

# **EXPLORING A SEMIOTICS OF NEW MEDIA**

**A thesis submitted in partial fulfilment of the  
requirements of Napier University for  
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in Computer Science**

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**In memory of my father**

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# Publications

Listed below are the publications written by the author of this thesis in collaboration with his supervisors Prof. David Benyon and Dr. Susan Turner. All of the publications listed below are directly related to this thesis.

- O'Neill S. J., McCall R. G. (2004) Measuring Presence in Virtual Environments: Demo 1 The Botanic Garden, Video, CHI2004 proceedings CD2, CHI2004 Vienna, Austria.
- O'Neill, S. J., & Benyon, D. R. (2004). *Semiotics, HCI and the Avant-Garde*. Paper presented at the WS#18. Reflective HCI: Towards a Critical Technical Practice, CHI2004, 24-29th April 2004, Vienna, Austria.
- O'Neill, S. J., (2003). *Theory and Data: The Problems of Using Semiotic Theory in HCI Research*. Paper presented at the 7th Human Centered Technology Workshop, 15-16 December 2003, University of Sussex, Brighton, UK.
- O'Neill, S. J., & Benyon, D. R. (2003). *An Exploration of a Semiotic Model of Interaction Through Interactive Media*. Paper presented at the the International HCI, Arts and Humanities workshop, 21st July 2003, University of York, York, UK.
- O'Neill, S., & Benyon, D. (2003). *A Semiotic Approach to Investigating Presence*. Paper presented at the COSIGN-2003, Middlesborough.
- O'Neill, S., Benyon, D. R., & Turner, S. R. (2002). *Semiotics and Interaction Analysis*. Paper presented at ECCE 11, Catania Sicily.
- O'Neill, S., Benyon, D. R., & Turner, S. R. (forthcoming). The Semiotics of Interactive Systems. *To appear in Cognition, Technology and Work*.

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# Abstract

New technology is transforming our world by providing new mediating and communicating opportunities. Expert critical opinion highlights that these new media are essentially a reformulation of older media that have been transformed by integration with computers. Arguably, these transformations in media result in transformations of the familiar signifying systems that surround us. Thus, a semiotics of new media must be explored in order to understand how we interact with these new media sign systems.

In proposing a semiotics of new media, this thesis re-evaluates the basics of semiotic theories and their application in numerous older media domains. The specific problems of interaction with new media are considered, then a solution is proposed in relation to notions of embodiment and semiotic theory. A semiotic model is then developed that focuses on interaction and user interpretations of new media sign systems. An argument is also put forward from an embodied/semiotic perspective for a methodological approach that employs the strengths of both.

Empirical studies are conducted that explore the model and ascertain the suitability and robustness of the model when applied to new media systems, such as; mobile phones, the Photoshop desktop application and a novel virtual environment. The critical analysis reveals that the elements in the presented model are indeed relevant. Moreover, the embodied/semiotic method of analysis successfully highlights aspects of participants meaning making activities during new media interactions.

This thesis contributes to an understanding of how users make sense of their interactive encounters with new media sign systems from a semiotic perspective. The semiotic model and the embodied/semiotic method of analysis presented here, are the result of a wide-ranging exploration of semiotic theory in relation to HCI and new media. It is expected that this thesis will be used as the basis for further exploration and future work in this field.

# Introduction

The concept of 'new media' is a tricky concept to define. It is not clear when exactly it came into being, nor is it clear exactly what it means. For example, thinking about new media gives rise to several questions, such as, how is new media different from old media? Is it totally different or just marginally different? Similarly, what is new media about? Logically, the 'new' part of new media essentially refers to the introduction of new computer technology into previously non-computerised media forms. The 'media' part refers to those older media forms themselves, e.g. the fine arts, graphic design, architecture and film. Taken together, the study of new media is essentially about understanding the transformation from old non-computerised media to new computerised media. New media then, straddles two major areas of research, computer science and critical media/art theory.

Within computer science, it is Human Computer Interaction (HCI) that offers a lot in terms of understanding how people interact with computer systems and new technology. Over the last 30-40 years HCI has emerged as its own research domain, which continues to expand its understanding. The traditional HCI approach considers interaction from a largely cognitive perspective (Dix, Finlay, Abowed, & Beale, 1998), while others consider HCI in terms of interactive systems design (Benyon, Turner & Turner, 2004; Preece, Rogers, & Sharp, 2002). Others look for alternative positions from which to understand interaction with computers, such as the embodied approach of Dourish (2001) or the experiential approach of McCarthy and Wright (2004). Thus, HCI is continually exploring its theoretical positions, as highlighted in official ACM documents that consider the development of an HCI curriculum (Grover, 2001; Hewett et al., 1992). Indeed, wherever computers touch on the activities of humans, HCI is there to try and understand it.

