THE DESIGN & AESTHETIC PERFORMANCE OF WEB SITES

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This thesis investigates the visual aesthetic performance of Web sites. An experiment was conducted in which a Web site, designed with three controlled levels of ‘visual enrichment’, was evaluated on a number of measures by two subject groups. The measures used represent facets of the Categorical-Motivation model of aesthetics, plus others directly related to the performance of Web sites. The results of the experiment indicate that the drivers of site evaluation were primarily exploratory variables that represent ‘novelty’, ‘interest’ and ‘fun’. This supports the argument that an important question to consider when designing a Web site is not merely ‘can the site’s audience use the Web site?’, but also ‘does the site’s audience want to use the Web site?’ Visual, audio and interactive appeal are, as the findings show, very important design considerations.

This research adds to a body of knowledge that seeks to understand aesthetic phenomena and develops a theoretical framework that will prove useful for the investigation of visual interfaces.
To Honie, thank you for your support and encouragement.

Thank you Professor Allan Whitfield for your help, supervision, guidance (and all the coffees). I am very glad that this work has helped foster your interest in the possibilities of research in the digital domain.

Thank you Professor Gitte Lindgaard for your supervision, keen interest and for furthering this research.
I, Andrew Haig, declare that this thesis:

- contains no material which has been accepted for the award to the candidate of any other degree or diploma, except where due reference is made in the text of the thesis;

- to the best of the candidate’s knowledge contains no material previously published or written by another person except where due reference is made in the text of the thesis; and

- where the work is based on joint research or publications, discloses the relative contributions of the respective workers or authors.

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1.1 Introduction to the World Wide Web

In 1989 the World Wide Web (or Web or WWW) was invented at CERN, the European Laboratory for Particle Physics in Switzerland, by Tim Berners-Lee. Building upon the idea of the original defence/research networks originating in the USA in 1969, Berners-Lee devised this global hypermedia system to allow physicists from any corner of the globe to collaborate on research projects via this digital information space.

By the year 2001, the Web has developed into a mass medium, with an estimated global reach of over 200 million people (Nielsen, 2000). It extends into the homes of 3.5 million Australians and is used by 21 percent of all businesses in Australia; in fact, 85 percent of all large businesses in Australia use the Web (Australian Bureau of Statistics, May 2001). The Web allows asynchronous global communications and is a global resource of information. This information manifests itself in every digital format imaginable: text, data, imagery, video, audio and software are all accessible for viewing, experiencing and interacting with via a ‘browsing’ application such as Netscape Navigator, Microsoft Explorer or Opera Software’s Opera (all commonly known as browsers). The development of the browser has enabled the information contained within the Web to move beyond raw text and data (circa 1989) to the aforementioned text, data and ‘rich media’ experience traditionally found within the audio-visual domain, but now able to be experienced on the computer desktop.

The Web (and multimedia generally) is also a “convergence of: advertising, graphic design, image making, film and video production and broadcasting, marketing, publishing, public relations, information technology, telecommunications and education” (Cotton and Garret, 1999). It is a medium that bonds and unites communications practitioners. It is also fair to say that nowadays much of the Web is devoted to commercial imperatives: e-commerce and online shopping (B2C – Business to Consumer transactions), B2B (Business to Business transactions) and product/service promotions have usurped the Web’s original conception as a tool for research.

Within a medium that achieved over ten million Web sites in January 2000 and is estimated to grow to 100 million sites by 2002 (Nielsen, 2000), it is clear that visual
performance as a means of differentiation amongst Web sites is of prime importance. As reported by Zeldman (2001): “Internet traffic doubles every one hundred days.” In the commercial, or e-commerce arena, the ability to distinguish between products, services, brands and other aspects of content could contribute significantly to the success or failure of an e-commerce site. In fact, the designed interface between the e-commerce entity and the customer should attract the interest of the user and, ideally, entice them to return to the site repeatedly (Nielsen, 1997; Lee et al, 2000). Also, with the Web’s increasing global connectivity, the critical challenge for designers is to use research to ensure that their client’s communications work successfully with the intended audience – locally, internationally and multiculturally, if need be.

As well as being visually attractive and enticing, a Web site should be usable and should function well – “bad usability means no customers” (Nielsen, 2000). Creating and developing usable computer-based technology (hardware, software) is a major undertaking of people working within the Human-Computer Interaction (HCI) community. HCI researchers tend to come from the field of cognitive psychology and bring to their work insights from their “knowledge of human cognitive and perceptual abilities and limitations” (Tractinsky, 1997). Much research has been conducted within this area, with principles being formulated to enable the creation of usable computer systems, software and technology. For example, Schneiderman (1992), Nielsen (1993) and Nielsen (2000) all provide highly regarded texts in this field. Evaluating computer hardware/software usability has become a major facet of modern HCI work; in fact, as Tractinsky (1997) points out, “critiquing the poor usability of systems designed for human use has become the bon ton in the field.”

In short, the design and creation of a Web site draws upon various components: usability, content creation, budget allocation (which is generally out of the hands of the designer/usability expert) and visual performance, which is an area normally included under the umbrella definition of usability (by some HCI people). For my purposes, however, I wish to isolate it, as I consider it to be an important area, and one of considerable relevance to the design profession.

This thesis seeks to contribute to the rather neglected area of research into visual performance and aesthetics, so that we may better understand how people respond to the Web. This thesis is intended to contribute to the knowledge of Web design and to provide information to enable designers and others to design sites that engage and enlighten users.

1.2 Thesis overview
Chapter one, the introduction to the thesis, provides the background to the research. It gives an historical overview of mass-media communication leading up to the advent of the www. Some definitions of Web terms, aesthetics and design – which will be referred to in this thesis – are included here.
Chapter two provides a literature review of research and writings on usability and aesthetics (some of which, but certainly not all, focus on the Web). Contained here is a discussion of the motivation for the current research, plus an outline of what design is and how it works in the context of both Web design and our now digitally connected culture. The role of the two key areas of branding and information design are examined here.

Chapter three outlines the questions that the research will address. This chapter also covers the experimental procedure employed in this research. Both the design of the experiment and its methodology are detailed.

Chapter four provides the outcomes of the experiment with some discussion of the results.

Chapter five summarizes the findings of the research and considers how this work may contribute to the field of Web design.

Chapter six discusses possible future research and both the strengths and weaknesses of the work conducted here.

1.3 World Wide Web definitions

Following the lead of Marsh (1997), I would also like to include a short vocabulary of some World Wide Web-specific terms. As the Web is not a physical space but a digital one, www concepts and components may need some explanation.

- **Web site**
  A Web site is an organised collection of Web pages. This can vary in size from a few pages to many thousands. Generally, a Web site should have a uniform, linking, consistent graphical interface design, and operate according to consistent interactive and navigational principles.

- **Web page**
  A Web page is a single page of information that is viewed in a browsing application. A Web page is often scrollable (up and down and from left to right) and may contain links to other Web pages within its own site or have links to other sites. Contained within the Web page may be text, hypertext (links), images, animation, sound and video.

- **Hypertext and/or link (or hyperlink)**
  Hypertext is, simply, text with links to other passages of text. “In the terminology of linguistics, the link plays a conjunctive role, binding together disparate ideas in digital prose” (Johnson, 1997). Most people are familiar with using references, the index and the main text within a book, flicking between pages and sections of a
book to access related, linked information. Hypertext is generally similar, only no pages are turned – the hypertext link takes the user straight to that particular link. Hypertext allows the user to actively explore information and to pursue a pathway of their own, rather than experiencing information in a prescribed sequential order. Hypertext links do not have to be text – they can be imagery, video or audio files.

- **Interface**
  “The interface of a shovel is its handle, the interface of a lamp is its switch. But the word comes from the culture of computer technologists” (Patton, 1993).

  The Graphical User Interface (GUI) is the visual, graphic, two-dimensional depiction of digital data displayed via the computer screen and interacted with by means of a mouse and/or keyboard. Engelbart is credited with inventing the modern (graphical user) interface. In 1968 Engelbart demonstrated the first GUI where an actual information space was displayed that allowed direct manipulation of its contents by means of what we today call a mouse. (In fact, the on-screen depiction of the navigational cursor actually was an animated mouse.)

  The Apple Macintosh, released in 1984, was the first personal computer to use a GUI as a means of allowing users to visually interact with information. Now practically every computer system utilises this ‘user-friendly’ approach.

  “The interface makes the teeming, invisible world of zeros and ones sensible to us. There are few creative acts in modern life more significant than this one, and with such broad social consequences” (Johnson, 1997, p17).

  For many designers, scientists and users, “human interface design represents the most important single discipline in information technology” and “it is, metaphorically speaking, where the rubber meets the road” (Patton, 1993).

- **E-commerce**
  Conducting a business transaction over the Web is called e-commerce. On-line shopping is the major constituent here, but also B2B (Business to Business) transactions are a significant component of this development that is defining what many people refer to as ‘the new economy’.

  With regard to e-commerce in Australia, “online purchasing has quadrupled over the last five years, from 8% in 1997 to 32% in 2001. This represents approximately 16% of the Australian population”, with this figure “expected to increase to approximately 38% over the next twelve months” (Multimedia Industry Network, 2001).

  [Link to article](http://www.min.com.au/min/article.cfm?objectid=A708FE88-435111D5-B7D0000629D51F5E)
In the USA, on-line retailing contributed US$50.7 billion to the economy in the 2000/2001 financial year (source: Forrester online retail index, July 2001). http://www.forrester.com/NRF/1,2873,0,00.html).

- **Visual Performance**
  According to Nielsen (2000), usability can be measured by examining two areas: performance and subjective measures (see Chapter two). Usability often fails to consider subjective measures, such as appeal and ‘fun’, even though it is highlighted in Nielsen’s Theory of System Acceptance (an important defining text on interface usability). In the work described in this thesis, visual performance relates much more to subjective measures of interest, arousal, appeal and fun, and how much these variables determine user preference. Action-orientated-performance based upon sensory arousal is another way of describing this.

- **Rollover**
  A rollover is interface-based user feedback. When the mouse is ‘rolled-over’ a link, the link may change colour or perform some action that indicates to the user that they have passed over an active link that may be selected. JavaScript, a Web programming language, is used to achieve this effect: the words ‘image swap’, once inserted into the appropriate location in a Web page’s HTML code (or via a ‘visual HTML’ application such as Macromedia Dreamweaver), allows this action to occur.

- **Plug-in**
  A plug-in allows ‘rich media’ file formats to be played. Rich media is digital video, sound, animations, 3D images and interactive files. Plug-ins are small, free, downloadable software applications that enhance the Internet using experience. They operate either inside the Web browser or external to it (and may be a stand-alone player). Another term for them is “helper applications” (Zeldman, 2001). Popular plug-ins are RealPlayer, Apple’s QuickTime and Windows Media Player for streaming digital video and audio. QuickTime can also play 360 degree panoramic images, called QuickTime VR. Shockwave and Flash are plug-ins for animation and interactive content.

- **Web design**
  Web design is an imperfect term. Normally, when it comes to defining what a designer does, this is referred to by the type of object/product or system that is designed; for example, a fashion designer designs fashion, a product designer designs products. Web designer is common parlance (at least in Australia, the UK and the USA) for someone who designs for the World Wide Web and for emerging interactive technologies linked to the Web. One example of the latter is WAP, Wireless Application Protocol, a graphical and text-based interface for mobile telephones. Multimedia designer is an all-encompassing title describing a designer who works with CD-Rom, the Web and digital video, and other related media.
However, Web design “is a term too encompassing and one that usurps too much from the many other disciplines now necessary to create for the Internet” (Brown, 2000). Web site designer, interaction designer and experience designer are three terms also used to describe this area of activity – but are also flawed. Web site designer is perhaps too limiting: it implies that only www sites (and not linked technologies) are designed. Interaction design implies that only the interactive aspects of the new emerging communication technologies are catered for; that is, the technical area of linking and file formats and the organisational aspects of an interactive project. Branding or conceptual based components of interface design and navigation are not really covered by this term. Similarly, experience design implies that ‘experiences’ are designed, when it is really a product or a ‘thing’ (such as a book, poster, or Web site) that is designed and that people then use and experience.

In short, designers don’t design experiences, people have them: as Aldous Huxley said, “Experience is not what happens to you, it’s what you make of what happens to you” (1932).

Despite these limitations, the rather vague term ‘Web design’ will be used throughout this thesis. Most people, it seems, know what it means.

1.4 The history and pre-history of the Web: a timeline

“If human knowledge is indeed power, then a device that can help us transform information into knowledge should be the basis for a very powerful technology” (Rheingold, 1985).

The following is a brief outline of mass communications media related to the development of the World Wide Web:

1447 Johannes Gutenberg mechanizes printing and his friend Peter Schoeffer develops a method for casting metal letterforms (Jean, 1992). Gutenberg’s process is a refinement of woodblock printing systems invented in China and Korea around two hundred years earlier. The mass production of books ensues and the widespread dissemination of knowledge begins, extending beyond Asia and into the Western world.

1836 The telegraph, the first electronic telecommunications device, is created by Cooke and Wheatstone. This device utilised morse code to send messages back and forth.

1866 The Trans-Atlantic cable is established. Telegraph (and later, telephone) communications are now possible between the United States and Europe. This is the beginning of long distance communication.
1876  The telephone is invented by Alexander Graham Bell. The telephone is a synchronous medium whilst its predecessor, the telegraph, is asynchronous; that is, a telephone conversation happens simultaneously between the two speakers. It’s the next best thing to face-to-face conversation – however the ‘faces’ may be spatially separated from each other by thousands of miles. With a telegraph message, an operator sends a coded message to another telegraph office that is decoded by the operator and passed on to the intended recipient. This process is not ‘face to face’ like the telephone, but is both spatially and temporally detached. The advent of the answering machine and voice mail has transformed the synchronous nature of the telephone into something more asynchronous: now you don’t have to be there to get the call – the machine will record it for you.

1900s  Radio, a synchronous medium, is developed. The first commercial radio station, KDKA Pittsburgh, commences broadcasting in 1920.

1930s  Television, another synchronous medium, that can happily become asynchronous with the addition of a VCR (video cassette recorder), a Japanese invention from the 1980s. Both TV and radio originally harnessed the technology of the vacuum tube (developed in the early 1900s) and are broadcast-based. The first television broadcast using electronic cameras was of the Berlin Olympic Games in 1936.

1950s  By the 1950s, cable, wire and microwave (wireless) links were employed to provide an extensive analogue global telecommunications network. Analogue gave way to digital in the 1960s and the first communications satellites were put into orbit. By the 1980s, fibre-optic cables were being installed to provide very efficient digital data transmission. “It was clear that existing, largely separate, telephone, radio, television and data networks would eventually evolve into a worldwide, broadband, digital service” (Mitchell, 1995).

1980s  The fax machine, which emerged parallel to the personal computer is different to what preceded it. It is an asynchronous communications medium that uses telephone networks to send its visual data. Within the evolutionary sequence of telecommunications media, it could be considered a somewhat inefficient, backwards step (but has an interesting history, nonetheless).

Developed in Japan, the facsimile machine is entirely appropriate to the image-based orientation of Japanese culture and business. The visual nature of fax suits the pictographic style of Japanese Kanji very well, but is not ideally suited to the Latin alphabet. Compared to sending a digital e-mail message, the fax is very slow and energy inefficient. “E-mail is ten percent the cost of fax, measured per bit or per second” (Negroponte, 1995). Negroponte, remarking on current business communications practice, finds the whole medium of facsimile rather circuitous:
“Most business letters today are prepared on a word processor, printed out and faxed. Think about that. We prepare our document in a completely computer-readable form, so readable in fact that we think nothing of passing a spell-checker over the words. Then what do we do? We print it on paper bond letterhead. The document has now lost all the properties of being digital. We then take this piece of paper over to a fax machine, where it is (re)digitized into an image, removing what little qualities of feel, colour, and letterhead that might have been in the paper” (1995, p188).

The above developments and inventions lead us to more www-specific developments:

1945 As an idea, the Internet dates back to 1945. Vannevar Bush, the highest-ranking scientific administrator in the US army (also the creator of the Differential Analyser, an early computer, in 1930), wrote an essay, ‘As We May Think’, in the Atlantic Monthly. Here he described the ‘Memex’, an information processor that enabled users to access massive amounts of data that were continuously being updated from books, records and other communications via a vast network of ‘searchable’ pathways, called trails.

