound and animation as time delay fillers on www.nike.com

The user-centric design also provides many features to assist in the purchase-decision. These include help with sizing and a 'fit consultant' that assists with user needs and requirements. This prevents any fears about purchasing something that won't fit.

fig 2.8.12 Tools to ease concerns about requirements on www.nike.com

It is interesting to note that Nike has different sites for different parts of the world – recognising the needs of different cultures. This was deemed very important by literature. The USA home page was

shown in figure 2.8.9, and other countries are displayed in figure 2.8.13 - each reflecting the culture of the highlighted country via use of colour, attitude, national identity and sporting focus.

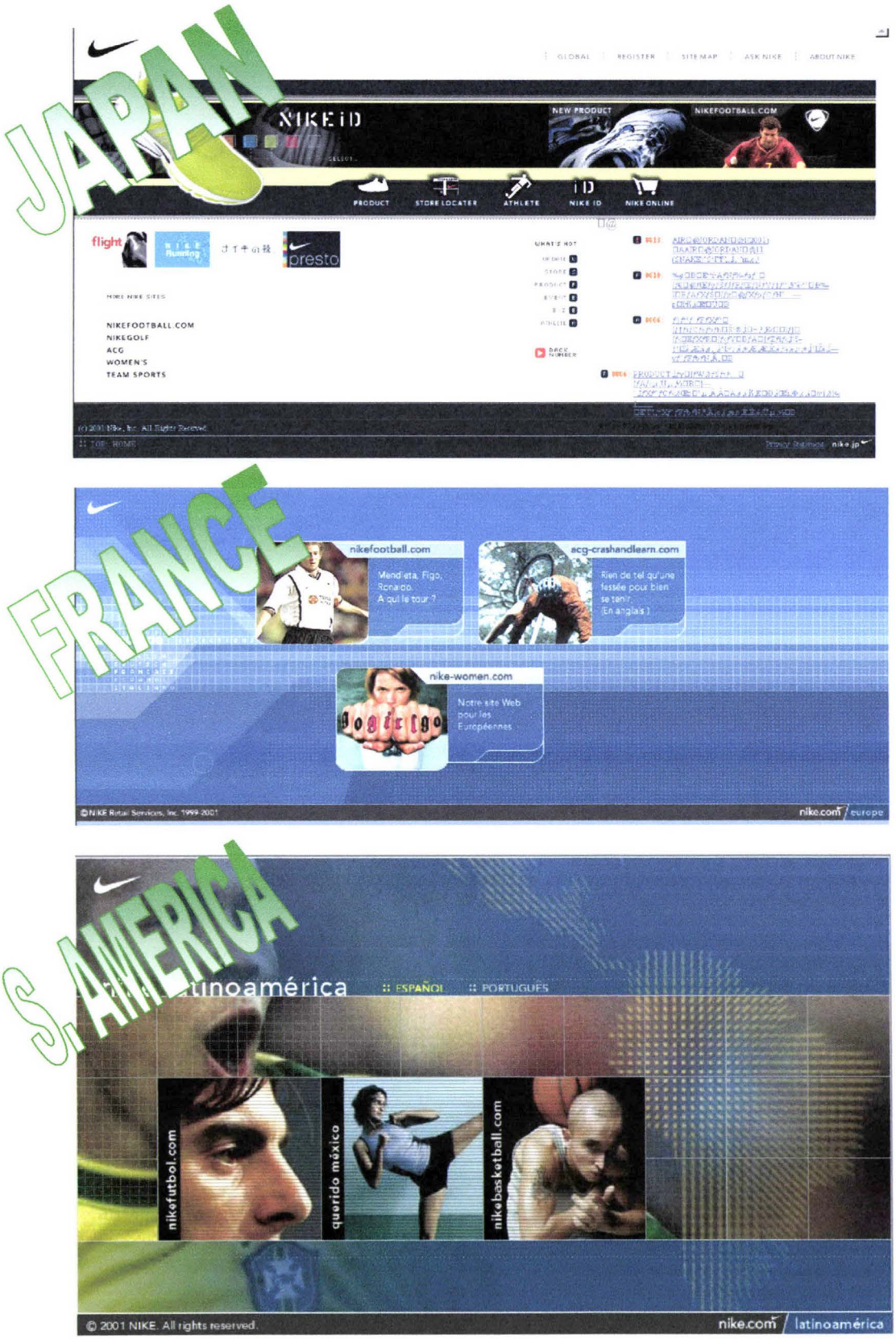


fig 2.8.13 Cultural differences on www.nike.com

Nike also has a dedicated site for women (http://www.nike-women.com [2001, Sep 28]). This site is aimed at a specific audience – young athletic women with an attitude. This site also makes great use of sound, with funky musical beats appropriate for the target visitors. Also notice the amazing use of colour – with a striking pink that matches the attitude of the target users.

fig 2.8.14 Gender differences through Nike

Once the user goes further into the site they are presented with a 3D virtual reality animated fashion show in which the user can interact with the lastest styles. Information pops up on the highlighted clothing. This is accompanied by music that sets the mood – with sound that is recognisable as that played on typical modelling cat-walks. All of this adds up to an experience that has elements of variation and surprise, and most of all, it is *pleasurable.*

fig 2.8.15 3D animation, interactivity, virtual reality and sound at www.nike-women.com

A couple of other shoe sites were investigated as a comparison to www.nike.com. Some screenshots of these sites are shown in figure 2.8.16. The ability to customise and have fun is present in some of the others as well – but not to the same comprehensive emotional level as www.nike.com.

fig 2.8.16 Shoe design from www.customatix.com and www.creo-shoes.com [2001, Oct 19]

2.9 Recontextual Case Studies

2.9.1 Learning from Car Design

The design of automobiles is oriented to promote fun, pleasure and emotional connections. These concepts are covered in this section, and whether designers and users believe the factors can be recontextualised into Web design will be asked in the research questionnaires of this thesis.

Automobiles are an obvious starting point for examining an object designed to generate an emotional purchase. When people buy a car, they don't just look at what it can offer functionally, they look at it on an emotional level – what do the curves look like?; what history does the brand have?; and what colour is it? Most people agree that there is a significant emotional factor in buying a new car.

BMW's Chief of Design Chris Bangle views design as an "expression of the emotion and passion within" (Car Today, 2001). Chin (n.d.) looks at the design theory of BMW, who promote a design pyramid with three components. The Emotional Quotient (EQ) is the pinnacle of the design pyramid, and includes styling. The EQ is the component of the car that has no mathematical equation or description. The EQ should evoke expression, and imply form follows emotion. It should be noted that while EQ is important, it won't sell a car unless the intelligence and function are also present and of high quality. There is a need to balance emotional and functional design.

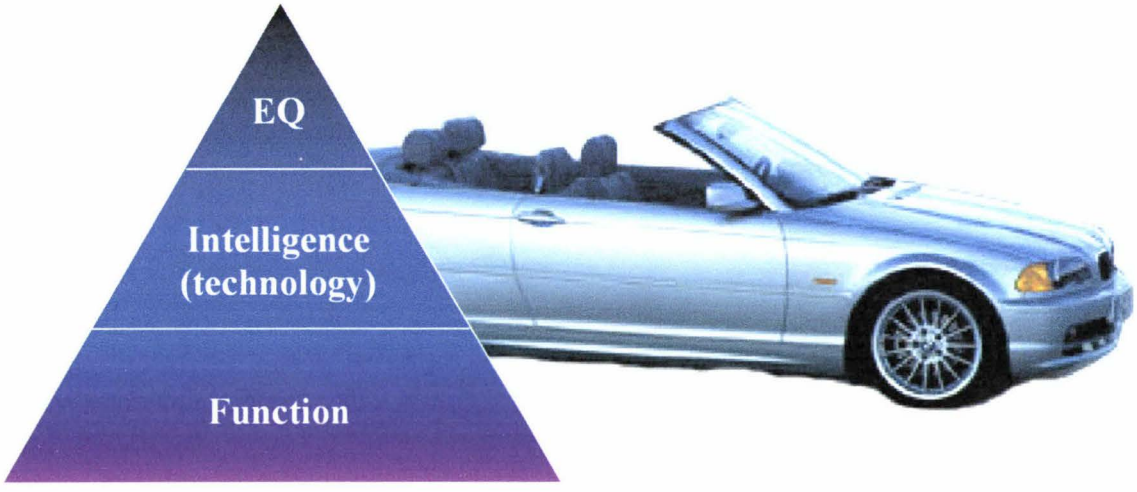


fig 2.9.1 BMW design triangle derived from Chin (n.d.)

Designer Sohrab Vossoughi (cited by Muoio and McCauley, 1999) notes that the first VW beetles were named 'power through joy'. Designers Katherine and Michael McCoy are cited as saying that, like the Volkswagen Beetle, there's something witty about the shape and colours of the iMac. Its sensual and rounded form nods to the natural organic world. With the Apple iMac they understand that a computer, like many consumer products, can be an object of lust.

fig 2.9.2 Objects of lust – the VW Beetle and Apple iMac

Continuing in the theme of comparing the design of the iMac to cars like the VW Beetle, and showing the transferability of design aspects evoking fun, pleasure and expression, Apple (2001) provides fun blended examples of the embodiment of emotional design.

fig 2.9.3 Mutual recognition of fun design – blending the VW Beetle and Apple iMac

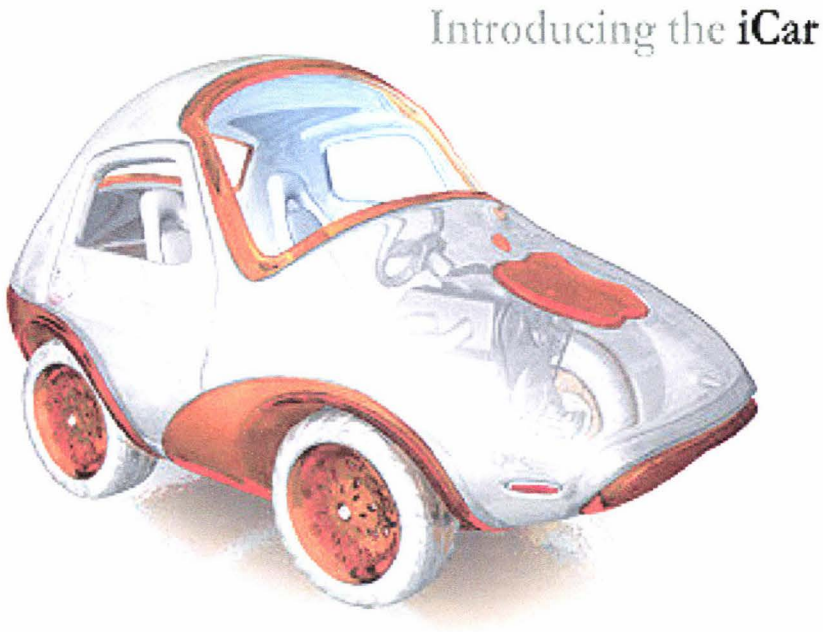


fig 2.9.4 Mutual recognition of fun design – blending the VW Beetle and Apple iMac

Designer Lix Wetzel (Muoio and McCauley, 1999) reveals that sometimes the success of a design has as much to do with its physical structure as with the emotion it invokes. The 1998 Corvette is cited as having a great design – it's a sports car that reinforces the Corvette brand and heritage, while triggering a sense of nostalgia. The Corvette spells fun. What makes it distinctive and unique is the sensual form which evokes emotional response.

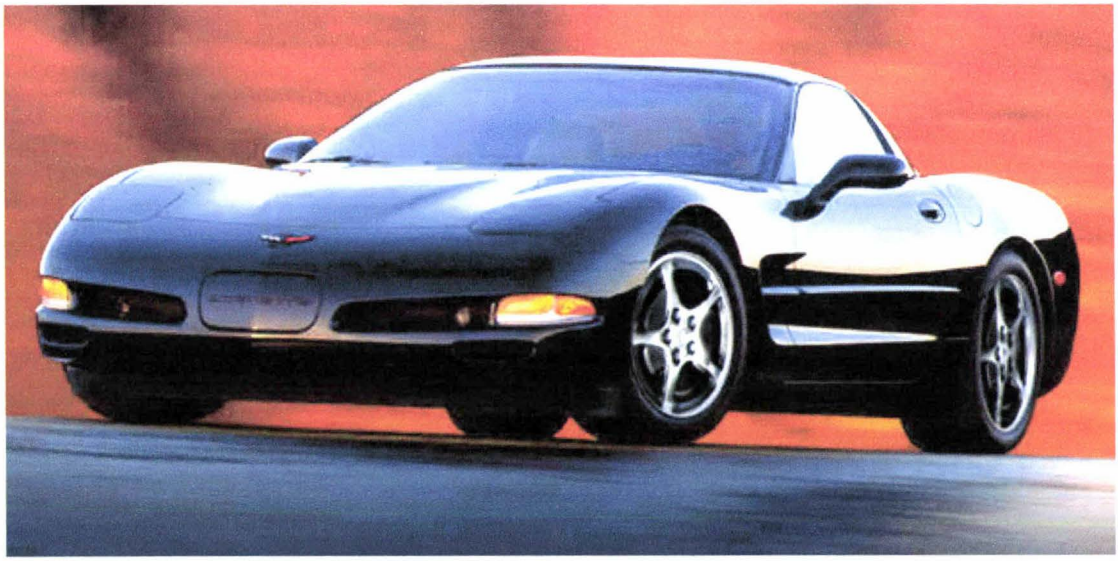


fig 2.9.5 The Corvette spells fun

Other evidence from well-known car brands in terms of design philosophy includes recent awards for Mercedes. Two Mercedes cars prevailed in the competition for the "Most Beautiful Car of the Year" and were awarded the "Autonis" design prize 2001 (WH Networks, 2001). The Autonis Award for the Most Beautiful Cars of 2001 has the philosophy 'pure emotion instead of braking distance, individual taste instead of invisible technology'.

CDF (2001) looks at Mercedes-Benz's messages of approachability, value and fun by integrating similar design cues throughout layers of consumer communication in the 1996 model year catalogues. In a series of catalogues for the '96 model year, there were titles such as 'Inspiration', 'Imagine', 'Desires', 'Dreams' and 'Envision', having the intention of being easier to read, more accessible and more emotional.

"Chrysler PT Cruiser embodies a design that evokes emotion in people all around the world," says Tom Gale, Executive Vice President Product Strategy, Design and Passenger Car Operations - DaimlerChrysler Corporation (cited by DaimlerChrysler, 2001). "The distinct personality of the PT Cruiser is unmatched by any vehicle on the road." The Chrysler PT Cruiser's presence on the road and new level of interior flexibility were created by a design philosophy that Gale believes appeals to both the emotional and rational needs of consumers.

"Chrysler PT Cruiser borrows design cues from classic American automobiles and interprets them with a healthy dose of American fun and freedom," says Bryan Nesbitt, Chrysler PT Cruiser exterior designer.

fig 2.9.6 A healthy dose of American fun and freedom

For an automobile, the designers want to create form that says 'take me home with you' (Hamilton, 1998).

CuoreSPORTIVO, the Italian Car Enthusiasts Organization (http://www.cuoresportivo.org [2001, Sep 2]) looks at famous Italian car manufacturers, and how the cars display a magical balance between reason and sentiment, engineering and creativity. They are built to transcend the essential and enter the realm of emotion. They embody aesthetic taste, a passion for sophisticated engineering, the pleasure of sitting behind a driving wheel and the desire to express one's own personality.

Colour is very important in car selection. The owners of sporty cars are likely to opt for fun colours (Heath, 1997). This can actually be visualised online using New Media interactivity. Fun colour selection is available on http://www.vw.com/newbeetle/color.htm and http://www.chevrolet.com [2001, Mar 9] with sample outputs in fig 2.9.7.

fig 2.9.7 Website customisation at www.vw.com and www.chevrolet.com

2.9.2 Learning from Game Design

In 1997, the video game market was $15 billion (Roberts, 1997) and it has grown markedly since then. In the first half of 2001 the US gaming industry saw a 30% spike over the previous year (Sega, 2001), with some sources such as Simpson (2001) stating that the worldwide computer gaming industry is currently $20 billion. Someone is obviously doing something right. The PlayStation for example, is one of the most successful consumer products for a long time.

Although the flexibility of the compact disc has been instrumental in the success of the Playstation, what really makes a difference is the emotional appeal of the games and the console itself. Characters in the games appeal so much that they become digital celebrities. This is evidenced by recent motion-picture releases of the Playstation games Tomb Raider (with the virtual character Lara Croft) and Final Fantasy (Aki Ross).

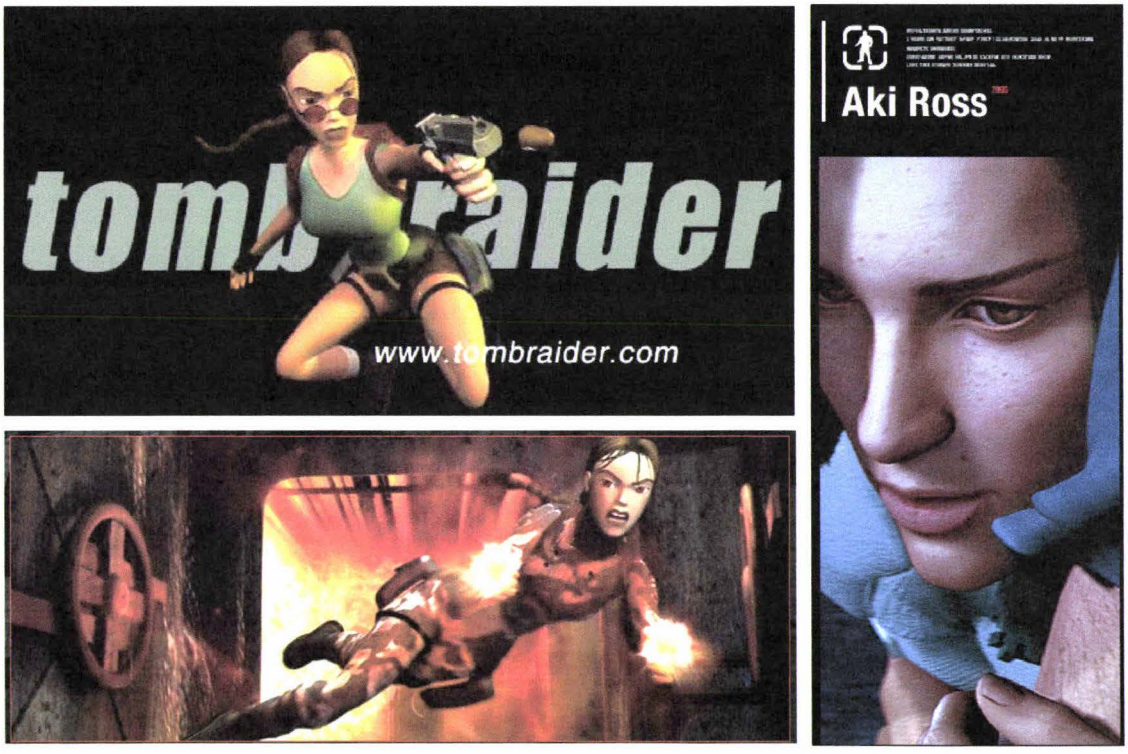


fig 2.9.8 Digital celebrities

The XBox gaming console from Microsoft has a neon green circle on top that gives out a glow. This appeals to the emotions of the target audience, but has no rational sense. The XBox outperforms all other consoles with the technical specifications and power, but it is not just functional – it is emotional as well. Design sets the tone and conveys the potential of the gaming system.

fig 2.9.9 Microsoft XBox controller

Microsoft (2001) describes the design of the XBox and the extremes they went to in the design process to get it emotionally-charged. The XBox has raised ribs that run across the rich black exterior of the console – giving it the look of a supercharged car stereo amplifier. The designers state that they want people to see the XBox as they would a powerfully loud car stereo. Designers actually toured peoples homes to get ideas on what gamers liked and how they played - including designing a new controller that offers more ways to interact with the game.

fig 2.9.10 Microsoft XBox console

So how can game design be re-applied to Web design? What follows now is an examination of empirical studies that have identified characteristics of the gaming experience – some of which are transferable to other fields.

Amory et al (1998) states that 'play' performs important roles in psychological, social and intellectual development, and could be defined as voluntary, intrinsically motivating, involving some level of activity, and possessing make-believe qualities. Games appear to motivate users intrinsically by stimulating via curiosity. This may be due to the challenges and elements of fantasy. Some argue that intrinsic motivation is also a result of the novelty and complexity of games, while others state that games promote goal formation and competition. Games represent one way in which people can be immersed into constructivist microworlds. Users become part of the scenario, stimulating interest and motivation.

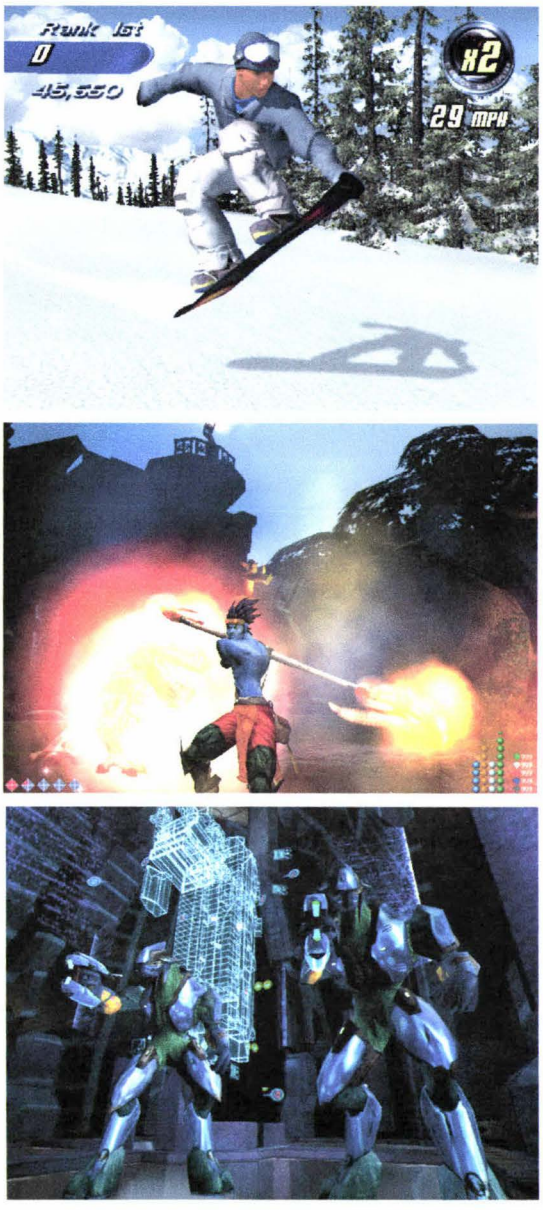


fig 2.9.11 Xbox Gaming Examples

Kersten-Tsikalkina and Bekker (2001) conducted an exploratory study into evaluating the usability and fun of children's products. They cite a taxonomy for causes of fun and frustration in games:

- challenge – neither too easy or too difficult
- feedback – reduce uncertainty
- curiosity
- fantasy – appeal to emotions
- choice – choose where to go
- control – skip, pause etc

Fun is generated when you have positive aspects of the above taxonomy dimensions. Frustration follows when you have negative interactions.

Clarke (2001) looks at designing Websites for young people based on their love of computer games. Recent trends show that older age groups are now becoming more involved with computer games and so these changing dynamics may mean that this work can still be used across age groups, given a particular target market. Clarke (2001) had a triangulated methodology of conducting observational

playgroups, focus groups, online surveys, and usability studies with children to determine their preferences for the site design and content, and to learn more about how children interact with the Internet. Observing the children's behaviour on the Web led them to several subjective conclusions: children like games and they judge a site based on the games it has; children will continue playing a game or activity as long as they are having some success and fun; children like to master a game and will play several times to increase their skill level (they like to continue learning and developing skills as the game progresses); and games that children played for long periods were ones where they could master the basic game skills quickly and then continue to progress in play, adding new skills at a slower rate. Games that were abandoned quickly by children were those that they had difficulty mastering the basic skills required to progress in the play of the game. They found these frustrating. Games that were easily mastered were abandoned quite quickly as they were deemed boring. This is reflected in the Game Skill Learning Curve diagram in figure 2.9.12.

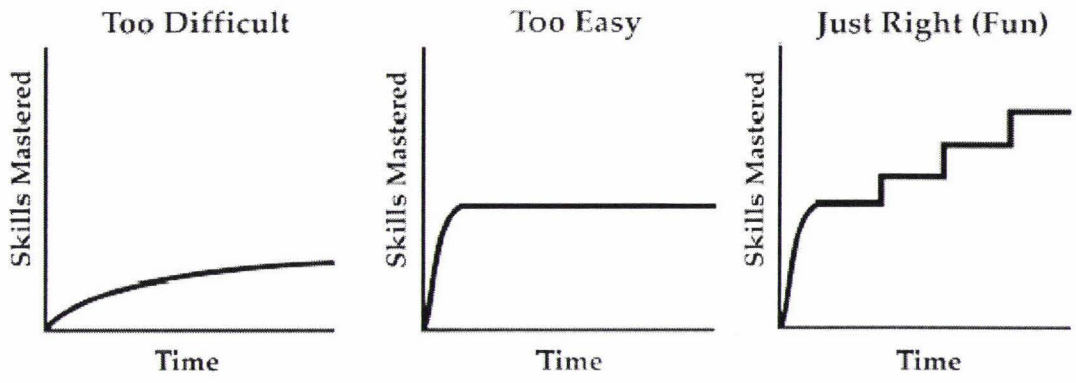


fig 2.9.12 Game Skill Learning Curve (Clarke, 2001)

Overall, the goal of the site design was to communicate that it was fun. They feel that too much structure and plain text indicates that the site will not be fun and interactive. If there is too much text then people think there is lots of information but no fun. Children look for interactivity on the Web, and especially gravitate towards games. Site content areas that are interactive (e.g. surveys and trivia) are deemed games by children, although adults would be more likely to describe them as activities. Other findings from the study included:

- colour, movement, fun, graphics and sound are attractive game elements;
- surprises and magic elements that appear in a game are very popular.

Once again, although his study was applied to children, perhaps the same features can be reapplied to adult audiences given they are also receptive to emotions inherent in games. In order to confirm this there needs to be similar tests on adults by future researchers. This thesis investigates (via questionnaires) if adult designers and users believe that gaming theory is transferable to Websites.

Amory et al (1998) undertook research to see what aspects of gaming can be used to best effect in educational software by reapplying those characteristics to the different context. The methodology was to use four different game types (simulation, strategy, adventure, shooting) and arrange for a small group of biology students of equal demographic proportions to play each one for about an hour, completing questionnaires afterwards. In addition, students provided some demographic data. Questions on each game attempted to ascertain whether the game was captivating or addictive, presented challenges and/or contained racist or sexist elements. Students also identified attractive game properties and suggested how such a game could be used in education, what strategies they used to solve problems and if they acquired new knowledge and skills. To determine the type of game elements most appreciated by the students they were asked to rate the games according to the aspects of fun, sound and graphics, type of game, game story and use of technology. Males played the games for longer than females and therefore completed more of each game. This gender difference once again emphasises the need to take note of target demographics when designing.

Cassell and Jenkins (n.d.) also examine differences in computer game characteristics between genders, with an overwhelming male-oriented computer gaming industry. Approximately 75 to 85 percent of the sales and revenues generated by the multi-billion dollar game industry are derived from male consumers. In a study of one hundred arcade games it was found that 92 percent contained no female character roles whatsoever. Assuming a gender-neutral target market on a Website, this imbalance will have to be addressed. Cited studies show that girls report negative emotions (stress) when working with educational software that has violent themes (while in the same study, boys report stress when working with software that requires verbal agility and cooperation, and does not contain aggressive content). It has been shown, for example, that the violent nature of many video games specifically alienates girls. Conclusions were that although boys and girls can be equally skilled at using computers and computer games, boys are more likely than girls to choose to play with them, and children of both sexes consider both computers and computer games to be boys' toys. The fact that more boys play computer games means that more games are currently targeted toward them.

Irrespective of age or sex, people enjoy board games in their daily lives with friends and family (Sugimoto et al, 2001). Compared with today's computer games that use sound, graphics and animation, a board game is a simple media, but yet people still find them exciting (because of strategies, skills, competition and face-to-face interaction).

Bryce and Higgins (n.d.) looks at the design of educational software via favourable elements of gaming, stating that the electronic environment is an area in which individuals take part in playful and enjoyable experiences. It is therefore the focus of a large amount of leisure time for adults and children, and the increasing focus of activity in work and educational contexts. Research conducted on positive experiences of computer use suggests they share the same structural characteristics (Ghani, 1991; Ghani and Deshpande, 1995), and that these characteristics are comparable with other intrinsically motivated activities. Structural characteristics such as involvement, control and a balance between skill and

challenge have been identified as determinants of optimal experience or flow (Csikszentmihalyi, 1975), and the experience of enjoyment, involvement and learning in different contexts. This suggests that games and simulations can be designed in ways which allow the experience of enjoyable and educational computer-use in leisure as well as in more formal contexts. If these references are to be believed then the formal context of spending money on the Internet could be a target for gaming characteristics in order to achieve fun and flow.

Csikszentmihalyi (1990) states that flow is a state of pure engagement. An example of a flow experience is becoming so absorbed in a movie that you forget you are in the audience. Three things are necessary for a flow experience:

1. Clear goals
2. Fast accurate feedback
3. Level of challenge matched to skill level

Bryce and Higgins (n.d.) cite references looking at aspects of gaming that can reapplied in other contexts. These are particularly relevant to this thesis.

- *Intense involvement and concentration, lack of self-consciousness and altered sense of time* - Computers have a 'holding power' that limits awareness to the demands of the task at hand, and users often report an alteration in their perception of time.
- *Clarity of goals and feedback* - Clear goals and feedback are readily discernible in most games and sports (e.g. complete the game, or achieve the highest score). Games are structured so that players are able to monitor quality of performance. Webster (1989) provided evidence that enjoyment results from the immediate feedback which computers provide to their users.
- *Control over actions and environment* - A frequent explanation for the reasons why people play computer games is the sense of control they afford the player - being in control is a key factor in the experience of flow.
- *Intrinsically rewarding experience* - Theories of play emphasise the voluntary nature and the lack of ulterior purpose and the importance of enjoyment. The notions of play and enjoyment are central to playing computer games, and these factors have been identified as important motivations for computer gaming.
- *A balance between skill and challenge* - Of central importance to the experience of flow is the balance between the skills of the individual and the challenges inherent in any situation or activity (Csikszentmihalyi, 1975). It is the balance between these two factors which facilitates the experience of enjoyment, learning and personal growth. Other research has found evidence that skills such as strategising, critical thinking, categorisation and problem-solving developed during computer gaming use and are similar to notions of expertise used in other areas of the educational curriculum (Vandeventer, 1998).

- *Enjoyment* - Enjoyment has been identified as an important motivational factor in computer use, contributing towards creativity and exploratory use behaviour (Ghani, 1991), as well as being a major determinant of optimal experience or flow (Clarke and Haworth, 1991). The link between enjoyment and involvement in learning situations (Malone and Lepper, 1981), suggests that designing software in ways that facilitates the experience of enjoyment is an important future direction in educational software design.

Johnson and Wiles (2001) state that if a game does not generate positive emotions in users then it might not succeed. To help users achieve this positive emotion, the game should provide the user with secondary goals or tasks. In comparison, most non-leisure software is designed to achieve a pre-existing task or goal. However, they also believe that the users' primary motivation is to achieve this goal and that the desire for emotional affect, if considered at all, is secondary to the achievement of the task. This statement forgets that a lot of people would perform Internet shopping as a leisure activity. Studies into what makes games so popular are cited, and how they create positive affects. Once again the importance of flow is emphasised (the euphoric state of concentration and involvement, that can often be described as one of the most enjoyable and valuable experiences a person can have, where the sense of time is altered). During gameplay the joy of success is dependent upon the possibility of failure. This aspect would not be advisable to be too strong when trying to get someone to buy something online though.

According to Keeker (1997), challenge (a common element of games) is an important part of emotional response in Websites. Challenge is exciting and attention-getting. To be continually challenging but not threatening, sites can present new ideas and content in a relatively safe manner. It's particularly difficult to provide an appropriate level of challenge for all audience members. Like chess, a good site should be easy enough to learn, but complex enough to keep people coming back. Things that have to be considered include:

- Will the level of challenge found in the site's content be appropriate for the core audience?
- Will people find new challenges as they gain experience?
- Are there qualities in the site that are familiar to the viewer?
- Are there qualities that are unique to this site?
- Are a range of goals and skill-levels accommodated for?
- Is information logically organised (for example, from broad to narrow levels of detail)?
- Enabling the audience member to change the rules or create their own challenges.

To finish of this section, pictorial examples from Pepsi (http://www.pepsiworld.com [2001, Nov 2]) are used to show how one company has gone about integrating games, fun, challenge and variation into it's Website in order to complement its efforts to sell products online. It can be seen how customisation and interactivity have been combined with branding and online shopping. The games themselves have a branding theme throughout. For example, the Pepsi product Mountain Dew has a game that involves trying to rescue a stolen shipment of that product. While some could argue that this type of interactivity would only appeal to the younger audiences, this audience has been shown to also include adults (i.e. the popularity and sales of Playstation games in aging demographics). Using other emotional themes like selection of music and fun customisation is also present here.

fig 2.9.13 Fun at www.pepsiworld.com

fig 2.9.14 Fun at www.pepsiworld.com

3. Original Research Methodology

We have now seen many elements of what literary and business sources suggest should be part of design in order to achieve emotional connections. In order to further achieve the objectives of this thesis (answer the research questions in section 1.1), research was undertaken via surveys of designers and users to verify findings from literature; identify what literary themes are being emphasised the most in practice; address gaps (e.g. are emotionally aware designers misjudging what is deemed as emotionally important to users?) and to what degree human-computer communication is taking place; and also to uncover anything else missed by literature referenced in this thesis.

Previous research methodologies into elements identified as being emotion-centred (from chapter 2) included the use of semantic maps, trust models, taxonomical frameworks, classification systems, and deployment of questionnaires. There was a distinct lack of application of these methods to e-Commerce design, except in the case of trust formation. A number of models and frameworks seemed to be appropriate and successful for general affective human factors in consumer products, but they are unproven in e-Commerce design. While the methods could be used directly, there is a definite lack of proven validity and reliability.

While using focus groups to rate designs based on pleasurable experiences would be an excellent methodology (perhaps using semantic maps and classification frameworks), it was felt that the emotional dimensions for e-Commerce had not previously been developed enough to work from – hence the decision to undertake extensive literature reviews and case examples combined with original surveys of designers and users to strengthen theory on what experiences work for e-Commerce and Web design. This thesis looked to explore and then make comments on analysis of literature and questionnaires.

3.1 Use of Background Literature and Case Examples

As has been seen in chapter 2, an extensive range of literature was searched and analysed for links to emotional design. Because the topic of this thesis revolves around the design of e-Commerce, many references came from Internet-based sources, of which there is an abundance of articles and papers on Internet activities. These references were supported by academic literature, journal articles, and business sources. Extensive use was also made of recent conferences on affective human factors. Collated material was heavily utilised for presenting good and bad examples of design via miniature cases in the form of screenshots - demonstrating principles applicable to this thesis. The literature was grouped and re-grouped in an iterative process to bring together similar references, resulting in the themes that relate to each element of this thesis.

As stated, previous literature was also used to identify gaps in theory, obtain ideas for original research via analysis of previous methodologies, and gauge the level of support for emotion-centred design.

3.2 Survey of Web Designers

The questionnaire given to Web designers formed a major part of the original methodology for this thesis. The survey was designed to answer the research questions, looking to:

- use elements from literature and address gaps
- compare opinions with that of literature
- assess the level of usage of emotion-centred design
- see if there are relationships between opinions and respondent demographics
- gain new ideas from 'rich' questions

The original sample was 120 email addresses of Web design companies or known independent designers. These were obtained via searching under "Website Designers" at http://www.yellowpages.co.nz and http://www.searchnz.co.nz. Each Website listed (from the first 5 search results pages only (displayed non-alphabetically) because they were frequently repeated after the 5th results page) was visited and examined to get contact details for the design company. In some cases this was a generic address like info@designABC.co.nz, and other times it was a specific name of a staff-member or designer. In some cases multiple addresses were obtained for different staff within the same company. Email addresses were also obtained via the small number listed in the physical Wellington Yellow Pages Book, those on http://www.netguide.co.nz and a small number by previous business association with the researcher.

The survey was submitted and carried out over the Internet in the hope of increasing response rates and to reduce costs. The sample respondents were also asked to forward the link to the survey on to other colleagues or designers if they so wished. Ethical considerations were covered by assuring confidentiality and anonymity in the results, and giving background information of the intended research to provide informed consent. Acknowledgement of informed consent came in the form of the submitted questionnaire. All questions were described as being voluntary, and no coercion was offered. The probability of any psychological or physical damage resulting from the survey was deemed extremely low (if not non-existent).

The survey link was sent via email with the following text:

> *Dear Designer(s)*
>
> *My name is Warren Smith - a Master of Philosophy student undertaking a study on the emotive aspects of Web design. I am looking at ways of helping me expand current knowledge in applying design criteria to evoke emotions such as fun, joy, pleasure or trust in Web design. To this end, I have created a survey that aims to gauge opinions on emotion-centred Web design, which I hope you might participate in. This survey is completely confidential and anonymous, and you have the right to refuse to answer any of the questions. If you handle incoming mail correspondence on behalf of your company it would be very much appreciated if you could forward this on to design staff, managers or contributors to Web content. Alternatively, if this has reached a designer directly, you may wish to forward this on to friends or colleagues to increase quantity of results.*
>
> *The link to the survey is*
> *http://www.survey.net.nz/survey.php?99c8b6de90fb437ab0b21d29331e44fb*
>
> *It is expected that the survey will take approximately 10 minutes to complete.*
>
> *You are most welcome to contact me at warren.smith@xtra.co.nz for any further information or access to the results.*
>
> *The survey responses will be collated on August 7, 2001.*
>
> *Your name was obtained via searching the physical Wellington Yellow Pages book, undertaking a search for 'Website developers' on www.yellowpages.co.nz, www.searchnz.co.nz, and www.netguide.co.nz, or through a relationship with the researcher.*
>
> *Kind regards*
> *Warren Smith*

A number of Web-based survey hosting sites were researched to see what functionality they could offer the survey desired for this thesis. The choice ended up being http://www.survey.net.nz as it allowed users to create, manage and collate free surveys of indefinite length (other survey-hosting sites had a maximum of ten questions and charged a fee). However, the tool had limitations in terms of layout and difficult-to-use mechanisms for inserting graphics. The site allowed researchers to download the responses to a spreadsheet (Microsoft Excel in this case) for further analysis.

The full list of questions in the survey are reframed into statements and presented in the Results chapter of this thesis. The full questionnaire can also be found in the Appendices of this thesis, with a sample screenshot of the layout being shown on the next page.

Emotion-Centred Design for E-Commerce

Warren Smith - Master of Philosophy - Massey University

Survey on Emotion-Centred Web Design

Thankyou for coming to this web-based survey. My name is Warren Smith. I am a Master of Philosophy student undertaking a study on the emotive aspects of web design. Your participation in this survey is most appreciated and would help me to expand current knowledge in applying design criteria to evoke emotions such as fun, joy, pleasure or trust in web design. It is expected that the survey will take approximately 10 minutes to complete.

In completing this survey you are acknowledging informed consent as per the email that linked you to this site. Full confidentiality and anonymity are assured.

You are most welcome to contact me at warren.smith@xtra.co.nz for any further information or access to the results.

The survey responses will be collated on August 7, 2001.

Please note that there is a SUBMIT button at the bottom of this survey that will need to be clicked on to send the results.

DEMOGRAPHICS

(A1) Which of the following best describes your role in the workplace?

•
•
•

(C4) What should the design mix be between rational and emotional qualities?

- ○ 100% Rational, 0% Emotional
- ○ 75% Rational, 25% Emotional
- ○ 50% Rational, 50% Emotional
- ○ 25% Rational, 75% Emotional
- ○ 0% Rational, 100% Emotional

(C5) If you were to rate a site according to its level of emotional effectiveness, what dimensions/adjectives would you examine?

(C6) Do you use any classifications/ratings systems to critique your designs before they go live? If so then please explain.

Most questions were based on a 5 point Likert scale, and were represented as 'radio buttons' on the Web-based survey:

- stongly agree
- agree
- not sure
- disagree
- strongly disagree

This scale was chosen so as to gauge the overall positive or negative views respondents had on the statement(s) put forward. Other questions were framed so as to receive richer data, including 'free-text' fields for placing comments, and checkboxes to denote anwers to questions requiring selection of more than one option (e.g. selecting the top 3 aspects of design for a particular emotional characteristic).

The questionnaire went through a number of iterations when it was being developed – in terms of both content and layout. There were four sessions with the thesis supervisor to improve lines of questioning and response scales – including attempts to remove ambiguity or persuasive questioning, and also to add richness.

A pilot was run to check the ease of understanding and user-friendliness of the questionnaire, and also as a spelling and grammar check. This was conducted amongst five ex-colleagues of the researcher. They all thought that the survey was easy to follow and was pitched at the right level. One person thought that it was a bit long, but it was decided this was necessary to cover the new field of emotional design and to capture as much information as possible for analysis. Three people suggested changing the response scales on some of the questions from the agree-disagree scale to a high-low scale – and this suggestion was adopted. Another person picked up issues with spelling and structure which were addressed in the final survey.

Analysis takes place via graphical representation of the frequency of results, written commentary, and also statistical analysis via the chi-square test. Chi-square was chosen because the data gathered from the survey is non-numeric and therefore usual statistical tests involving means and numerical analysis are not valid. Because the data is coded into groups, with frequencies of responses being tabulated, the chi-square test was chosen as it gives a sense of association between rows and columns in those tables. The graphs presented in the Results & Analysis chapter of this thesis give much insight into opinions and suggestions in emotion-centred design, and the chi-square tests build on this by seeing if there are any relationships between the findings and the demographics of respondents. The chi-square test indicates if demographic distributions of responses are different, but it does not say how they differ. The test is therefore combined with a written description of the relationship (based on obervation of graphical results) as per recommendations from Moore and McCabe (1993).

3.3 Survey of Users

After the survey had gone out to the designers and the results were beginning to be compiled, a smaller-scale survey to Website users was put out. This was done so as to verify if designers were meeting user expectations, and to gauge the level of fit between the originators and users of Websites. Specific questions that were hoped to be answered by this smaller secondary survey included whether designers understand the way a user's brain works; and if the bond between computers and humans is being fully formed.

This extra survey was done to increase triangulation of methods/angles of approach – creating a more robust and rigorous basis for analysis and having more evidence for concluding commentary. The questions for this survey asked some of the key themed questions which literature identified. In some cases they were asked exactly the same question as the designers for direct comparision, and in other cases questions were more oriented around levels of emotion experienced and the actions taken by them as a result. The survey questions are not listed here, but can be seen in the Results & Analysis chapter of this thesis and in appendices.

Participants for the user survey were gathered from people who had a previous workplace association with the researcher or via other peers. It should be noted that this therefore has limitations in terms of a lack of randomness (compared to the designer surveys) and a potential bias of views and similar ways of thinking given that many users were from the same working background as the researcher. However, it was ensured that there was a cross-section of demographics amongst the sample of 45. There were 32 responses from this group.

This questionnaire was delivered and responded to by hand and were paper-based (rather than e-mail). Once again, information about the study was provided in the introductory text on the survey. Ethical considerations were addressed as per the survey of designers.

4. Results & Analysis

4.1 Designer Survey (n=42)

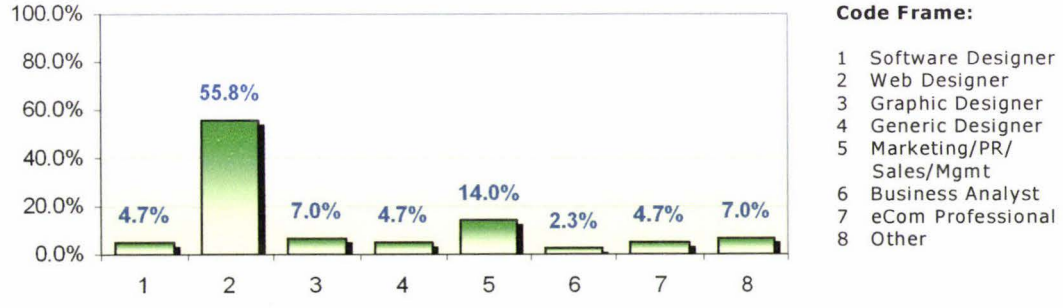
There were 44 responses to the survey sent to design companies, one of which has been excluded from the analysis because of null responses to all questions. Another respondent answered the demographics questions but neglected to answer any others. For these reasons, the base can be assumed to be 43 for the demographics questions but 42 for the main emotional design questions. Because the questions were voluntary, null responses were also recorded for other questions and these have been noted with each commentary and graph below. It needs to be emphasised that each question should be read with a view that further commentary takes place in the Discussion chapter of this thesis, which ties everything together with literature and user results. Note also that respondents within the designer survey were a mixture of designers, developers and other staff such as marketing/management involved in the design company. These are often collectively referred to as 'designers' in discussion and commentary.

4.1.1 Analysis of Survey Responses

(A) DEMOGRAPHICS

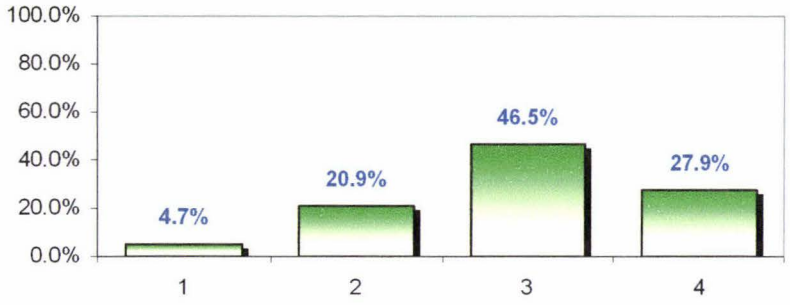
(A1) Respondent workplace roles

These results (which show that more than half of the respondents were Web designers) are not unexpected, as the surveys were sent to Web design companies. It was interesting to see that the second highest group was Marketing/PR/Sales/Management, perhaps reflecting the importance of these roles in design companies – helping to tie together the designs with a balance of customer needs and business objectives.



(A2) Respondent age groups

As expected, the 26-40 age group was the biggest group because it had the widest range of ages. The groupings for this question were made so as to separate out those who have recently left school or university from those who would have a bit more experience in both design and life. It will be investigated whether they have differing views on emotion-centred design.

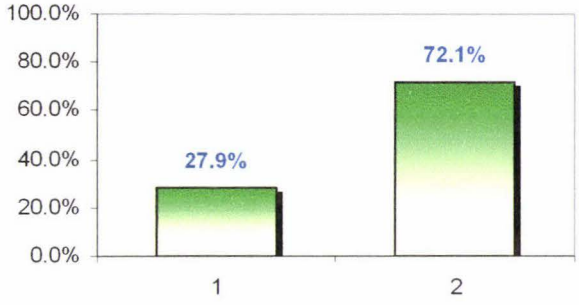


Code Frame:

1 20 or below
2 21-25
3 26-40
4 41+

(A3) Respondent genders

This question was asked to see if females differed from males in their design philosophies and attitudes towards emotion. As it turns out there is an overwhelming percentage of men (72%) in this sample.

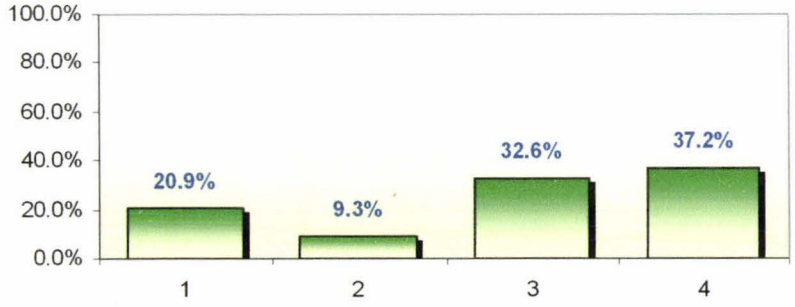


Code Frame:

1 Female
2 Male

(A4) Periods in which a course or studies in design or e-Commerce were undertaken

There are a number of interesting figures here. The biggest group of respondents (37%) have actually never had any training in design or e-Commerce. Only 1 in 5 respondents had been on a course or undertaken studies in the last year. This question was asked to see if recent training would affect views on emotional design. For example, do those who have no training in design or e-Commerce think differently? Chi-square analysis will check this later.

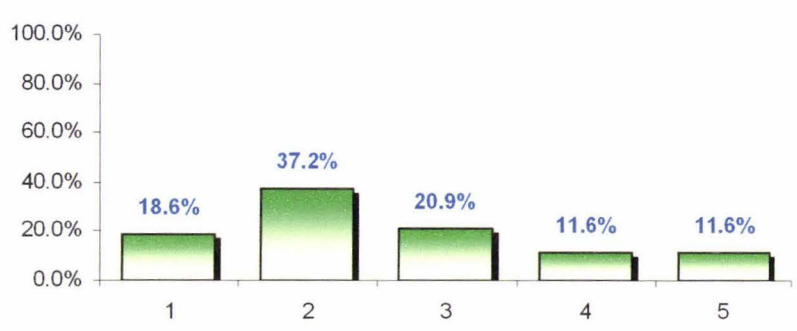


Code Frame:

1 Last 12 mths
2 1 or 2 yrs
3 3 or more yrs
4 Never

(A5) Level of qualification

There is a good spread of results for this question, with a relatively even mix of qualification levels. It is interesting to note that nearly 90% of respondents have tertiary qualifications, but yet, as per question A4, 37% of respondents had never studied design or e-Commerce. This could potentially affect their willingness to undertake emotional versus rational design.

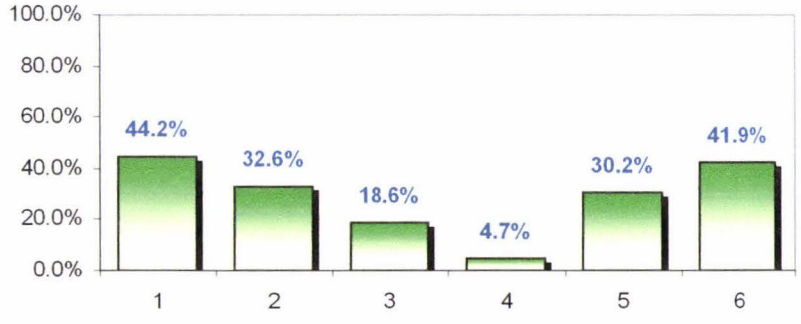


Code Frame:

1 Post-Graduate Degree
2 Bachelors Degree
3 Diploma/Certificate
4 Some tertiary papers
5 High School/College

(A6) Main educational disciplines

In this question the respondents were able to associate themselves with more than one group. The high percentages in some of these groups show that the respondents are multi-skilled. For example, 44% say they have been educated in Web design, and some of those have also trained in areas like marketing and management. The area of industrial design is only represented to a small degree in this sample.

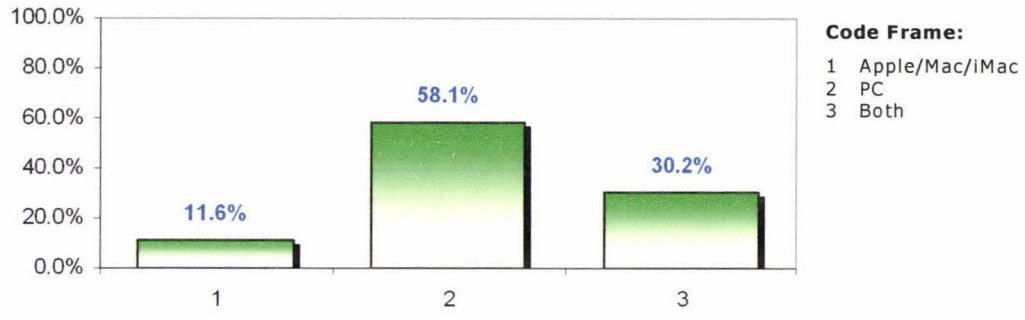


Code Frame:

1 Web Design
2 Graphic Design
3 Software Design
4 Industrial Design
5 Marketing/Sales/ PR/Management
6 Other

(A7) System environment that is worked in

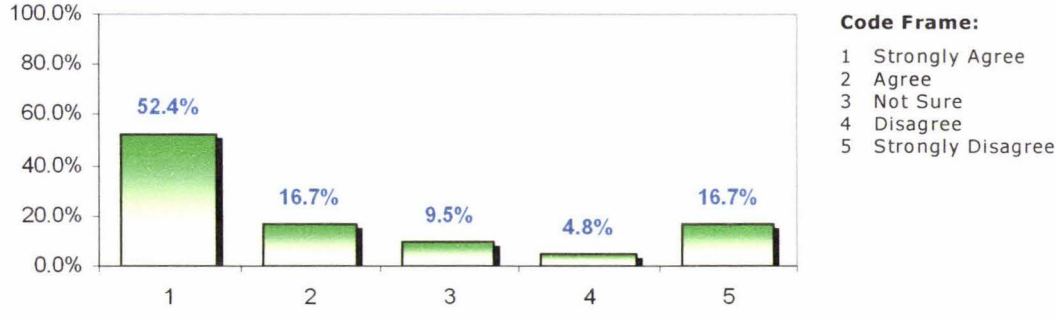
The use of the PC appears to be more popular in this sample, however, code groupings (1) and (3) show that over 40% of respondents made some use of an Apple computer. It will be investigated via chi-square analysis whether Apple-users think differently about design than non-users. Literature has shown that the iMac is emotionally-designed so do its users also have that mindset?



(B) EMOTION-CENTRED DESIGN QUESTIONS

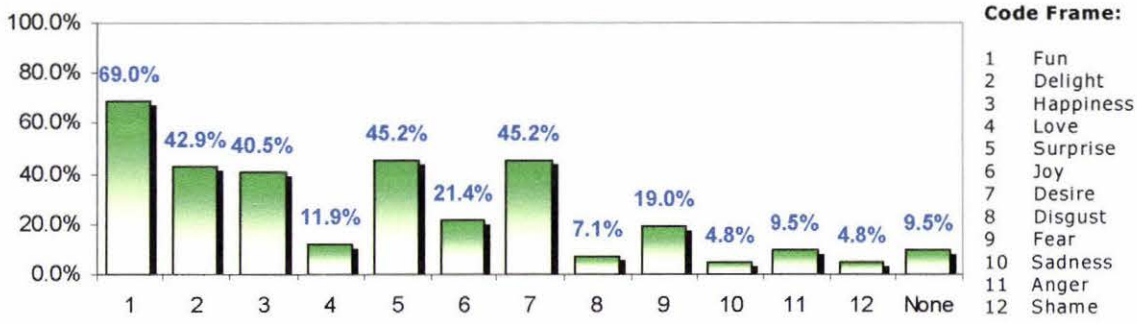
(B1) Beliefs about the statement that the emotional mind is quicker than the rational mind and therefore aiming to appeal to emotions first, thoughts second when designing for the Web is important

Almost 70% of respondents were in agreement with this statement. As this is the first question relating to emotion it will be interesting to see how this percentage changes with other questions later in the survey – seeing if opinions are actually undertaken in practice.



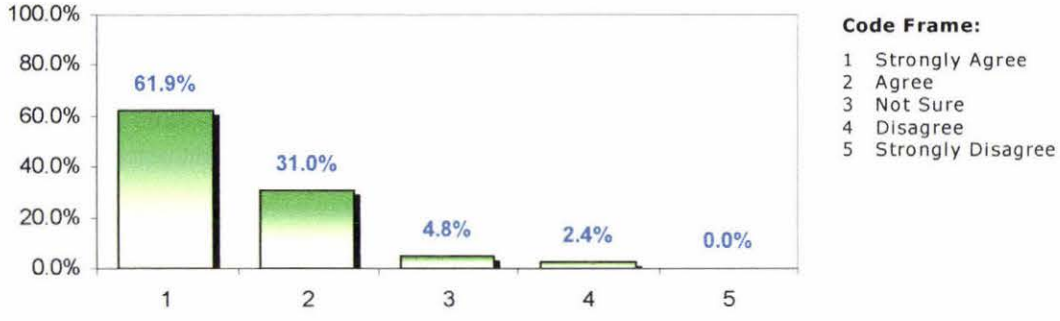
(B2) Emotions that have been conscientiously integrated into designs in the past

The code groupings for this question were chosen from the emotional families highlighted in references like Goleman (1995) and Cacioppo (1999). Respondents could tick more than one answer here. There are several interesting findings. The negative emotions (sadness, anger, shame, disgust, fear) were heavily outweighed by the positive ones in their usage. The exception to the lesser use of negative emotions was fear (19%). This is probably due to the users' fear of losing their money or private details on the Internet – evident by the literature on trust in this thesis. Almost 10% of respondents had not conscientiously used any of the emotions in their designs. Of the positive emotions, fun was overwhelmingly the most popular (69%), with delight, happiness, surprise and desire also being above 40% each. The positive emotions appealed to the least were love and joy.



(B3) Belief that empathising with the target users is important

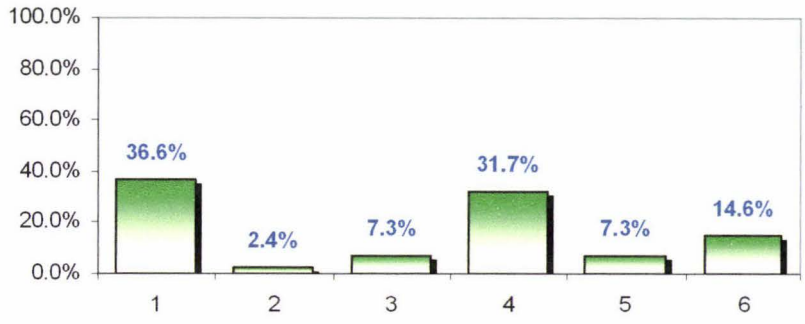
There was an overwhelming positive response to this question, with only 2.4% disagreeing. This shows that empathy (a major part of emotional intelligence) is thought to be very important, meaning that designers think they are putting themselves in their users place when thinking about designs. It will be investigated in other results (including the user survey) if these views are practised appropriately.