“The summation of human experience is being expanded at a prodigious rate, and the means we use for threading through the consequent maze to the momentarily important item is the same as was used in the days of square-rigged ships” (Bush, 1945). http://www.w3.org/History/1945/vbush

Bush’s hypothetical Memex stored vast amount of text on microfilm, and personal ‘trails’ could be stored – a direct precursor of what we today know as hypertext.

1965 Pre-World Wide Web, the idea of hypertext possibly goes back 30 years: “Xanadu, a global hypertext publishing system, is the longest-running vapourware (non-existent software) story in the history of the computer industry” (Wolf, 1995). Scientist and visionary, Ted Nelson, coined the word hypertext in 1965 to describe an idea he had where passages of writing – should there be some kind of conceptual or referential link between them – could be ‘zipped’ together. It need not matter whether the sections were small or large, whole chapters or just a few lines. “The writer and reader could manufacture a unique document by following a set of links between discreet documents” (Wolf, 1995). This was an idea twenty-four years ahead of its time.

1969 The first node of the Arpanet is installed by the computer research program of the US Department of Defence’s Advanced Research Projects Agency. The development of the Arpanet allowed USA computer scientists to share far-flung computer resources and research at a time when computers were wildly expensive,
The initial director of ARPAnet, JCR Licklider, saw the network’s potential as a system where scientists could constantly work together in a ‘time-sharing’ process, so that their time and the valuable computing resources were well utilised.

“Although their sponsorship was military, the people Licklider hired or supported were working toward a transformation that he and they believed to be social as well as technological. Licklider saw the new breed of interactive computers his project directors were creating as the first step toward an entirely new kind of human communication capability” (Rheingold, 1985).

http://www.rheingold.com/texts/tft/

1984 The Apple Macintosh personal computer is launched. This is the first personal computer to use a GUI (Graphical User Interface) – icons, folders, menus and trash cans appeared (creating a metaphorical ‘desktop’). The GUI was actually invented at Xerox Parc in the 1970s and launched on their ill-fated Xerox Star in 1981.

Invisible digital information whose graphic presence was once only words or data, could now be readily accessed, modified and even played with. With the Mac the interface had truly become a medium. “No longer a lifeless, arcane intersection point between user and microprocessor, it was now an autonomous entity” (Johnson, 1997). Because of its easily understood graphic approach, the Macintosh was very simple to learn, and largely followed natural intuition. Everyone understands the basic fundamentals of the desktop-based interface; files go into folders, folders into other folders or get stored together, or thrown in the trash, and commands located in menus perform actions on the data. Someone could set up and learn how to use a Mac in two hours: it took much longer to be productive with a non-GUI MS-DOS-based computer. The PC world followed suit a few years later with the Windows, OS/2 and Linux operating systems which all incorporated GUI-based systems. Interestingly, with Mac OSX, (released in 2001), the Macintosh uses Linux as the basis of its operating system.

“The Mac was a major step forward in the marketplace and, by comparison, almost nothing has happened since. It took all the other computer companies more than five years to copy Apple and, in some cases, they have done so with inferior results, even today” (Negroponte, 1995, p91).

The most successful of the GUI designs (now to be found on all computer platforms) all adhere to a single concept, the desktop metaphor, and “offer multiple reinforcements of ‘intuitive’ ways of doing things – the hand’s muscle memory seconds the eye’s visual memory” (Patton, 1993).
1989 The World Wide Web is invented by Tim Berners-Lee and his assistant Robert Cailliau. The three key concepts that underpin the Web are:

- Hypertext for easy navigation, such as HTML,
- a uniform naming scheme, such as URL,
- protocols for accessing information, such as HTTP.

“Think of hypermedia (multimedia hypertext) as a collection of elastic messages that can stretch and shrink in accordance with the reader’s actions. Ideas can be opened and analyzed at multiple levels of detail” (Negroponte, 1995, p70).

HTML (Hypertext Mark-up Language) allows the logical structure of a Web site, not the document’s actual format/layout, to be displayed optimally. Given that there are numerous different operating systems employed by Web users, each with their own on-screen depiction conventions and font configurations, HTML cuts across potential incompatibility by using a very flexible, interchangeable display system. “To publish information for global distribution, one needs a universally understood language, a kind of publishing mother tongue that all computers may potentially understand” (Raggett et al, 1998).

On the Web, HTML gives authors the means to publish online documents with paragraphs, headings, images and other ‘layout’ considerations; it enables hypertext links to be followed at the push of a button (or other linking device); and allows forms to be designed for conducting transactions; and permits video clips, sound files and applications to be included directly into their documents. Interoperability reduces costs for authors/content providers by generally only requiring one version of a Web site to be made. If it wasn’t for HTML the Web would possibly dissolve into a networked system of incompatible formats, reducing the communicative potential for all.

Every page of every document on the Web has its own URL (Universal Resource Location) or Web-site address. By typing a site’s URL into a Web browser the user gains access to that particular site (if there are no access restrictions). A Web site can be housed on a number of types of different servers that may use different access protocols (HTTP, FTP, or Gopher, for example) – but URLs are able to access the particular site regardless of varying protocols. HTTP is the most ubiquitous access protocol.

A typical URL consists of three components: the naming scheme of the mechanism used to access the file, the name of the machine hosting the file, and the name of the file itself, given as a path. For example, with:

http://www.aaa.edu.au/timetables
the naming scheme of the access mechanism is http; the name of the machine is www.aaa.edu.au, and the path to the file is ‘timetables’.

HTTP (Hypertext Transfer Protocol) is the specific ‘linking protocol’ of the Web – it is both fast and ‘stateless’. A unique feature of HTTP is that the user sends a list of the file formats it can understand along with the request, and the server can then ensure that it replies in a suitable way by supplying relevant file formats.

“I developed the Web with three purposes in mind. The first was to give people up-to-date information at their fingertips by giving them the personal power to hypertext. The second goal was the realization of an information space that everyone could share and contribute their ideas and solutions to. Part three was the creation of agents to integrate the information that is out there with real life. Enormous amounts of information would no longer be lost” (Berners-Lee, 1998).


1993 Mosaic, the first graphical (GUI style) browser for the Web, is developed by Marc Andreessen and Eric Bina. Both work for the National Centre for Supercomputing Applications (NCSA) in the USA. Mosaic is released at no cost to Macintosh and PC users.

1994 Andreessen forms another company and releases the Netscape Web browser. Tim Berners-Lee founds the World Wide Web Consortium (W3C): “The W3C was founded in October 1994 to lead the World Wide Web to its full potential by developing common protocols that promote its evolution and ensure its interoperability” (Berners-Lee, 1995). The consortium, a non-profit organisation, is jointly hosted by a number of key global educational research facilities, and looks to over 270 consortium members – commercial and academic – spread over the globe. Software and hardware developers, telecommunications companies, content providers, government/academic groups and corporate users figure amongst these members. All work together to provide a framework for what the ‘net’ is and may be in the future.

Yahoo, the first Web directory (now called a Web portal) emerges.

1995 Netscape’s success, plus a burgeoning public awareness of the medium, sees around 100,000 Web sites available on the www (Zeldman, 2001).

1996 JavaScript is launched by Netscape. This programming language devised by Sun Microsystems allows Web sites to be created that are much more interactive than previously.

Microsoft enters the Web arena and devises a browser, Internet Explorer. Netscape now has a rival (but is still the most popular browser by far) and
the ‘browser wars’ begin. Both browsers do not adhere to the same standard architecture: designers and developers now have to deal with multiple software differences as well as platform (operating system) differences.

1997  The ‘browser wars’ develop, with each browser devising its own separate technologies. Microsoft’s Internet Explorer 3.0 now supports a technology created by the W3C called Cascading Style Sheets (CSS), whilst Netscape’s Navigator does not. It does use JavaScript however, which Explorer does not. E-commerce begins to become popular.

1998  “The growth of e-commerce exceeds its one-year expectation by more than 10,000 percent. The projected growth of business-to-business services on the Web dwarfs even the growth of e-commerce” (Zeldman, 2001).

The ‘browser wars’ still continue to escalate.

2000  Netscape 6.0 and Explorer 5.0 appear. Both are quite robust and offer near perfect compliance with various technologies (JavaScript, HTML 4, and CSS, for example). Another browser arrives, Opera 5.0, which follows suit with its technological compliance. Explorer looks as though it has won the browser wars with a much more substantial market share than Netscape and Opera combined.

2001  It is announced that Microsoft’s new XP operating system will not support JavaScript. Internet Explorer users will now have to download the Java software (originally created for its rival, Netscape, by Sun Microsystems). This follows a protracted legal dispute between Microsoft and Sun in 2000. Also, Internet Explorer version 5.5 (and 6.0 as well, it is rumoured) does not support QuickTime (a popular Apple video plug-in). Perfect cross platform compliance may now prove to be short-lived.

1.5 Aesthetics: a definition

“Despite the sheer prevalence of aesthetic phenomena, no concerted effort has been made to understand aesthetics scientifically” (Haig and Whitfield, 2001).

Defining aesthetics is problematic due to its amorphous nature. As Lindgaard and Whitfield (2001) point out, the term was “originally coined by Baumgarten in 1735 to describe the philosophical pursuit of laws pertaining to art.” Both art theory and philosophy have created an extraordinary output exploring questions of beauty, art and harmony.

According to Tractinsky (1997), aesthetics is simply a synonym for visual beauty. Sparshot (1963), however, writes that the word ‘beauty’ has at least five different and clearly distinguishable meanings within philosophy:
“In the context of a metaphysical consideration of the world’s order, beauty is equated with its orderliness. In the epistemological context derived from Baumgarten, beauty is thought of as adequacy to the mind in perception. From the anthropological point of view it may seem to be nothing more than sensual attractiveness. To the legislators of taste it tends to become one aesthetic quality variously differentiated among a number. Those reflecting more generally upon criticism may use it to mean ‘aesthetic excellence’: that is, as an almost empty term, standing for a problem rather than for its solution” (p59).

Sparshot (1963), also goes on to say that beauty, in normal everyday speech, does not follow the above definitions, but applies “chiefly to women and weather”.

Interestingly, the classical Greek meaning of aesthetics refers to sensory-perceptual knowledge rather than intellectual/semantic knowledge (Lindgaard and Whitfield, 2001).

Mainstream psychology has tended to neglect or overlook aesthetics, as has research in the field of applied science (hence the paucity of work evaluating aesthetics in HCI). In terms of HCI’s attitude and/or lack of recognition of things emotive and how user response and satisfaction may be linked to aesthetic aspects, the following is a revealing quote: “of all the things that come to mind when one thinks of computers and user interfaces, drama and personality are among the last” (Mountford et al, 1989). Admittedly, this is an old quote (in Web years, its 42 years old! – more of this later in Chapter two), but it is clear to see that in some circles, emotive elements (drama and personality) are not highly regarded aspects of interface design.

Within psychology there were two main (but opposing) theories of aesthetics to emerge since the 1960s. The Collative-Motivation model (Berlyne, 1971) and the Categorical model, proposed by Whitfield (1983). The collative model links aesthetic evaluation with exploratory behaviour that is arousal-based, whilst the categorical model links aesthetic evaluation with information processing demands and highlights categorical variables as central in this process. The two were integrated recently (Whitfield, 2000) into what has been termed the Categorical-Motivation model. Categorical variables are represented by such concepts as representativeness, typicality and appropriateness. Motivation (collative) variables are represented by such concepts as novel and interesting. This model allocates specific predictions according to the category of the object being evaluated.

Whitfield’s Categorical-Motivational model (2000) states:

“1. Where an aesthetic category is well-formed and closed to further articulation, prototypicality would be the primary determinant of aesthetic preference. Examples of such categories are inevitably speculative, and would reflect the individual’s schemata. However, to a Western educated audience, examples could be traditional furniture, Renaissance paintings and medieval cathedrals.
2. Where an aesthetic category exists, and is partially formed and open to further articulation, arousal related factors would partially account for preference, along with prototypicality. With the same proviso as above, examples of such categories could be post-modern architecture, and Internet Web page design.

3. Where an aesthetic category is ill formed and therefore open to major articulation, preference would be a function of arousal/motivational factors. Examples of this could be the ‘Spring Collections’ (next year’s fashions), and avant-garde paintings” (p5).

Suffice to say, the model that integrates these two opposing theories of aesthetics will form the basis for this research. The material to be tested also sits within category two of Whitfield’s Categorical-Motivational model, involving both arousal and prototypicality. The material is Web sites for mobile telephone companies – the focus of the experiment to be described. This would constitute a ‘known’, partially formed category that is open to further articulation.

1.6 Design: some modern definitions

“Design builds the bridge between the black box of technology and everyday practice” (Bonsiepe, 1999).

Throughout this thesis, design will constantly be referred to, discussed and evaluated. Much academic literature in this field (Web/interface design and usability) refers to design in an inconsistent manner. What follows is an attempt to clarify what design is. It should also be said that much professional literature from the design profession itself is somewhat confusing. In this digital era that we find ourselves within, the design profession is reinventing itself and transforming from what some would consider to be a ‘professional craft’ to a fully fledged profession with a strong theoretical and research-based background. Also, within the burgeoning ‘new economy’, traditional roles and distinctions between different fields of design are blurring, as never before.

Grefé (2000) describes the ‘on-screen experience’ (communicating, gathering information, e-commerce, amongst others) that is created by Web and multimedia-based designers:

“Each of the professional disciplines included in this practice (Web and multimedia design) was once considered a discrete competency... These professionals need to use a range of skills that stretch the preconceptions of ‘design’: business strategy, user research and marketing, behavioural sciences, creative process diagramming, information and interaction design and story-telling. One cannot underestimate the importance of this final skill, since experience is about a journey occurring over time” (p6).

“By now we are all designers in a sense. That is what the Web’s success has made of us. We’re likely to have an opinion either as developers or users” (Klein, 2001). And as
Cooley (1998) has observed: “the public is not only confronted with increasingly greater quantities of media stimulation, but is also acquiring the means with which to produce that media, hence becoming more media literate”. The Web has democratised design – as with desktop publishing a decade or so ago, now anyone can be a designer.

A common perception is that all an individual needs is a computer plus some software – and they’re immediately a designer. Possibly. Some people (in fact, even some quite noteworthy designers) with little or no design training can become good, maybe even great, (professional) designers. But, anecdotally, having taught at a leading Australian design school for the past ten years and having practised in industry for the same amount of time, these people are very few and far between (but they do exist). And certainly, Grefé’s quote above pinpoints designers as having highly trained professional skill sets.

In fact, an examination of figure 1 reveals that a designer working in the Web/multimedia industry can expect to find themselves working in a highly specialised and professional arena. This figure refers to the various components of the whole profession, but one can see the numerous types of specialist design skills that may go into the production of an interactive piece.

It should also be said that the distinctions between some of these categories are quite blurred. I myself would fall into an Advertising Art Director/Graphic Designer/Publication Designer/Information Designer/User Interface Designer/Interaction Designer/Animator who is quite reasonable at Audio and Music Composition and could assist in the Brand Strategy category. Many designers would be quite similar in their ability to exist in numerous categories.

Figure 1:
Map of the professions involved with the design industry in the ‘new economy’.
Type in **boldface** refers to design roles.
(Grefé, 2000, p7).
Interestingly, as Nguyen (2001) reports: “unlike law, medicine... design has no set certification or licensing before someone calls themselves a designer.” Many, but not all, practising designers have an undergraduate or post-secondary design (or related) qualification, but as they are working in a creative industry (similar to television, cinema, writing and art), designers find themselves working in a field that is not monitored, nor has it standards reinforced by any external agency. So, it is possible for anyone to call themselves a designer. However, this doesn't mean that they are gifted in this area or that they can ‘do’ design.

Traditionally, professional designers: “play an essential role in the formation of concepts and images that convey brand attributes and communicate meaningful intellectual and emotional propositions” (Zeldman, 2001). Designers are able to fulfil that ‘essential role’ by being trained in such things as colour theory, typography, form, layout principles, spatial dynamics, concept development and the articulation of concept through visual language (the relationship between images and typography), identity construction, brand design, ‘usefulness’, social and environmental compatibility, and the understanding of target audiences. In short, they're trained communication professionals. Again, from Zeldman (2001):

“In a consumer society, communication is a function of time. Traditional designers and art directors are trained in the art of instant communication. They understand that consumers make split-second decisions based on emotional responses to visual information. Which toothpaste gets tossed into the shopping cart? A stripe of colour may make one dentrifice appear more clinically effective than its competitor. Which paperback is bought in the airport bookstore? Colour and typography make one book leap off the shelves while another is ignored. Which of a thousand billboard messages is remembered? The one with the smart line of copy and complementary image lingers in the mind” (p4).