(C) DESIGN PHILOSOPHY

(C1) Design philosophy followed by respondents

The results from this question show that the philosophies of form follows function and subjective/intuitive were by far the most popular (both over 30%). Of special interest here is that only 1 respondent replied that they were using 'form follows emotion'. Because other results show that emotional-design principles are supposedly being used, this result may reflect the lack of recognition of the phrase 'form follows emotion' as it has only been recently coined. It will be interesting to see via chi-square analysis if subjective/intuitive people think differently than 'functional' respondents with regard to their other responses in this survey.



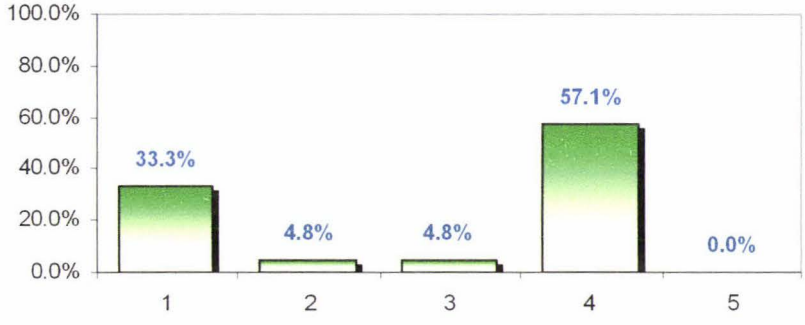
Code Frame:

1 Form Follows Function (as per Bauhaus)
2 Form Follows Emotion (as per Frog Design)
3 Positivistic Rationality / Scientific Methods
4 Subjective/Intuitive
5 Other
6 Not Sure

(1 null response)

(C2) Stage at which emotional considerations should take place during the process of design

The overwhelming response here was that emotional considerations should take place throughout the design process. Another large group thought that up-front was the best time to undertake this. No one thought that emotional considerations shouldn't be employed at all – which slightly contradicts questions C3 and C4, which follow.

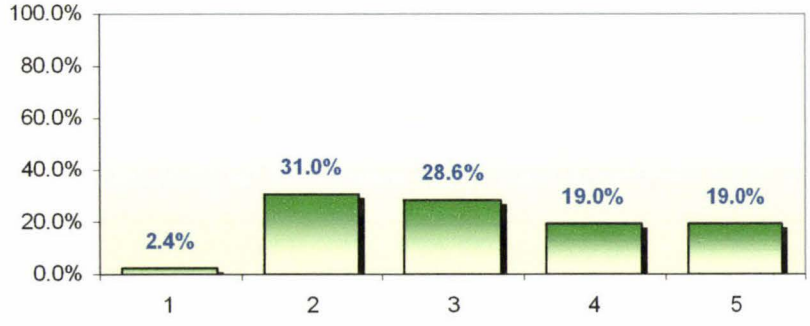


Code Frame:

1 Upfront
2 Middle stages
3 At the end
4 Throughout
5 Nowhere

(C3) Inclusion of design aspects that have no rational reason behind them

Two things of note come from these results. The first is that only 1 person out of 42 applies non-rational design aspects all of the time, and the other is that the other responses are quite evenly spread. It is interesting to also note the contradiction here that almost 20% of respondents never include something that doesn't have a rational reason but yet no-one said they would not include emotional considerations at any stage in question C2. It could be argued though, that including emotional design aspects is a rational idea, as you might purposefully and rationally include them in the design.

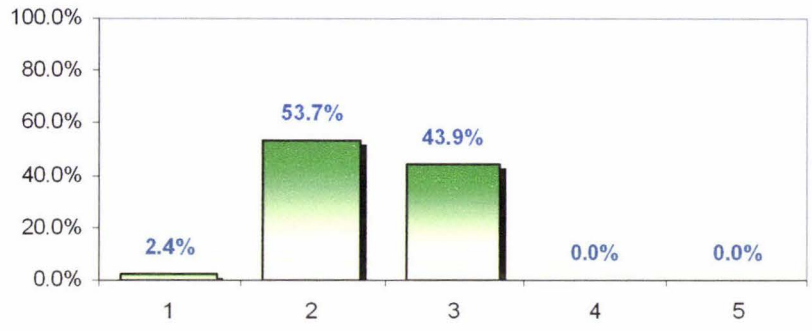


Code Frame:

1 All the time
2 Regularly
3 Sometimes
4 Once or twice
5 Never

(C4) The design mix between rational and emotional qualities

Except for one case, all respondents said that emotional considerations should form at least 25% of the design. However, no one said that the mix should be more than 50%. These results show that there is a belief that rational design elements should always be present – which is fair enough – if a Website was *all* emotion then it might not have any useful functionality.



Code Frame:

1 100% Rational, 0% Emotional
2 75% Rational, 25% Emotional
3 50% Rational, 50% Emotional
4 25% Rational, 75% Emotional
5 0% Rational, 100% Emotional

(1 null)

(C5) Dimensions/adjectives that designers use to rate a site according to its level of emotional effectiveness

Selected groupings of reported adjectives from this question are listed below. These can be related to the sample Kansei words provided earlier by Nagamachi et al (2001).

Relaxation	***Honesty***	***Relevance***
Harmony	***Purity***	***Engaging***
Interesting	***Warmth***	***Insightful***
Usability	***Curiosity***	***Humorous***
Fitness	***Welcoming***	***Inclusion***
Persuasiveness	***Clever***	***Ownership***
Sympathy	***Quirky***	
Fun	***'Feel'***	

There were also some more extensive quotes given as responses to this question:

- "What it offers the visitor in terms of a solution"
- "If I liked it - and thought the target audience would also like it...."
- "Whether it encouraged return visits"
- "It is purely objective.... there would be no rational dimensions to measure it by"
- "I like to see how I feel about the site's creators, and how I feel about myself in relation to them. A lot of Web design smacks of arrogance to me"
- "I would not necessarily try to "rate" a site for emotional effectiveness in an empirical way. If I were to apply specific adjectives to describe the emotive qualities of a

particular site they would be on a case-by-case basis and therefore not conducive to any type of comparative analysis"

- "Colours, imagery, heading and subheadings and main text"
- "Lifestyle, business and values of target audience"
- "Colours/typefaces/complexity/layout"
- "Did I come away with a clear view of what the brand 'values' were? Did I feel excited by and drawn into the site? Was the navigation intuitive or strictly functional?"

Overall, there was a large range of descriptors, with some designers relating emotion to design aspects like colour and text type, others to the way it makes you feel, and others based on recognition of user needs.

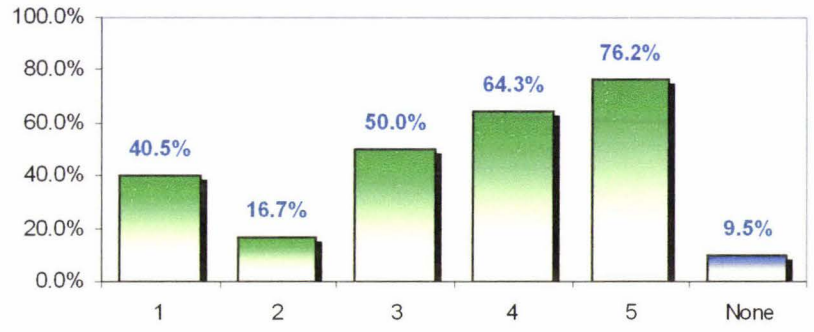
(C6) Use of classifications/ratings systems to critique designs before they go live

Rich-text response groupings to this question are shown below. 10 responses to this question stated that there was no formal rating or classification was being used at all. The proportion may be greater than this due to the fact that there were 18 null responses. Of those that did respond in the positive sense, no-one made reference to a particular formal classification framework – an opportunity perhaps. Usability testing and peer reviews seemed to be the most common techniques (with 2 responses each). One response indicated that they were not able to divulge the system they use for confidentiality reasons. Responses included:

- "A small pre-release sampling group."
- "Self assessment, peer assessment, target market assessment, client happiness."
- "Unofficially we rank them in house comparing what we had hoped to build with what the marketing people inside the client organisation forced us to produce at the end. I am almost invariably disappointed with what we are pushed into - I feel that self-inflated marketing individuals make some bad form and function decisions in an effort to produce an advertisement and sales pitch rather than a Website."
- "The look and feel of a site is developed in a concept stage of development. This stage is interpretive and based on research and analysis of the client's communication objectives."
- "Often do a review of a sites look and feel as compared to the initial brief given by the client, at the end proposal stage to check that we both are envisaging and are happy about what is proposed and what the end product will be like."
- "Peer approval and feedback."
- "Structured usability testing with the target market rating the site."

(C7) Affective human factors dimensions that are attempted within design

The dimensions of affective human factors design from Demirbilek and Sener (2001) were presented to respondents to see which were being undertaken. Respondents could reply to more than one of these categories. All of the groups had very high response rates with the exception of cuteness. This shows a high degree of correlation with what current affective factors research is saying should be included in design. Less than 10% of respondents did not try and appeal to any of the groups. The high percentage of designers looking to use colour to appeal to emotions is also verified in positive responses to questions E1 and E3.

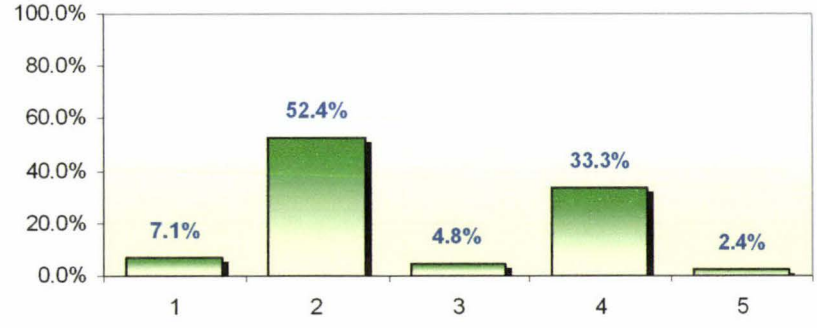


Code Frame:

1 FUN - humour and happiness
2 CUTENESS - varying proportions and roundness to imply differing ages
3 FAMILIARITY - using metaphors from nature (i.e. biomimicry) to increase intuitive functionality
4 METONYMY - distinction, difference and exclusivity
5 COLOURS - use of colour to appeal to emotions

(C8) Opinions of whether speed of loading is the top priority

There seems to be a distinct division between respondents in this question. While almost 60% of respondents believed that speed was the top priority, a third of respondents disagreed. Speed has been determined a contributor to the emotional appeal of a Website by the literature, with slow times causing frustration and negative emotions. However, although speed is important, it is obviously not always the absolute *top* priority for some designers.



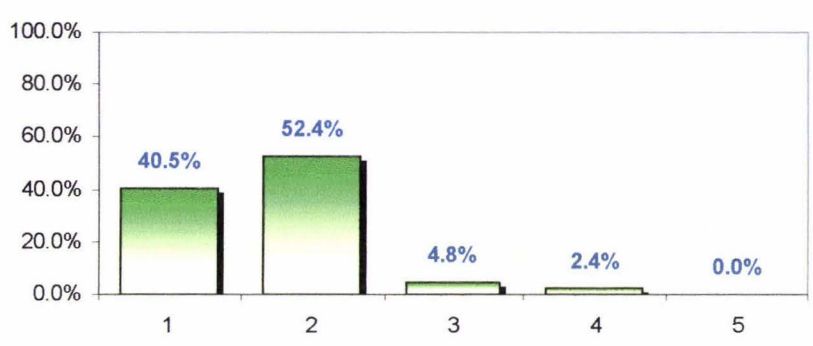
Code Frame:

1 Strongly Agree
2 Agree
3 Not Sure
4 Disagree
5 Strongly Disagree

(D) GENERAL QUESTIONING

(D1) Degree of importance assigned to considering the users' demographics

93% of respondents gave high or very high importance to user demographics. Whether this is done accurately or not will be discovered in user survey findings.

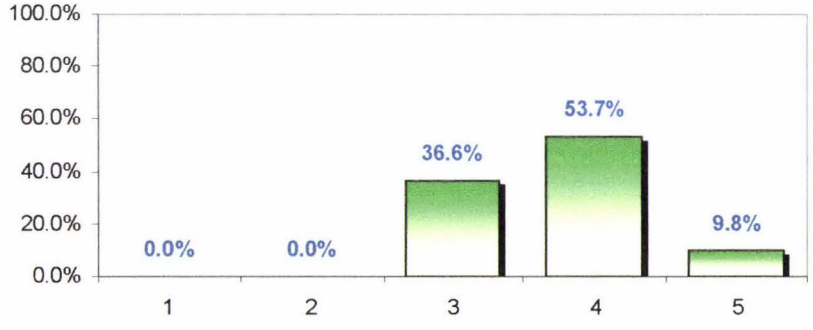


Code Frame:

1 Very High
2 High
3 Not Sure
4 Low
5 Very Low

(D2) Degree of importance assigned to considering the users' technical environment

As opposed to user demographics, it appears that little importance is given to the user's technical environment. This goes against what literature suggests, and could be an area of concern.



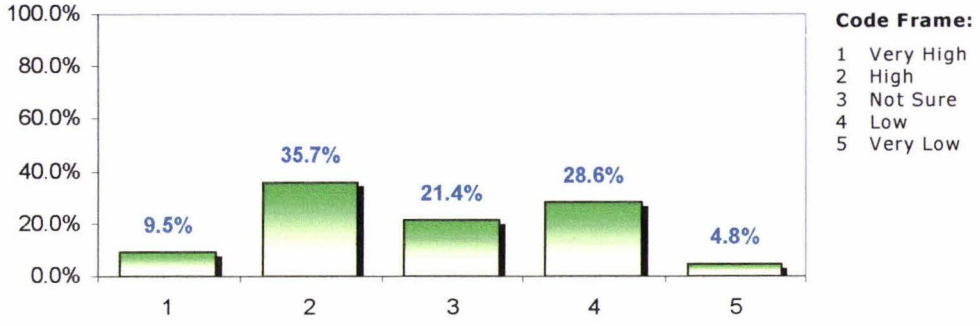
Code Frame:

1 Very High
2 High
3 Not Sure
4 Low
5 Very Low

(1 null)

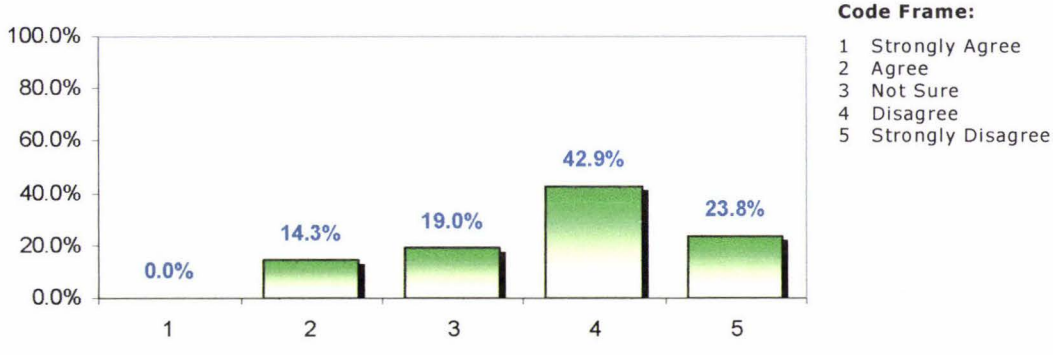
(D3) Degree of importance assigned to considering the users' international culture

There was an even spread of responses to this question, with less than half of designers assigning much importance to culture. This could be a major issue as globalisation continues, causing negative emotions in cultures that have not been catered for. But this might also reflect the fact that some designers are going for specific target audiences only, not a wider group.



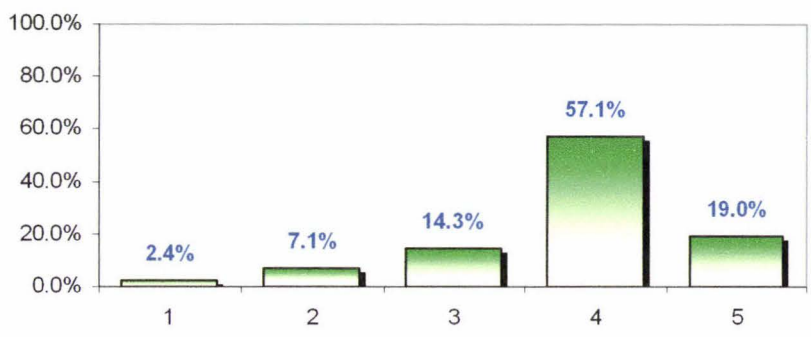
(D4) Opinions on the importance of Virtual Reality and 3D for emotional connections

Respondents felt that virtual reality and 3D were not very important in emotional design. Perhaps this is because they are too early on in their development and use, and slow connections prevent full benefits, or it could be due to a lack of knowledge of what VR and 3D can offer. However, these results do coincide with the views of usability expert Nielsen (2000), who was generally against 3D elements on Websites at the time of his paper.



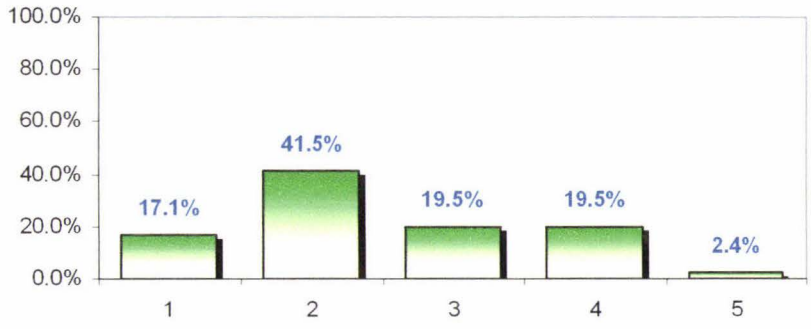
(D5) Use of 'Streaming' video and audio to achieve emotional connections

Even more surprising than D4 is the negative opinion of streaming video and audio, which should theoretically enable emotional connection via more interactivity and sensory stimuli – but this is not the case according to the sample (over 75% have a negative opinion).



(D6) Belief that broadband connections and WebTV will mean fewer barriers to reaching people on an emotional level

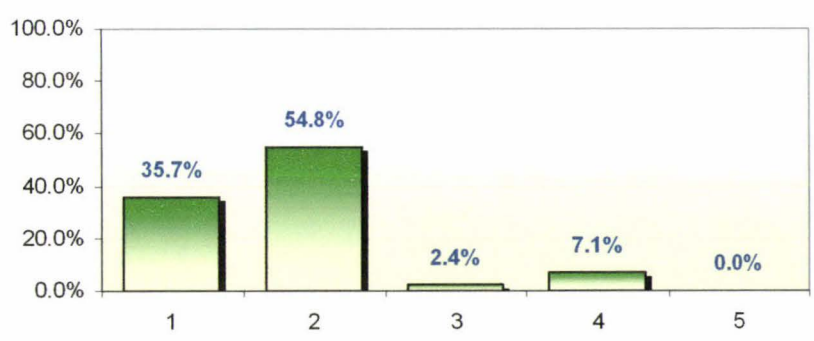
D4 and D5 show that designers don't place much importance on virtual reality, 3D and streaming media. However, there seems to be a bit of a contradiction here because the results of D6 show that increasing use of broadband will be favourable – but this technology is actually being put in place to enable New Media technologies such as streaming media to be used more.



(1 null)

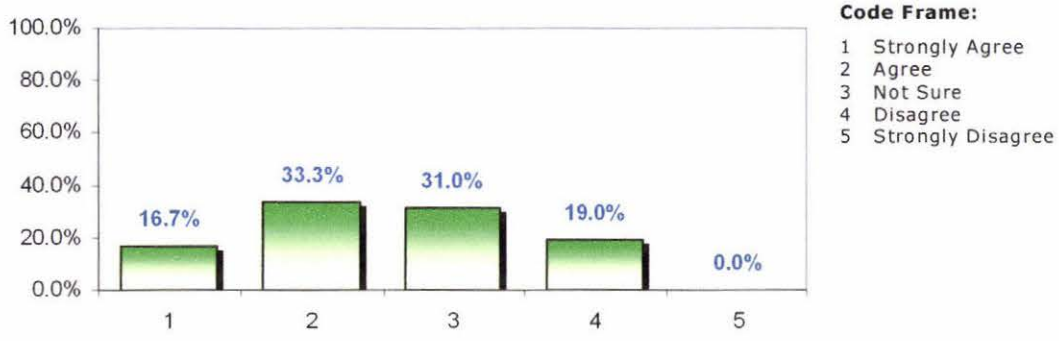
(D7) Importance of involving users when designing Websites (and using their feedback to improve the design)

The overwhelming positive response to this question perhaps reflects the fact that user-centred design is becoming more widely recognised, and it also supports the results of question B3 on empathising with users, and D1 with respect to demographic considerations.



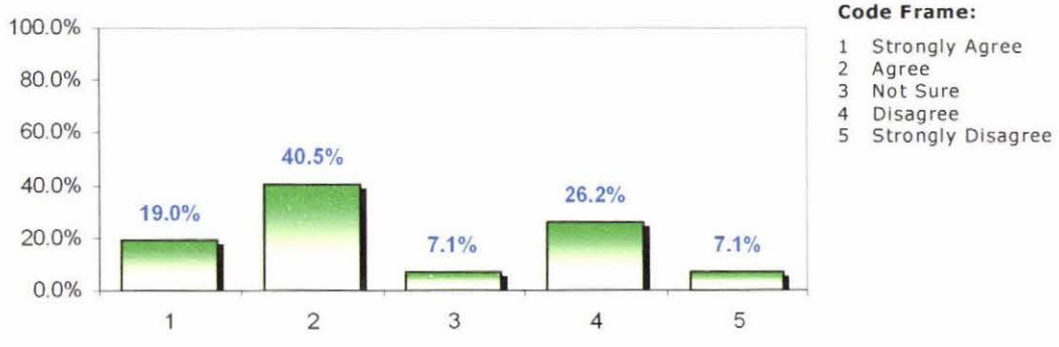
(D8) Importance of fun and pleasure when trying to get people to buy online

While 50% of respondents agreed that fun and pleasure are crucial in getting people to buy online, there are still a lot of people who are either unsure or disagree (50%). This may contradict the results of question B2 which showed that fun was the most commonly used emotional appeal in design.



(D9) Importance of 'transparency' of a Website, where the user feels known to the site creators and other users

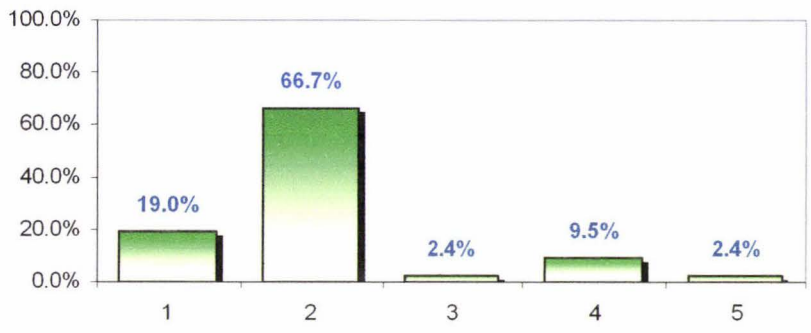
While 60% agreed that transparency was important there was still quite a few who disagreed – perhaps transparency depends on the circumstances and the target user demographics.



(E) USING COLOURS

(E1) Importance of understanding the traditional links between colours and the emotions they evoke

The fact that over 85% of respondents agreed with this statement is supported by the responses to question C7, which showed correct application of colour was very important in design.

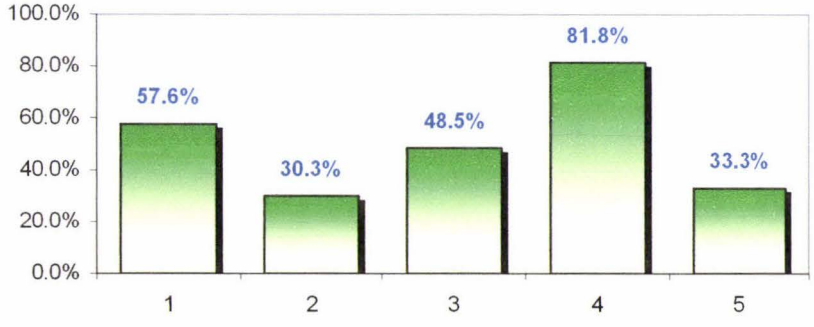


Code Frame:

1 Strongly Agree
2 Agree
3 Not Sure
4 Disagree
5 Strongly Disagree

(E2) Top 3 colour schemes used most often in designs

Of the colour schemes given for selecting 3 from, colour harmony was by far the most popular. Also of note is the fact that warm hues were used more than cool hues, remembering that warm hues can create positive emotions and cool hues may create more of a subdued sense, which might not necessarily be negative.



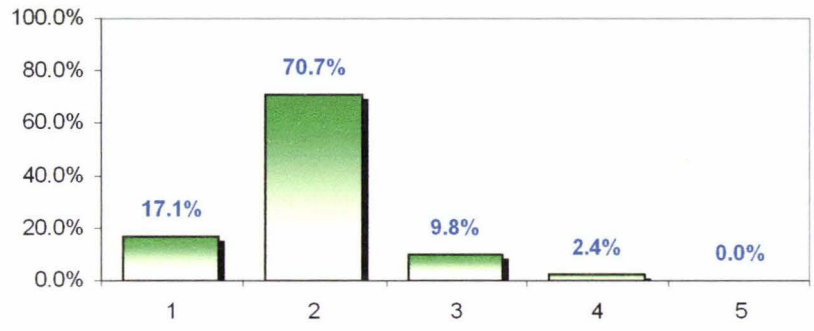
Code Frame:

1 Warm Hues
2 Cool Hues
3 Colour Contrast
4 Colour Harmony
5 Colour Graduation

(9 null or void)

(E3) Choosing colours to match the desired emotions to evoke in site visitors

As expected from the results of E1, there was an overwhelming positive response to the use of colours to evoke certain desired emotions

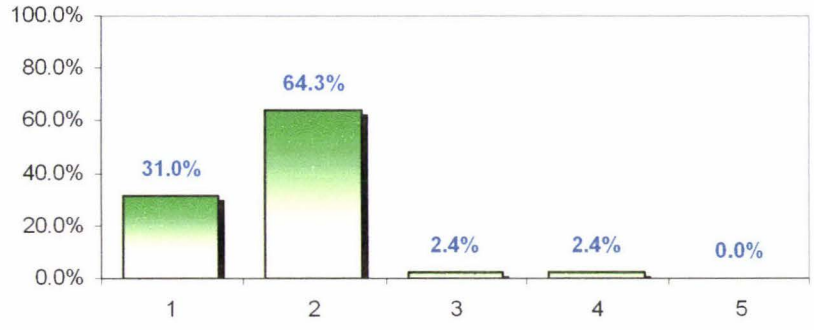


(1 null)

(F) TRANSFERRING THEORY FROM OTHER AREAS

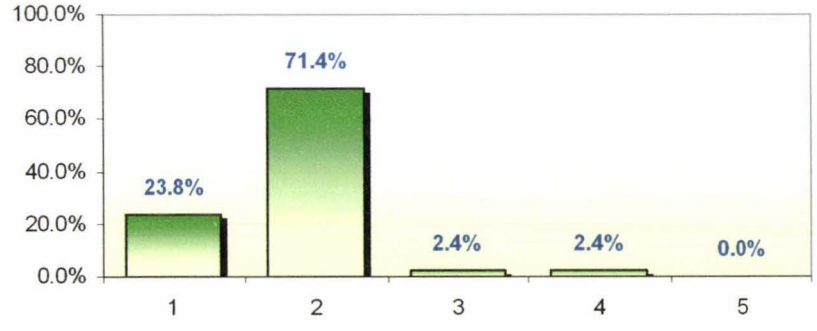
(F1) Belief that car design is emotional just as much as functional

The results of F1 and F2 show an overwhelming recognition (95% in both cases) that car design involves high levels of emotional design and that it invokes fun and pleasure in customers.



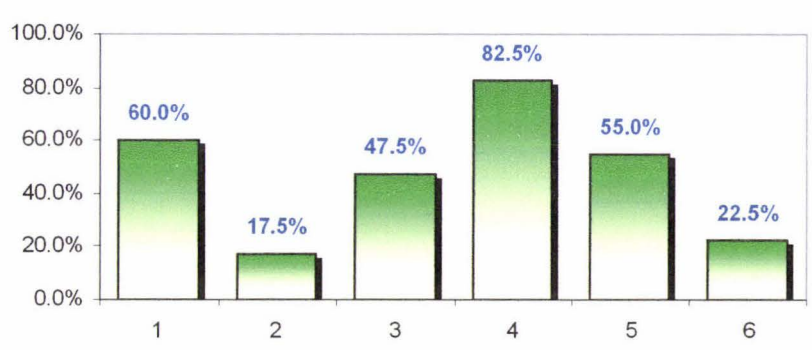
(F2) Belief that car design encompasses invoking fun, lust and pleasure in consumers

The commentary for this graph is present in F1.



(F3) Top 3 aspects of computer game design that are the most appropriate for use in Web design

The aspects of computer games that are best applied to Web design (according to respondents) are the use of colour, interactivity and fun. Identification with an imaginary character and the use of challenge are not deemed as transferable.



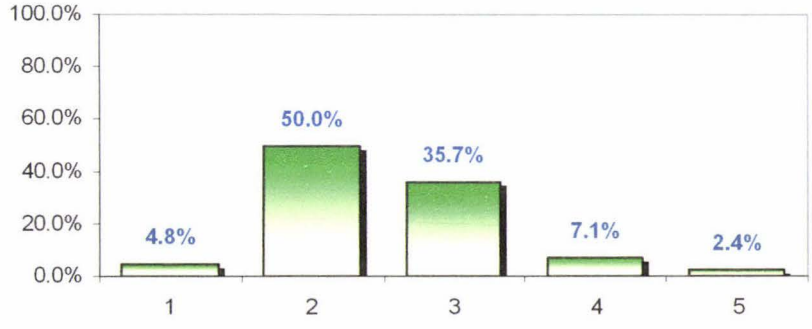
Code Frame:

1 Emotional colour use
2 Identification with an imaginary character
3 Social contact
4 Interactivity
5 Fun
6 Challenge

(2 null)

(F4) Belief that principles applied to the design of cars and games can be reapplied to appeal to the same emotions during e-Commerce design

While a large proportion of respondents were still unsure, only 9% disagreed with the statement that principles applied to car and game design can be transferred to Web design to evoke the same emotions. This proves the relevance of the inclusion of car and gaming case studies in this thesis.

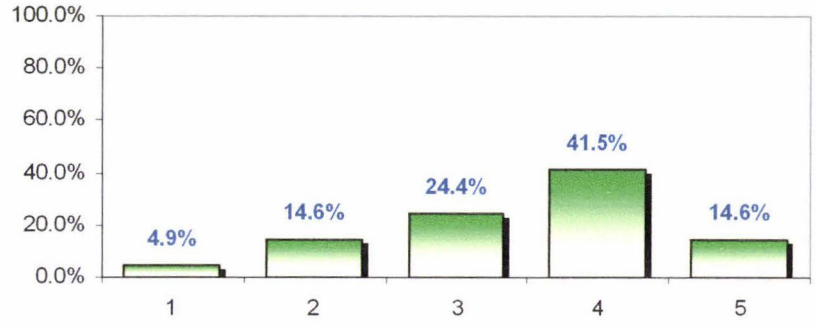


Code Frame:

1 Strongly Agree
2 Agree
3 Not Sure
4 Disagree
5 Strongly Disagree

(F5) Importance of integrating challenges into Web designs

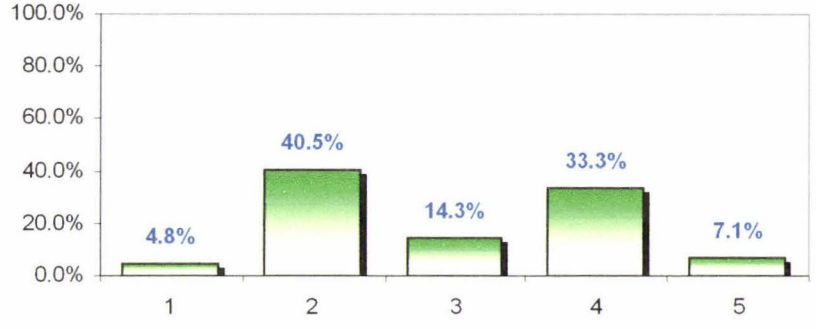
Questions F5 and F6 were asked to check the validity of two major gaming elements into Web design. It was found that challenges were not looked upon favourably (only 19% agreement, which matches the result of F3) – perhaps because of the fact that challenges may cause frustration when customers are trying to undertake a task they want to do quickly. As asserted by Clark (2001) there is a fine balance between making something neither too easy or too difficult in order to make it fun. Views on the use of variation were more evenly spread, with an element of surprise being utilised in some cases but not in others.



(1 null)

(F6) Importance of integrating variation into designs to give an element of surprise or unpredictability

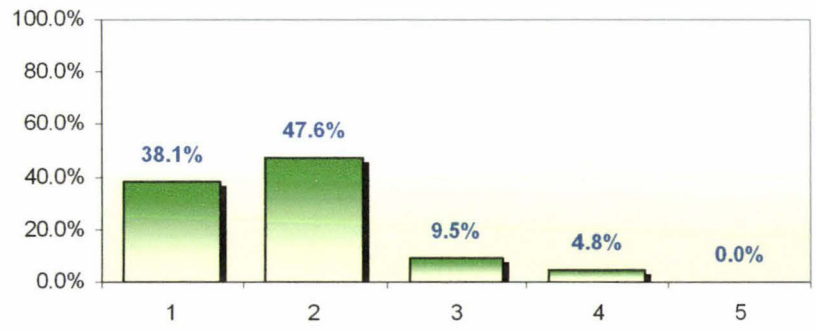
Commentary for this graph is present in that for F5.



(G) TRUST

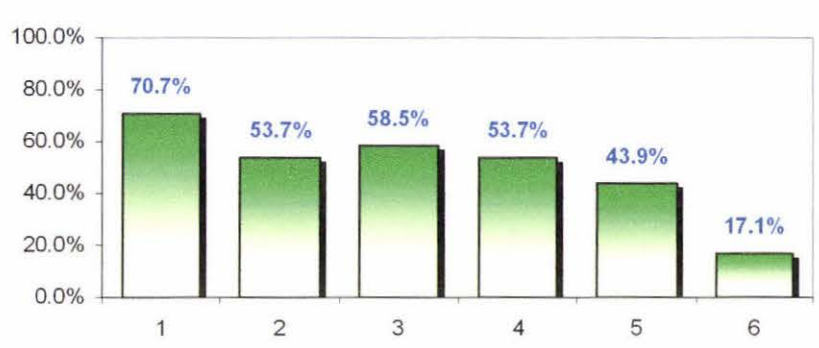
(G1) Opinions on whether fear and lack of trust of online payments is still a major psychological barrier to purchasing online

There is an obvious support for literature (85%) in this question. It would seem that admitting that fear and distrust are major problems is also an admission that design is not soothing the right emotions.



(G2) The top 3 most important aspects of obtaining trust online

Seals of approval were the favourite amongst respondents in this question. From the 6 areas of trust highlighted by Cheskin Research (1999), only 'efficient technology' was not supported to a high degree. Perhaps if the survey had explained what each of these 6 areas was in more detail the results could have differed slightly.



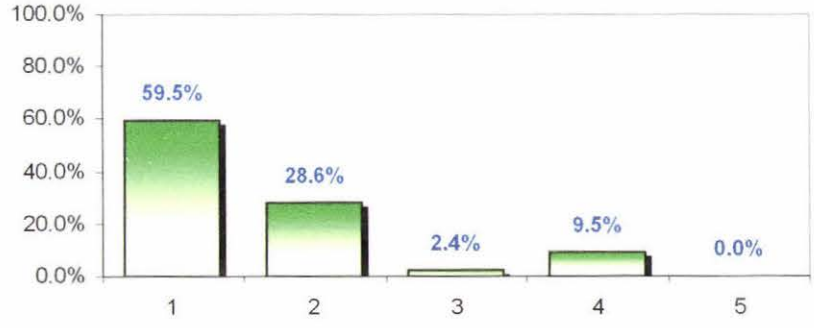
Code Frame:

1 Seals of approval (e.g. Visa logo or Securecheck)
2 Branding
3 Easy error-free Navigation
4 Description of the fulfilment process
5 Excellent overall presentation
6 Efficient technology

(1 void)

(G3) Beliefs about always having statements of privacy, confidentiality and security

There was overwhelming support for the use of statements that portray a high level of trust.

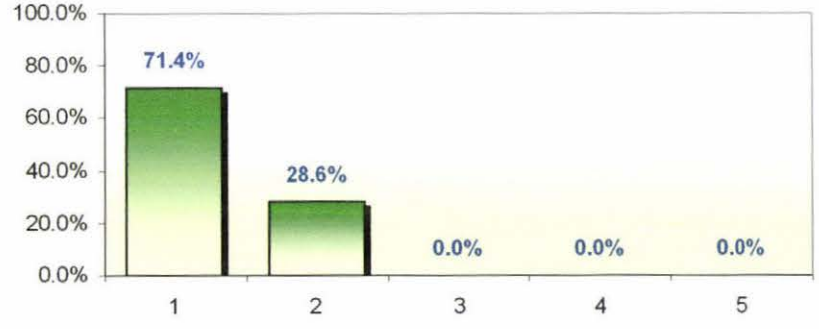


Code Frame:

1 Strongly Agree
2 Agree
3 Not Sure
4 Disagree
5 Strongly Disagree

(G4) The importance of a high level of trust in e-Commerce design

The 100% agreement reflects the sentiments shown in G1.



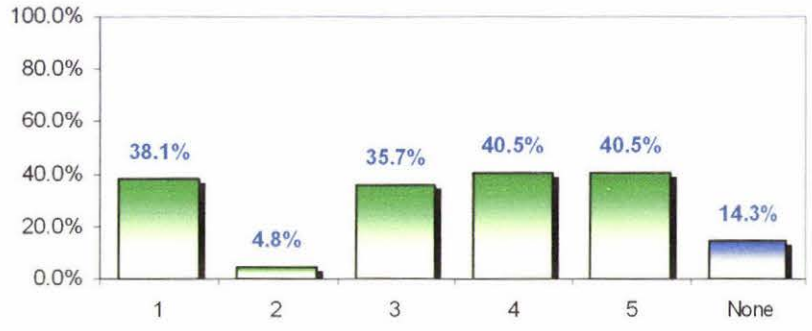
Code Frame:

1 Strongly Agree
2 Agree
3 Not Sure
4 Disagree
5 Strongly Disagree

(H) E-COMMERCE VERSUS TRADITIONAL RETAIL

(H1) Traditional retail experiences that are attempted to be recreated online

Respondents could answer more than one item here. There was a very even spread between categories (with the exception of sound). According to designers, the sounds associated with traditional shopping should not be used in Web designs. Only 14% didn't think any of the traditional retail characteristics should be used in designs. Also of note is that over 50% of respondents ticked at least 2 categories.



Code Frame:

1 Social relations (shop assistants, friends, communities)
2 Sounds associated with shopping
3 The aesthetics of traditional shopping
4 Events associated with traditional shopping
5 Comfort and luxury

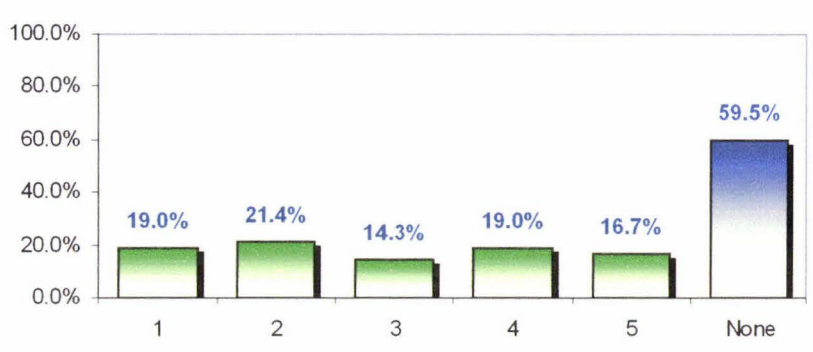
(H2) Other design factors that have been used to recreate aspects of the traditional retail experience online

Selected quotes from respondents are listed below, and they seem to reflect the sentiments of literature in most cases:

- "A true look alike with conventional environments"
- "Design reflecting target markets expectations, i.e. simple design for bargain basement type shops, more complex for top end market"
- "Ease of use"
- "Terms the shopper is familiar with - cart, check out etc"
- "The use of an avatar (computer-generated character that is not necessarily human-like)"
- "There should not be the assumption that the 'real world' or traditional shopping experience should be recreated on-line. Buying online has nothing to do with mimicking an experience, but rather ease of fulfilment"
- "Functionality integrated with the design"
- "Clear images of products so consumer feels they know what they are considering"
- "Feedback of customer name 'Thanks for shopping here Mrs Jones'"
- "Branding"
- "Prices, catalogues, the bill"

(H3) Difficult product attributes that have been incorporated into site designs

Of obvious note here is that most people haven't had to include any of these aspects in their designs so far (60%). This supports the literature, which stated that products were hard to sell online if they had any of these characteristics. Of those that had included these attributes, there was a relatively even spread. Only 7% ticked 4 or more of the categories.



Code Frame:

1 The product was new and untried
2 The purchase was subjective or emotional
3 Touch, smell or other senses would normally be needed
4 The item was expensive
5 Product specifications were hard to show

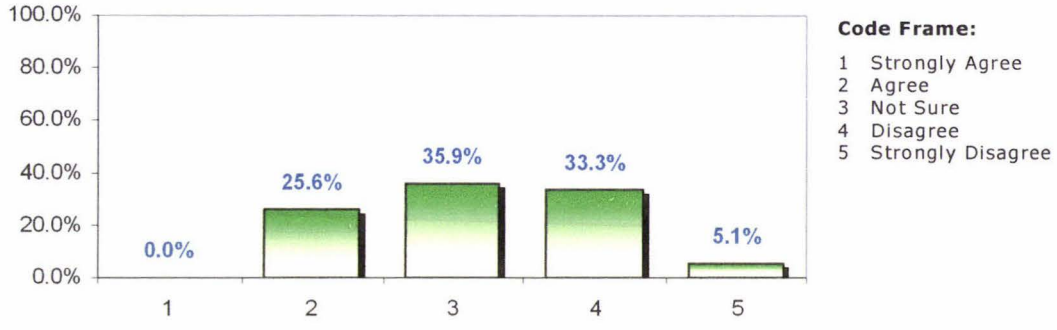
(H4) Key design elements and success levels for difficult product attributes

Selected quotes from respondents are listed below. These are a good source of knowledge to supplement literary recommendations on how to sell products with difficult attributes:

- "Expensive looking site showing successful company, clear pricing & returns info, high emphasis on 'testimonials'" (success not mentioned).
- "Simplifying it down as much as possible. Usually it's our client that has to be impressed first. They usually know what they want... so the effect, good or bad, is then passed on to the client" (success not mentioned) .
- "Wine is the product - consistency in message was the key design element - harmonise with other real world media and colouration as used on labels etc" (good success).
- "Good images of the product, picturing them in an attractive setting, providing close-ups of materials used, close-ups of the actual product, good descriptions" (success not mentioned).
- "Online promotions for Travel industry companies" (medium success).
- *"Product new or untried* - user testimonials, high quality/elegant presentation to enhance credibility; *subjective, emotional* - quality photographic presentation of product, association with lifestyle of potential buyers; *touch/weight* - difficult attribute to present; *expensive* - elegance design, present value for money (success is hard to measure as there are too many other factors that influence the success of the site)".
- "Keeping designs simple yet at the same time giving a feel of exclusivity" (high success).

(H5) Importance of agents, avatars and online shop assistants for sales of goods online

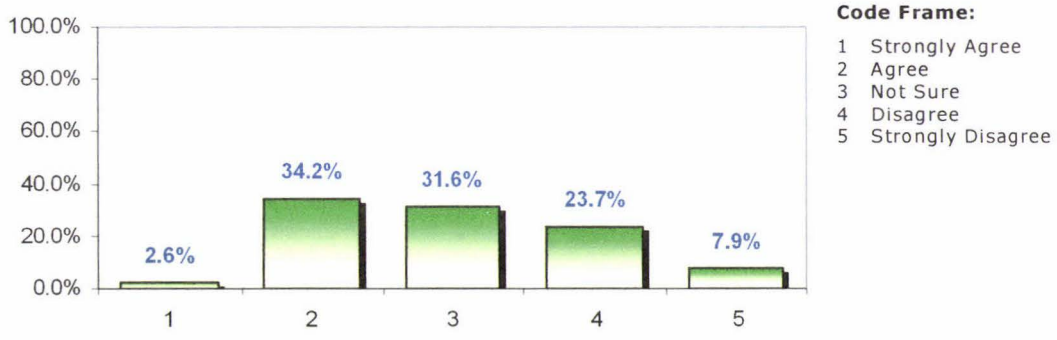
There is a spread of opinions here, with the highest group being those that are unsure and a tendency towards those disagreeing with their importance. This might reflect the fact that agents and avatars are an emerging technology and are still held back until New Media can take advantage of more wide-spread broadband connections. Interestingly, one respondent to question H2 highlighted their use of avatars and virtual characters to recreate the traditional retail experience online.



(3 null)

(H6) Importance of emotional facial expressions and gestures of virtual agents in assisting sales online

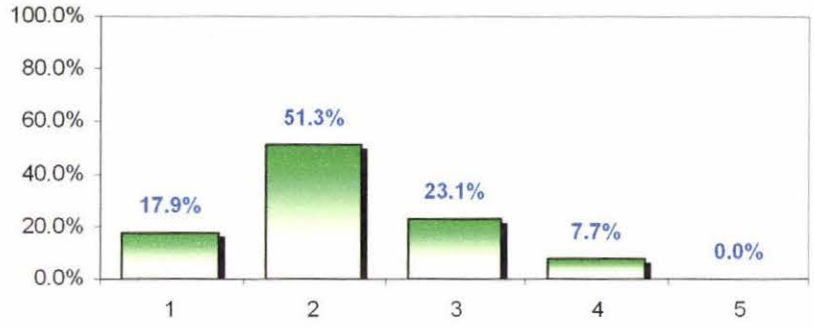
These results seem to reflect a lack of recognition that facial expressions and body language closely affect emotions, with many respondents disagreeing or unsure.



(4 null)

(H7) Importance of matching the look and personality of virtual agents to the demographic expectations of the target users

Only 8% disagree with this statement. It will be hard for Websites aimed at wider multi-cultural audiences to match agent look and feel, feeding fuel to the results of H8.



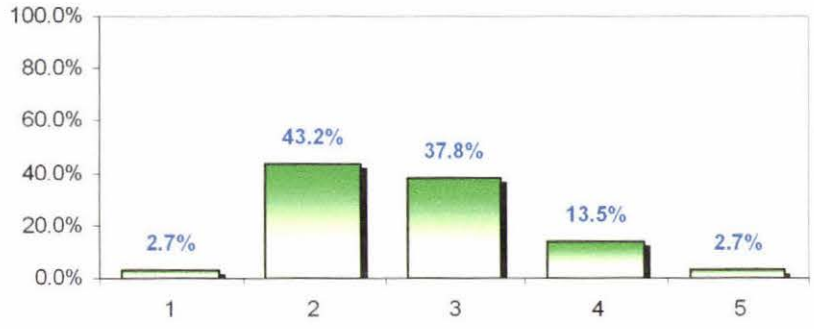
Code Frame:

1 Strongly Agree
2 Agree
3 Not Sure
4 Disagree
5 Strongly Disagree

(3 null)

(H8) Opinions on whether the look and personality of virtual agents and characters should be chosen by the visitor, not hard-coded by the designers

While a large proportion of people are still unsure, only 16% disagree that virtual agent customisation should take place, proving the need for tools like the AvatarMaker from Blaxxun (2001).



Code Frame:

1 Strongly Agree
2 Agree
3 Not Sure
4 Disagree
5 Strongly Disagree

(5 null)

(Z) FINAL THOUGHTS

(Z1) Other ways used to reach people on an emotional level with New Media or Web designs

A couple of interesting comments are made here. Some responses show an anti-emotional attitude; others look to proven design aspects like layout, colour and text type; and surprisingly a number of comments supported the use of sound (given the negative general reaction to sound in questions D5, H1, and also Z4). Selected quotes from respondents include:

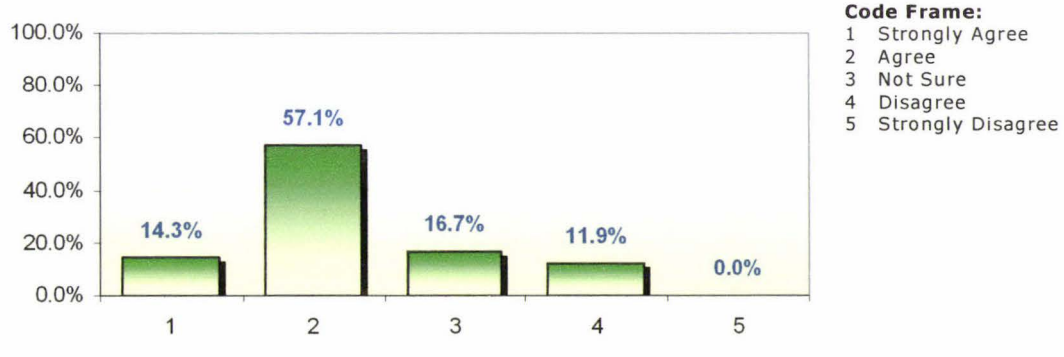
- "Bring them fact with truth."
- "Sound, writing, animation."
- "I don't believe we do attempt to manipulate or reach people emotionally in online designs. I believe people are coming online to get away from all of that. It has become transparent to people in the world that this is happening so if they seek information or

purchases online its because of the anonymous facts and figures - not the emotional, touchy feely stuff."

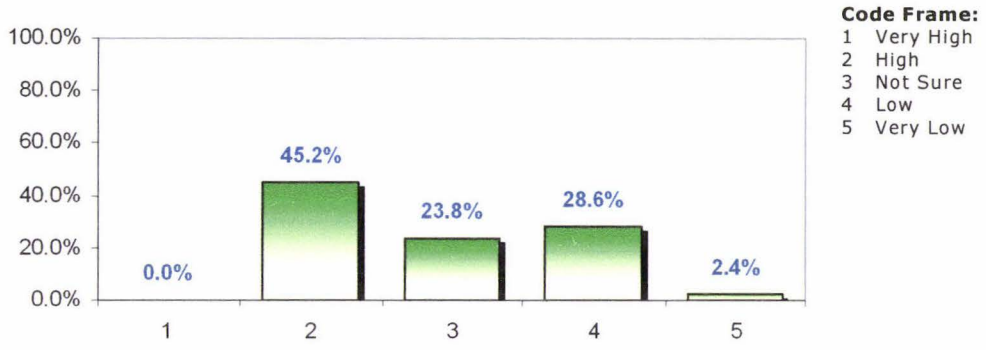
- "Well-written copy (rare on Websites)."
- "There is only one reason that people will return to any information source (this includes print, television, radio and Web): ENGAGING CONTENT. Everything else is surface."
- "Clean lines that are easy on the eyes (feng shui)."
- "Integrate existing client branding into Website - recognition is important - matching existing marketing off-line to online promotions."
- "Emotion is not a direct consideration in any way as a good designer intuitively understands and targets the needs, wants and desires of the sites target users. Most of the things you ask about are in my site designs but not by "emotional design" considerations."
- "Relevance, credible information, simple to understand text."
- "Interaction / customer recognition / site response language."
- "Anything which makes the users experience pleasant - speed and efficiency in displaying information, correct and unambiguous English, speed of site - generally aim for under 8 seconds loading time, the use of Web safe colours, simplicity - no clutter."
- "Shock, sympathy, battering down with rational argument, general mystification, not trying to sell them something at every turn."
- "Controlled sensitive use of design methodology such as typography, form, symbolism, layout, metaphor, and textual information. Sound and motion are used too."

(Z2) Overall importance of Websites that are designed to evoke emotions

A good level of support for emotional design is shown, with support from 71% of respondents. Whether this view is undertaken in practice is discovered in user survey results and the response to Z3.

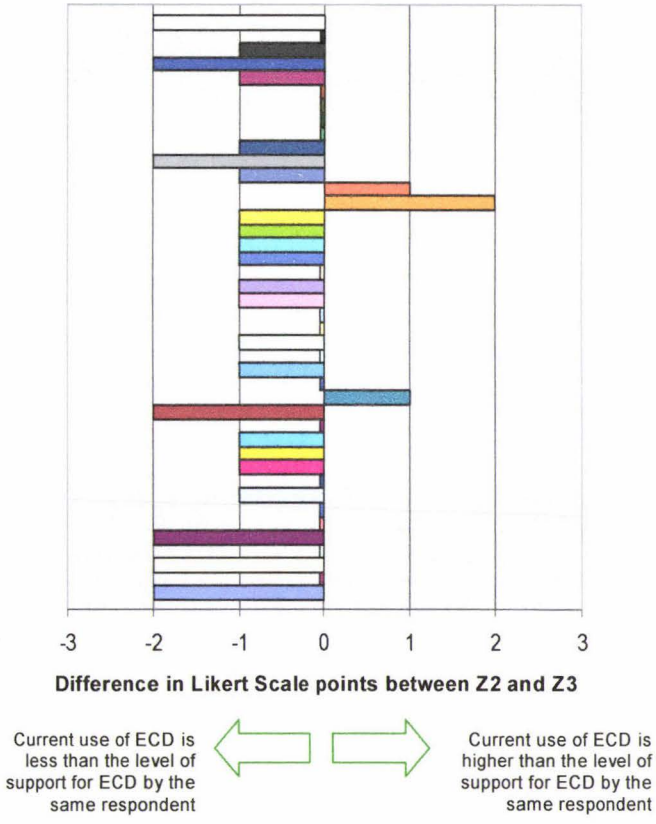


(Z3) Levels of emotional design currently being employed by designers



The relatively even spread here shows that although 71% believe emotional design is important (Z2), only 45% of them are actually doing this currently. There is obviously a mismatch between theory and practice.

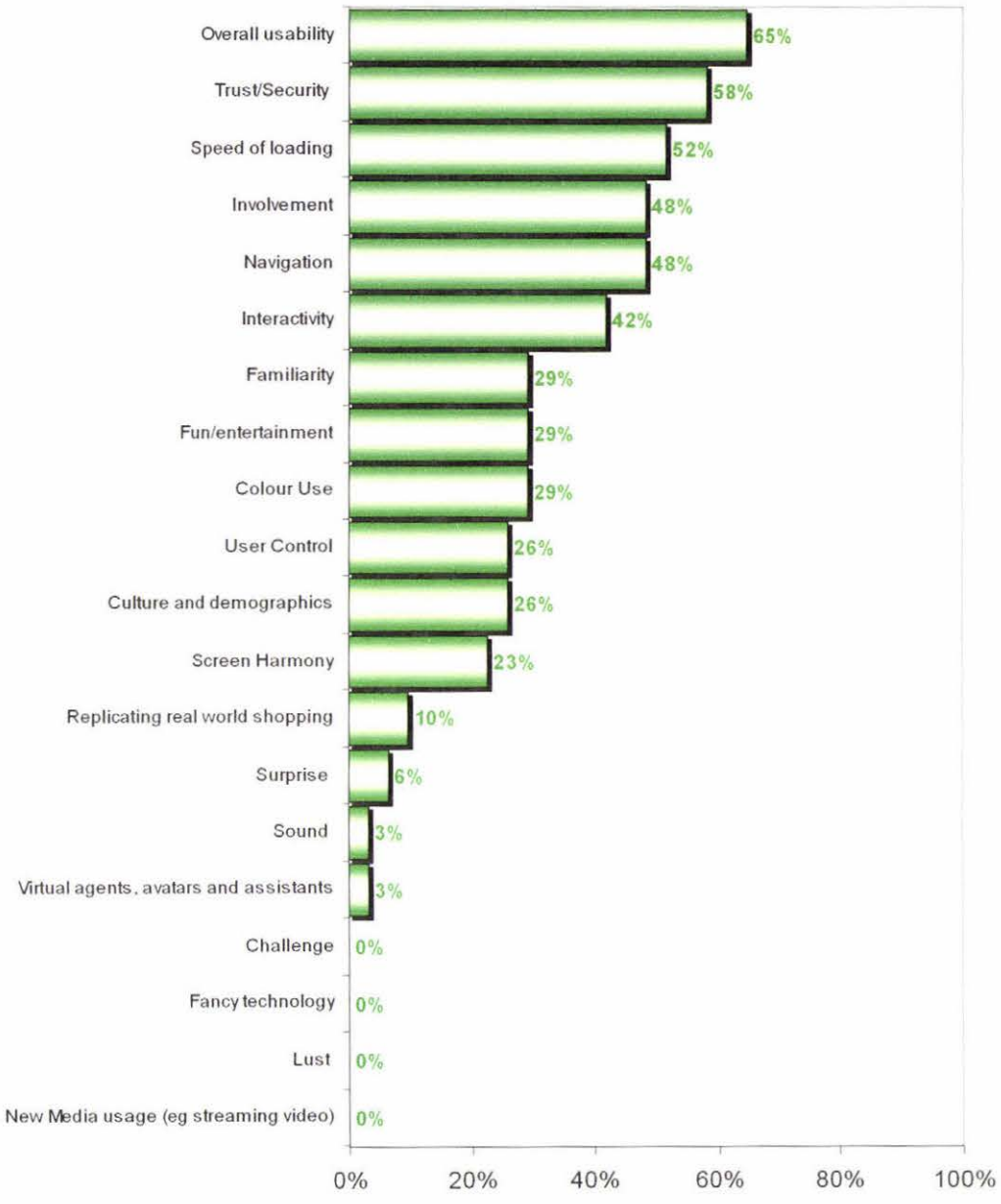
There is a definite gap between what the respondents believed to be the importance of emotion-centred design (ECD) from the level of emotional design they are currently using. These are represented in the chart to the right. This shows the gaps between support and usage of emotional design for each respondent – highlighting that most designers should be doing more in the way of emotional design according to their beliefs. There was also a large percentage that felt they were currently performing the same level of emotional design as they thought was necessary (0 gap). Only 3 respondents (7%) believed they were doing too much emotional design.



(Z4) The top 5 most important aspects of designing to obtain emotional connections for e-Commerce

The most important emotional design aspects out of those supplied to respondents were overall usability, trust, speed of loading, involvement and navigation. The least important were New Media usage (surprisingly), evoking lust, use of fancy technology, challenge, sound and agents/avatars.

Application of elements like colour, fun, and matching designs to user demographics performed only moderately considering they were rated highly earlier in the survey.