In 1922 William Dwiggins, a book designer, coined the term ‘graphic designer’ to describe his activities as “an individual who brought structural order and visual form to printed communications” (Meggs, 1983). Put simply, Dwiggins's definition of what graphic design is has held true for the past 80 years. In the new digital and global domain of the www, the term ‘graphic designer’ requires a more accurate and contemporary description: an individual who brings structural order and visual form to all modes of communication “with the aim of reducing cognitive entropy” (Bonsiepe, 1999).

Much of the literature on Web design up until now (2001) has largely been written and compiled by HCI practitioners, not designers, but that situation is slowly being changed. That is not necessarily a bad scenario – designers and HCI people are, or should be, actively engaged together (along with Web developers and programmers and others) in the crafting of an effective Web site. But, in the HCI literature, design is not often referred to in the sense that it is ‘visual communication aimed at a specific audience that has
been created and crafted by a trained professional’, but ‘communication assembled by someone’, and is often considered merely as ‘assembly’ – ‘sticking stuff together on a Web page', nothing more. Knutson (1997) is a case in point here.

There is also the common perception that design is all about style: “many people still associate the word ‘design’ with ‘expensive’, ‘impractical’, ‘short-lived’ and ‘ego-centred” (Bonsiepe, 1999). But, one can see from where that perception emerged. According to Robert Brunner, a partner of Pentagram – a noteworthy and eminent global design practice:

“In the past, design was generally a veneer added to make something look better. There were clear divisions between design, engineering, marketing, and manufacturing, and the process was very serial” (Pearlman, 2001, p179).

A recent ‘special design issue’ of Time magazine reported that the USA in particular, is enjoying the longest economic boom in history and it’s here, “where prosperity and technology meet culture and marketing” (Gibney and Luscombe, 2000) that a ‘design economy’ is created. Manufacturers are now placing a very high premium on how their products look: “When industries are competing at equal price and functionality, design is the only thing that matters” – Mark Dziersk, Industrial Designers Society of America (Gibney and Luscombe, 2000).

Appearance, form and beauty are all part of what designers hopefully contribute to a designed product, as “desirability plays an important and often decisive role in product selection” (Buchanan, 2000). But the desire for a product is due not just to its particular ‘look’, but also how it functions, as well as other practical (usability) aspects: considering all these multiple viewpoints is what design really is.

“Good design is a renaissance attitude that combines technology, cognitive science, human need and beauty to produce something” – Paola Antonelli, Museum of Modern Art, New York (Pearlman, 2001).

And, in the words of Steve Jobs, CEO, Apple Computer:

“In most people’s vocabularies, design means veneer. It’s interior decorating. It’s the fabric of the curtains and sofa. But to me, nothing could be further from the meaning of design. Design is the fundamental soul of a man-made creation that ends up expressing itself in successive outer layers of the product or service” (Buchanan, 2000, p31).

In terms of the ‘bigger picture’ and where and how design fits into our culture, figure 2 is a fascinating insight into what two of the most celebrated designers of the previous century saw as being “the domain of the designer’s interest and concern” (Brown, 2000). Here, a diagram created for the 1969 exhibition ‘Qu-est-ce que le design?’ (What is design?) at the Musée des Arts Décoratifs in France, outlines the seemingly complex
relationships between the key concerns of any designer. These are: the area of interest to the designer, the area of interest to the client, and concerns of society as a whole. The overlapping area is where “the designer can work with conviction and enthusiasm” – Charles and Ray Eames (Brown, 2000). We can see that the Eames’ view of the designer is certainly not as someone merely adding a cosmetic veneer to communications: there are far wider considerations here, to the client and to the very fabric of society as a whole.

Aside from requiring technical skills, proficiencies (the ability to design) and an understanding of market differentiations, there are bigger implications arising for the contemporary designer as well, as Bonsiepe (1999) argues:

“Never before has it been possible to incorporate design as a decisive factor in discussions of the efficiency of firms and national economies... Today design is a phenomenon that has not been researched theoretically, despite its omnipresence in our everyday lives and in our economies” (p33).

Environmental concerns, design management and (lately) research into new, interactive media are now the main focus of much design discourse. There is a very definite attempt by many design practitioners and educators to ground design in a
As Bonsiepe explains, design still lacks a Newton, a Freud or a Lavoisier, who were great influences in their fields of physics, psycho-analysis and chemistry respectively, and who contributed much to the expansion of human knowledge.

Much undergraduate design education involves skill-oriented training. A real need exists for designers and students to move beyond being “mere implementers of predetermined concepts” (Bonsiepe, 1999) and to expand their horizons. Otherwise, the stereotypical, even prejudiced view of a designer, as someone constructing the “visually attractive presentation of information, driven only by the criteria of whatever happens to be considered attractive at that particular time” (Bonsiepe, 1999) is bound to be prevalent.

Knowing what is a ‘visually attractive mode of presentation’ is also a very important skill for a designer to have – it’s knowing when, where and how to deploy such a presentation that is often one of the hallmarks of a ‘good designer’.

Anecdotally, what designers are especially good at is collaborating across various professional and non-professional fields and synthesizing from these often quite disparate inputs a workable, functioning end product that, ideally, is a joy to behold and use and which can “add up to more than the sum of its parts” (Mijksenaar, 1997). In the words of Josef Albers (a member of the original, pioneering German Bauhaus design movement): “in design sometimes one plus one equals three” (1969).

1.7 Technology
“Technology is created at a rate that culture cannot keep up with” – Todd Purgason, a director of Juxt Interactive, an award winning USA interactive design company (Schmitt, 2001). The Web is a rapidly developing, ever-changing medium that many designers and researchers are attempting to come to grips with. A designer, or indeed anyone working with this new medium, needs to relinquish themselves of a “few long-cherished ideas such as absolute visual control” (Zeldman, 2001) such as you will find with print-based communications, and be prepared for working in a very fluid and dynamic medium ‘the likes of which we’ve never seen before’ – an oft mentioned catchcry that is not entirely accurate. According to Hillman Curtis (2001), an eminent Web designer: “The most attractive quality the Web has to offer is its propensity for constant change.”

Components of the Web – video, sound, animation, aspects of print (namely: visual and information hierarchies, branding, strong content presented interestingly and in an engaging manner) and computer software (and the user interface to that software) – have all been ‘seen before’, but never together all at the same time and interacting with each other. That is where the Web is so ‘all-encompassingly dynamic’ and ‘fun’, and sometimes even infuriating.

The Web is still only in its infancy. According to Weinmann: “we’re still in the covered
wagon days of this medium. There's no question about it” (Holzschlag, 2001). Print has been around since the thirteenth century (in China and Korea) and the fifteenth century (in Europe) with Gutenberg’s invention of movable type and the printing press. Over the ensuing 700 plus years, that particular process has been refined and perfected (and developments still continue to be made); but the Web has only been in existence for twelve years. “Every medium has its own character, its own elasticity and limitations, and with the Web, we're still discovering the terrain” – Jeffrey Zeldman (Nguyen, 2001).

As much as people help define and shape the Web, it should be mentioned that software also has a very large part to play in determining the shape and form of the Web and how content is delivered via this medium. As observed by Cooley (1998): “While good design is driven more by ideas than tools, it is clear that there is an intimate relationship between tools and the outcome of work.” Within the world of print, the end result of the print process is a material product (a book, magazine, leaflet, newspaper, letterhead, flyer) that can be held in the hand. The end of the production chain on the Web is most often the browser, although this may be just for now. Todd Purgason, as one example, sees a possible scenario of “interactive billboards controlled by wireless handheld computers” (Schmitt, 2001) being very much part of our media landscape in the not-too-distant future.

The variety of browsers, coupled with the mixture of computer platforms available, means that the ‘Web page end product’ that you look at on your browser and computer system may be quite different to what someone else is looking at on their system. Standards are slowly being arrived at and one hopes that it is not several hundred years or so (as was the case with print) before universal systems and standards are adopted. But then again, this ‘non-standard’ approach is also what makes the Web so interesting – we are all witnessing the birth of an extraordinary new medium.

Software, or specifically 'visual HTML' applications such as Macromedia Dreamweaver and Flash, Adobe GoLive and Microsoft FrontPage and video software such as Adobe Premiere, Apple QuickTime and Final Cut Pro, Real Player and Windows Media Player, now make the design and construction of Web sites and media content contained therein available to all. In the hands of a skilled designer, trained and experienced in handling layout and spatial configurations, typography, image creation, navigation and media content (and ideally, some software programming), a designed Web site can be a great source of information, education, data, entertainment, ‘info-tainment’ (and, dare I say, ‘edu-tainment’ – a category which I think will actually emerge as one of the strongest aspects of the Web). ‘Edu-tainment’ may fuse learning imperatives with entertaining, ‘rich media’-based presentation delivery, harnessing the amazing multimedia potential that the Web has to offer.
1.8 Summary
It is fair to say that the Web is changing the way in which many people conduct their daily lives. Outlined in this chapter were some of the developments the medium has gone through. As designers become involved in designing for the Web (alongside the rapid developments in multimedia software), the www is being refined into an extraordinary platform for human exchange. What is especially challenging for designers is that we are actively being involved in the creation of the medium itself – we are defining (with the crucial assistance of programmers and scientists amongst others) what the Web can and can’t do. This is a very exciting time to be practising as a Web designer (most of us weren’t around when print was developed many centuries ago): that said, it is especially important to establish the medium on the right foundations.

Thus far, this chapter has given a brief definition of ‘Web terms’; provided a historical overview of where the Web has come from; approached the subject of aesthetics and attempted to provide some definitions of this subject; and provided some definitions of design in the age of the World Wide Web. This chapter also has sought to highlight the main focus of this thesis – the importance of aesthetics in the design of a successful Web site. This thesis will also discuss some of the shortcomings of research conducted on Web design; namely, a paucity in the appreciation and understanding of aesthetics, and how the study of this area is important in the design, development and performance of the Web medium.


Chapter 2: Literature Review – Usability & Aesthetics

2.1 Introduction
This research addresses a number of questions relating to aesthetics and the visual performance of Web site design. The literature review covers research that has taken place into Web design and which deals with aesthetics, usability, design and the World Wide Web. Each of these separate fields, where relevant to the research, will also be discussed. Emerging from the literature review are a number of issues that will be examined and discussed. These provide the foundation for the current research, and the reasons why the current research was undertaken.

Also, the review covers two design fields that are very much involved and ‘intrinsically entwined’ in the area of Web design, namely, branding and information design. In the print field, these two areas of design normally occupy different ends of the design practice spectrum. Branding sits at the ‘persuasive’, commercial and marketing-based pole whilst information design sits at the other; that is, where the efficient presentation of objective information is the task at hand.

2.2 Issues arising from the literature review: aesthetics, usability, Web design
Several pertinent issues arise from an investigation of relevant research in Web design/aesthetics/usability and aspects of the World Wide Web. These are:

1. Research into usability and aesthetics rarely deals directly with Web site design; rather, it deals with software, computer systems and technology.

2. There is very little research on the aesthetics of Web site design.

3. Most research into Web site design has focussed on performance-based usability questions, not aesthetics.

4. The research that investigates the usability and aesthetics (in particular) of Web site design has not involved a designer, and the experiments conducted do not deal with pertinent design and communication issues in context.

5. The research that investigates or touches on the aesthetics of Web site design has not been conducted recently and, due to the rapid developments in Web technology, is out of date in a contemporary context.
Following is a description of each of these issues:

1. **Research into interface usability and aesthetics rarely deals directly with Web site design; rather, it deals with software, computer systems and technology.**

The most prominent investigations into interface aesthetics have been conducted by Kurosu and Kashimura (1995) and Tractinsky (1997). Their studies of ATM interface designs found that there was a high correlation between the perceived attractiveness (aesthetics) of the interface and the perceived ease of use of the interface (its usability). These are interesting reference points for the current research; unfortunately, they do not discuss Web site design. Several prominent books and papers in the HCI field (Laurel, 1991; Schneiderman, 1992; Nielsen, 1993; Nielsen and Levy, 1994) deal with the usability and aesthetics of software and computer systems, but, again, not Web design per se. Norman’s landmark HCI text “The Design of Everyday Things” (1990) critiques usability aspects of several technological items in relation to their (aesthetic) design base, but really has little to say about aesthetics. Lindgaard and Whitfield (2001), a recent addition to the literature, argue for the place of aesthetics in the field of HCI research. According to them:

> “real progress cannot be made towards understanding, explaining and predicting user preference unless the research anchors itself to a theoretical framework. It is argued that such research needs to integrate cognition and emotion” (p1).

However, this paper does not address the specific nature and unique attributes of Web design, but rather the general field or domain of human-computer interaction.

2. **There is little research on the aesthetics of Web site design.**

Knutson (1997) touches on the importance of aesthetics in relation to user preferences when adopting new technology; namely, what visual features affect preference for a WWW user interface. But this is not a dedicated study of the aesthetics of Web site design. Haig and Whitfield (2001), Veen (2001) and Zeldman (2001) are some of the few examples of literature focussing on this field. However, the latter two authors provide general Web design textbooks, containing no experimental procedures.

3. **Most research into Web site design has focussed on performance-based usability concerns, not aesthetics.**

According to Nielsen (2000), usability is the most critical factor in the success of a Web site’s design. Nielsen’s Theory of System Acceptance, from his 1993 book, “Usability Engineering”, defined the components of usability as: learnability, efficiency, memorability, errors and satisfaction. These components can also fall into two distinct areas – performance measures and subjective measures. Performance measures are the ‘typical’ usability measures: learnability, efficiency, memorability. Subjective measures focus on fun, excitement and appeal.
A typical usability test may involve users operating a piece of software or a computer system, with the users’ responses measured in relation to Nielsen’s five recommended components.

Due to the strong presence of the HCI community in interface research and their (almost) single-minded adoption of Nielsen’s Theory of System Acceptance, it is not surprising that there are many examples of literature that research Web site design through a usability framework (e.g. Marsh, 1997; Forsythe, Grose and Ratner, 1998; Nielsen, 2000; Lee, Kim and Moon, 2000). These examples deal with Web site memorability (Marsh, 1997), e-commerce customer loyalty (Lee, Kim and Moon, 2000), with Forsythe, Grose and Ratner (1998) being a general Web-based HCI textbook and Nielsen (2000) being regarded as a seminal textbook on Web usability.

4. The research that investigates the usability and aesthetics of Web site design has not involved a designer (or in conjunction with one), and the experiments conducted do not deal with pertinent design and communication issues in context.

Experiments investigating design are often flawed by their lack of context or communication imperative (i.e. the target audience, to whom the message is intended) and severe limitations in ‘design’ terms (i.e. poorly, even unprofessionally, designed stimulus material).

In the case of Knutson (1997), the stimulus material is extremely poorly designed. In my experience, the level of design skills displayed here would not be suitable for entry into an undergraduate design programme. Outlined below are some of the design flaws in this research. Unfortunately, lack of context dogs this research as well. Users were asked to evaluate various Web sites that contained Atlanta, Georgia visitor information. The design modifications made to each site are questionable and bear little relation to the site’s audience, context and budget.

The design variables presented via the Atlanta, Georgia site were:

- **Site one, animated text:**
  Here, the words ‘Atlanta Guide’ move around the screen. There is no rationale presented for the animation nor any guide as to why this may be an interesting, effective design strategy that may add to a user’s experience of the site and to a better understanding of Atlanta’s attributes. From the inclusion of animation here, one wonders whether Atlanta is in an earthquake zone or has animation been used because Atlanta is the home of Coca Cola, a fizzy drink with lively bubbles? Animation of this type appears not to be an appropriate design element here. The inclusion of the animated text seems quite arbitrary. A possible rationale for its inclusion is that software exists enabling type to be animated. But the question of appropriateness has been overlooked in favour of the inclusion of a totally gratuitous design component.
(which, it should be said, also happens from time to time with professional designers who become momentarily enwrapped by the dazzling capabilities of software).