(11 void or null)

(Z5) Favourite Websites that attempt to sell something

Selected responses are shown below. Note that Amazon.com was the most commonly cited (with 6 referrals) and that www.nike.com (previously covered in section 2.8) is chosen.

- www.woolworths.co.nz
- www.oakley.com
- www.millton.co.nz

- www.amazon.com
- www.nike.com
- www.estore.com.au
- www.mp3.net.nz
- www.urban75.com
- www.software4u.co.nz
- www.k10k.net

(Z6) Final comments from respondents

Final quotations about the field of emotional design (applied to e-Commerce and Websites) reveal a number of issues that supplement literary findings and/or reveal difficulties in applying emotional design:

- "When selling B2B (i.e. the business managers which is what we do), they have little time to become emotional. They want facts, price, and delivery time clearly spelt out. Without those key elements business buyers won't trade."

- "There are so many factors to be considered when designing Websites, from customer target audience to practicality and various limitations of money, imagination and expectation. Just like with any thing, you want the visitor to come in and keep on coming back, so you do what ever you can to get that result! Of course to get the best results for this can cost money which limits most peoples vision of how their site can look!"

- "I think the content of the Website is the most important. Users are intelligent and usually just want the information that they set out to find. If they are successful in finding it they are happy. The content is the thing that should evoke emotions not the container it comes in."

- "'Emotional' is a bit of an emotive word . . . sub-conscious design is something I do regularly."

- "Emotive values aren't as important in e-Commerce as they are in traditional commerce. Emotive values will be received from the environment from which they are using their PC from. If you are using your PC in your nice cosy lounge then you are probably in better form for purchasing than if you are sitting in a cold basement. The PC is merely an interface, which is why functionality is so important. Of course function is also linked

with emotions. On the other hand emotive design can add or subtract to the existing 'real' environment that the person is in."

- "The use of emotion is very important however what is more important is finding customers that are willing to purchase these design skills. Price is a driving factor in this very competitive market I believe clients choose the lowest price regardless of the emotional tools that we can use to build a site."

- "Loading speed of the site triggers the first emotional response. Because first impression is often the most important impression, then loading times become one of the most significant factors in triggering favourable emotions. Poor English grammar, spelling mistakes, ambiguous instructions etc. are other significant factors, which will trigger unfavourable emotions. Privacy and confidentiality clauses on a site don't engender much confidence - for example, everyone knows you will get spammed more if you use Hotmail, in spite of their privacy statements - besides why trust someone you don't know? Privacy and confidentiality statements can trigger 'I don't believe you' negative emotions. The pages of many sites cannot be printed full width of page - not good for potential customers who want to have a hard copy to consider their proposed purchase. It's like giving a pamphlet to a customer with the right hand edge torn off. Hardly a good last impression."

4.1.2 Chi-Square Associations

Chi-square tests were conducted to check any significant associations between the distribution of demographic profiles and other response variables. If the P-value is low enough then the chi-square test confirms that the data contains clear evidence against a null hypothesis (for example, different genders have the same distribution of opinions about emotional design).

Results of tests of demographic variables against key design questions are shown below:

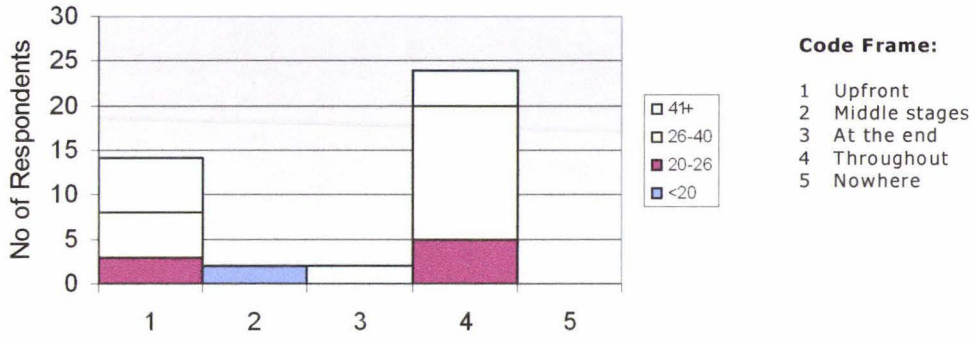
	Role	Age	Gender	Last Study	Highest Quals	System Environ
B1 – The emotional mind is quicker	$\chi^2 = 21.469$ df = 28 $p = 0.805$	$\chi^2 = 16.524$ df = 12 $p = 0.168$	$\chi^2 = 3.169$ df = 4 $p = 0.530$	$\chi^2 = 10.744$ df = 12 $p = 0.551$	$\chi^2 = 27.061$ **df = 16** **$p = 0.041$**	$\chi^2 = 17.750$ **df = 8** **$p = 0.023$**
C1 – Design Philosophy	$\chi^2 = 49.196$ **df = 35** $p = 0.056$	$\chi^2 = 18.726$ df = 15 $p = 0.226$	$\chi^2 = 8.242$ df = 5 $p = 0.143$	$\chi^2 = 15.466$ df = 15 $p = 0.418$	$\chi^2 = 13.734$ df = 20 $p = 0.844$	$\chi^2 = 12.893$ df = 10 $p = 0.230$
C2 – Stage where ECD should occur	$\chi^2 = 21.067$ df = 21 $p = 0.455$	$\chi^2 = 50.515$ **df = 9** **$p = 0.000$**	$\chi^2 = 1.570$ df = 3 $p = 0.666$	$\chi^2 = 10.449$ df = 9 $p = 0.315$	$\chi^2 = 17.563$ df = 12 $p = 0.130$	$\chi^2 = 1.111$ df = 6 $p = 0.981$
C4 – Design % mix	$\chi^2 = 7.552$ df = 14 $p = 0.911$	$\chi^2 = 1.678$ df = 6 $p = 0.947$	$\chi^2 = 0.377$ df = 2 $p = 0.828$	$\chi^2 = 4.884$ df = 6 $p = 0.559$	$\chi^2 = 4.763$ df = 8 $p = 0.783$	$\chi^2 = 2.389$ df = 4 $p = 0.665$
D8 – Fun & pleasure are crucial	$\chi^2 = 16.905$ df = 21 $p = 0.717$	$\chi^2 = 7.732$ df = 9 $p = 0.561$	$\chi^2 = 5.071$ df = 3 $p = 0.167$	$\chi^2 = 4.662$ df = 9 $p = 0.863$	$\chi^2 = 15.964$ df = 12 $p = 0.193$	$\chi^2 = 5.697$ df = 6 $p = 0.458$
E3 – Colour is important	$\chi^2 = 19.126$ df = 21 $p = 0.577$	$\chi^2 = 6.591$ df = 9 $p = 0.680$	$\chi^2 = 4.213$ df = 3 $p = 0.239$	$\chi^2 = 15.720$ **df = 9** **$p = 0.073$**	$\chi^2 = 22.210$ **df = 12** **$p = 0.035$**	$\chi^2 = 2.977$ df = 6 $p = 0.812$
F4 – Recontextualising from games and cars	$\chi^2 = 27.984$ df = 28 $p = 0.465$	$\chi^2 = 11.96$ df = 12 $p = 0.216$	$\chi^2 = 2.069$ df = 4 $p = 0.723$	$\chi^2 = 7.479$ df = 12 $p = 0.587$	$\chi^2 = 23.890$ **df = 16** **$p = 0.092$**	$\chi^2 = 8.618$ df = 8 $p = 0.376$
H5 – Agents and avatars	$\chi^2 = 13.597$ df = 21 $p = 0.886$	$\chi^2 = 10.929$ df = 9 $p = 0.281$	$\chi^2 = 1.099$ df = 3 $p = 0.777$	$\chi^2 = 6.000$ df = 9 $p = 0.740$	$\chi^2 = 10.228$ df = 12 $p = 0.596$	$\chi^2 = 10.462$ df = 6 $p = 0.107$
Z2 – Overall view of ECD	$\chi^2 = 24.706$ df = 21 $p = 0.260$	$\chi^2 = 3.976$ df = 9 $p = 0.913$	$\chi^2 = 4.453$ df = 3 $p = 0.217$	$\chi^2 = 6.711$ df = 9 $p = 0.667$	$\chi^2 = 19.089$ **df = 12** **$p = 0.086$**	$\chi^2 = 7.097$ df = 6 $p = 0.312$
Z3 – Current use of ECD	$\chi^2 = 11.436$ df = 21 $p = 0.954$	$\chi^2 = 24.142$ **df = 9** **$p = 0.004$**	$\chi^2 = 2.835$ df = 3 $p = 0.419$	$\chi^2 = 13.820$ df = 9 $p = 0.129$	$\chi^2 = 15.109$ df = 12 $p = 0.236$	$\chi^2 = 10.813$ **df = 6** **$p = 0.094$**

Cells that are highlighted above in grey reflect a high association between the rows and columns (e.g. demographic and question response) – where there is a greater than 90% probability that opinions vary according to the particular demographic groupings in the population of people involved in Web design. These high associations are examined in the graphs on the following pages. Note that each is presented as a stacked column graph. These are interpreted by looking at the distribution of respondent demographics within each opinion-response group, bearing in mind that the total number of responses

in that opinion-group will affect the ability to draw strong conclusions about a relationship. The sample size can be assumed to be 42, except where null responses were indicated in section 4.1.1.

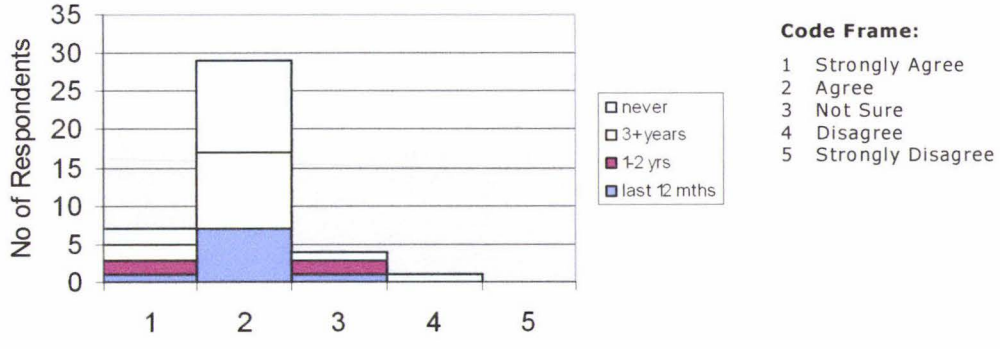
Age (A2) and ECD stage (C2)

Respondents aged under 20 (although there weren't many of them) were all in favour of undertaking emotion-centred design (ECD) in the middle stages of design. The older age group (41+) was the only group considering ECD to be best at the end of the design process. The groups comprising all those between 20 and 40 were interested in using ECD throughout the process, or upfront.



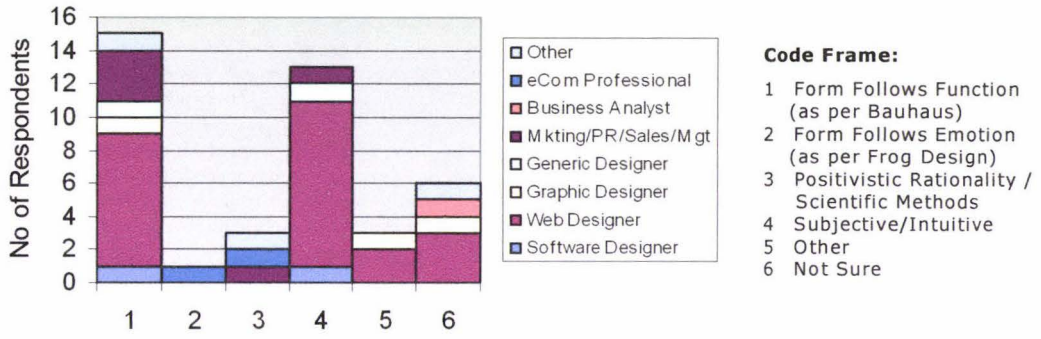
Last study (A4) and favourability of colour use (E3)

No obvious trends are visible form the graph below apart from the fact that the only person disagreeing with the value of colour had never undertaken study in design or e-Commerce.



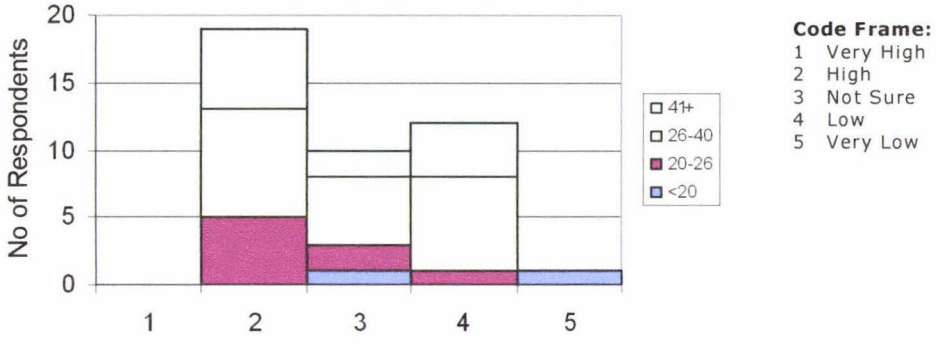
Role (A1) and design philosophy (C1)

Graphic designers (as opposed to Web designers) seemed more likely to have a philosophy not listed (other) or were not sure of their formal philosophy. Overall, the complexity of the graph reflects that the views are 'all over the place' amongst the respondent role-types, with designers not classifying themselves in a group that has been so successful for the likes of Frog Design. Also of note is that fact that the two most popular choices (form follows function, and subjective/intuitive) had the largest number of different roles making up those groups.



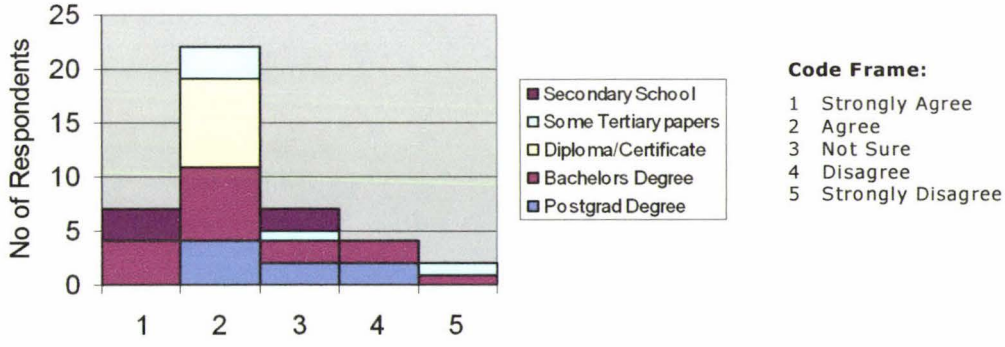
Age (A2) and self-assessed current level of ECD (Z3)

Those respondents younger than 20 were inclined to believe they were not currently using ECD to any great degree, whereas the other age groups were reasonably evenly represented in the other coding frames. This could imply that younger people need more exposure to emotion-centred principles and training, but this may be too strong a statement given the small sample of people younger than 20.



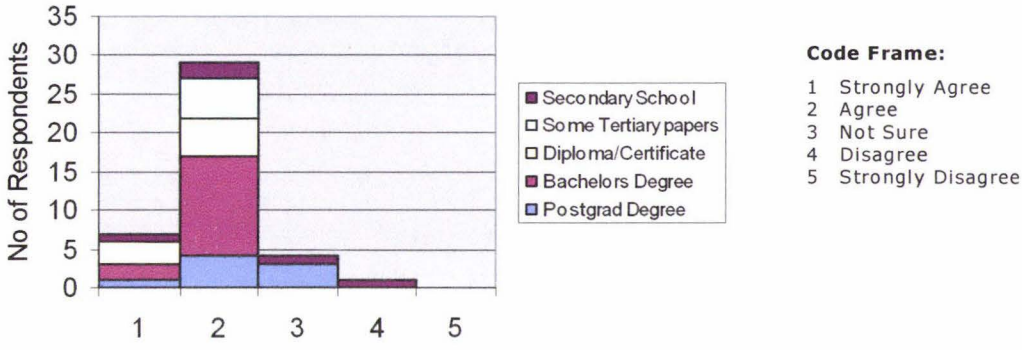
Highest qualification level (A5) and belief that the emotional mind is quicker than the rational therefore this should be reflected on the Web (B1)

No obvious trends came from the graph below, even though the chi-square statistic shows that there is a significant association between the distributions of qualification level against this variable. However, the post-graduate respondents were less extreme in their opinions.



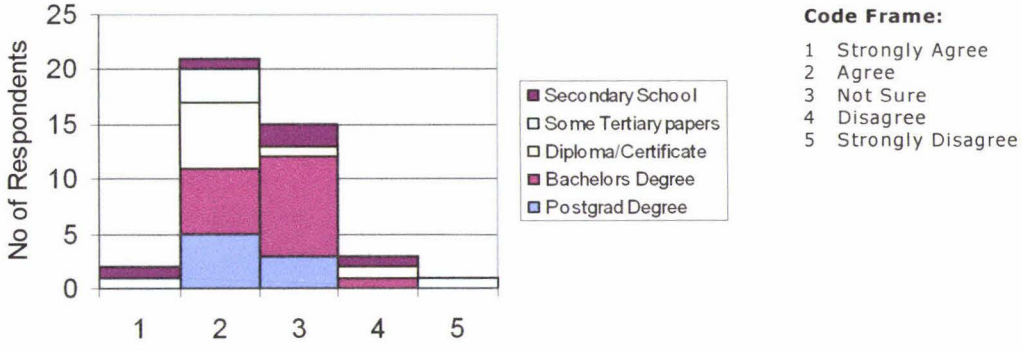
Highest qualification level (A5) and favourability of colour use (E3)

Interestingly, post-graduate and bachelors respondents were more likely to be the ones having a high representation in groups who were unsure or in disagreement with the application of colour to achieve emotional appeal.



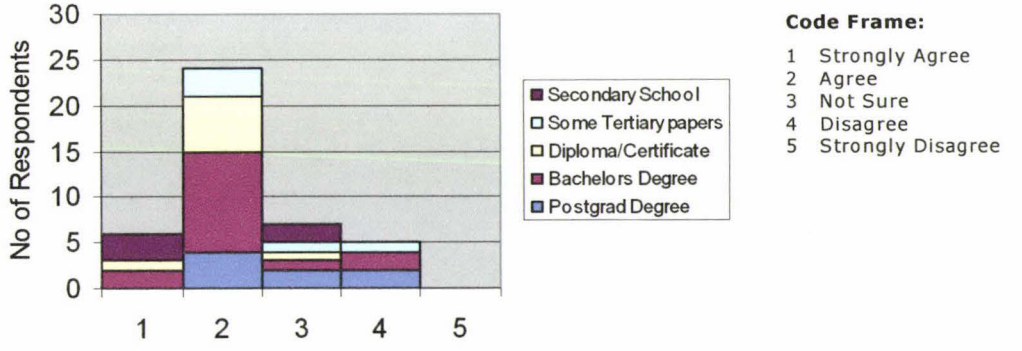
Highest qualification level (A5) and reapplication of gaming and car design (F4)

It appears that those with higher qualifications were more centralised in their views, whereas those who had undertaken no tertiary training (or only some papers) had more extreme opinions.



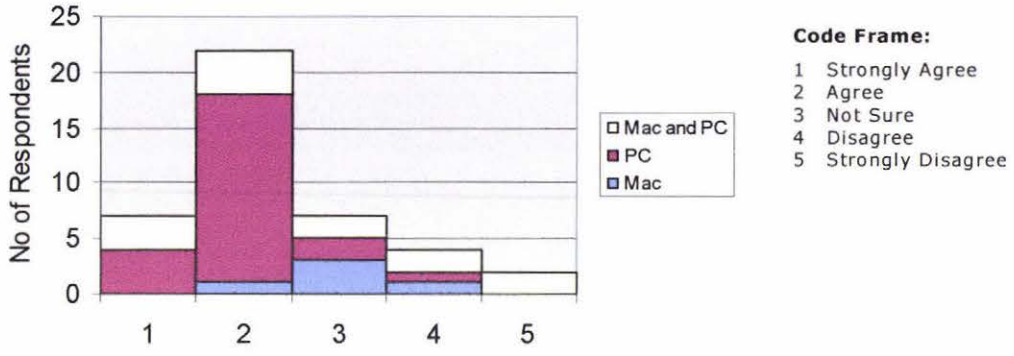
Highest qualification level (A5) and overall opinion of emotional design (Z2)

No obvious trends (apart from post-graduate respondents having high representation amongst the negative opinion frames) were visible from the graph below even though the chi-square was significant.



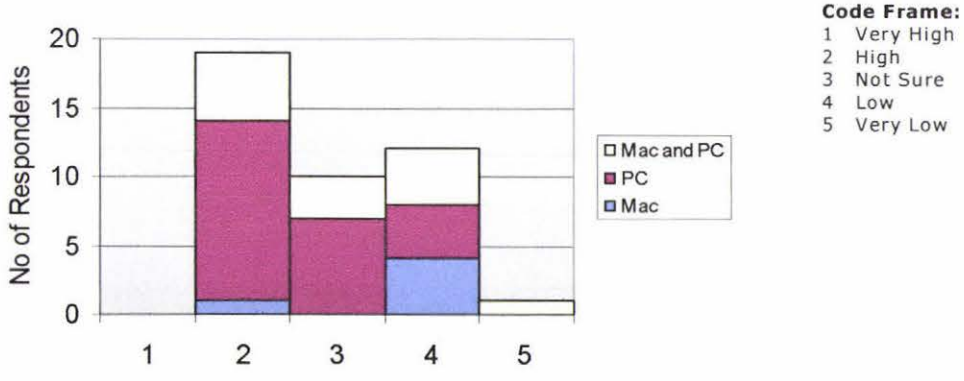
System environment (A7) and belief that the emotional mind is quicker than the rational therefore this should be reflected on the Web (B1)

Apple Mac users (or those that used some Mac) seemed to be slightly more resistant to belief in this statement – evident through their higher proportionate representation in the negative or unsure groupings.



System environment (A7) and self-assessed current level of ECD (Z3)

Those that used both a Mac and a PC, or just a Mac had a greater representation of the responses in the low level of current usage, compared to the groups of respondents which had higher or unsure levels of use of ECD.



4.1.3 Re-Groupings of Demographics in Order to Increase Chi-Square Cell Counts

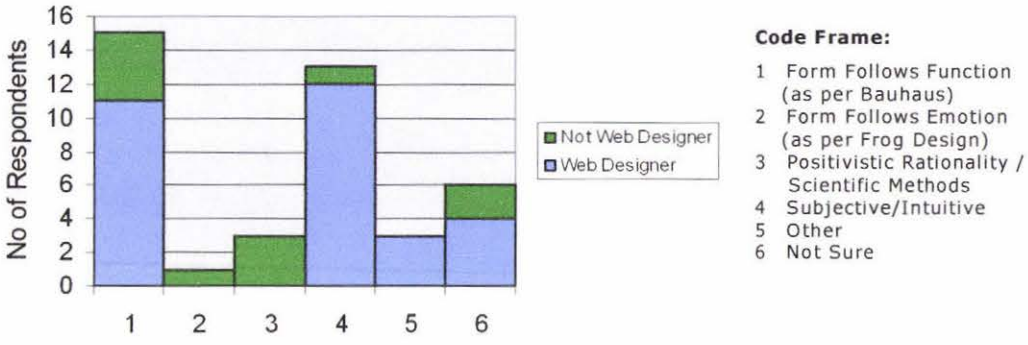
Moore and McCabe (1993) state that there is a rule of thumb that an average value of 5 should be present in 'expected cells' during chi-square calculations in order to draw solid conclusions. The small sample size in this thesis did not always make this true (potentially diminishing the value of some of the associations highlighted in 4.1.2), so the demographics were re-grouped into smaller groups for testing with the aim of having higher cell counts. Role was split into 'designers' and 'non-designers'; Age into those 41+ and those 40 or below; Training into 'never' and 'at least some'; Qualifications into 'at least bachelors level' and 'below this level'; System Environment into 'PC only' versus 'some Mac involvement'; and Age was left as it was because there are only 2 groupings anyway.

This regrouping resulted in the following chi-square results table. Once again, the grey entries signify highly probable relationships (90% or greater), which are then graphed for further analysis.

	Role	Age	Gender	Last Study	Highest Quals	System Environ
B1 – The emotional mind is quicker	$\chi^2 = 6.491$ df = 4 $P = 0.165$	$\chi^2 = 6.491$ df = 4 $P = 0.165$	$\chi^2 = 3.169$ df = 4 $P = 0.530$	$\chi^2 = 4.002$ df = 4 $P = 0.406$	$\chi^2 = 3.500$ df = 4 $P = 0.478$	$\chi^2 = 10.328$ df = 4 $P = 0.035$
C1 – Design Philosophy	$\chi^2 = 14.564$ df = 5 $P = 0.012$	$\chi^2 = 8.190$ df = 5 $P = 0.146$	$\chi^2 = 8.242$ df = 5 $P = 0.143$	$\chi^2 = 6.960$ df = 5 $P = 0.224$	$\chi^2 = 8.462$ df = 5 $P = 0.133$	$\chi^2 = 8.101$ df = 5 $P = 0.151$
C2 – Stage where ECD should occur	$\chi^2 = 1.254$ df = 3 $P = 0.740$	$\chi^2 = 8.867$ df = 3 $P = 0.031$	$\chi^2 = 1.570$ df = 3 $P = 0.666$	$\chi^2 = 4.316$ df = 3 $P = 0.229$	$\chi^2 = 6.514$ df = 3 $P = 0.089$	$\chi^2 = 0.097$ df = 3 $P = 0.992$
C4 – Design % mix	$\chi^2 = 1.673$ df = 2 $P = 0.433$	$\chi^2 = 0.600$ df = 2 $P = 0.741$	$\chi^2 = 0.377$ df = 2 $P = 0.828$	$\chi^2 = 0.673$ df = 2 $P = 0.714$	$\chi^2 = 1.134$ df = 2 $P = 0.567$	$\chi^2 = 1.483$ df = 2 $P = 0.476$
D8 – Fun & pleasure are crucial	$\chi^2 = 2.342$ df = 3 $P = 0.505$	$\chi^2 = 3.392$ df = 3 $P = 0.335$	$\chi^2 = 5.071$ df = 3 $P = 0.167$	$\chi^2 = 0.662$ df = 3 $P = 0.882$	$\chi^2 = 7.516$ df = 3 $P = 0.057$	$\chi^2 = 1.946$ df = 3 $P = 0.584$
E3 – Colour is important	$\chi^2 = 1.397$ df = 3 $P = 0.706$	$\chi^2 = 2.105$ df = 3 $P = 0.551$	$\chi^2 = 4.213$ df = 3 $P = 0.239$	$\chi^2 = 2.282$ df = 3 $P = 0.516$	$\chi^2 = 2.431$ df = 3 $P = 0.488$	$\chi^2 = 1.687$ df = 3 $P = 0.640$
F4 – Recontextualising from games and cars	$\chi^2 = 3.523$ df = 4 $P = 0.474$	$\chi^2 = 4.177$ df = 4 $P = 0.383$	$\chi^2 = 2.069$ df = 4 $P = 0.723$	$\chi^2 = 6.946$ df = 4 $P = 0.139$	$\chi^2 = 6.533$ df = 3 $P = 0.088$	$\chi^2 = 6.203$ df = 4 $P = 0.185$
H5 – Agents and avatars	$\chi^2 = 3.018$ df = 3 $P = 0.389$	$\chi^2 = 1.811$ df = 3 $P = 0.613$	$\chi^2 = 1.099$ df = 3 $P = 0.777$	$\chi^2 = 1.045$ df = 3 $P = 0.791$	$\chi^2 = 4.028$ df = 3 $P = 0.258$	$\chi^2 = 5.701$ df = 3 $P = 0.127$
Z2 – Overall view of ECD	$\chi^2 = 0.534$ df = 3 $P = 0.911$	$\chi^2 = 0.537$ df = 3 $P = 0.911$	$\chi^2 = 4.453$ df = 3 $P = 0.217$	$\chi^2 = 1.454$ df = 3 $P = 0.693$	$\chi^2 = 3.320$ df = 3 $P = 0.345$	$\chi^2 = 4.895$ df = 3 $P = 0.180$
Z3 – Current use of ECD	$\chi^2 = 0.978$ df = 3 $P = 0.807$	$\chi^2 = 0.978$ df = 3 $P = 0.807$	$\chi^2 = 2.835$ df = 3 $P = 0.419$	$\chi^2 = 1.701$ df = 3 $P = 0.637$	$\chi^2 = 3.670$ df = 3 $P = 0.299$	$\chi^2 = 5.773$ df = 3 $P = 0.123$

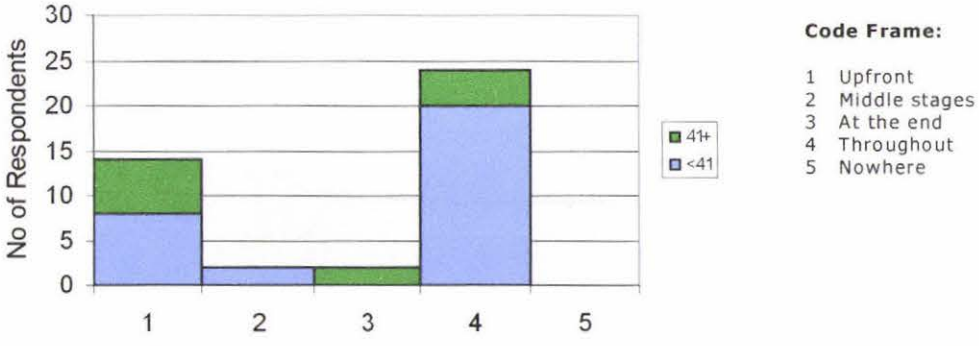
Role (A1) and Design Philosophy (C1)

Web designers were heavily represented in the subjective/intuitive and 'other' philosophies but not in the form follows emotion or positivistic/scientific area. Inversely, those respondents who were not Web designers had higher representation amongst those following those latter two philosophies.



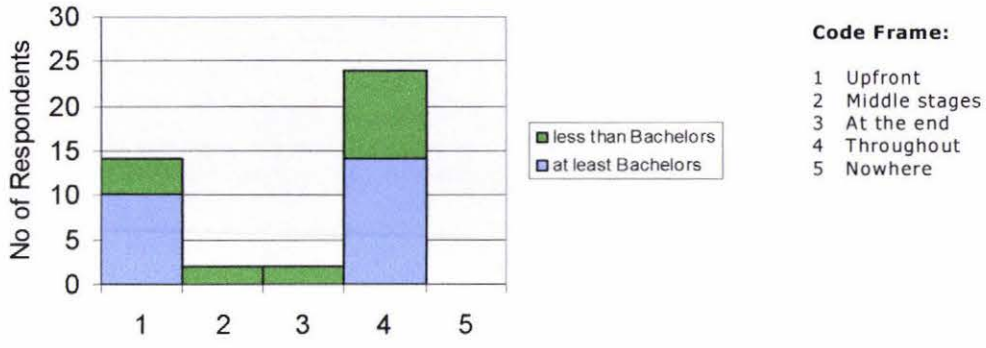
Age (A2) and ECD Stage (C2)

Those aged 41+ were the most heavily represented group in those thinking the end of the design process is where emotional considerations should come in. Those aged less than 41 had a higher proportion of representation amongst those thinking ECD should be used throughout the process, compared to upfront, where the distribution was more even between the two age groups.



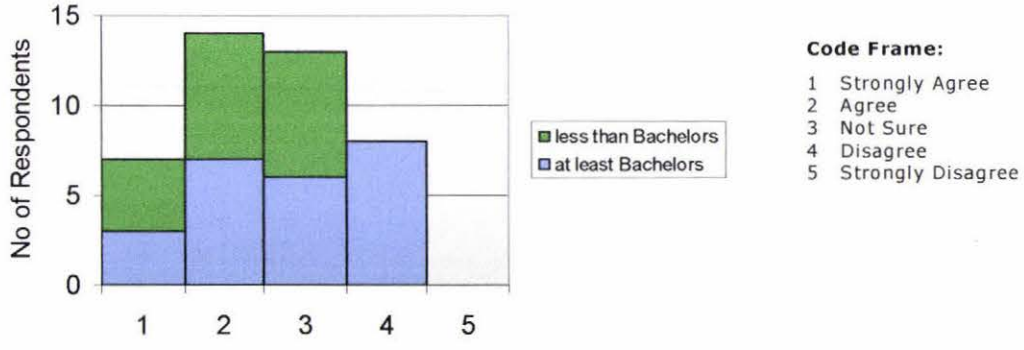
Highest qualification level (A5) and ECD stage (C2)

Those who had not reached Bachelor's level made up most of the respondents thinking emotional design considerations should be considered at the end or middle stages. Those with at least Bachelors level were distributed amongst those wanting to either consider emotion upfront, or throughout the whole process. Once again, this shows that education can have an influence on emotional design.



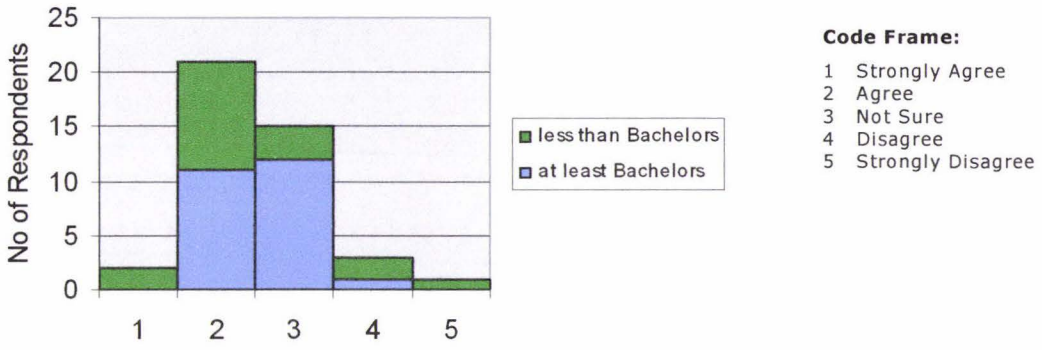
Highest qualification level (A5) and fun and pleasure are crucial in getting people to buy online (D8)

Those respondents that had qualifications of a bachelor's degree or higher made up all of those who did not think fun and pleasure were crucial in getting people to buy online, although plenty were still favourable. Those with qualifications of a lower level than a bachelors degree were more likely to be in agreement, or unsure. This negative sentiment by the more educated respondents shows that maybe more education can actually decrease the willingness to apply affective factors to e-Commerce design.



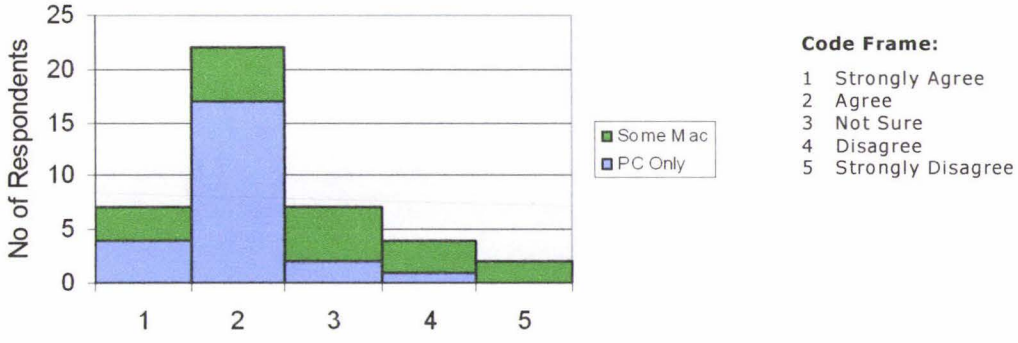
Highest qualification level (A5) and reapplication of gaming and car design (F4)

Those that have less than bachelors level seem more firm in their opinions, whereas the distribution of those with bachelors or higher is more centralised towards being unsure or of a less extreme opinion.



System environment (A7) and belief that the emotional mind is quicker than the rational therefore this should be reflected on the Web (B1)

Those that use some aspects of the Apple Mac in their work are more likely to have the highest representation in those who disagree with the fact that the emotional mind is quicker than the rational mind and utilising this on the Web. This dispels any myth that users of the Mac might be more emotional-design oriented than PC users.

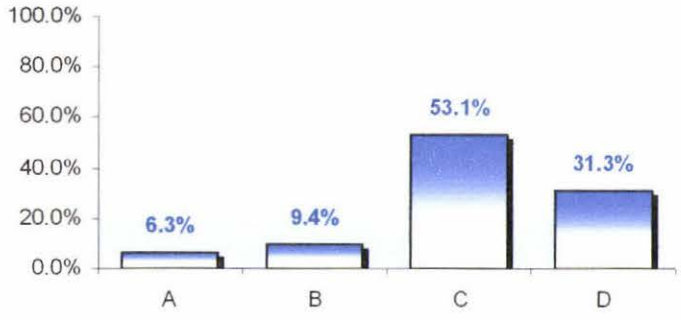


4.2 User Survey (n=32)

Results from the user survey (described in section 3.3) now follow, including some comparative analysis to the Website designer questionnaire results.

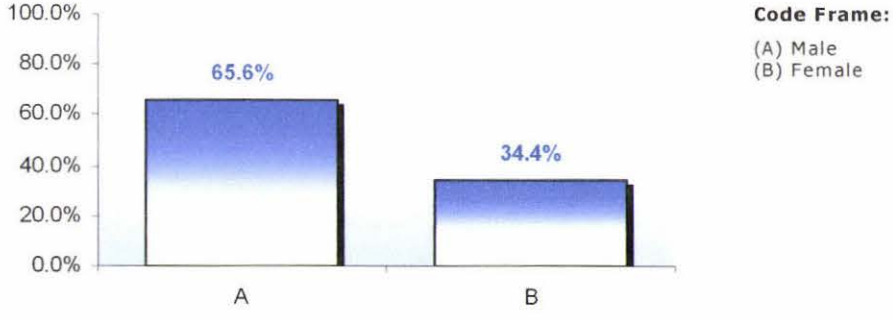
(1) User age groups

Only about 15% of respondents were younger than 26. This is a likely effect of choosing a sample that mainly comprised respondents who came from previous workplaces of the researcher – perhaps biasing the sample towards people in the age groups older than 26.



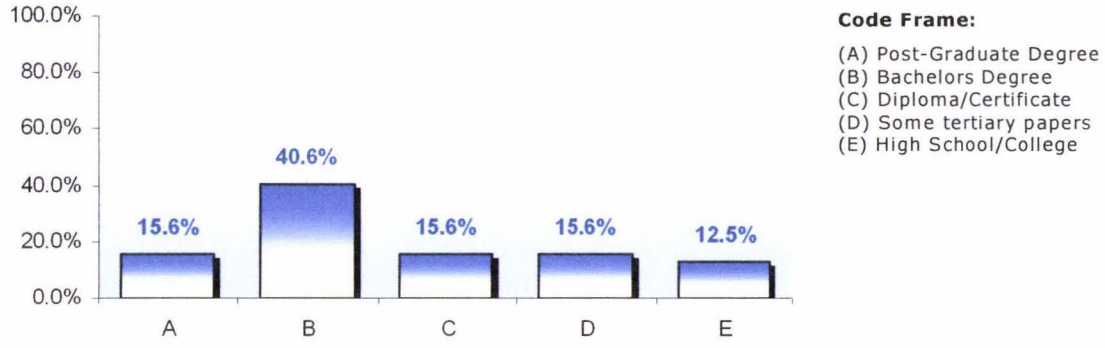
(2) User genders

Although there are a large proportion of males in this sample, this approximately matches the percentages found in the designer survey – meaning good cross-comparison of results.

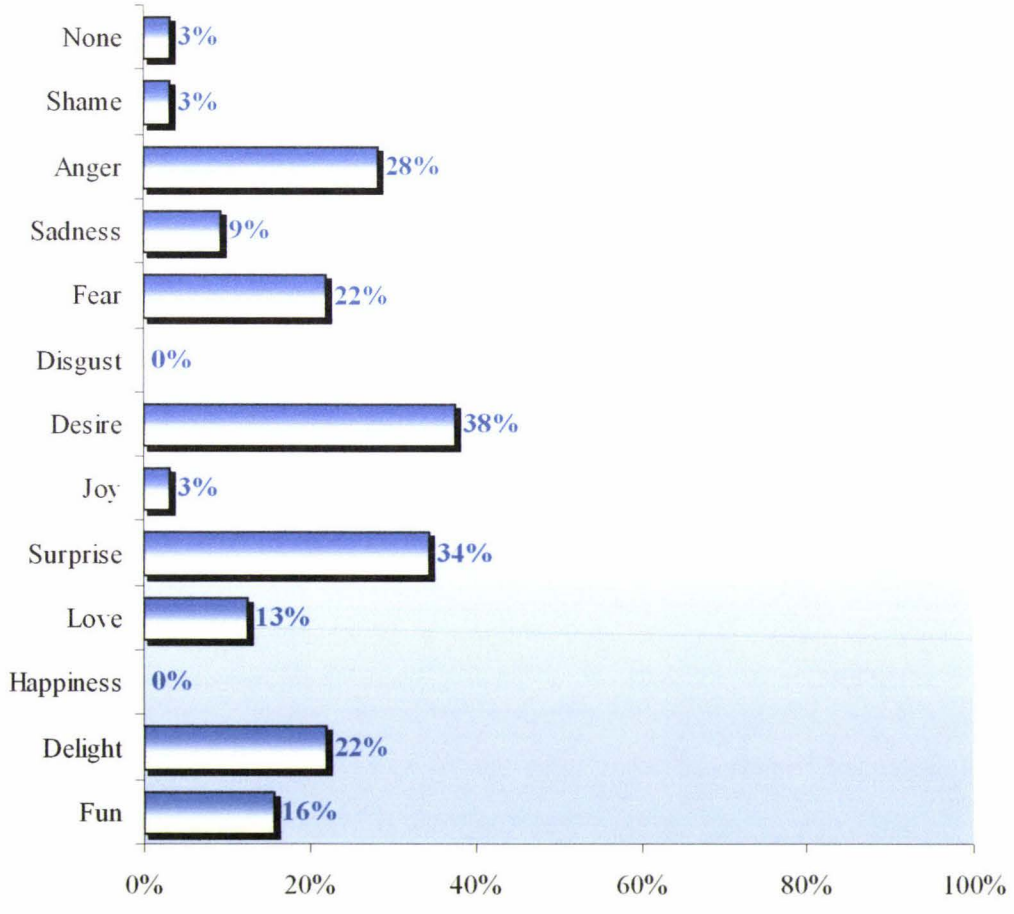


(3) User qualification levels

Once again, the percentages shown below are quite similar to the distribution found in the designer survey.



(4) Emotions that have been experienced by users when viewing Websites in the past



It is very interesting to compare these results with what designers are saying they are appealing to (a graph of which follows). Of note is the facts that there are large gaps between what designers believed they are appealing to, and what users believe they are receiving, for fun, delight and happiness and joy in particular. In fact, overall, chi-square analysis shows that when examining the significance of the

relationship between rows and columns (respondent type (designer or user) versus response opinion), P-value = 0.0023 (chi-square statistic = 30.557 and df=12). This shows that the distribution of responses varies significantly according to respondent type (designer or user). Because of the gaps between provision and perceived receipt of fun, delight, happiness and joy, designers might not be delivering their design intention. This could also imply that web developers do not fully understand human-computer communication theory from the emotional viewpoint. Although designers think they are appealing to appropriate emotions to a high degree, it not being received as such. Another interesting gap includes the fact that while designers do not often attempt to cause the emotion of anger, users are actually experiencing it (perhaps from frustration). However, designer's attempts at creating surprise and desire are better matched with the reported experiences of the users. The discussion section in this thesis (Chapter 5) comments on this further.

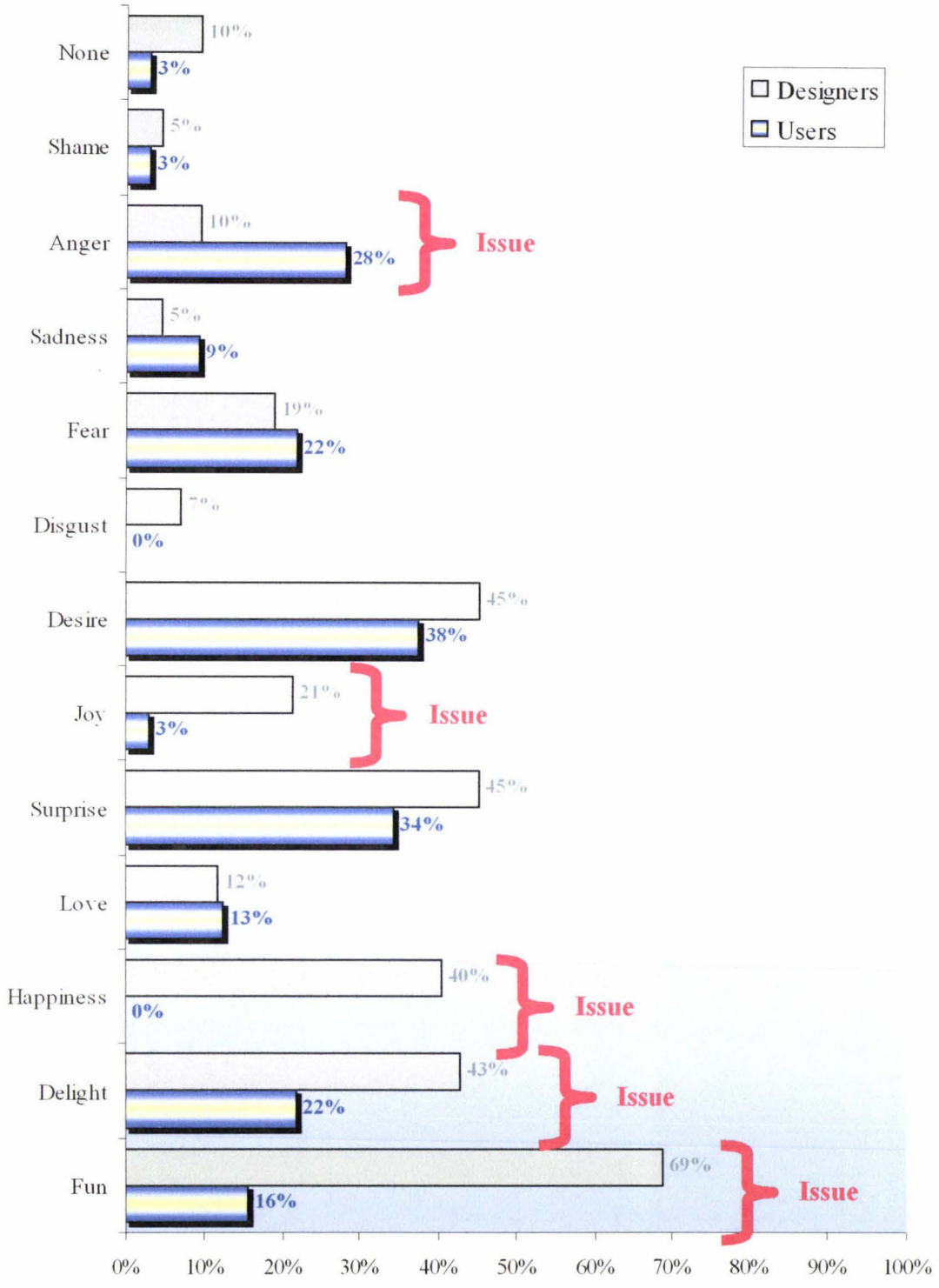


fig 4.1 Gaps between the emotions that designers state they are appealing to, and what users report that they are actually encountering

(5) Words/adjectives used to rate a site according to the way it evokes emotion

A list of words that users would use to describe the appeal of a site include:

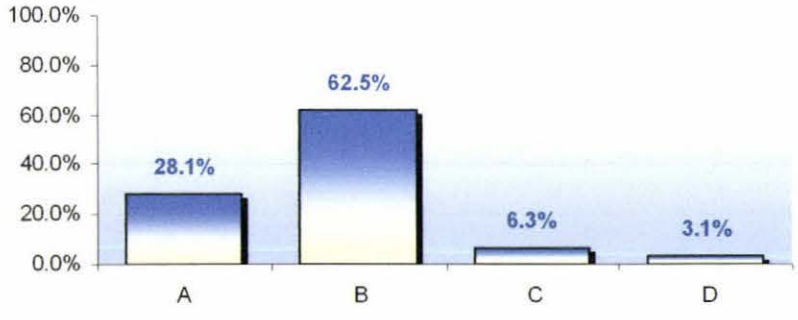
- Love
- Energy
- Frustration
- Mood
- Embodiment
- Power
- Control
- Excitement
- Fun
- Relaxing
- Intuitive/familiar
- Sexy
- Impulse
- Warm
- Cheerful
- New
- Different
- Interesting
- Rapture
- Cool

These are quite similar to the designer survey emotional adjectives – which shows that both designers and users have a good understanding of what emotion stands for. However, it is obvious that it presents a challenge to capture these emotions in the Websites that have been designed.

---

(6) The speed at which users would go somewhere else if their emotions were not appealed to on a Website

These results show that users will not continue to spend much time at a site if their emotions are not appealed to very quickly. Over 90% of respondents said they would go elsewhere in less than 30 seconds if they didn't receive the right emotional impact. Only 3% would spend more than a minute there.



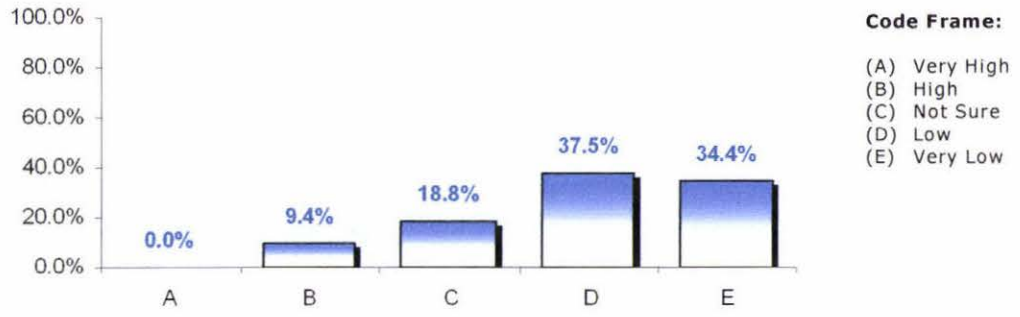
Code Frame:

(A) Less than 5 seconds
(B) Less than 30 seconds
(C) Less than 1 minute
(D) Longer than a minute

---

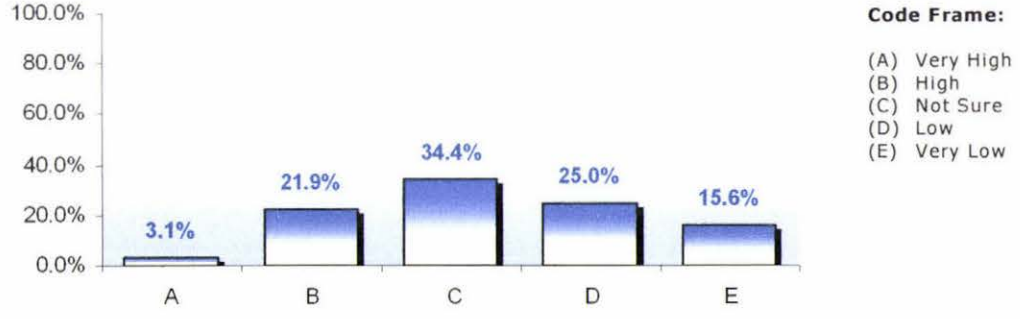
(7) Extent to which fun and pleasure are being evoked on Websites that attempt to sell something

In the designers survey it was found that 69% agreed with the importance of trying to incorporate fun. However, a worrying sign below is that users believe these aspects are not being evoked in them (over 70% rate their experiences lowly). Perhaps the designer's views on what embodies fun and pleasure differ from what the users perceive is fun. It could also be true that designers are unsure of how to incorporate fun into design. This has big implications for the relationships between theory, practice, design and education.



(8) Extent that current Websites portray a level of trust that makes you feel safe when giving over information or purchasing online

There is a mixed bag of results here, with some people trusting the average Website, and others not. What is of interest here is that the biggest group is those that are not sure. This could mean that a lot of people are on the border-line between trusting a site, and not trusting it – meaning that they are susceptible to any design features included to relieve negative emotions such as fear and distrust.



(9) Elements of a Website that portray trust

Below is a list of design elements that users have identified as being associated with feelings of trust:

- Branding
- No spelling mistakes
- Visa symbols
- Reputation
- Knowledge/dealings with the physical company
- Word of mouth

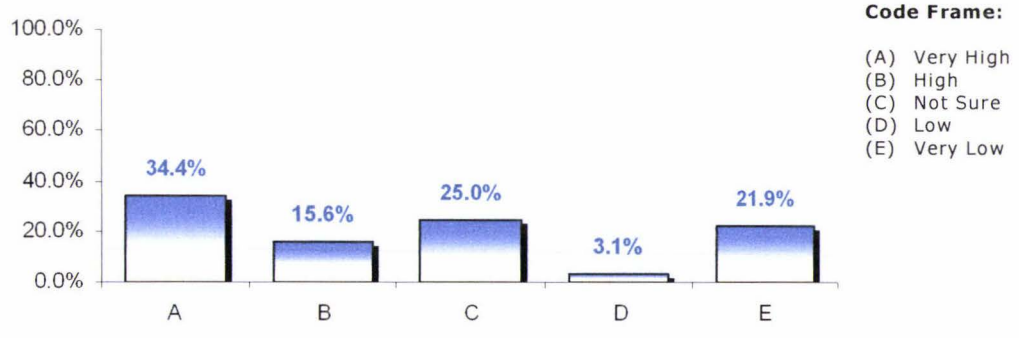
- Explanation of what happens when I pass my details over
- Error free
- Overall look and feel
- Always works
- Experience with similar companies
- Navigation always works
- Length of time it has been around

These reported elements are remarkably similar to what literature reveals as being important to users – confirming the empirical research carried out by the likes of Cheskin Research (1999) and Bailey et al (2001).

---

(10) Extent to which computerised virtual shop assistant characters would help on an emotional level and therefore evoke a more likely purchase over the Internet

There are a number of distinct groups of people here. They either seem to think very highly of agents, very lowly, or not be sure. This is interesting to compare to designers, whose opinions were more centralized (less extreme).



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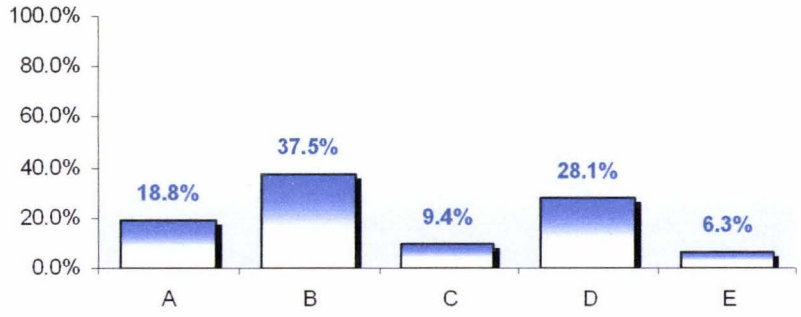
(11) Extent to which 3D, virtual reality and streaming video are important in emotional appeal

Although designers did not attribute much emphasis on 3D, VR, and streaming media, users seem to like it (over 55% like it to a high extent). This may mean that designers are missing an important aspect of design that could be taken advantage of to improve success. In saying that though, a third of users are still hesitant to support their use.

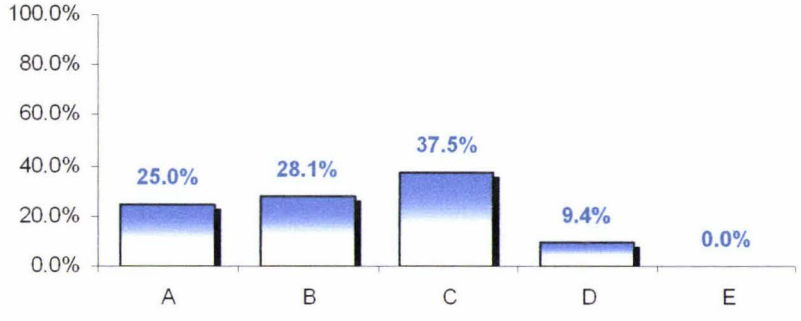


Code Frame:

(A) Very High
(B) High
(C) Not Sure
(D) Low
(E) Very Low

(12) Level to which users would like to be able to feel the same emotions on a Website as when they are playing a computer game, examining a sports car or interacting with some other pleasurable product?

While a large group were unsure, the general positive opinion on recontextualising aspects of car design and gaming validates the inclusion of these areas in this thesis.

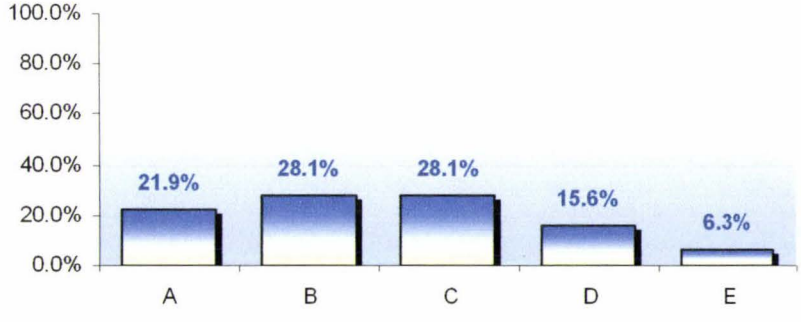


Code Frame:

(A) Very High
(B) High
(C) Not Sure
(D) Low
(E) Very Low

(13) Extent to which designers are respecting demographics and culture on Websites

Although there is still room for improvement, designers are doing moderately well in this area in meeting the expectations of the users – with only 20% of users experiencing low levels of demographic or cultural respect.