- **Site two, background pattern:**
  With this site an intricate linear background pattern has been added, with Atlanta set in a typeface known as ‘Wide Latin’. Questions arise as to whether the pattern is of significance to an Atlantan, or is it just a pattern chosen at random? Similarly for the typeface. The particular typeface used seems more appropriate for a ‘west of the Rockies, Sante Fe or Tex-Mex’ visual flavour (Atlanta is in the south-east). Again, one would question the rationale for choosing such a typeface. With the introduction of the Netscape Navigator browser in 1995, it became possible to include tiled background images. Many non-professional designers added busy background patterns to their sites thinking that such visual ‘enhancement’ could only aid the user’s experience. Unfortunately, such busy background wallpaper patterns severely undermine legibility and the understanding of the site’s navigational system.

- **Site three, colour:**
  With this site it is difficult to critique the colours involved in the design: only a black and white version of the site is available for viewing here. Knutson’s research does not indicate what colours were used, only that ‘colour’ was used in the experiment. This is quite an astonishing omission; colour is a vitally important ingredient in design. To make no mention of it (other than it is not grey) indicates that Knutson’s research hardly considers this design component seriously. Ideally, a colour sympathetic or traditional or meaningful to the city of Atlanta would have been used. Hot pink, lime green or aqua would be questionable choices.

- **Site four, three dimensional type:**
  Here headings are transformed into the third dimension, complete with bevelled borders. Again, there seems to be no rationale for this development.

- **Site five, the inclusion of pictures:**
  This is the most appropriately designed of all the sites. Simple, legible typography coupled with a picture of Atlanta construct the most logical visitor information site in the experiment; however, the layout and type configuration are banal.

To communicate successfully with a designated target audience, appropriateness is a most important design consideration. The above research by Knutson disregards this fundamental tenet of design. He is not a designer, but then again, if he is testing Web design, the research should at least know what design is, not merely guess at what design is and does. It is much more than randomly ‘assembling ill-considered elements on a Web page’ in 2D or 3D or maybe with an irrelevant background pattern.
Design is researched, considered, reflected upon, tested and then adopted. According to Zeldman (2001): “each site speaks to a particular demographic... focused, usable, brand-supportive interfaces are as particular as the taste of a fresh-picked plum on a summer’s day.” Designers need to employ a visual language (mixture of colour, type, imagery, navigation principles) that is synchronised with their audience. Non-designers often call this aspect of communication ‘style’ (as discussed earlier in Chapter one), but visual language has far greater and deeper implications than just being a cosmetic addition – it actually sets the mood and tone of the communication, pitching it at the right level and in the appropriate context.

It is my opinion that many of the sites evaluated (and constructed) by non-designers researching the field of Web site design could have the above criticism (lack of appropriateness to their context) levelled at their selection of sites, and the design of their sites. Bonsiepe’s (1999) perception of computer experts and programmers is interesting: “To them, design seemed initially to be mere decoration, the aesthetic upgrading of computer programmes – an appealing icon here, adjustment of screen layout there, a careful correction to a harsh colour” (p9). From the above two examples it seems that the HCI community may have a rather limited understanding of what design is, and how it can make the difference between communicating and not.

In terms of utilising an appropriate visual language, one USA company has gone to the extraordinary (but perfectly logical) lengths of employing a board of Web site directors whose average age is only nine years (some of whom are six)! The design of Mattel’s Barbie.com Web site is presided over by a cohort of 26 young girls.

“The look, the feel, even the sound of a Web site can mean the difference between a Web hit or miss, especially for kids. Online marketers have less than eight seconds to capture a kid’s attention – or lose them, perhaps forever” (USA Today, 2001).

This board of directors has only one mission: to help “keep the Barbie.com Web site ultra-appealing to girls”. This approach ensures that an entirely appropriate ‘look and feel’ or visual language is used to make this site one of the top ten most-visited children’s Web sites. Other companies have followed suit. According to USA Today (2001), Disney.com, after surveying 2,500 children, recently redesigned their Web site to better reflect the Disney characters. Fewer words but more pictures were used. “Kids told us, ‘just give me a picture of my favourite character, and I’ll know what to do from there” (USA Today, 2001). Disney believe that soon the first contact a child has with Mickey Mouse won’t be on television, or a book or at Disneyland – it will be on-line, on the Web.

It will be important for the particular organisation to establish that first all-important point of contact with that audience to ensure long-term brand loyalty and connectivity. With Disney.com that will be at least until their teens. Crayola.com and Nintendo also
have similar ‘children’s aesthetic and usability’ development teams built into the design strategies of their products (USA Today, 2001).

5. The research that investigates or touches on the aesthetics of Web site designs has not been conducted recently, and due to the rapid developments in Web technology, is out of date in a contemporary context.

Most Web developers refer to a ‘Web year’ as being only three months long. The amount of development, refinements and invention of software that would normally take place in any ‘normal year’ takes place in one-quarter of that time on the www. Hence, I have tended to avoid literature that investigates Web usability and aesthetics that is pre-1995 (wherever possible). For in Web terms, that research is now 26 ‘Web years’ old!

In the case of Marsh (1997) and Knutson (1997) – whilst acknowledging that Knutson is not a designer, and the sites utilised in the research are poorly designed – what seriously impinges upon this research’s contemporary relevance is that the sites utilise Web browser technology over four years old (i.e. over sixteen plus ‘Web years’ old). Knutson’s Atlanta visitor information sites (due to the limitations of 1997 browser technology and some ill-considered design elements as described above) look ungainly and extremely primitive by today’s standards. Many of the design variables included in Knutson’s experiment (with the exception of colour) are not usual design considerations. (Anecdotally, I have not seen a decorative background pattern used on a Web site in four or so years.) And this is a piece of Web research only four years old. The Web has come a very long way during this period of time.

2.3 Research motivation: a. HCI’s problems with design and aesthetics

As stated previously, the research material relating to usability and aesthetics is clearly underdeveloped: some research avoids subjective measures and concentrates exclusively on performance measures (such as task oriented behaviour, database entry and searching). Norman’s influential 1990 book, “The Design of Everyday Things” is one example, whilst others (Nielsen and Levy, 1994; Andre and Wickens, 1995) do incorporate subjective measures and indicate that users do prefer technology (not Web sites per se) that is novel, colourful and contains pictures. According to Knutson (1997), “subjective measures (such as fun, excitement and appeal) are rarely measured with any real rigor and don’t seem to be taken seriously by the HCI community.” This is quite astonishing, as “the existence of an entire industry – the design industry – is increasingly devoted to it” (Haig and Whitfield, 2001).

Tractinsky (1997) reports, in an examination of some prominent HCI textbooks and literature (e.g. Schneiderman, 1992; Preece, Rogers, Sharp, Benyon, Holland and Carey, 1994), that there is “no single entry for ‘aesthetics’ (or synonyms and related concepts such as ‘appearance’, ‘attractiveness’, ‘beauty’ or ‘form’).” Nielsen (2000) could also be added to this list. In his preface to a book on this subject (Forsythe, 1998), he states:
“this book includes the perspectives of a broad range of experts in Human Factors, Cognitive Psychology, and Web development and reports research addressing issues associated with the design and usability of Web products.” Not one of the forty experts who have papers included in this book is a professional designer. The design information included here also does little more than paraphrase some very basic design principles that would only be relevant to Web design neophytes.

“If everyday design were ruled by aesthetics, life might be more pleasing to the eye but less comfortable; if ruled by usability, it might be more comfortable but uglier. If cost or ease of manufacture dominated, products might not be attractive, functional or durable. Clearly each consideration has its place. Trouble occurs when one dominates all the others” (Norman, 1990, p151).

Research into Web design does tend to focus very much on usability issues, and ‘trouble does occur’ when this seemingly dominates all other aspects of literature in this area. Judging by the tone of the available literature, many HCI professionals have little time for aesthetics. Norman (1990), in particular, admonishes designers’ tendencies to favor aesthetics over usability. However, whilst Norman’s book may sit proudly in the bookcase of many a HCI practitioner, his ‘evidence’ on this matter is purely anecdotal and has no empirical support. According to Patton (1993): “Norman is seen by many professionals... as stronger on criticisms than solutions.” The final, critical word on the standard HCI view of aesthetics is Tractinsky’s (1997): “The contribution of aesthetics to HCI... should be measured in terms of facilitating information processing, not in terms of engaging the user in a pleasing experience.”

However, as noted earlier, there are those who dissent from this view. For example, Laurel (1991) argues that an interface may be a designed experience that combines an application (software) and its interface into a single, integrated and ‘entertaining’ process. Hudson (2000) reports that HCI is seen as a proponent of graphically inelegant and clumsy design work (compared to the work of professional designers) and that usability testing based on performance measures may indeed be irrelevant with some sites, particularly entertainment or art-based ones. As a practising designer and design educator, I find this to be a very odd state of affairs. Anecdotally, I know (after 19 years in the design industry) that aesthetics is critically important in the success of a designed product, and that designers do not neglect usability and function in a design project. If they did to the degree alluded to by Norman, they would be out of business. In fact, on the contrary, the multimedia design industry is booming (especially in Web design). As of June 2001, Australia's economy is growing at an annual rate of 1.3 percent, whilst the IT (Information Technologies) industry (of which, multimedia and Web design are very significant components) is growing at the extraordinary rate of nine percent per annum (Multimedia Industry Network, June 2001). Clearly, designers are getting some things right.
Focussing single-mindedly on the usability of Web site design without considering the impact and importance of aesthetics could be considered as ‘putting the cart before the horse’. Other attributes (aesthetics, appearance, likeability) may well have overriding effects on a decision to use a Web site (Tractinsky, 1997) and, as stated by Kurosu and Kashimura (1995): “inherent usability is meaningless for the user if the product is not appealing enough for them to buy it”.

In fact, it could be said that without investigating emotion and aesthetics, HCI is somewhat doomed and will not progress very far. The Web is a ubiquitous, networked, global system that is “making computing much more colourful and fun than completing simple tasks in the monochrome world of yesteryear” (Lindgaard and Whitfield, 2001). Designers acknowledge that “function now embraces psychology and emotion” (Gibney and Luscombe, 2000): HCI needs to follow suit if its research is to be valid in a new, everchanging, dynamic digital environment.

Technology bandwidth will also allow many of the creative industries and professions that design interfaces – for example, cinema, television, and the fine arts to successfully come on-line. As is the case with design, these fields have a very rich background in aesthetics and audio/visual presentation (and in some cases avant-garde developments). Many of the sites designed by ‘Web artists’ are groundbreaking, pushing notions of interactivity, personal narrative and exploration that are challenging and unbridled, pure creative expression. Some of the innovations developed by these artists are very far removed from the straightjacketed Web scenario envisaged by many HCI people.

2.4 Research motivation: b. Designers’ problems with usability testing
As outlined earlier, designers generally do not ignore functionality and usability. They are the cornerstones of our activity. At present there is disagreement between designers and HCI people who, ideally, should be working together to make a better WWW for all. Cloninger (1999) sums up the differences between the two fields by jokingly referring to them as: “Usability Experts are from Mars, Graphic Designers from Venus.”
http://www.alistapart.com/stories/marsvenus

In fact, the whole issue of Web design is emerging as a topical subject in the public domain (and will no doubt become an interesting area of research enquiry). This is interesting: it is quite rare to have a debate about, of all things, design. It has never before been such a contentious issue; the democratic, ‘you can do it yourself’ ethos that underpins much of the Web has made the once neglected field of design a hot topic, as it begins to involve everyone (at least in the Web community – but everywhere, really) in the discussion:

“Web design, at least in the online community, is something about which everyone increasingly has an opinion. Once issues like design and layout passed many of us by
without a second thought. Not long ago it would have been hard to imagine a letter to the editor at Time or Newsweek bemoaning the ‘cardinal sins’ committed by either magazine on the subject of design” (Klein, 2001).

For designers, designing Web sites is only a fairly recent phenomenon. With skills in traditional media (print, broadcasting, advertising, product design, interiors) it was just a matter of time before designers transferred their skills and redefined them in the context of this new medium. With the advent of ‘visual HTML’ applications (such as Macromedia’s Dreamweaver, Adobe’s GoLive and Microsoft’s FrontPage), designers are able to design and map out the structure, links and intricacies of a fully-fledged Web site. Using these applications is as simple as using applications such as Quark Xpress, Adobe InDesign or Pagemaker – page/document layout programs often used by designers. Prior to this, the only way to design for the Web was with code (HTML – Hypertext Mark-up Language) which, for many designers, was difficult. Suffice to say, a few hardy, code-literate designers did make inroads into this area, but it was generally something that most designers didn’t participate in.

Subsequent to these more recent developments, most Web site design was constructed by computer scientists. The inventors of the original principles behind the computer interface – mouse, bitmaps, on-screen depictions et al – were very familiar working with the intricacies of computer code. In 1993, Patton, in an article for ID Magazine, (a noteworthy design journal) wrote “interfaces await the attention of professional designers”. The Web was being used for more than research, business was looking over its shoulder and considering the potential of this new medium, and designers, artists and others were experimenting with what the Web looked like, for it was clear that the scientists building the sites knew little about design.

Lindgaard and Whitfield (2001) contains a concise summary of the origins of HCI:

“HCI research originally grew out of cognitive psychology in an attempt to apply and ‘translate’ findings from human information processing into ‘engineering statements’ and guidelines that could be applied by non-psychologists. Computer systems were designed to support individual users completing linear tasks” (p1).

And, from the ACM SIGCHI (Special Interest Group in Computer Human Interface Issues of the Association for Computing Machinery) Web site that list the curricula for the teaching of HCI comes the following definition (2001):

“Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.”

http://www.acm.org/sigchi/cdg/cdg2.html#2_1
Note the use of design in the above statement. It is this use of the term ‘design’ in the description of HCI’s work that is contentious amongst designers; after all, it is what they (we) do. The statement previous to this one (Lindgaard and Whitfield) indicates that the HCI community comes to research with a fairly dry, data driven approach, which encompasses design. A designer would rarely consider their work to be ‘dry’ and diagrammatic: after all, emotional responses, aesthetic considerations and working with a rich tapestry of different audiences are enjoyable, challenging design considerations. Consideration of the audience’s tastes and emotional responses, in particular, is a very significant component of any design project: HCI’s apparent neglect of such an important consideration will probably irk most designers.

Another area that I (as a designer) find hard to reconcile is the usability terminology of people using their systems/interfaces as ‘users’. The term is quite demeaning and harks back to the early 1980s, where mundane tasks relating to the productivity and learnability of systems were the main issues examined by HCI (as outlined in Lindgaard and Whitfield, 2001). As IT (Information Technologies) begins to play a more substantial (and potentially overwhelming) role in everyone’s lives, it is important to think of the users of technology as people, not ‘interface test-pilots’ performing arcane tasks against the stopwatch. Three salient articles from John Thackara’s “[10] Articles of Association Between Design, Technology, and the People Formerly known as Users” (2001) highlight this point:

“Article 1:
We cherish the fact that people are innately curious, playful, and creative. We therefore suspect that technology is not going to go away; it’s too much fun.

Article 2:
We will deliver value to people, not deliver people to systems. We will give priority to human agency and will not treat humans as a “factor” in some bigger picture.

Article 4
We do not believe in idiot-proof technology, because we are not idiots and neither are you. We will use language with care and will search for less patronizing words than ‘user’ and ‘consumer’.


As mentioned earlier, Nielsen’s Theory of System Acceptance defined the components of usability as: learnability, efficiency, memorability, errors and satisfaction. HCI gravitated from computer systems towards the Web as it developed, and has assessed interfaces to Web sites since the inception of the medium. It is only recently that the two fields of HCI and design have collided. Several prominent HCI exponents, most notably Nielsen and Norman, have emerged as prominent spokespeople for usability and design. However, in
the latter area they show little understanding, beyond paraphrasing some very basic undergraduate or 'beginner' design principles. An example from useit.com, Nielsen's Web site, states: “Web design is easy: If you are thinking about how to design a certain page element, all you have to do is to look at the twenty most-visited sites on the Internet and see how they do it” (Nielsen, 1999). This is an extraordinarily naive viewpoint on design emanating from someone advising on a design strategy. There is no consideration of ‘appropriateness’, a crucial and oft-used design criterion (as discussed earlier) in this statement.

Many designers consider ‘over-standardisation of interface’ (hinted at in the above comment by Nielsen) to be working against the best interests of the medium. Wells-Papanek, a director of interface design at Apple Computer, considers the ‘drivability’ of interfaces to be a strong consideration in the design of a GUI. The idea is that car dashboards are varied in their design, but by sharing common elements across all car types, the interface is easily learnt. For her, guidelines instead of restrictive standards are the way to progress this new medium (Patton, 1993).

As the Web is an astoundingly diverse medium where a site may be devoted to, well, just about anything, it is crucial that an appropriate ‘voice’ be used for communication. For the sites listed below to follow Nielsen’s advice above is patently ridiculous: the site would not communicate succinctly and accurately with its intended audience:

– Middle Eastern Cooking: http://www.twdg.com/cooking

– Golf Tips: http://www.golftips.com

– Graphic visualization of stocks and share data: http://www.mapofthemarket.com

– An online ‘distributed computing’ project that designs anti-AIDS drugs using the processing power of computers around the world. This is a shared computing facility that runs whilst your computer is idle: http://www.globaldevelopment.org/aids.htm

– A gallery of abstract, zen-like, meditative photographic imagery: http://www.photomontage.com

Shedroff (1994) outlines a key strategy for design: “All sensorial details must coordinate not only with each other, but with the goals and messages of the project.” Shedroff’s ‘sensorial details’ are “an all-encompassing category over those disciplines involved with the creation and presentation of media” – visual, auditory and tactile sensations. In other words, appropriateness, again and again, is the key. Jeffrey Veen, an eminent Web design practitioner and spokesperson, also confirms this: “the biggest mistake I see on today’s Web sites is the one we’ve seen since the Web’s inception: not understanding the intended audience” (Stuart, 2001).
Significant publications have emerged from the usability camp. Nielsen’s “Designing Web Usability: The Practice of Simplicity” (2000) is a case in point. Performance usability is the real focus here. When discussing design principles and strategies, Nielsen’s failure to discuss design considerations such as communication, ‘visual language’ and designing for a target audience flaw this substantial 400 page book.

In 1968, Licklider (the Director of ARPA.net), foresaw the potential for a medium such as the Web:

“Creative, interactive communication requires a plastic or moldable medium that can be modelled, a dynamic medium in which premises will flow into consequences, and above all a common medium that can be contributed to and experimented with by all” (Licklider, 1968, p22).

The criticism made of designers by Nielsen and Norman, and much of the HCI community, is hardly advocating a medium that is ‘contributed to and experimented with by all’. This is another shortcoming of HCI – HCI’s inability to imagine the Web being anything other than a database, or a grey and dry, data-driven experience. Much usability literature does not focus on the engagement and empowerment of the people using technology: quite the reverse.

Designer Hillman Curtis has a more egalitarian view: “the Web is defined by a collective intelligence and cannot be dictated by any one person, group or set of ideas” (2001); whilst for Shedroff: “the most important skill for almost everyone in the next decade and beyond will be the ability to create valuable, compelling and empowering information and experiences for others” (1994).

Designers have some other views on usability. Zeldman (2001) argues that usability testing often does not gauge appropriateness, but rather, efficiency. A site may be efficiently navigated through and objectives realised, but may not entice further usage or even communicate with the intended audience. “One reason that we have so many unimaginative interfaces (visual Muzak) is because their familiarity makes them appear intuitive, and they therefore survive the pre-launch user-testing phase” (Zeldman, 2001, p77). Again, if the site is eminently ‘usable’ but unenticing and bland, the potential of the ‘get me out of here’ click looms large. A significant question that the designer of a Web site should ask is not ‘can people use this site?’ but ‘do people want to use this site?’ If they don’t, they’ve clicked and moved away already.

Buchanan (2000) illustrates that usability is merely a single consideration (not the ‘be-all’ and ‘end-all’) in the design of a digital interface:

“Do I really want to explore this product? This is a very personal question. It goes beyond
the utility of the product and beyond issues of usability. When I have choices in the marketplace, why should I select this product over that?... This is the subtle domain of the desirable, and it is often neglected – particularly when the culture of a company focuses on engineering and computer programming or when there are few choices available among competitors. But desirability plays an important and often decisive role in product selection” (p33).

2.5 Web design: branding and information design

For designers working in this field, it is a most challenging, exciting time. The Web is a medium that users interact with “in novel ways that have no precedents in paper document design” (Lynch and Horton, 1998). Indeed, the design profession working in this field has spawned its own vocabulary. One example, describing the art of attracting repeat customers to a site, by Derek Ellis (2001), a leading Australian interactive designer, refers to user/customer ‘stickiness’: “The objective... is to make time interacting with a site more tactile, enjoyable and engaging, in turn offering visitors a more ‘sticky’ experience that will attract return visits.” Lee, et al (2000) and Nielsen (1997) also highlight this as being of fundamental importance when designing an e-commerce site.

Ellis (2001) also highlights the need to give a Web site a level of personality: “shifting out of a static, or semi-static state, starts to give a Web site a tangible personality.” Given the development of software and the medium itself, it is now very timely for designers to expand the horizons of design and communications and to push their work beyond what people expect (when appropriate). Lindgaard and Whitfield’s (2001) scenario of a monochrome digital world being replaced by fun and colour is most decidedly upon us.

Personality is emerging as a key design consideration. As Thackara (2001) states:

“Interaction design favors all the senses and allows us the power to hear and taste and see and touch and feel. It’s about communication that is playful, intuitive, moving, surprising, and fun. This kind of communication has value not found in today’s services.”


For FutureBrandFHA (2001), a leading Australian Branding and Design consultancy, “a visual and verbal brand expression that is compelling and has personality” is a vital and intrinsic aspect in the creation of a brand (as described in figure 3).

There are two significant areas of the on-line experience that are best handled by designers. Traditionally, designers have demonstrated their expertise in branding and information design. However, it is on the Web that these two distinctly different areas of design activity and practice come together and co-exist as strange bedfellows; for normally in the world of design, it is uncommon for them to interact with each other.
2.51 Branding

“Brand is the proprietary visual, emotional, rational, and cultural image that you associate with a company or a product. The fact that you remember the brand name and have positive associations with that brand makes your product selection easier and enhances the value and satisfaction you get from the product.” http://www.brand.com/intro.htm

Originally, branding existed solely as a means of product differentiation. A company name and product logo would help differentiation between like products. Later, advertising was involved with branding and aimed to portray the advertised product as a desirable object, a product that you could aspire to own. Within this, psychological aspects became part of the advertising/branding landscape. Now, in a digitally empowered environment, branding can go one step further: it can consider micro-markets (instead of mass-markets) and develop advertising/promotions that really push communications into distinct and discreet communities.

Ideally, branding channels the fundamental needs met by a product into attractive, acceptable and original expressions. Branding also taps basic human drives, which, in turn, give the brands currency. Social acceptance, power, prestige, independence, order, honour, avoiding distress, curiosity, sex and hunger are some of these basic drives.

A brand goes beyond mere physical, graphic appearance: the Nike swoosh is not a simple,
dynamic action/gestural mark, it is an indication of a ‘mood’, an attitude, a global interconnected multiracial bond between active, healthy people (who actually may not be all that active and healthy) but who aspire to be by wearing that ‘swoosh’. The brand is so well known and instantly recognisable, that Nike, in a daringly confident move, often deletes the word ‘Nike’ from underneath the ‘swoosh’. But, we all know what it means and what it stands for.

“When your stomach hurts, you reach for Alka-Seltzer (not an antacid). Sneeze, and you reach for Kleenex (not a disposable paper tissue). Like millions, we may express our individuality through Levi’s” (Zeldman, 2001). Whether we like it or not, this is what branding does and this is also what a designer will be spending much time working with in the commercial Web design world.

But, with branding, things are a little different on-line. Each visitor to a Web site is merely a click away from leaving that same Web site. Content and the ‘visual delivery’ of that content has to be handled intelligently. Doing so in a manner that is “persuasive in the narrow sense of seducing and manipulating” (Buchanan, 2000) – and perhaps even annoying – could see affronted or dissatisfied (potential) customers clicking elsewhere. This thought is echoed by Levine et al (1999): “because the Net connects people to each other, and impassions and empowers through those connections, the media dream of the Web as another acquiescent mass-consumer market is a figment and a fantasy.”

It is clear that both the ‘branders’ (designers and marketers) and the products/services that they are selling/promoting, and their Web-based audiences now have a relationship formed along guidelines unlike those in any other medium. The branders and communicators need to understand their audience and how best to intelligently articulate their communication to them. The Web is all about segmentation and niche areas of interest: “the future business of businesses that have a future will be about subtle differences, not wholesale conformity” (Levine et al, 1999).

Buchanan, again, sums up the initial experience of the visitor to a site:

“When I first encounter a Web site or other digital product, I ask, What is its intended use? What is it useful for in my life? In short, I look for content and purpose, and I make a fateful commitment to trust those who have conceived and designed the product. What I trust is that designers have tamed the complexity of the content, shaping it with efficiency and clarity” (2000, p32).

Designing a ‘visual language’ and an interface that supports and sustains a client’s brand is important in the commercial arena (even in the non-commercial world too). Even if the site that you have designed contains important information, extraordinary photography and elegant navigation, if the brand doesn’t do its job and act as a coherent link between
all associated Web pages within a site, you run the risk of your site being forgotten or passed over.

“Interfaces that deeply and meaningfully reflect the brand will encourage repeat user visits and repeat assignments from your clients. As a Web designer grounded in traditional art direction and design, you are better equipped than many working professionals to create brand-appropriate Web interfaces: interfaces that don’t just look like the brand, they behave like it” (Zeldman, 2001, p107).

Apart from the design and construction of the actual site itself, designers are (and always have been) involved at a primary, root level of communication with branding. Typography is one area of expertise of a skilled designer: in terms of formal design elements, “type, layout, and colour make up the equilateral triangle of brand identity” – Stefan Rögener (Ginger et al, 1995).

“Art directors... use creative typography to give power to brand identities in the marketplace... For example, Mercedes has been using Corporate ASE for its identity since 1990. Art director Karl Gerstner chose Berthold Bodoni for IBM’s international markets fourteen years ago. And Marlboro, the world’s best selling cigarette, has been riding successfully on Neo Contact for twenty years” (Ginger et al, 1995, p14).

Add to that list Nike’s use of Futura Extra Bold Condensed Italics (until recently), Apple Computer’s ITC Garamond Condensed, Vogue magazine’s Didot, Absolut Vodka’s Futura Extra Bold Condensed and the Commonwealth Bank’s use of Helvetica Black, and it is clear to see how type (just being a single component of Rögener’s equilateral triangle of brand identity) contributes significantly to the design of a recognised brand (as outlined in figure 4). Designers are educated in typography (the study and practice of using type and letterforms) and in using type effectively, intelligently and appropriately.
There are many design factors that constitute a brand, but a salient point is that according to many ‘brand experts’, branding is “100% emotion” (Frankel, 2001). It is the emotional relationship forged between people and brands that invests them with their power. But it is design that creates that emotional relationship. It does this by devising a unique visual language that intelligently communicates to the audience.

2.52 Information design

One of the least recognised, but most important areas of design is information design; that is, selecting, organising and presenting information.

“Information design as a discipline has the efficient communication of information as its primary task, and this implies a responsibility that the content be accurate and unbiased in its presentation. Unlike much of advertising and marketing design, in which the object is to persuade the user into a course of action, information design tries to present all the objective data required to enable the user to make some kind of decision” (Wildbur and Burke, 1998, p6).

Traditionally, information designers design such things as timetables, maps, signage systems, guide books, and now, with the development of the Web and multimedia, interfaces. Pre-WWW, the material information designers worked with was objective: they took delight in “making the complex appear simple” (Wildbur and Burke, 1998). Taking dry, raw data, such as from a transportation timetable for a busy rail network and transforming this into something easily understood and enjoyable to use was the raison d’être of the traditional information designer.

Three celebrated examples of information design:

1. Charles Joseph Minard, a French engineer, created possibly the greatest informational graph ever drawn. Minard’s ‘double’ graph, as depicted in figure 5, tracks Napoleon’s disastrous Russian campaign of 1812-1813. The left hand side of the graph sees Napoleon beginning his march on Moscow (which is on the right hand side of the graph) with an army of 422,000 men – depicted in beige. When Napoleon’s army reaches Moscow, only 100,000 of his men survive: on the return journey – depicted in black – even more men are lost due to both the freezing conditions and his army having to cross icy rivers.

   The ‘double’ component of the graph sits at the bottom of the chart; here the temperature is depicted in a synchronous chart, with rivers and other obstacles also depicted. It is possible to track the progress of Napoleon’s forces and to ascertain when and where most losses occurred, and even to observe the temperature at that time. (Incidentally, only 10,000 men make it back to where the campaign began: 22,000 were lost in one river crossing alone!). Minard’s graph is noteworthy for it depicts statistical information and its relationship to topographical and other data.
“Minard’s graphic tells a rich, coherent story with its multivariate data, far more enlightening than just a single number bouncing along over time. Six variables are plotted: the size of the army, its location on a two-dimensional surface, direction of the army’s movement, and temperature on various dates during the retreat from Moscow” (Tufte, 1983, p40).

2. Nurse Florence Nightingale devised a ‘polar graph’ during the Crimean War (1853-1856), shown in figure 6. Within a circular graphic form that represented an entire year, the loss of life of wounded soldiers during the war’s winter months was charted. Nightingale succeeded in convincing the Ministry of War that the appalling number of mortalities in this war (sixty percent of all enlisted men) was due to disease rather than
injuries sustained during the conflict. “This was the origin of the revolutionary notion that social phenomena could be objectively measured and graphically represented” (Wildbur and Burke, 1998).

3. Nightingale’s idea was furthered by Charles Booth’s map of London Poverty (1889), where colour coded zones indicated streets and individual houses detailing where the spectrum of London’s humanity dwelled. From the wealthy to the ragged and destitute, Booth, like Nightingale before him, objectively recorded this social phenomenon and reported it graphically.

But now, with the development of the Web, the hard-edged, marketing imperatives of branding have been forced to live harmoniously with the streamlined objectivity (and often deliberately uncommercial world) of information design. The Web has created a most interesting union.

Information design manifests itself in a number of different guises on a Web site. It may be referred to as information architecture; that is, intrinsically linked to navigation and the actual interface design. Effective site architecture and navigation allow visitors to the site to experience the content of the site without becoming lost and confused: it may also mean that they’ll come back and be repeat customers or visitors (Ellis’s previously mentioned ‘stickiness’). Again, from Zeldman (2001):

“Web design is communication. It says specific things to specific people. It does this by offering meaningful content in the context of focused digital architecture. Navigation and interface are the doors to that architecture” (p71).

One of the most important aspects of Web design that a designer new to this medium must master is the sequencing and structure (the architecture) of the site, which a visitor will interact with via the interface. Some of the typical information design considerations that a Web designer should evaluate in the planning stages of a Web site include:

“What are the key objectives of the Web site?
How are these objectives communicated in the design?
What is the overall structure of the Web site? How is it expressed in the design?
Who is the intended audience? What is their user profile?
What are the user’s information needs?
What are the access pathways and restrictions?
What is the hierarchy of information?
What are the general and specific qualities of the information?
What unique features can a Web site offer for specific programs or the collection of information?
What types of information should be linked?
What types of navigation controls are required?”
http://www.dynamicdiagrams.com

It is imperative that users/visitors to a site are able to use the Web site’s interface, and that is where the art of information design excels, in its ability to present information (which on the Web may be data, or a highly commercial branding proposition) clearly, succinctly and in an appropriate way.

“Movies immediately plunge a protagonist (and the audience) into conflict and action. Entertainment sites can work the same way.

Newspapers carry many stories but call the reader’s attention to the most important ones. Content sites can work the same way.

Stores sell many products, but special displays on featured products arrest shoppers’ attention as they enter. Commercial sites can work the same way” (Zeldman, 2001, p74).

2.6 Summary
The review of literature relating to Web design is revealing in the lack of research into the aesthetics of Web sites. Recently, Veen (2000), Zeldman (2001) and Haig and Whitfield (2001) have argued that aesthetics are important intrinsic design considerations with Web sites. It is interesting to note that the above are all designers.