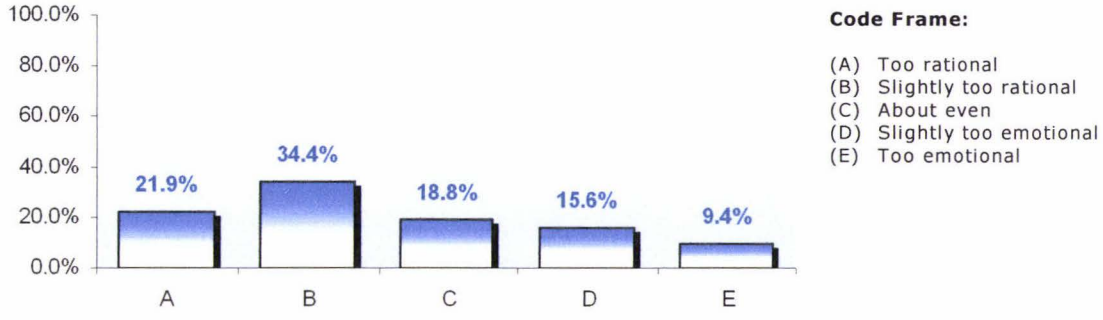


Code Frame:

(A) Very High
(B) High
(C) Not Sure
(D) Low
(E) Very Low

(14) Extent that Website designers have the right mix between rational and emotional qualities

Only about a quarter of people think that Websites are too emotional, but over 55% believe they are too rational. The group assigning the mix to be about right is quite small – only 19%. In question C4 in the designer survey almost half the designers said that a mix of 50% rational, 50% emotional was appropriate. However, only a small percentage of users are actually experiencing this opinion in practice.



(15) Top areas of design that should be employed the most to match user needs as an emotional human being

The ranked ordering of emotional design dimensions by users is illustrated on the next page (figure 4.2). Of note is the importance of trust, fun, speed, usability, colour and virtual assistants. There are some big gaps in the popularity of design dimensions between designers and users (evident from figure 4.3). In fact, overall chi-square analysis shows that when examining the significance of the relationship between rows and columns (respondent type versus response opinion), P-value = 0.0017, and chi-square statistic = 42.134 (df = 19). This shows that there is a significant variance in the response according to whether the respondent was a designer or a user. Of extreme difference are those for fun, sound and use of virtual characters. In the opposite direction, factors like 'level of involvement' are not deemed as important by users as they are by designers. Among the aspects that are favoured by both users and designers are trust, speed and overall usability.

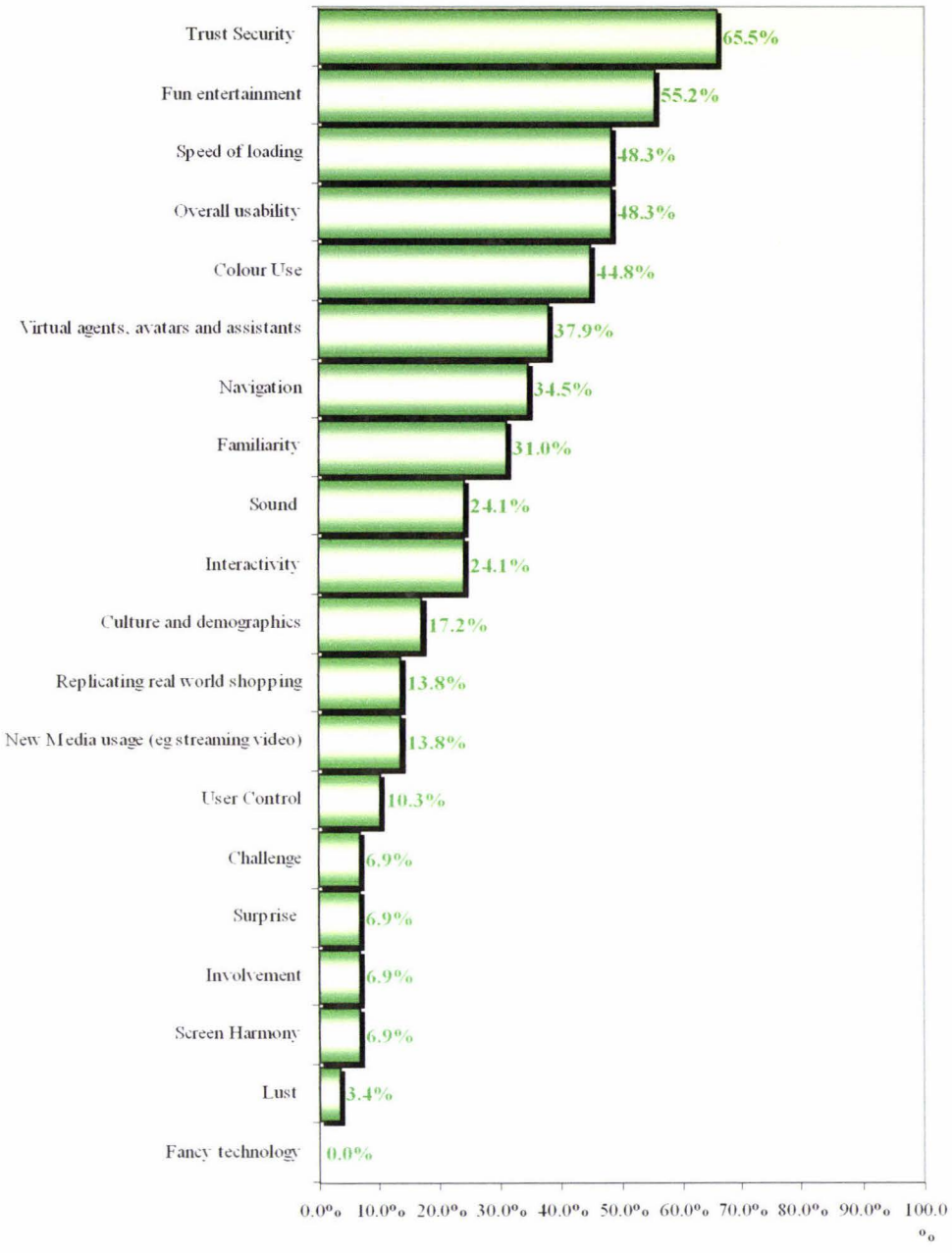


fig 4.2 Ranked desirability of design elements according to Website users

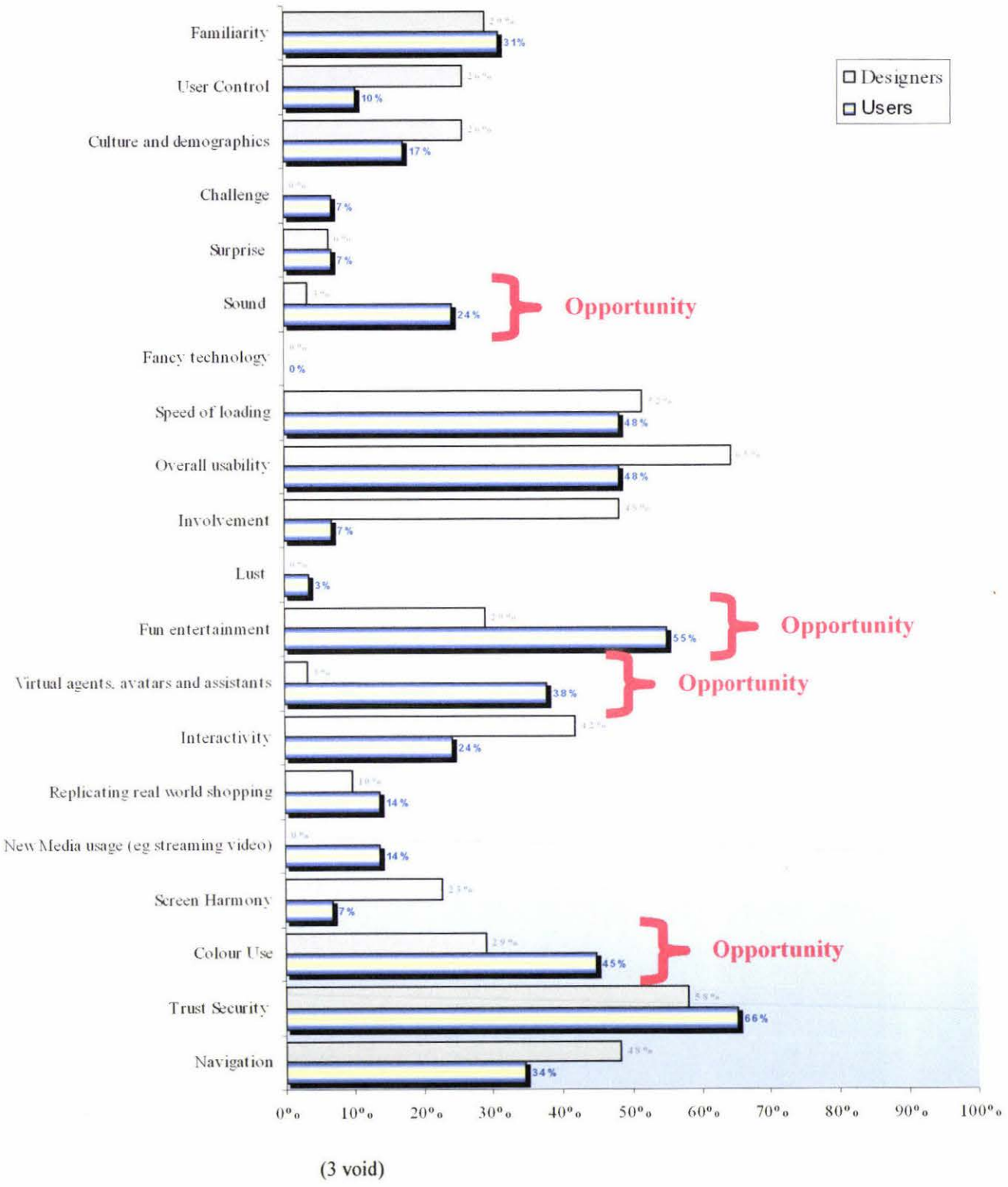


fig 4.3 Gaps in the desirability of design elements between Website developers and users

(16) Final comments by users on the way that emotion needs to be incorporated into Websites, or that might help this line of study

Examples of concluding comments put forward by users reveal both good and bad experiences on the Web, and there appears to be an emphasis on trust considerations.

- "Emotion is not something I consciously think about when visiting Websites, it is something that is on the subconscious level."
- "I visit so many Websites – only the ones that are 'different' will have me coming back."
- "I never bought anything online until I had a company credit card instead of a personal one."
- "I use the Web to get away from the emotional hoo-hah that is out there in retail and advertising – I want to find things quickly then move on."
- "Mistrust of giving over my personal details has so far prevented me from buying anything on the Internet However, because the Internet has been around for so long now and I haven't heard many horror stories, I am probably getting closer to the point where I will take the plunge."
- "Why buy something online when I can check it out in real life? I want to play with something and touch it before I buy it – even books."
- "I believe designers aren't doing too bad a job in meeting consumer needs. Recently I have been impressed with the increased speed of loading of many sites – with lots of graphics that somehow don't take too long to come up."

5. Discussion

The move from traditional media to New Media has meant that many new skills have had to be learnt and many paradigms have been shifted. In the old paradigm designers and teachers were set according to what they knew and were comfortable with – nowadays the endless opportunities of New Media requires a full understanding of how it relates to the way the human mind works. We are still learning how the human mind interacts with New Media. Much has been borrowed from disciplines such as psychology and engineering, but they are still being validated, integrated, and recontextualised into theory appropriate for the New Media paradigm. This chapter now summarises and refines the findings of this thesis – comparing literature to analysis of questionnaires – working towards concluding commentary.

For all of the talk about the huge size of the e-Commerce industry, with exponential growth patterns and multi-billion dollar revenues, much opportunity is still being lost. Some companies are going bust, others are having to lay off staff, and even the ones that are successful could be doing better. Amongst other factors, emotional bonding with customers through the site design could be a 'missing link' that overcomes barriers to purchasing online by the mainstream population.

5.1 Emotion

Emotion is core to our functioning as humans. It is inherent in everything we do (including the experience of shopping) and is a mandatory part of our lives. The evolution of the species has seen the emotional parts of the brain grow from the primitive brainstem long before rational areas arose. The emotional mind is quicker than the rational mind, coining the phrase *first feelings, second thoughts*. Central to this behaviour is the amygdala, which stores emotional memories and the ability to experience affection and passion. Given the importance of emotion it is only natural that an emphasis should be placed on it in design philosophies. Whilst some designers are realising the importance of this in consumer products and automobile design through the awareness of affective human factors and Kansei engineering, this concept needs to be further emphasised in the world of e-Commerce to a higher degree. Designers surveyed in this thesis were nearly all following a form follows function or a subjective/intuitive design philosophy – with hardly any nominating themselves as a follower of form follows emotion. However, it was found that there was a good level of support for emotional design, with over 70% of respondents deeming it important and aiming to appeal to emotions first, thoughts second. A gap was established from this fact because only 45% believe they are currently using a high level of emotional design in practice. Coupled with the fact that demographics like age and the level of education affect opinions on emotional design aspects like colour and recontextualisation, this perhaps infers that the concept needs to be brought more into the open, and educational programmes should cover the topic.

Literature revealed a large number of words that encapsulate emotion and Kansei ideals. Adjectives that designers believed would describe the emotional effectiveness of a Website included qualities exuding fun, a welcoming nature, warmth, humour, sympathy and harmony. When users were asked a similar question they came up with a very closely related list of words – showing a good empathy by designers in this instance. These qualities still need to be put into practice.

5.2 Trust

The theme of trust was covered in literature as a means to overcome the core human emotion of fear. Trust was described as a design feature that would convert browsers into buyers – overcoming the current situation where people abandon shopping before making a purchase because they don't have enough confidence in the online company. Along with branding, literature puts forward that specifying what will happen with the sensitive data, use of seals of approval, high quality navigation, professional presentation, and full explanations of the fulfilment process, will all assist in bridging human-computer distrust.

As far as previous empirical research into e-Commerce trust was concerned, one study modelled how trust factors lead to a usage experience which over time becomes loyalty and intrinsic trust. Other studies involving modelling e-Commerce trust revolved around similar dimensions (presentation, usability, and privacy) but also brought in pre-interaction elements – where pre-dispositions, previous experiences and personal vulnerability can affect initial trust values. There was a reasonable level of empirical studies in this area but a gap seems to be the lack of repeated verification (by others) of some of the models that are being put forward – with designers not yet using them to classify and assess corporate Websites to increase emotional effectiveness via trust generation.

Questionnaire results found that designers still believe that lack of trust is a major psychological barrier to purchasing online, and that establishing trust is very important in e-Commerce design. Major trust dimensions from previous empirical research that were put forward to designers were all deemed important, with seals of approval particularly favoured, and 'efficient technology' to the least degree. Most designers also believe in the importance of statements of privacy and security, although a small group still needs to be convinced. Trust rated second (behind usability) as one of the top-ranked emotional themes to concentrate on. This matches the expectations of users, who rated it number one. User results showed that there is still a large proportion of people who are undecided about whether to trust online purchasing or not – meaning they are susceptible to extra efforts designers undertake to relieve fears. An open-ended question asking users to reveal what would make a site trustworthy confirmed the findings of previous literature – branding, seals of approval, reputation, familiarity and error-free navigation. Due to the overall emphasis placed on trust by both designers and users, and the extensive modelling studies that have been undertaken, it is safe to say that trust should be an integral part of any overall emotion-based e-Commerce design strategy.

5.3 Colour

There was an abundance of literature that covered the relationships between emotion and colour but there was very little in terms of empirical research. There were many descriptions of the stereotypical associations of colour and emotion – on Websites and in general – but there were no studies that rated e-Commerce success based on the use of colour – which could potentially be very hard to do. The examination of literature revealed certain generic aspects of colour theory that can be related to the human brain. Designers should manipulate dimensions of colour in order to achieve a harmonious interaction with target users, with the brain rejecting colour schemes that are either under-stimulating or too chaotic. Designers also have to be aware of the stereotypical associations (and 'temperatures') of colours when looking to get the right emotional reactions from target users. New Media colour principles like Web-safe colours, contrast between text and backgrounds, and the differences in the presentation of colour in differing technical environments were other areas of literary emphasis.

Designers involved in this study were very much in agreement with the importance of choosing colours to match the emotions they wanted to evoke in visitors (based on their understandings of colour-emotion linkages). Use of colour harmonies and warm hues were especially favourable. Amongst the list of 20 emotion-related design themes proposed to designers, colour use came in the middle-rated group, with about 30% of designers ranking colour in their top 5 emotional design elements. Chi-square analysis and associated charts showed that there could be relationships between respondent education and favourability of using colour as an emotional appeal. Surprisingly, those that were unsure or looked upon colour-use unfavourably were likely to have a Bachelors degree or higher. The survey of users revealed that almost half of the respondents counted colour in their top 5 emotional themes. It appears that designers therefore have to place more emphasis on getting colour to correctly match the emotional expectations of users. Designers recognise the importance of colour, but there is a still a gap to make up. Empirical research needs to be undertaken in this area to measure how different colour designs affect the emotional purchase decision.

5.4 Culture and Demographics

In a similar fashion to colour, designing Websites to match cultural needs seemed to have a large number of literary articles, but very few that were of an empirical nature – meaning that following a previously-validated methodology for assessing the emotional intelligence of Websites with respect to their cultural correctness was difficult. One exception to this was an interesting study that classified different sites along cultural dimensions such as power-distance and masculinity, but this did not disclose calculation methods on these dimensions. Non-empirical references showed that certain metaphors and images could be deemed offensive to some cultural groups but not others; that the stereotypical associations of colour differed drastically according to international culture; and that user testing was important in preventing any emotive cultural offences.

Roughly 50% of users felt that designers were respecting their demographics and culture, so there is still a large number of people who feel they could be more satisfied in this sense. It should be noted however that culture and demographics only rated in the mid-ranked set of emotional themes by users, behind many other emotional elements like trust, fun, usability, colour and familiarity. Nearly all designers believed that empathising with target users (a part of emotional intelligence) was very important, as was involving users in the design process (user-centred design). However, there were differences in opinion of the importance placed on culture as part of an emotionally-fulfilling design for users. This could be a reason for the fact that half of users aren't totally satisfied with the cultural messages they are receiving from e-Commerce designs. Questions relating to virtual agents and shop assistants showed that a good percentage of designers believed it was important to match the look and personality of these to the target users' demographics and expectations (including the users' ability to change the characteristics to suit themselves). Although designers do see some importance in matching design to culture and demographics, there is room for improvement. Perhaps more user testing needs to be carried out in conjunction with using frameworks that rate cultural dimensions based on target audiences.

5.5 Usability

Usability is also closely related to working with different role-types, demographics and cultures. There has to be a thorough understanding of the audience as the situation in which an interactive product is used can influence usability design factors. Emotion should supplement (and be integrated with) usability and functionality in e-Commerce. There is debate in literature about emphasising the difference between usability and 'art' – with some believing usability is quite functional and rational therefore different to graphic design; however if something is not inherently usable then it loses emotional appeal, generating negative emotions of anger and frustration instead. Usability was the top-rating design theme amongst designers. Yap (2001) asserts that there has to be a good balance between the rational and emotional sides. Designers in the survey were nearly all in favour of having a 75% rational, 25% emotional, or a 50/50 split.

5.6 Speed

Many references point to the need for speed in Websites, with frustration, anger and other negative emotions arising when there are delays or if a site is slow to perform. Designers have to balance speed with the amount and quality of New Media elements, at least until high-speed broadband connections become more common. Some studies undertook research into the small amount of time it takes for someone to lose interest or get frustrated with delays or lack of response. Speed of loading was amongst the top emotional design elements for both users and designers. In fact, a large proportion of designers believe that speed is their *top* priority. It is a difficult line for designers to tread – on one hand using speed to prevent negative emotions, but on the other hand balancing the need for other design elements that generate positive emotions through fun and pleasure characteristics (that might slow things down).

At least there is an awareness by all of the importance, and so in this respect, designers seem to understand the interaction between the human brain and computer. Recent affective human factors research has investigated animated fillers as a means to soothe negative emotions during delays, and this was found to be in practice on sites such as http://www.nike.com.

5.7 Video and Streaming Media

The use of video and streaming media was portrayed to be a proposition requiring careful consideration and application by previous references. While video has a very strong ability to impart and evoke emotion (proven by the success of television), there are still many design decisions to make including the size and length of the video (i.e. speed versus quality and quantity). Streaming video can connect with people on an emotional level, bringing in a degree of surprise and variation, and being able to fully highlight appealing characteristics of the product(s) trying to be sold online. Over 75% of designer respondents had a negative opinion of the importance of streaming video and audio in gaining emotional connections. In conjunction with this, not one designer rated New Media like streaming video in their top 5 design elements that appeal to emotions (although it was rated in the middle of the pack by users). This result could be due to the designer's desire to keep the site fast because of slow modem connections. Interestingly, the technological improvements that will facilitate more common use of streaming media via higher bandwidth Internet connections are deemed favourable by designers in terms of increasing emotional appeal, but yet the New Media that will make the most of this was not deemed that important at the moment.

5.8 Sound

Following on from the use of streaming video, the inclusion of sound into Websites was investigated. Resources revealed that sound can account for a large part of an overall experience, and actually taps into the same brain structures as other things crucial to our well-being. Sound creates mood and atmosphere, and is present in the physical retail environment, but only to a small degree online. Although it must be used carefully in case it comes repetitive or annoying, sound can be used to inform, create a sense of place, and create harmony in conjunction with graphical elements. Although literature (and design companies like Frog Design and Lucky Penny) believe in the importance of sound to Web design, designers in this study were of quite the opposite view. Sound was not deemed to be an aspect of the traditional shopping experience that would be used online, and it was near the bottom of ranked emotional design elements. Users, however, rated sound amongst the middle group of emotional elements. This gap in the designer's undertaking of user expectations and human-computer interaction is a real opportunity for the future. Perhaps studies could be undertaken to measure the emotional response elicited from various music and sound stimuli in conjunction with differing e-Commerce sites such as online clothing (funky beats) and books (perhaps classical music).

5.9 Graphics

Similar discussions take place with regard to the use of graphics on Websites. Non-empirical literature emphasised that visual communication is part of human evolution, and that photographs of people can build an emotional bond with the visitor through cognition. Photographs and illustrations also partially fulfil the lost ability to touch and feel a product that would normally be feasible in the traditional retail world. Like video, too many graphics may slow down the speed of the Website, so many Websites allow users to click on smaller photographs to see larger images only if they are interested.

5.10 Virtual Reality and 3D

Virtual Reality (VR) and 3D are New Media technologies that have been around for quite awhile (in computer games and scientific applications) but are yet to make a big impact in terms of widespread usage in the world of e-Commerce. Having control over an environment and being immersed in it are deemed important emotional factors, as is the ability to interact and 'play' with products before they are purchased. There are various pieces of hardware available (including gloves and head-mounted displays) but these are currently too expensive for the average Web consumer. However, there are software applications that allow users to move around and explore objects – investigating features of products or shopping environments to aid in the purchase decision to a higher degree than static images. Companies like Blaxxun are firm believers in the power of VR for e-Commerce, and have a number of working environments with companies such as IBM. VR has great potential and could be deemed a powerful tool in generating an emotional bond with users – but its value still has to be proven in dollar-terms before mainstream companies will look to use it on their Websites. Some literature is against the use of VR and 3D on the Web but yet several companies like Frog Design and Ububu have been receiving industry accolades for their work in this area, with citations that it makes the Web more fun and bridges the gap between brands and consumers via an emotional relationship.

As stated earlier, New Media usage does not appear to be at the top of designers' motivators at the moment. Most design respondents did not think 3D and VR were important in order to gain emotional connections. This may reflect the perceived early stage of development of these tools on the Web, and it actually matches the expectations of users (who did not place New Media near the top of favoured emotional design elements). Further work needs to be done to explore how VR and 3D can create a response that could lead to a purchase (perhaps in conjunction with lessons from game design). This could involve having two versions of the same site – one in 3D/VR, one not - and measuring the differences in response from respondents (assuming a fast Internet connection).

5.11 Virtual Agents

The need for social contact and familiarity were discussed by literature and these needs could be the impetus for other references placing an emphasis on the use of virtual shop assistants and agents in future Websites. Because humans are generally social beings they like to involve others in their

activities and react to expressions and gestures that convey emotion and attitude. The physical retail world has people to help find and describe products, steering people towards buying things that might suit them; and has people to actually shop with (including family and friends). Some literature believes that this aspect of traditional shopping needs to be taken online, and that over the next few years this trend should start to occur. Companies like Microsoft are also pushing for this type of interface feature (although their own site does not currently have them).

Empirical research has been undertaken into matching the facial expressions of virtual agents to emotion, developing technologies to display human features mapped into virtual characters, ensuring 'kansei' is incorporated. Avatars (virtual representations of the self) have been popular on virtual reality worlds and chatting interfaces, but third person shop assistants are yet to be seen to any noticeable degree on e-Commerce sites. It seems the technology is there to do it but it is not yet being included in designs.

A different type of social contact does seem to be more common on Websites, and this is in the form of live chat. This has proven financial success on some eTravel sites. These text-based interactions fulfil some social contact needs and also play a big part in portraying trustworthiness since a real person is being interacted with. It will be interesting to see if this can be merged with visual representations of these people.

Designers surveyed in this study were reasonably evenly distributed amongst those in favour, unsure and in disagreement with the use of agents – once again this may be due to the fact that it is an emerging technology without too much in the way of tangible financial justification. However, if virtual assistants/agents were included, most designers agreed that it was important to match the look and personality characteristics to the target audience. Surprisingly, given that users would not have had much exposure to virtual agents and characters, they actually deemed them amongst the highest rating emotional design elements – creating a gap between user expectations and designer actions. Keeping in mind the limitation of small sample sizes, this survey result could be a pointer for further research, and another opportunity to cash in on a design element that could evoke an emotional purchase that is not currently being employed. Of final note is that one designer respondent provided the comment that they were actually building a Website currently that will incorporate virtual agents.

5.12 Recontextualisation

Two broad product ranges – automobiles and computer games – were investigated to see what made them such emotion-centred items. The fact that cars evoke pleasure, desire, and fun in consumers is probably due to the fact that emotion is central to the design philosophies of the companies that produce them. This was shown to be true for Volkswagen, Chevrolet, BMW, Chrysler, Mercedes Benz and classic Italian brands.

The success of the computer games industry has been overwhelming. The games themselves evoke emotions in users, as does the design of the console and hardware. Aspects of gaming that make it so emotionally stimulating include the design elements of fun, interactive control, fantasy, the right levels of colour and sound, challenge and surprise. Previous empirical studies have been undertaken to reapply game design theory to other disciplines and products (such as education) but not particularly to e-Commerce. While computer games have traditionally been associated with younger male demographics, this is changing with Sony and other console companies driving into older and more diverse customer segments. While not all Websites should have actual games (although this has been done well by companies like Pepsi) to generate an emotional purchase, the design elements that *embody* games could. This includes integrating the concepts of flow and fun. Further research needs to be undertaken into how fun and engagement can still be brought into sites wanting to maintain a more formal appearance. Future studies also need to investigate what adults think about fun activities being used on e-Commerce sites. Users who completed questionnaires for this thesis certainly rated it highly.

There was an overwhelming positive confirmation from designers that car design embodies emotion, fun and pleasure. Designers favoured interactivity, colour use and fun as gaming elements best applied to Web design. Although a third of designers were undecided, more than half believed that the design of cars and games can be recontextualised into Web design. Two aspects of gaming – challenge and variation – were examined in separate questions, with challenges not being deemed an importance part of Web design. It should be noted that there is a difference between a challenge to make something fun, and a challenge that causes frustration and usability problems. Although a proportion of users were unsure, most were definitely in favour of seeing emotional elements they like about cars and games placed into Websites. Designers think design elements from cars and games can be recontextualised (although this was shown to vary by education level), and users want these attributes, so this is potentially an area of future development. The difficulty surrounds *how* to apply these elements.

5.13 Classification Mechanisms and Core Dimensions

There are other elements of emotional design that this study did not have the foresight to ask about, but came out of open-ended questions in designer and user surveys. For example, there was an emphasis from a number of designers about the fact that the companies paying them to design Websites have their own agendas, and have little concern for building in emotion – they just want something up and running very quickly, for as little cost as possible. Designers have to balance the demands of their clients against what they believe the customers of those clients require in terms of emotional needs – but unfortunately the paying client is the one that usually wins. One could argue that designers could be more proactive in emphasising the importance of emotional appeal to their clients though. This thesis has revealed some opportunities for achieving emotional connections with users, but perhaps its not just the designers who need to take note . . . maybe it's also the companies paying for their Website to be designed. Users let their emotions do the talking while expectation gaps still exist – by not purchasing as much online as they potentially could.

Other themes to come out of rich-text responses included the need to have lower prices on the Web; the proposition that emotion is realised on a sub-conscious level; and that designers have no control over the emotional characteristics of the surrounding physical environment in which the user is browsing the Web.

When asked if they use any classification systems to rate/critique designs before they go live, many designers did not respond. Of those that did, some of the methods included piloting and usability testing with sampling groups, assessment by peers and paying clients, and comparisons of the final design versus initial briefs. So it appears that there are not many formal evaluation methods being used that systematically assess emotional qualities of a Website before it goes live – pointing to the need for such a tool. It should be noted that difficulties surrounding personal subjectivity and the fact that emotion is quite often subconscious would make such a tool difficult to apply.

Having an instrument for use in emotional design will firstly require dimensions to use as a platform. Comparisons of designer and user questionnaire results revealed a number of issues and opportunities. Firstly, there are a number of emotions that designers believed they are putting into their designs, but that users do not feel they encounter. Designs that are supposed to appeal to the emotions of joy, happiness and fun are not meeting expectations. It could therefore be assumed that there is a mis-understanding. Also of note was the fact that negative emotions like anger are being experienced, even though they are not always purposefully placed into design. In terms of New Media application, real opportunities exist in the use of virtual agents, more appropriate colour, inclusion of sound, and more fun and entertainment.