Research into interface usability and aesthetics rarely deals directly with Web site design. Kurosu and Kashimura (1995) and Tractinsky (1997) are the exceptions, and significantly, they find a high correlation between the perceived attractiveness of interfaces and their perceived ease of use. Most research dealing with Web site design focusses on the usability of interfaces, not aesthetics, and emanates from the HCI community (e.g. Marsh, 1997; Nielsen, 2000; Lee, Kim and Moon, 2000). Furthermore, it appears that very little research into the design of Web sites has been carried out by designers; and much of the research ignores fundamental design principles and considerations (e.g. Knutson, 1997; Forsythe et al, 1998).

Outlined in this chapter are the motivations behind the current research; namely, that most Web design research examines usability, not aesthetics. Usability exponents, it seems, tend to ignore the importance of visual aesthetic performance. As a designer, I am keen to redress the balance and to focus here on aesthetics.

The second part of this chapter discussed the coming together of two quite disparate fields of design in the context of Web design. Within this new medium, branding and information design exist and support each other in the construction of memorable on-line experiences and effective, appropriate interfaces (Zeldman, 2001).
3.1 Introduction
Given the interest in the World Wide Web, there is very little research that provides guidelines for the design of Web sites. As indicated in Chapter two, most of the research is usability-based (and has not involved designers). The design of this research tends to ignore fundamental design considerations, and the findings, when examined in terms of their design content, are somewhat spurious. So unformed is this area of enquiry (Web design and aesthetics) that the construction of specific hypotheses, would seem premature. However, there are some research questions that have emerged from this enquiry that have clear design implications.

3.2 Questions the current research addressed
1. Will the visual appeal of an interface for a Web site affect user preference?
Previous research has found that visual appeal is strongly related to preference in Web site design (Knutson 1997), and that visual appeal positively reflects receptivity to technology (Nielsen and Levy, 1994; Kurosu and Kashimura, 1995; Tractinsky 1997). However, none of this research has involved a dedicated investigation into Web site design aesthetics with realistic, context-based design components.

2. Will site preference increase with site enrichment/animation?
Research is scant in this area: Knutson (1997) found that site enrichment through animation was positively related to preference, but again, this work is dogged by problems of context. However, Nielsen (2000) offers commentary to the reverse, but with no empirical foundation to his argument.

3. Will site evaluation vary between different subject groups?
Interest lay in possible differences in the evaluation of sites between different subject groups. Differences in the evaluation of designed objects by designers and non-designers has been found in previous research, though this involved non-Web material (Whitfield and Wiltshire, 1982). The current study used both a design-educated group and a computing-educated group.

4. Will the experimental model employed here prove to be useful for the evaluation of interfaces?
A recent addition to theories of aesthetics within psychology is Whitfield’s (2000)
Categorical-Motivation model. This model (outlined in Chapter one) allocates specific predictions according to the category of the object being evaluated. The current research domain – Web sites – would be located within the second category of Whitfield’s model.

3.3 Introduction to the experiment
A study was designed to address the research questions outlined above. Interest lay in how different aspects of Web site design affect the site visitor’s preferences, and in possible differences in the evaluation of Web sites between different subject groups. Previous research by Whitfield and Wiltshire (1982) involving non-Web material, found differences between the evaluations of non-designers and designers. The present study therefore used both a group trained in design and a group trained in aspects of computing, and it was envisaged that this initial study would form the basis for further research in this field. (At the time of writing, similar research has been conducted at Carleton University, Ottawa, Canada, between design/multimedia students from an architecture course and non-design students from a psychology course. This data is currently being analysed.)

The two current main aesthetics theories to derive from psychology (Collative-Motivational and the Categorical models – discussed earlier) formed the broad framework for the choice of measures used in the survey. Some measures specifically relevant to site evaluation were also included. The focus of the survey was to determine “the capacity of the recently formulated Categorical-Motivation model of aesthetics to account for site preference” (Haig and Whitfield, 2001). Examples of the measures that fell into the ‘collative’ domain were: ‘This site is fun to use’ and ‘This site is novel in its visual design’; those in the ‘categorical’ domain were: ‘I have seen sites similar to this one’ and ‘This site is appropriate for a mobile phone company’; Web specific measures included: ‘I like this site’ and ‘This site is easy to use’.

The following section outlines the methodology used in the study; that is, the subjects, stimulus material and procedures employed. Included here is also a design rationale explaining the various design approaches used to design and construct the stimulus material.

3.4 Method: subjects
These were 64 students from Swinburne University of Technology, Melbourne: 37 were undergraduate Multimedia design students (called the ‘Design group’) and 27 were students from an undergraduate Multimedia course (called the ‘Computing group’). All subjects were from years one and two of their respective programs, and all took part in the study at the end of their academic year. Subjects were volunteers and recruited largely on the incentive of satisfying their curiosity. While attempts were made to recruit equal numbers of males and females per course, the numbers obtained reflect the unequal gender distribution of students on the two courses. The Design group
contained 25 males and twelve females. The Computing group contained fourteen males and thirteen females.

The students from the Computing group study one area from a suite of related multimedia courses: computers and networking, software engineering, media. These represent various streams within the Bachelor of Multimedia course at Swinburne University of Technology.

3.5 Method: stimulus material
This consisted of three Web sites designed for a hypothetical mobile phone company.

1. Site one used Flash-based animation extensively, plus sound and imagery.
2. Site two used neither animation nor sound, but used imagery.
3. Site three used neither animation, sound nor imagery.

All three sites were designed with identical layout, text, typefaces and colours, the only differences being those listed above. The sites were viewed on Apple Macintosh iMac computers via the Microsoft Explorer 5.0 browser, equipped with the Flash 4 plug-in (necessary for the viewing of site one). The sites were also accessed from each computer’s hard drive: they were not accessed from an external server as aesthetic rather than performance-based criteria were being employed in the study. Use of the same hardware and software, and the same design guidelines for the three site designs, was to ensure control of these variables.

It should be noted that each Web site was not fully functional. The ‘front end’ of the sites was usable: the seven links available on the Aurora home or index page were fully functional; and subjects could click between the seven linked pages per site (identical set-up per site). However, any ‘deeper’ linking to other pages within the site was not possible. This is a common practice within the design industry in terms of presenting prototypes to a client. The intent is to give an overview or indication of the site’s general visual appearance and the navigational principles involved in interacting with the interface. This provides a working model explaining how the site’s content and architecture is organised.

A mobile phone site was chosen to be the hypothetical vehicle for this study. It was considered that a company that dealt with (and sold) technology would be appropriate. It could be expected that such a company:

– may use a site that utilised animation, in order to give the site a ‘technological, cutting-edge’ flavour and feel;
– may use a site that did not utilise animation. At this time no Australian mobile phone company uses animation on their site (although this may well change).
A mobile phone site therefore appeared to allow for two distinct variations that were entirely feasible: animated or non-animated. The third site was included to provide another variation. All sites were constructed using identical design guidelines: the layout, typography, colour and navigation system were the same.

The three sites also reflected current (2000) industry practice in terms of their approach: a professionally designed Web site would either be constructed using Flash animation or with HTML (or simplified HTML). The construction process plus the design and technical issues involved with each of the three different site construction methods is outlined below.

**Site one used Flash-based animation with sound and imagery:**

Flash is a vector-based application that enables authoring of interactivity, animation (with sound), navigation and information. The beauty of the application is that file sizes are relatively small, thanks to their vector-based content, and are Web-ready, enabling a dynamic and often entertaining depiction of content. Effective Flash files download quickly. They are normally slightly bigger than the file size of a typical HTML-based Web page and are viewable on all contemporary computer platforms. Vector files are not bitmap/pixel-based; that is, each single pixel of colour (with a bitmap) takes up a certain amount of file size. A bitmap image of 1,000 pixels will have a larger file size than an image of 200 pixels, and consequently will take longer to download from the server where a Web site is stored.

A vector-based approach can significantly reduce file size as each pixel in a Flash file does not take up memory per se. The colour is defined by the vector path that constrains that colour. Imagine a farmer’s paddock: a fence (the vector path) surrounds the green grass (the colour content), fence posts (anchor points in a vector file) define the path of the fence wire. With a vector file, it’s the ‘fence posts’ and not the area of green grass that largely determine file size. A vector file is a mathematical rather than a pixel-based file format. As previously stated, Flash-based Web pages may be larger than HTML-based Web pages, but with the bandwidth of Internet connectivity continually increasing, the download time for a well-designed Flash page is barely discernible from a HTML page. This is the case for all but the slowest modem connection.

To view a Flash-based Web page, the Flash plug-in must be downloaded from Macromedia.com (the software company that makes Flash). To many people (especially the HCI community) this is a contentious issue. Having to leave a Web site, go to another, download a plug-in application (this takes around five minutes, on average), install the plug-in, and then go back to the original site – this could be considered to be a somewhat annoying process that interferes with the perceived ‘ease of use’ and functionality of a site. But, once the plug-in is installed, all sites that utilise that application will work (until a later version is developed, normally around a year later).
Most people online have the plug-in installed in their browser (over 96% of all Web users – source: http://www.macromedia.com) and regard the download as a necessary and vital part of their Internet experience.

However, some browsers come with the Flash plug-in pre-installed. Currently, Netscape Navigator for the both the Macintosh and Windows platforms comes with Flash pre-installed: Microsoft’s Internet Explorer for the PC comes with Flash, but IE for the Mac comes without Flash.

It should also be noted that many sites utilising Flash also offer the option of viewing a non-Flash, HTML-based site for users with low bandwidth connectivity. A link to download the required plug-in is usually found on these sites. Another way to tackle the problem of not having plug-ins is for the opening page of a Web site to search the user’s system for the required plug-in. Should the plug-in be found, the user is redirected on to the ‘rich media’ site. If the plug-in is not found, the user is redirected to another site to download the plug-in. Another approach is to redirect the ‘non-plugged-in user’ to a non-rich media version of the site. This version of the site may not feature animation or sound, but be more of a conventional HTML-based site (as site two is – see below).

Many HCI experts also consider Flash to be an audio-visual extravagance that is simply, unnecessary. From Nielsen (2000), “Flash tends to degrade Web sites for three reasons: it encourages design abuse, it breaks with the Web’s fundamental interaction principles, and it distracts attention from the site’s core value”.
http://www.useit.com/alertbox/20001029.html

In short, Nielsen’s three reasons that Flash is ‘99% bad’ are that:

1. Flash is often used for gratuitous, bandwidth-hogging animation.
2. It is not standard-issue HTML, and it operates in a slightly different way, possibly confusing novice users.
3. Too much attention is given to the creation of eye-catching graphics and animation rather than concentrating on the content of the site.

To be fair, HCI’s concern over Flash is somewhat justified; some designers are guilty of ‘Flash bloat’ (aptly described by Zeldman, 2001) – where overblown, self-indulgent and gratuitous animation wastes precious download time. Thankfully, designers are usually informed of their design strategy’s downfall by their none-too impressed client (and audience). Also, the design community has come a long way with Flash in the past year or so – nowadays, the contemporary usage of Flash is much more controlled, intelligent and appropriate to a site’s function and audience. The ‘gee-whiz’ factor that often accompanies the development of radical new software has now quietened down considerably with Flash. Other problems associated with Flash are that it is not
searchable nor is it able to be bookmarked. But, that said, it is still an extraordinary application. Used by a skillful designer, Flash sites can be captivating, entertaining and low in bandwidth – and be downloaded easily.

Figures 7 – 11 depict the animation sequence and interface design of site one.

**Site two is a conventional HTML-based site that utilised imagery, but not animation or sound:**

At the time of this study, most sites on the Web are constructed via this HTML-based methodology. HTML (Hypertext Mark-up Language), a computer code based-system, allows the logical structure of a Web site, not the document's actual format/layout, to be displayed optimally. HTML (as discussed earlier in Chapter one) cuts across potential conflict by using a very flexible, interchangeable display system. Many designers use software applications such as Macromedia Dreamweaver, Adobe GoLive and Microsoft FrontPage (which, in essence, are similar to page layout applications like Quark Xpress, Adobe InDesign and PageMaker). Text and images are imported into the application, their layout and configuration designed and the application builds the relevant HTML code in the background. Many designers now also code directly with HTML.

Using HTML, site two is constructed along identical design guidelines to sites one and three, but no animation is utilised. It does rely on images (as site one does) to help position and identify both its target audience and to promote its products and services for sale. Simple navigational feedback is given in the use of rollovers (links/buttons that change colour). Site one also uses this method. As stated earlier, a cursory ‘surf’ on the Web will reveal that most sites are constructed via this approach.

Figure 12 depicts the interface design of site two.

**Site three is a conventional HTML-based site that did not utilise imagery, animation or sound:**

This site, constructed along identical design guidelines as the other two sites, did not use imagery, animation or sound (depicted in figure 13). The site really is intended for optimum performance, ‘download-ability’ and the straightforward communication of information. Today, not many sites are constructed via this approach. They were very common four or five years ago, and still seem to be preferred by some HCI practitioners – Nielsen (2000) especially. “Remove graphic, increase traffic” (Nielsen, 2000) is his oft-quoted Web-design maxim. Even though he is not, strictly speaking, a designer, many of the design approaches and methodologies he advocates display an almost sub-undergraduate level of understanding of design issues.

In their quest for very fast access/download times, many HCI people tend to err on the side of Lindgaard and Whitfield’s (2001) scenario of a monochrome digital world.
That is, imagery and other interesting graphic and sensory attributes that may help a site communicate with its target audience and make the site fun to use are subjugated to speed and efficiency. The average bandwidth of connectivity has increased substantially since this kind of approach was mandatory for a site to succeed in the mid-nineties. Site three is really built along the lines of ‘universal good site design’, that is, using a ‘lean and mean’ design methodology, as proposed by usability experts such as Nielsen in ‘Designing Web Usability’ (2000).

Figure 13 depicts the interface design of site three.

3.6 Method: procedure
All subjects were tested as members of their course group. Accordingly, five sessions were run. Subjects were provided with a seven page survey (see Appendices 1-4), the top page of which was for biographical data and to inform them of the broad purpose of the investigation. The rating scale was also explained here. This was a ten point interval scale with disagree and agree at the poles. Subjects were asked to indicate their level of agreement with a number of statements covering ‘collative’, ‘categorical’, and site related measures.

The statements were:
1. I have seen sites similar to this one.
2. This site is visually interesting.
3. This site is interesting to use.
4. This site is fun, visually speaking.
5. This site is fun to use.
6. This site is visually complex.
7. This site is easy to use.
8. This site is novel in its visual design.
9. This site is novel in the way you can navigate through it.
10. The design of this site is appropriate for a mobile phone company.
11. This site looks like a typical mobile phone company’s Web site.
12. This site is visually attractive.
13. I think that this site would take a long time to download.
14. This is a colourful site.
15. The animation is interesting.
16. I like the colour.
17. I like this site.

The three sites were evaluated by each subject using the same measures. In order to counter possible site order effects, two orders of presentation were used – normal ‘A’ order (one, two, three) and reverse ‘B’ order (three, two, one). Subjects were allocated at random to either order. Also, to provide masking between the site presentations, two
sets of pre-loaded sites of approximately five minutes duration were viewed between the target sites one and two, and two and three. The masking sites were unrelated in content to the target sites.

The masking sites were chosen as typical examples of commercial Web sites: some used animation, although most did not. They were from companies as diverse as a UK architectural practice, a Japanese car manufacturer, an Australian Web development and design company and a US mountain bike manufacturer. They were saved for viewing offline via the ‘save as Web archive’ option in Microsoft Explorer 5.0, with five levels of links included. Figures 14 and 15 depict these sites.

Each of the experimental sites (sites one, two and three) were viewed by the subjects for approximately ten minutes. Each subject was instructed to explore the sites by clicking on all of the links available on the ‘Aurora’ home page.

Figures 7 – 15 depict each of the three sites and the ‘masking sites’ inserted between sites one and two, and two and three of the experiment.

It may be noted that the experiment was not designed to measure typical usability performance attributes (learnability, efficiency, memorability). Even though not fully operational, this would not affect outcomes given the measures employed in the study.

3.7 Summary
Chapter three has described the experimental study designed to address the research questions outlined at the commencement of this chapter. The method and procedure of the experiment have been explained, and the rationale for the ways in which the three Aurora Web sites (the stimulus material) have been designed. The appendices contain the questionnaire described in this chapter.

Previous research involving non-Web subject matter (Whitfield and Wiltshire, 1982) found differences between the evaluations of two different groups of people – designers and non-designers. This was also an area of interest within this experiment. The results of this experiment are given in the following chapter, with discussion of the results appearing in Chapter five.
The three sites:

![Image of Aurora Mobile website](image1)

**Figure 7:**
Site one index page.

Animation, sound, imagery.

Note rollover functionality.

![Image of Aurora Mobile opening web page](image2)

**Figure 8:**
Opening Web page: describes study to participants.
Figure 9: Site one – animation sequence.
Figure 10: Site one – animation sequence continued.

Site one – animation ends at home page allowing interaction with navigation.
Figure 11:
Site one – individual pages of site.

Each page has animation sequence at opening (seen with this frame and the one below).

Sites two and three have static pages, but use same basic design.
Figure 12: Site two index page.

Imagery, but no animation or sound.

Note rollover functionality.
Figure 13: Site three index page.

No imagery, no animation and no sound.

No rollover functionality.

*Please note that the sites are available for viewing online at: http://home.iprimus.com.au/ahaig/aurora/start.html

The sites have also been included on the CD Rom to be found inside the front cover of this thesis.

Please ensure that you have the Flash plug-in loaded for use by your browser. There is a link on the study site to the Flash download page at www.macromedia.com
Figure 14: The first set of masking sites, viewed between sites one and two.

Figure 15: The second set of masking sites, viewed between sites two and three.
Chapter 4: Results of the Experiment

The main interest in the study was in possible differences in responses to the three sites. This ‘within-subjects’ effect – or difference – was therefore tested for as part of the statistical analysis. The study was also interested in possible differences in response due to Sex (male/female) and Course (Design group/Computing group). In addition, any effect due to the Order of Viewing the sites needed to be established. These ‘between-subject’ effects – or differences – were therefore tested for as part of the statistical analysis. Repeated Measures Analysis of Variance was used to analyse the data. The analyses were performed using SPSS (Statistical Package for the Social Sciences), version 10.0.

What follows is a description and analysis of each question in the questionnaire given to the study’s participants.
**Within-subjects analysis**

Subjects clearly differentiated amongst the three sites in terms of similarity to other web sites the subjects had seen, \( F(2,54) = 39.03, p < 0.001 \). Figure 16 indicates that site three was perceived as the most similar, with site one being perceived as the least similar.

Site three, then site two are perceived as the most similar to other sites previously seen. This may be due to them being conventional HTML sites with no Flash-based animation or sound or imagery. The bulk of the sites on the Web are generally constructed in this way — however, animation-based sites are becoming more popular as technology develops and bandwidth increases.

**Between-subjects analysis**

For this question no between-subjects effects achieved statistical significance.
Within-subjects analysis

Subjects clearly differentiated amongst the three sites in terms of visual interest, $F(2,54) = 68.45$, $p < 0.001$. Figure 17 indicates that site one was perceived as being of highest interest, followed by site two, and then site three.

![Figure 17: Mean interest of the three sites.](image)

The result here is as anticipated; site one with its ‘rich media’ content is perceived as easily the most visually interesting. The animation, sound, imagery and interface feedback found on site one is perceived as more visually interesting than site two that has imagery, and site three that has no visual enrichment whatsoever.
**Between-subjects analysis**

The only between-subjects effect to achieve statistical significance was for Course, $F(1,54) = 17.07, p < 0.001$. Figure 18 shows that the Computing group consistently rated the three sites as more interesting than their Design group counterparts.

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**This site is visually interesting**: Tests of between-subjects effects

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Question 3: The site is interesting to use

Within-subjects analysis

Subjects clearly differentiated amongst the three sites in terms of them being interesting to use, $F(2,54) = 81.20$, $p < 0.001$. Figure 19 indicates that site one was perceived as being the most interesting to use, followed by site two and then site three.

Site one, enriched with animation, sound and imagery, is regarded as being the most interesting to use. The navigational system utilises user feedback via image rollovers and sound and each page loads with an opening animation.
Between-subjects analysis

The only between-subjects effect to achieve statistical significance was for Course, $F(1, 54) = 10.40, p = 0.002$. Figure 20 shows that the Computing group consistently rated the three sites as more interesting to use than their Design group counterparts.

![Figure 20: Mean interestingness of the sites to use by subject group.](image)

This site is interesting to use: Tests of between-subjects effects

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</table>
Within-subjects analysis
Subjects clearly differentiated amongst the three sites in terms of them being ‘fun’, visually speaking (in visual terms), $F(2,54) = 83.20, p < 0.001$. Figure 21 indicates that site one was perceived as being the most ‘fun’ in visual terms, followed by site two and then site three.

This result is as anticipated. Site one, enriched with ‘rich media’ is perceived as being the most fun in visual terms. The multimedia components (animation, sound and imagery and interface feedback) contained on that site create more of a ‘fun’ experience in visual terms than the other two sites.
**Between-subjects analysis**

The only between-subjects effect to achieve statistical significance was for Course, F(1,54) = 11.22, p = 0.001. Figure 22 shows that the Computing group consistently rated the three sites as more ‘fun’, visually speaking, than their Design group counterparts.

![Figure 22: Mean perception of fun (visually speaking) by subject group.](image)

### This site is fun, visually speaking: Tests of between-subjects effects

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Question 5: The site is fun to use

Within-subjects analysis
Subjects clearly differentiated amongst the three sites in terms of them being fun to use, $F(2,54) = 56.05, p < 0.001$. Figure 23 indicates that site one was perceived as being the most fun to use, followed by site two and then site three.

This result too, is as anticipated. Site one, with animation, sound and imagery and interface feedback is fun to interact with. Animation, sound and imagery act as entertainment and the interface feedback contributes to an enjoyable, fun Web site ‘user experience’.
**Between-subjects analysis**

Again, the between-subjects effect for Course achieved statistical significance, \( F(1,54) = 9.21, p = 0.004 \). Figure 24 shows that the Computing group consistently rated the three sites as more fun to use than their Design group counterparts. The Viewing Order (\( AB \)) effect also achieved statistical significance, \( F(1,54) = 7.65, p = 0.008 \). Figure 25 demonstrates how the Order in which the sites were viewed determined how much ‘fun’ they were to use.

![Figure 24: Mean perception of fun to use by subject group.](chart.png)
**This site is fun to use:** Tests of between-subjects effects

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</table>

Figure 25: Mean perception of fun to use by viewing order.
**Within-subjects analysis**

Subjects clearly differentiated amongst the three sites in terms of visual complexity, $F(2,54) = 34.42, p < 0.001$. Figure 26 indicates that site one was perceived as being the most visually complex, followed by site two and then site three.

![Figure 26: Mean visual complexity of the three sites.](image)

Site one, whilst being regarded as the most interesting of the three sites to use, and the most fun to use, is also regarded as being the most visually complex. The level of visual complexity is therefore not overwhelming nor confusing, but is tolerated by the users.

**Between-subjects analysis**

For this question, no between-subjects effects achieved statistical significance.
**Question 7: The site is easy to use**

**Within-subjects analysis**

In terms of the sites’ ease of use, subjects did not clearly differentiate amongst them, \( F(2,54) = 3.22, \) N.S.

![Figure 27: Mean perceived ease of use of the three sites.](image)

Though not statistically significant, the result for this question is interesting. As figure 27 shows, site three, the basic HTML site, is perceived as being the most easy to use. With no animation, the site is the most easy to navigate through – a possible reason being that there are no visual distractions when using the site. However, site one, the enriched site (utilising animation, sound and imagery), is perceived as being the second most easy to use, ahead of site two, which also features no animation like site three, but does use imagery.

**Between-subjects analysis**

There were no between-subjects effects that achieved statistical significance.
Within-subjects analysis

Subjects clearly differentiated amongst the three sites in terms of the novelty in their visual design, \( F(2,54) = 37.50, p < 0.001 \). Figure 28 indicates that site one was perceived as being the most novel, followed by site two and then site three.

Figure 28: Mean perceived novelty of the three sites.

At the time of this research most web sites do not feature ‘enrichment’: they are reasonably static. Therefore the use of animation and sound appears to be perceived as more novel. At the time of writing, enriched sites have become rather commonplace and will soon (it can be anticipated) become the norm.
**Between-subjects analysis**

The only between-subjects effect to achieve statistical significance was for Course, \( F(1,54) = 5.66, p = 0.02 \). Figure 29 shows that the Computing group consistently rated the three sites as more novel in their visual design than their Design group counterparts.

![Figure 29: Mean perceived novelty of the three sites by subject group.](image)

**This site is novel in its visual design: Tests of between-subjects effects**

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Within-subjects analysis

Subjects clearly differentiated amongst the three sites in terms of their navigational novelty, $F(2,54) = 14.09$, $p < 0.001$. Figure 30 indicates that site one was perceived as being the most novel in its navigational method, followed by site two and then site three.

Figure 30:
Mean navigational novelty of the three sites.

As stated previously, most web sites do not feature an animated navigational system. At the time of the research, most Web sites are quite static: in fact, many sites use simple text based hypertext links or simple buttons as the basis of their navigational system.

Between-subjects analysis

There were no statistically significant between-subjects effects.
**Within-subjects analysis**

Subjects clearly differentiated amongst the three sites in terms of them being an appropriate design for a mobile phone company, $F(2,54) = 9.69, p < 0.001$. Figure 31 indicates that site one was perceived as being the most appropriate design, followed by site two and then site three.

![Figure 31: Mean appropriateness of the three sites for a mobile phone company.](image)

**Appropriateness of design to its context is an important and fundamental design principle.**

The context here is a mobile phone company – a technology-based organisation. Site one uses more technology (in its enrichment) and has more of a ‘high-tech’ feel and visual language or ‘style’. This may account for it being perceived as more appropriate for such a company.

**Between-subjects analysis**

No between-subjects effects achieved statistical significance.
Within-subjects analysis
Subjects did not differentiate amongst the sites in terms of them appearing typical of a mobile phone company’s Web site. The results were not statistically significant, \( F(2,54) = 2.12, \text{ N.S.} \)

Most web sites for mobile phone companies are constructed using HTML and do not feature animation or enrichment. Sites two and three were constructed using this method. Site one is perceived as being the least typical, but interestingly, is regarded as being the most typical design for such a site.

Between-subjects analysis
There were no statistically significant between-subjects effects.
**Question 12: This site is visually attractive**

*Within-subjects analysis*

Subjects clearly differentiated amongst the three sites in terms of visual attractiveness, $F(2,54) = 53.49$, $p < 0.001$. Figure 33 indicates that site one was perceived as being the most visually attractive, followed by site two and then site three.

![Figure 33: Mean perceived visual attractiveness of the three sites.](image)

*Site one, enriched with animation, sound and imagery, is perceived as being the most visually attractive. As the colour is consistent across all three sites, the enrichment – namely, animation, sound, imagery with site one and imagery with site two – seems to be the determinant of attractiveness.*

*Between-subjects analysis*

As previously, Course emerged as a statistical significant between-subjects effect, $F(1,54) = 12.91$, $p < 0.001$. Viewing Order (AB) also emerged as statistically significant, $F(1,54) = 7.62$, $p < 0.008$. In terms of Course, figure 34 shows that the Computing group consistently rated the three sites as being more visually attractive than their Design group counterparts. In terms of Viewing Order, figure 35 shows that the subjects who viewed the sites in the ‘B’, or reverse, order (sites three, two, one) consistently rated the three sites as being more visually attractive than their counterparts who viewed the sites in the ‘A’, or normal, one, two, three site order.
Figure 34: Mean perceived visual attractiveness of the three sites by subject group.

Figure 35: Mean perceived visual attractiveness of the three sites by viewing order.
In terms of the order effect, the perception that the sites' visual attractiveness was interesting was greater when the sites were viewed in the 'B' or reverse order. A possible explanation here is that when viewing the sites in the three, two, one order, perception of the animated site one is heightened due to the unexpected (animated) element occurring. The static nature of sites two and three act as a prelude to ‘the highlight’ of site one with its ‘rich media’ content.

When the sites are viewed in the ‘A’ or one, two, three order, the ‘viewing effect’ is reversed: the enriched site is viewed first, with the non-animated sites being perceived as less visually attractive. As with the ‘animation is interesting’ question (on page 81), viewers’ perceptions are not ‘warmed up’, but appear to be ‘cooled down’ when viewed in this order.

**This site is visually attractive:** Tests of between-subjects effects

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Within-subjects analysis

Subjects clearly differentiated amongst the three sites with regard to their perception of how long each site would take to download, $F(2,54) = 83.96$, $p < 0.001$. Figure 36 indicates that site one was perceived as being the slowest to download, followed by site two and then site three.

Site one, being enriched with animation and sound, is perceived (quite rightly so) as being the slowest in terms of downloading. In theory, the file size of site one is marginally larger than the others and would probably download slightly slower than the others. In reality, the difference in speed in download time is barely perceptible, if at all. The download time has been tested (informally) at several locations all over Melbourne on various Internet connections (cable modem, 56K modem) and there is no perceived difference in download time.

The results here probably reflect two things:

1. the education of the students involved (especially the Computer group) stresses the importance of download time, and its importance as a usability factor, but,
2. time moves on, and what was once a very contentious ‘Web issue’ is becoming less so as the general bandwidth of our connectivity increases and the design skills of Web designers develops, allowing them to make visually effective Web sites that are economical in their file size (and efficient in their download time).
**Between-subjects analysis**

The only between-subjects effect to achieve statistical significance was for Course, $F(1,54) = 5.61, p = .02$. Figure 37 shows that the Computing group consistently rated the three sites as being slower to download than their Design group counterparts.

**Figure 37:**
Mean perceived download times for the three sites by subject group.

---

### I think that this site would take a long time to download:

**Tests of between-subjects effects**

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Within-subjects analysis

Subjects clearly differentiated amongst the three sites in terms of colour, $F(2,54) = 54.36$, $< 0.001$. Figure 38 indicates that site one was perceived as being the most colourful site, followed by site two and then site three.

Figure 38: Mean perceived colourfulness of the three sites.

This is a most interesting and unexpected result. Site one is perceived as being the most colourful site; yet in terms of colour, all three sites are exactly the same. Sites one and two use more imagery than site three, but the colour scheme used on all three sites is identical. Viewers’ perceptions may have been influenced by the animation on site one, where colours and graphic shapes and components move about the interface, giving the impression that there are more colours than there really are. The results for this question suggest that the perceived ‘colourfulness’ of a site may be independent of the actual number of colours used.

Between-subjects analysis

For this question, no between-subjects effects achieved statistical significance.
Within-subjects analysis
Subjects clearly differentiated amongst the three sites in terms of the animation being interesting, $F(2,54) = 138.182$, $p < 0.001$. Figure 39 indicates that site one was perceived as having the most interesting animation, followed by site two and then site three. The results obtained for this question are the most surprising.

![Figure 39: Mean perception of the animation as interesting.](image)

**Overall, site one is perceived as having the most interesting animation, as should be the case, for it is the only site that actually contains animation. It is surprising that there was a general perception of sites two and three being animated, when, in fact, they were static.**

Between-subjects analysis
As previously, Course emerged as a statistically significant between-subjects effect, $F(1,54) = 10.48$, $p = 0.002$. However, Viewing Order (AB) also emerged as highly statistically significant, $F(1,54) = 20.20$, $p < 0.001$. In terms of Course, figure 40 shows that the Computing group consistently rated the three sites as having more interesting animation than their Design group counterparts. In terms of Viewing Order, figure 41 shows that the subjects who viewed the sites in the reverse order (sites three, two, one) consistently rated the three sites as having more interesting animation than their counterparts who viewed the sites in the normal one, two, three site order.
Figure 40: Mean perception of the animation as interesting by subject group.

Figure 41: Mean perception of the animation as interesting by viewing order.
The animation is interesting:

Tests of between-subjects effects

<table>
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<tr>
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</tbody>
</table>

The magnitude of the between-subjects effects indicates that Viewing Order has greater impact than Course. In addition, the absence of a significant Course by Viewing Order interaction indicates that the Viewing Order effect is independent of Course.

In terms of the order effect, the perception that the sites' animation was interesting was greater when the sites were viewed in the 'B' or reverse order. A possible explanation here is that when viewing the sites in the three, two, one order, perception of the animated site one is heightened due to the unexpected (animated) element occurring. The static nature of sites two and three act as a 'warm up' or prelude to the more 'graphically extravagant' site.