It is difficult to give a definitive list of the top design aspects that need to be utilised in emotional design. There are differences in emphasis by designers, users and literature. However, from the areas of overlap, the following design characteristics are put forward as proposed dimensions to be used as a starting point, and basis for classification systems:

- trust and security
- speed of loading
- fun and entertainment
- usability
- application of colour
- virtual agents and social contact mechanisms
- sound that adds mood or atmosphere

These dimensions are placed onto figure 5.1, which highlights the premise and direction that this thesis has taken, integrating points from this discussion (chapter 5).

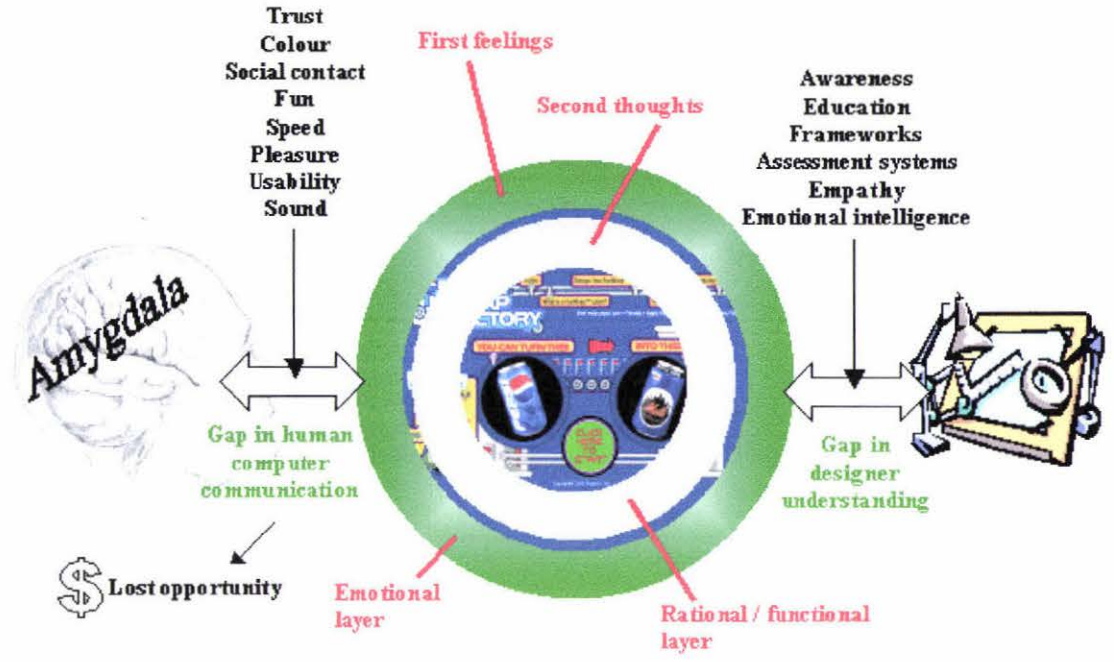


fig 5.1 Gaps in the human-computer interaction

There are a number of options for taking these dimensions and applying them in Website assessment. Previous affective human factors research has demonstrated the use of focus groups linked to semantic maps, and the positioning of products within sets of dimensions represented as axes. Because rational and functional thinking are still integral to a design, semantic maps or continuums could also be used to see where a site lies – trying to get the right balance between emotion and rationality. The dimensions that have come out of this thesis could be used to judge Websites – grouping together those that share common emotional attributes – highlighting features that typify an emotional design. Examples of this are shown below in figure 5.2 (noting that the screenshots are for demonstration purposes only):

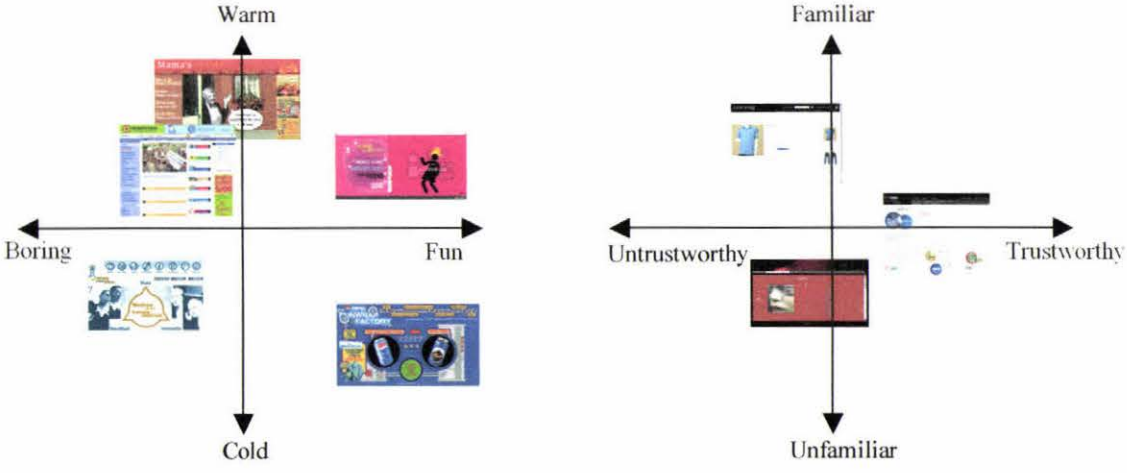


fig 5.2 Semantic maps for e-Commerce

Another idea is to take the complete list of emotion-centred dimensions (rather than the limiting sets of two in semantic maps), assign them weightings (e.g. perhaps trust and fun would be weighted highly given the results of this thesis), and then undertake surveys or focus groups to assign ratings to a Website. This type of framework is represented below in figure 5.3.

		Weighting	Score	Weighted Score
Generates positive emotions	**Fun**			
	Colour			
	Social contact			
	. . .			
Prevents negative emotions	**Trust**			
	Speed			
	Navigation			
	. . .			
		Total emotional appeal =		

fig 5.3 Assessing emotional appeal

Of course, if someone was rating a site according to each of these emotional factors they would have to be given a good definition of what each factor means. For example, for the fun factor, a site might receive a high rating if there is evidence of purposeful attempts to evoke pleasure and humour. A lot of the factors would be quite subjective (because of their emotional nature), whereas others like cultural fit and speed would be able to measured more quantitatively.

To finish off this chapter, it is worth emphasising the limitations inherent in this study. There have been many case examples provided in the form of screenshots and commentary throughout this thesis – but there has been no investigation into the *actual* sales success or popularity of these sites. The sample-sizes of the original surveys were sufficient to perform some quality analysis, but yet not big enough to warrant unconditional belief in the findings and chi-square associations. Response samples involving hundreds of designers and users chosen with more random methods would be advisable for future research – and this will probably mean going further a field than New Zealand – perhaps undertaking the study with the large base in the USA or Europe. Showing users live examples of sites and getting them to identify and rate qualities that create fun, trust or other experiences was an alternative to the questionnaires undertaken in this study. These focus groups may have revealed more in-depth findings with respect to what appeals to emotions. However, this thesis has hopefully identified the dimensions, gaps and opportunities that will allow future focus groups to have a platform to investigate from.

6. Conclusion

This thesis presented an extensive range of literature along with original survey research and case examples of emotionally appealing Websites and consumer products. At the start of this research a number of questions were asked with a view to being answered by this study. Each of these is presented below along with commentary on the extent that each has been addressed, and what still remains for future researchers who are keen to develop this area of study.

The question of how e-Commerce could be better designed to meet customers on an emotional and psychological level (increasing the probability of sales) was put forward, and this can be integrated with the question of what characteristics form an emotion-centred Web design. Literature uncovered a large list of design qualities that were deemed appropriate for emotion-generation. This included trust; fun and entertainment; functional speed and navigational efficiency; use of colour; fitting in with demographics and culture; using social contact like live chat and virtual assistants; using principles like biomimicry and familiarity; using sound, video and graphics; replicating some aspects of the traditional shopping world; and trying to encapsulate principles from the emotional design of games and automobiles. Underlying the examination of these principles was the theme of emotional behaviour of humans (the function of the amygdala in particular), and the tried and true marketing and advertising propositions that emotion sells, and that purchasing behaviour is often emotionally based. Survey respondents favoured some elements over others, with trust and fun being of top ranking for users. It remains a task for future researchers to further analyse each of the design themes that were revealed – seeing how the theory of emotional qualities can be applied in practice.

Another question surrounded what literature and designers thought about the emotion-centred design philosophy. There were many references uncovered in the process of this research that revolved around traditional form follows function and rational design philosophies. Whilst this can definitely not be forgotten, there seems to be a growing amount of literature over the last couple of years which is placing the emphasis on emotion-centred aspects and philosophies. The recent emphasis on qualities that create emotional bonds is exemplified by large conferences on affective human factors and the world-famous success of Frog Design and products like the Apple iMac and the new Beetle from Volkswagen. Designer-respondents in questionnaires did not formally follow an emotion-centred philosophy, but many expressed favouritism towards many of the dimensions or design aspects that could potentially form emotional design. However, many concepts emphasised by literature (such as the inclusion of sound and virtual characters) were not looked upon favourably. Overall, the opinion of emotion-centred principles was favourable, but there is still much work to do in putting this into practice. Because there was support by both designers and users for recontextualising design elements from cars and games, this should be proactively researched for ways of doing this.

The question of how well the views on emotion-centred design perceived by practitioners (or emphasised by literature) are translated into deliverables for users was also asked – in other words, how well are Websites meeting the emotional expectations of the customers who use them online? This led into the question of whether there was a gap in understanding human-computer communication with regard to the New Media and e-Commerce. It was found that there was indeed a reasonably large misunderstanding. The distribution of responses to the favourability of design dimensions varied significantly according to the respondent type (designer or user). While the ideal of fulfilling emotional needs was favoured, many principles are not being translated into the Websites – sometimes due to the designer not correctly utilising the positive emotion generators like fun, pleasure and harmony or preventing negative emotions through trust, speed and usability; other times due to not knowing *how* to apply these principles (which is still an area for further research to build upon); and yet other times because they feel they have to follow the directions of the paying client rather than what the end-user really wants. An example of the way this affects user experiences can be illustrated by the concept of trust. Both literature and designers know it is important, but yet many consumers will still not trust an e-Commerce site enough to undertake a transaction. Issues also surround difficulties in integrating concepts of fun and pleasure into designs, creating a polysensory experience that harmonises the online shopping activity.

A final question surrounded what type of framework can be used for assessing emotion-centred design and helping designers use it in a practical way. This research did not completely answer this question, but initial thoughts and suggestions were put forward. This included suggesting the use of key concepts that were identified as being important to emotive functions or that were a source of human-computer misunderstanding, and utilising them in tools like semantic maps, which have been proven in consumer product design, but yet to be validated for e-Commerce. No formal mechanisms were revealed by designer respondents in surveys to assess emotional intelligence of sites, but the concept of using a weighted list of emotional dimensions was proposed in this thesis. It remains a task for future researchers to take something like this tool and use it in focus groups or interview situations with users. Hopefully upon repeated publication of results certain qualities will emerge that will eventually enable easy identification of what exactly makes a Website fun and pleasurable.

Emotions are at the foundation of human experience, and so understanding the emotional or affective responses people have to products, services and systems is beneficial to creating good design and for the economic benefit of society. A lot of people buy on emotion and we all respond to the basic needs and emotions such as fear, greed, desire, lust, respect, praise, self-esteem, wealth, beauty, and attention. Some people would want to buy based on facts and rationality (if that suits their personality-type or they are regularly purchasing as part of their role in the workplace), but many consumer purchases are pointed to being emotionally-based. Not all Websites have been designed to make us feel good and it is not necessarily a technological limitation – perhaps it is due to the need for further research into human-computer interaction. Some designers are finding it hard to integrate concepts such as emotion, or don't feel it is necessary to formally consider it as part of their philosophy of design. Theories of emotion

have to be part of the design process, complementing the rational and functional side. Many Websites are more cold and sterile than warm and creative. Successful Websites need engagement and invitation.

Design requires that people's feelings as well as their thoughts be taken into consideration. Many studies and designs still only use non-affective evaluation criteria. The significance of emotions and their centrality to human experience has been established so now it is time for designers to acknowledge the role that emotions play in their discipline. The notion of emotional competence lies at the heart of affective computing. It is anticipated that readers of this thesis will realise that the survey sample sizes were small and that there were other limitations. However, it is hoped that interested readers will expand on this research and continue to undertake analysis in this area of study. This thesis has been one more step in trying to understand the interaction between the human mind and technology. Form follows emotion. Success follows emotion-centred Web design.

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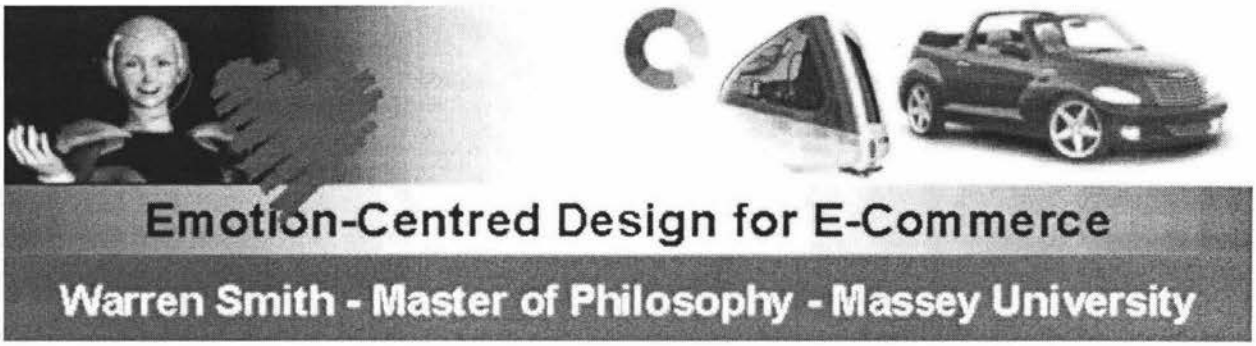
Appendices



Survey on Emotion-Centred Web Design

Thankyou for coming to this web-based survey. My name is Warren Smith. I am a Master of Philosophy student undertaking a study on the emotive aspects of web design. Your participation in this survey is most appreciated and would help me to expand current knowledge in applying design criteria to evoke emotions such as fun, joy, pleasure or trust in web design. It is expected that the survey will take approximately 10 minutes to complete.

In completing this survey you are acknowledging informed consent as per the email that linked you to this site. Full confidentiality and anonymity are assured.

You are most welcome to contact me at warren.smith@xtra.co.nz for any further information or access to the results.

The survey responses will be collated on August 7, 2001.

Please note that there is a SUBMIT button at the bottom of this survey that will need to be clicked on to send the results.

DEMOGRAPHICS

(A1) Which of the following best describes your role in the workplace?

- O Software Designer
- O Web Designer
- O Graphic Designer
- O Generic Designer
- O Marketing/PR/Sales/Management
- O Business Analyst
- O eCommerce Professional
- O Other

(A2) Which age group do you fall in?

- O 20 or below
- O 21-25
- O 26-40
- O 41+

(A3) What is your gender?

- O Female

○ Male

(A4) When was the last time you undertook a course or studies in design or e-Commerce?

○ Within the last 12 months
○ 1 or 2 years ago
○ 3 or more years ago
○ Never

(A5) What is your highest qualification?

○ Post-Graduate Degree
○ Bachelors Degree
○ Diploma/Certificate
○ Some tertiary papers
○ High School/College

(A6) Which of the following (tick more than one if necessary) are you mainly educated in?

☐ Web Design
☐ Graphic Design
☐ Software Design
☐ Industrial Design
☐ Marketing/Sales/PR/Management
☐ Other

(A7) What system environment do you work in?

○ Apple/Mac/iMac
○ PC
○ Both

EMOTION-CENTRED DESIGN

(B1) The emotional mind is quicker than the rational mind and therefore aiming to appeal to emotions first, thoughts second when designing for the web is important

○ Strongly Agree
○ Agree
○ Not Sure
○ Disagree
○ Strongly Disagree

(B2) There are a number of emotions that can be incorporated into your web site designs. Please tick those you have conscientiously tried to appeal to in the past

☐ Fun
☐ Sadness

- ☐ Anger
- ☐ Shame
- ☐ Delight
- ☐ Happiness
- ☐ Love
- ☐ Surprise
- ☐ Joy
- ☐ Desire
- ☐ Disgust
- ☐ Fear

(B3) **Empathising** with the target users is important

- ○ Strongly Agree
- ○ Agree
- ○ Not Sure
- ○ Disagree
- ○ Strongly Disagree

YOUR DESIGN PHILOSOPHY

(C1) Which one of the following design philosophies do you follow?

- ○ Form Follows Function (as per Bauhaus)
- ○ Form Follows Emotion (as per Frog Design)
- ○ Positivistic Rationality / Scientific Methods
- ○ Subjective/Intuitive
- ○ Other
- ○ Not Sure

(C2) At what stage do you think emotional considerations should take place during the process of design?

- ○ Upfront
- ○ Middle stages
- ○ At the end
- ○ Throughout
- ○ Nowhere

(C3) Have you ever included design aspects that have no rational reason behind them?

- ○ All the time
- ○ Regularly
- ○ Sometimes
- ○ Once or twice
- ○ Never

(C4) What should the design mix be between rational and emotional qualities?

- O 100% Rational, 0% Emotional
- O 75% Rational, 25% Emotional
- O 50% Rational, 50% Emotional
- O 25% Rational, 75% Emotional
- O 0% Rational, 100% Emotional

(C5) If you were to rate a site according to its level of emotional effectiveness, what dimensions/adjectives would you examine?

(C6) Do you use any classifications/ratings systems to critique your designs before they go live? If so then please explain.

(C7) Which of the following do you strive to achieve when designing a web site? (Please tick as many as necessary)

- ☐ FUN - humour and happiness
- ☐ CUTENESS - varying proportions and roundness to imply differing ages
- ☐ FAMILIARITY - using metaphors from nature (i.e. biomimicry) to increase intuitive functionality
- ☐ METONYMY - distinction, difference and exclusivity
- ☐ COLOURS - use of colour to appeal to emotions

(C8) No matter what else is done, SPEED of loading is my top priority

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

GENERAL

(D1) What degree of importance do you assign to considering the users' demographics?

- O Very High
- O High
- O Not Sure
- O Low
- O Very Low

(D2) What degree of importance do you assign to considering the users' technical environment?

- O Very High
- O High
- O Not Sure
- O Low
- O Very Low

(D3) What degree of importance do you assign to considering the users' international culture?

- O Very High
- O High
- O Not Sure
- O Low
- O Very Low

(D4) Virtual Reality and 3D are very important in achieving emotional connections

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(D5) 'Streaming' video and audio are very important in achieving emotional connections

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(D6) Increasing use of broadband connections and webTV will mean fewer barriers to reaching people on an emotional level

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(D7) Involving users when designing web sites (and using their feedback to improve the design) is important

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree

O Strongly Disagree

(D8) Fun and pleasure are crucial aspects of web design if trying to get people to buy online

O Strongly Agree
O Agree
O Not Sure
O Disagree
O Strongly Disagree

(D9) 'Transparency' of a website, where the user feels known to the site creators and other users, is important

O Strongly Agree
O Agree
O Not Sure
O Disagree
O Strongly Disagree

USING COLOURS

(E1) Understanding the traditional links between colours and the emotions they evoke (eg red could mean danger or excitement) is important in web design

O Strongly Agree
O Agree
O Not Sure
O Disagree
O Strongly Disagree

(E2) Which **3** of the following colour schemes do you use most often in your designs?

☐ Warm Hues
☐ Cool Hues
☐ Colour Contrast
☐ Colour Harmony
☐ Colour Graduation

(E3) Choosing colours to match the desired emotions I want to evoke in site visitors is important

O Strongly Agree
O Agree
O Not Sure
O Disagree
O Strongly Disagree

TRANSFERRING THEORY FROM OTHER AREAS

(F1) Car design is emotional just as much as functional

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(F2) Car design encompasses invoking fun, lust and pleasure in consumers

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(F3) From the following aspects of computer **game** design, which **3** do you think are the most appropriate for use in web design?

- ☐ Emotional colour use
- ☐ Identification with an imaginary character
- ☐ Social contact
- ☐ Interactivity
- ☐ Fun
- ☐ Challenge

(F4) Principles applied to the design of cars and games can be reapplied to appeal to the same emotions during eCommerce design

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(F5) Integrating CHALLENGES into web designs so that the user feels their intellect is being tested is important

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(F6) Integrating VARIATION into designs to give an element of surprise or unpredictability is important

- O Strongly Agree
- O Agree
- O

- O Disagree
- O Strongly Disagree

TRUST

(G1) Fear and lack of trust of online payments is still a major psychological barrier to purchasing online

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(G2) One major study reveals the following 6 aspects of obtaining trust online. Please tick the 3 that you consider to be the most important

- ☐ Seals of approval (eg Visa logo or Securecheck)
- ☐ Branding
- ☐ Easy error-free Navigation
- ☐ Description of the fulfillment process
- ☐ Excellent overall presentation
- ☐ Efficient technology

(G3) Statements of privacy, confidentiality and security should always be on a web site

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(G4) Infusing a high level of trust into eCommerce design is important

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

E-COMMERCE VERSUS TRADITIONAL RETAIL

(H1) 'Atmosphere' is a natural strength for traditional retail. Immersion in a store atmosphere can create a polysensory experience. Which of the following, if any, do you currently try to create in your designs? (tick as many as necessary)

- ☐ Social relations (shop assistants, friends, communities)
- ☐ Sounds associated with shopping

- ☐ The aesthetics of traditional shopping
- ☐ Events associated with traditional shopping
- ☐ Comfort and luxury

(H2) What other design factors have you used to recreate aspects of the traditional retail experience online?

(H3) Which of the following product attributes (if any) have you had to incorporate into your site designs? (tick as many as necessary)

- ☐ The product was new and untried
- ☐ The purchase was subjective or emotional
- ☐ Touch, smell or other senses would normally be needed
- ☐ The item was expensive
- ☐ Product specifications were hard to show

(H4) If you ticked any of the above, what were the key design elements? What level of success was achieved?

(H5) Agents, avatars and online shop assistants involve virtual representations of people or other creatures. They are important in helping sales of goods online.

- ○ Strongly Agree
- ○ Agree
- ○ Not Sure
- ○ Disagree
- ○ Strongly Disagree

(H6) The emotional facial expressions and gestures of virtual agents and shop assistants are important in assisting sales online

- ○ Strongly Agree
- ○ Agree
- ○ Not Sure
- ○ Disagree
- ○ Strongly Disagree

(H7) If virtual agents are used, the look of their face, and their personality, will have to be closely matched to the demographics/expectations of the target users

- ○ Strongly Agree
- ○ Agree
- ○ Not Sure

- O Disagree
- O Strongly Disagree

(H8) The look and personality of virtual agents and characters should be chosen by the visitor, not hard-coded by the designers

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

FINALLY

(Z1) What other ways do you use to reach people on an emotional level with your New Media or web designs?

(Z2) Overall, websites that are designed to evoke emotions are important

- O Strongly Agree
- O Agree
- O Not Sure
- O Disagree
- O Strongly Disagree

(Z3) From the insights gained from this questionnaire, what is the level of emotional design you feel you employ *currently*?

- O Very High
- O High
- O Not Sure
- O Low
- O Very Low

(Z4) Please tick the 5 most important aspects of designing to obtain emotional connections for eCommerce

- ☐ Navigation
- ☐ Lust
- ☐ Involvement
- ☐ Overall usability
- ☐ Speed of loading
- ☐ Fancy technology
- ☐ Sound
- ☐ Surprise

- ☐ Challenge
- ☐ Culture and Demographics
- ☐ User Control
- ☐ Trust/Security
- ☐ Familiarity
- ☐ Colour Use
- ☐ Screen harmony
- ☐ New Media usage eg streaming video
- ☐ Replicating real world shopping
- ☐ Interactivity
- ☐ Agents and avatars
- ☐ Fun/Entertainment

(Z5) What is your favourite web site that attempts to sell something?

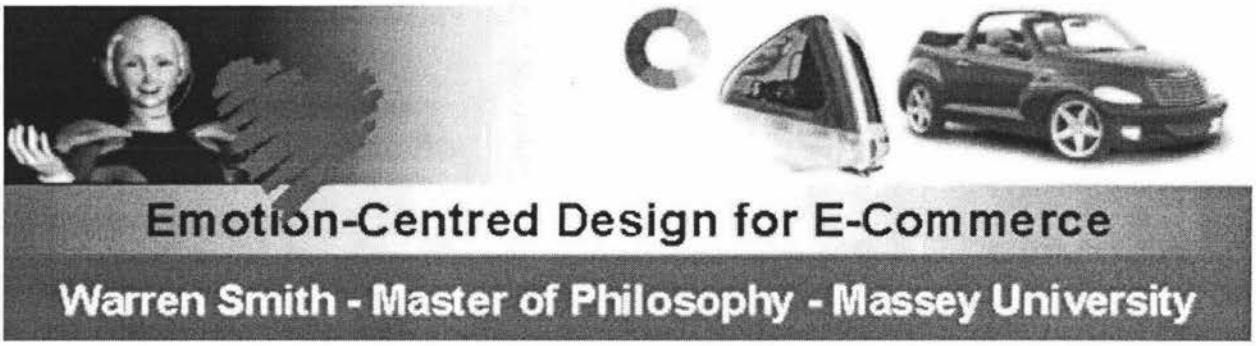
(Z6) Please include any other comments you feel I should consider for my study

Thankyou for your time

(Z7) If you would like a copy of the results of this survey sent to you, then please enter your email address below, otherwise leave blank. Your email address will not be used for any other purpose and full anonymity and confidentiality will be maintained.

Submit

<< back | Close



SURVEY ON EMOTION-CENTRED DESIGN

Thankyou for examining this survey. My name is Warren Smith - a Master of Philosophy student undertaking a study on the emotive aspects of web design. Your participation in this survey is most appreciated and would help me to expand current knowledge in applying design criteria to evoke emotions such as fun, joy, pleasure or trust in web design. It is expected that the survey will take approximately 5 minutes to complete.

Full confidentiality and anonymity are assured upon completion of this survey. You are most welcome to contact me at warren.smith@xtra.co.nz for any further information or access to the results.

The survey responses will be collated on September 30, 2001.

DEMOGRAPHICS

(1) What is your age group?

(A) 20 or below
(B) 21-25
(C) 26-40
(D) 41+

(2) What is your gender?

(A) Male
(B) Female

(3) What is the level of your highest qualification?

(A) Post-graduate Degree
(B) Bachelors Degree
(C) Diploma/Certificate
(D) Some tertiary papers
(E) High School/College

EMOTIONAL DESIGN

(4) Which of the following emotions have you experienced when viewing web sites in the past (circle as many as necessary)?

(A) Fun
(B) Delight
(C) Happiness
(D) Love
(E) Surprise
(F) Joy
(G) Desire
(H) Disgust
(I) Fear
(J) Sadness
(K) Anger
(L) Shame

(5) If you were to rate a site according to the way it evokes emotion in you, what words/adjectives would you use?

_____

_____

(6) If a web site does not appeal to your emotions as soon as you go there, how quickly would you go to another site to find the same information, products or services?

(A) Less than 5 seconds
(B) Less than 30 seconds
(C) Less than 1 minute
(D) Longer than a minute

(7) To what extent do you believe that fun and pleasure are being evoked on web sites that attempt to sell you something?

(A) Very High
(B) High
(C) Not Sure
(D) Low
(E) Very Low

(8) To what extent do you think current web sites portray a level of trust that makes you feel safe when giving over information or purchasing online?

(A) Very High
(B) High
(C) Not Sure
(D) Low
(E) Very Low

(9) What elements of a web site make you trust it?

_____

_____

(10) To what extent do you think computerised virtual shop assistant characters would help you on an emotional level and therefore evoke a more likely purchase over the Internet?

(A) Very High
(B) High
(C) Not Sure
(D) Low
(E) Very Low

(11) To what extent do you believe that 3D, virtual reality and streaming video are important in appealing to your emotions?

(A) Very High
(B) High
(C) Not Sure
(D) Low
(E) Very Low

(12) When visiting a web site, to what level would you like to be able to feel the same emotions as when you are playing a computer game, examining a sports car or interacting with some other pleasurable product?

(A) Very High
(B) High
(C) Not Sure
(D) Low
(E) Very Low

(13) To what extent do you think designers are respecting your demographics and culture on web sites?

(A) Very High
(B) High
(C) Not Sure
(D) Low
(E) Very Low

(14) To what extent do you think web site designers have the right mix between rational and emotional qualities?

(A) Too rational
(B) Slightly too rational
(C) About even
(D) Slightly too emotional
(E) Too emotional

(15) What 5 areas of design do you feel should be employed the most to match your needs as an emotional human being (please tick 5 only)?

(A) Navigation
(B) Trust/Security
(C) Colour Use
(D) Screen Harmony
(E) New Media usage (eg streaming video)
(F) Replicating real world shopping
(G) Interactivity
(H) Virtual agents, avatars and assistants
(I) Fun/entertainment
(J) Lust
(K) Involvement
(L) Overall usability
(M) Speed of loading
(N) Fancy technology
(O) Sound
(P) Surprise
(Q) Challenge
(R) Culture and demographics
(S) User Control
(T) Familiarity

(16) Do you have any other comments on the way you think emotion needs to be incorporated into web sites, or that might help my line of study?

_____

_____

_____

_____

THANKYOU VERY MUCH FOR YOUR TIME