The reverse occurs when the sites are viewed in the 'A' or one, two, three order. The enriched site is viewed first, with the non-animated sites being perceived, rightly so, as having less interesting animation: they contain none. Viewers' perceptions are not 'warmed up', but appear to be 'cooled down' when viewed in this order.
**Within-subjects analysis**

Subjects clearly differentiated amongst the three sites in terms of liking the colour of the sites, $F(2, 54) = 15.61$, $p < 0.001$. Figure 42 indicates that site one was perceived as having the most likeable colour, followed by site two and then site three.

![Figure 42: Mean perception of liking the colour of the three sites.](image)

Again, as with the response to the question ‘this is a colourful site’, site one is perceived as being the most likable in terms of its colour. But again, all three sites use the same colour scheme and colours. The perceived attractiveness of the colour is influenced by non-colour factors that are independent of the colours used. This response suggests that it is what you do with the colours, such as animating them, that creates a favourable attitude towards them.
**Between-subjects analysis**

The only between-subjects effect to achieve statistical significance was for Course, \( F(1,54) = 8.63, p = 0.005 \). Figure 43 shows that the Computing group consistently rated the three sites as having more likeable colour than their Design group counterparts.

![Figure 43: Mean perception of liking the colour of the three sites by subject group.](image)

### I like the colour: Tests of between-subjects effects

<table>
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<th>Source</th>
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<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
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<td>5810.168</td>
<td>412.288</td>
<td>.000</td>
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<td>.855</td>
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<td>121.619</td>
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<td>.005</td>
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<td>9.754</td>
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<td>.409</td>
</tr>
<tr>
<td>Sex(^\text{e})AB</td>
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<td>1</td>
<td>21.581</td>
<td>1.531</td>
<td>.221</td>
</tr>
<tr>
<td>Course(^\text{e})AB</td>
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<td>1</td>
<td>10.793</td>
<td>.766</td>
<td>.385</td>
</tr>
<tr>
<td>Sex(^\text{e})Course(^\text{e})AB</td>
<td>.859</td>
<td>1</td>
<td>.859</td>
<td>.061</td>
<td>.806</td>
</tr>
<tr>
<td>Error</td>
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<td>56</td>
<td>14.093</td>
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<td></td>
</tr>
</tbody>
</table>
Within-subjects analysis

Subjects clearly differentiated amongst the three sites in terms of liking the sites, $F(2,54) = 49.07, p < 0.001$. Figure 44 indicates that site one was perceived as being the most likeable, followed by site two and then site three.

Between-subjects analysis

Course emerged as a statistically significant between-subjects effect, $F(1,54) = 7.75, p = 0.007$ and also Viewing Order (AB), $F(1,54) = 23.94, p < 0.001$. In terms of Course, figure 45 shows that the Computing group consistently rated the three sites as being more likable than their Design group counterparts. In terms of Viewing Order, figure 46 shows that the subjects who viewed the sites in the reverse order (sites three, two, one) consistently rated the three sites as being more likable than their counterparts who viewed the sites in the normal one, two, three site order.
Figure 45: Mean perception of liking the sites by subject group.

Figure 46: Mean perception of liking the sites by viewing order.
It is interesting that both the Course and Order effects are independent: there is no Course by Order interaction. Also, Viewing Order emerges as a more powerful effect than Course. Site one was the most liked site, irrespective of the viewing order.

As with ‘the animation is interesting’ question, the order effect is highly pronounced. The subjects liked all of the site designs more when viewed in the ‘B’ or reverse (three, two, one) order. Those that viewed the sites in the ‘A’, or one, two, three order, generally liked all three designs less than their ‘B’ counterparts.

**I like this site:** Tests of between-subjects effects

<table>
<thead>
<tr>
<th>Source</th>
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<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
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<td>6601.450</td>
<td>867.749</td>
<td>.000</td>
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<td>6.868E-02</td>
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<td>.925</td>
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<tr>
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<td>58.968</td>
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<td>.007</td>
</tr>
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<td>.000</td>
</tr>
<tr>
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<td>1</td>
<td>4.223</td>
<td>.555</td>
<td>.459</td>
</tr>
<tr>
<td>Sex*AB</td>
<td>17.668</td>
<td>1</td>
<td>17.668</td>
<td>2.322</td>
<td>.133</td>
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<td>Course*AB</td>
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<td>1</td>
<td>2.451</td>
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<td>Sex<em>Course</em>AB</td>
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<td>1</td>
<td>.519</td>
<td>.068</td>
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<td>426.023</td>
<td>56</td>
<td>7.608</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.1 Introduction
The three main findings to emerge from this research can be summarised as follows:

1. **Site enrichment was positively related to preference**
Web sites that are enriched or enhanced with animation, sound, imagery and interactive features were more likely to be positively related to users’ preferences. This supports Knutson (1997) but contradicts much usability research, such as Nielsen (2000). Site three was built along the ‘lean and mean’ guidelines proposed by usability experts such as Nielsen in ‘Designing Web Usability’ (2000), whilst site one and to a lesser extent, site two, used enhancements such as those listed above. Throughout the study, users reacted much more positively to site one (and to a lesser extent, site two) than they did to site three.

For both the Design and Computing groups, site preference increased with site enrichment. Site one, with animation, sound and imagery, was preferred to site two, which had neither animation nor sound but did contain imagery, while site two was preferred to site three, which used neither animation, sound nor imagery.

This finding supports the argument that an important question to consider when designing a Web site is not merely ‘can the site’s audience use the Web site?’, but also ‘does the site’s audience want to use the Web site?’ Visual, audio and interactive appeal are, as the findings show, very important design considerations.

2. **Differences**
The most intriguing feature of the results is that while both subject groups show very similar patterns of response, the Computing group evaluated most sites higher than the Design group. This difference is found throughout the data set (figures 47, 48). A possible explanation is that designers may underestimate the aesthetic performance of sites relative to their non-designer counterparts: or, non-designers may simply overestimate the aesthetic performance. To clarify the meaning of this difference, data from other subject groups representative of the general public would be required.

In order to gain an overview of the relationships amongst response measures for both subject groups, Multidimensional Scaling (MDS) was performed on each subject group’s data (figures 49, 50). MDS represents objects – or in this case, response measures – as a
set of points in multidimensional space. The locations of the objects are estimated from matrices of differences or similarities between all pairs of objects, and the distances between the points reflect the empirical relationships of the data. Essentially, the closer together two points are in the MDS space, the closer they are in their degree of similarity or association. Using ordinal measures in an Euclidean space restricted to two dimensions, both Kruskal’s Stress and the Rsq indicate strong fits between the data and their spatial representations (Kruskal’s Stress/Rsq: Design Group .08/.97: Computer Group .09/.97) (Haig and Whitfield, 2001).

3. Perceived attractiveness of colour
Each of the three sites used the same identical colour scheme. Users perceived that the colours used on site one were more attractive than the colours used on sites two and
three (site three was perceived as having the least attractive colours). The perceived attractiveness of the colour is clearly influenced by non-colour factors that are independent of the colours used. This response suggests that it is what you do with the colours, such as animating them, that creates a favourable attitude towards them.

5.2 Design group
The MDS reveals that site preference (‘I like this site’) is closely associated with a cluster of measures denoting ‘interesting...’ and ‘fun...’, and also includes ‘visually novel’ and ‘liking for the colour’ (figure 49). Measures disassociated from site preference are those denoting ‘similarity to other sites’, ‘typical of phone sites’ and, surprisingly, ‘appropriate for a mobile phone site’ and ‘ease of use’.

Figure 49: Multidimensional Scaling of Design group.

Figure 50: Multidimensional Scaling of Computing group.
These results suggest that the designers favoured sites that are high in ‘collative’ properties – i.e. novelty, interest – and low in ‘categorical’ properties – i.e. typicality, representativeness. ‘Fun to use’ also appears more important than ‘easy to use’, again suggesting ‘collative’, exploratory properties as key drivers of site satisfaction (Haig and Whitfield, 2001).

5.3 Computing group
Site preference is again closely associated with measures denoting ‘interesting...’, ‘fun...’, and ‘novel...’, and the two colour measures ‘liking for the colour’ and ‘colourful site’ (figure 50). Measures disassociated from site preference are those denoting ‘similarity to other sites’, ‘typical of phone sites’ and ‘ease of use’. As with the Design group, these results can be interpreted as indicating ‘collative’ properties as the drivers of site preference. Where they differ from the Design group is in the closer association of preference with ‘appropriate for a mobile phone site’ and ‘novel to navigate’. ‘Visual complexity’ is sufficiently removed from the other measures as to question its meaning for the Computing group (Haig and Whitfield, 2001).

5.4 Applications
The findings of the experiment are relevant for designers of Web sites and by implication, designers of other interactive communications media. Most available research on Web design focuses on usability, with very little scientific research conducted in the area that this thesis has touched on; that is, aesthetics in Web site design. With the exception of the present study, it appears that none has been completed by a designer using ‘real world’ design considerations and contexts. Given the rapid growth of the World Wide Web and its emergence as the dominant global communications medium, this is a remarkable oversight by the research and design communities. It is arguable that as the World Wide Web develops (and designers, writers, developers, programmers and others develop their skills alongside it) usability will become a ‘given’ “just as the mechanical performance of a washing machine or hair-dryer is now taken for granted. It will become a nil product differentiator” (Haig and Whitfield, 2001). Design will emerge as a primary force in creating and sustaining an exciting new communications technology that is changing the way we think about interpersonal communications, commerce, education and entertainment.

Finally, the correspondence between the Categorical-Motivation model predictions and the Multidimensional Scaling outcomes lends support to this model being a useful theoretical framework for investigating visual interfaces (Haig and Whitfield, 2001). In so doing, this research adds to a body of knowledge that seeks to understand aesthetic phenomena and, ultimately, to construct a robust predictive model.
In conclusion, this research has been an attempt to extend current knowledge of design principles and methodologies into seemingly uncharted research waters. The research focused heavily, or indeed, totally, on the aesthetic dimensions of Web site design and did not examine usability: it was an attempt to begin discussion on this important area of research. Useful avenues of future research would be to sample other subject groups, and to focus on the relationship between usability and aesthetics. The latter is perhaps one of the most challenging problems faced by interface designers.

In the print domain, when design dealt largely with local issues and local audiences, relying on some basic research to back up intuition-based design was a strategy that generally worked. As the WWW is a global and often cross-cultural medium (a Web site posted anywhere is viewable from anywhere), the financial investment involved in preparing a large scale Web site – for example, an e-commerce site or on-line educational site – is quite substantial. It is timely for the design profession to move beyond ‘informed intuition’ when designing for diverse audiences (especially when dealing with other cultures) and to consider the role that research can play in this regard. This is a critical aspect of the design process. Research such as that presented in this thesis will become commonplace in the Web and multimedia industry, and indeed the print industry as well, as print gets relegated from its ‘dominant medium’ position to a ‘support’ medium for the Web and other telecommunications media.

One dimension of this current research that I have earlier indicated as being potentially problematic is that of ‘Internet time or Web years’. That is, with the extraordinary speed of development that occurs on the Web, aspects of this research could prove to be out of date in the not too distant future. However, it is not the findings nor the experiment itself, that are important: rather, they point in an interesting direction, provide a framework for further research and can perhaps ‘start the ball rolling’ enabling more work to be done in this area. It is from a design point of view (which is going to be the most problematic area in terms of ‘datedness’) that the work may suffer in the future – but this is also inevitable and part of the currency of the Web. As a designer, you are very aware of the transitory, dynamic, ‘ebb and flow’ nature of this medium – it goes with the territory.

Specifically, with the current research, the way the ‘enriched’ or ‘rich media’ site has been constructed, with the opening ‘splash page’ of Flash animation, was, when
designed and produced, the industry standard, and a very common approach in terms of accommodating dynamic animation into a home or index page. This ‘cinematic’ design approach is based very much on Siegel’s (1997) idea of the ‘entry tunnel’ to a Web site, where the ‘mood’ and ‘tone’ of the site (and of the company) are established prior to entering the site proper. A ‘skip introduction’ button is included in the design to allow repeat visitors the option of ignoring the animated introduction. This, in retrospect, now seems a little ‘old’, a little gratuitous even, and is probably not the recommended way in which Flash would be implemented into a large commercial site today. But at the time of design and construction (and with the burgeoning interest in Web animation), it most certainly was an established procedure. As indicated, a lot can happen in a year and a half: site one was only designed in June 2000!
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Appendices

1. Survey cover sheet: Order A (sites one, two, three).
2. Survey sheet: Order A, site one (same for sites two and three).
3. Survey cover sheet: Order B (sites three, two, one – but presented as one, two, three).
4. Survey sheet: Order B, site one (same for sites two and three).
Web Site Design Research Questionnaire

Introduction
This questionnaire is part of a research project aimed at finding out people's perceptions of the design and performance of Web sites.

Please complete the details below:

Sex  ○ Male  ○ Female

Course and year

Instructions
All of the following questions involve a 10 point rating scale. The extremes are located at each end of the scale. Please colour the circle that best expresses your opinion. (Please colour only one circle for each question.)

Example a

This site is visually interesting

disagree ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ agree

Example b

This site is visually interesting

disagree ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ agree

Example a indicates that you strongly agree that the site is visually interesting. Example b indicates that you strongly disagree that the site is visually interesting.

If you have any problems understanding or completing the questionnaire please ask the administrator for help. Please do not write your name on the questionnaire. Your answers to the questions will be treated in confidence. The results of the research may be published.

Thank you for your help and co-operation.

Please answer the following 2 questions then go on to the following sheets.

It is more important for a site to function well than to look good

disagree ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ agree

I am very familiar with using the World Wide Web

disagree ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ agree

Appendix 1:
Survey cover sheet: Order A (sites one, two, three).
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<th>o</th>
<th>o</th>
<th>o</th>
<th>Agree</th>
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<td>o</td>
<td>o</td>
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<td>o</td>
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<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>Agree</td>
</tr>
<tr>
<td>I have seen sites similar to this one</td>
<td></td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
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<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>Agree</td>
</tr>
<tr>
<td>This site is visually interesting</td>
<td></td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
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<td>o</td>
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<td>Agree</td>
</tr>
<tr>
<td>This site is interesting to use</td>
<td></td>
<td>o</td>
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<td>o</td>
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<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>Agree</td>
</tr>
<tr>
<td>This site is fun, visually speaking</td>
<td></td>
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<td>o</td>
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<td>This site is fun to use</td>
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<td>This site is visually complex</td>
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<td>This site is novel in its visual design</td>
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<td>This site is novel in the way you can navigate through it</td>
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<td>The design of this site is appropriate for a mobile phone company</td>
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<td>This site looks like a typical mobile phone company’s web site</td>
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<td>Agree</td>
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Site 1

This site is visually attractive

I think that this site would take a long time to download

This is a colourful site

The animation is interesting

I like the colour

I like this site
Web Site Design Research Questionnaire

Introduction
This questionnaire is part of a research project aimed at finding out people's perceptions of the design and performance of Web sites.

Please complete the details below:

Sex ☐ Male ☐ Female

Course and year

Instructions
All of the following questions involve a 10 point rating scale. The extremes are located at each end of the scale. Please colour the circle that best expresses your opinion. (Please colour only one circle for each question.)

Example a
This site is visually interesting

Example b
This site is visually interesting

Example a indicates that you strongly agree that the site is visually interesting.
Example b indicates that you strongly disagree that the site is visually interesting.

If you have any problems understanding or completing the questionnaire please ask the administrator for help. Please do not write your name on the questionnaire. Your answers to the questions will be treated in confidence. The results of the research may be published.

Thank you for your help and co-operation.

Please answer the following 2 questions then go on to the following sheets.

It is more important for a site to function well than to look good

I am very familiar with using the World Wide Web

Appendix 3:
Survey cover sheet: Order B (sites three, two, one – but presented as one, two, three).
Appendix 4:
Survey sheet: Order B, site one (same for sites two and three).
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<th>Disagree</th>
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<tr>
<td>This site is fun to use</td>
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<td>This site is fun, visually speaking</td>
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<td>I have seen sites similar to this one</td>
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<td>I have seen this site previously</td>
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Predicting the Aesthetic Performance of Web Sites: What Attracts People?
First International Symposium on Smart Graphics.
IBM Research Headquarters, New York.