However, there is something fundamentally different about understanding interactions with a calculator and understanding interactions with an interactive movie or even interactive moviemaking software. Clearly, there is much more going on in an interactive movie than in a calculator. Interacting with an interactive movie involves

some form of continued interpretation, manipulation and formulation of numerous sign systems in relation to both personal social and cultural backgrounds, which are not always easily articulated from an HCI perspective. Traditionally, working with any media has been about the production, expression and communication of ideas. Similarly, the reception of media has been about understanding, interpreting and commenting on those ideas. Critical theory, semiotics in particular, has a long history of exploring these issues whereas HCI does not.

Therefore, the problem with HCI, in relation to new media, is that it lacks the history and theory to ground new media within the necessary context of older media. While the HCI approach to new media remains locked in the discussion of usability issues and system design methodologies, a more critically framed approach e.g. semiotics, offers a broader insight into the transformation that new media is having on our production and interpretation activities. That said, aspects of interactivity from HCI research remain highly relevant to the development of this approach. What semiotics has over HCI in understanding media, it loses when it comes to understanding interacting with technology. Thus, the position taken in this thesis leans towards a critical theory approach to new media, but places much of the discussion in relation to HCI issues, e.g. focusing particularly on semiotic theory in relation to the notions of interpretive interaction and meaning making with new media.

## Research Questions

The research presented in this thesis builds from a critique of contemporary new media theory, a re-evaluation of semiotic theory in relation to older media and notions of embodiment in other approaches to HCI. The aim is to develop an integrated semiotic model of interaction that is appropriate for describing interactions with new media, which can be explored through empirical studies. The research questions proposed here are derived from a need to understand how semiotics might contribute to the articulation of new media characteristics and are continually referred to throughout the thesis.

### Question 1

**“Given the characteristics of new media, what aspects of existing semiotic theory in relation to older media are relevant to the development of a semiotic theory of new media?”**

This question is answered in this thesis through a literature review (Chaps 1,2 and 3), that explores both the characteristics of new media and how semiotics might be brought to bear upon them, via an understanding of the semiotics of older media.

### **Question 2**

**“How might the concepts identified as relevant to the development of a semiotic theory of new media be combined to produce a model of interaction with new media systems?”**

This question is answered in Chapter 4 and 5 specifically, where initial semiotic studies are conducted and the problems of developing a semiotic model of interaction are considered in detail. A solution is then proposed, based on theories of embodiment that are related to semiotics via the work of Jacob von Uexkull.

### **Question 3**

**“Can the proposed semiotic theory be applied to the study of new media in order to identify the codes that users employ in understanding their interactions”**

This question is driven by a need to explore the proposed model, in relation to two key types of new media that are identified in the literature review. The answer to this question is provided by studies that explore user interactions with new media (Chapters 7 and 8), where evidence is found to support the proposal of the model from literature. To this end, the purpose of the studies is to answer three sub questions that aim to:

- Determine through observation and interpretation how messages are defined i.e., what they are, how they are constructed etc.
- Determine what users do with and to such messages.
- Determine what types of meanings are actually generated by the users that manipulate these messages.

The purpose of developing a semiotic model of interaction with new media is to find an analytical framework that treats all interactions across different domains, as the production, manipulation and interpretation of signs. This thesis shows how it is derived theoretically from literature and explored via studies that incorporate real world situations of interaction with different kinds of new media.

## **The contribution to knowledge made in this thesis**

As new technology changes the way we interact with the media that surround us, the sign systems that we recognise are transformed as new signifiers emerge. The question of how we make sense of these new sign systems is paramount if we are to understand the changing world around us and the new forms of interaction that are becoming a part of our daily lives. This thesis makes a contribution to the knowledge of how we understand these new media systems in a number of ways.

Firstly, this thesis contributes to an understanding of new media, by identifying aspects of semiotic theory that are relevant to developing a semiotic theory of new media. Secondly, rooted in the study of sign systems and notions of embodiment, the research presented in this thesis contributes a semiotic model of interaction with new media that places the user at the centre of activity engaged in the interpretation of sign systems that fall into two broad categories; hypermedia and immediacy. Thirdly, this thesis contributes to HCI through the development of methods of data gathering and analysis that allow not only a semiotic analysis of systems as texts, but of the meanings users make as they interact dynamically with those texts.

Ultimately, in doing this research, a critique of semiotic theory in relation to new media is developed and a fundamental problem emerges, namely, the lack of any pre-existing semiotic theory that is capable of both theorizing about interactive sign systems or producing user focused empirical findings. Semiotics has long suffered for its lack of empirical support for its assertions, in relation to the interpretations of readers. The research presented here attempts to deal with this problem, by developing an argument for a semiotic approach that borrows a great deal from the concept of embodiment. In this way, empirical data gathering and grounded theory are built into an embodied semiotic understanding of user interactions. This in itself can be considered as a contribution to semiotic theory, simply because there is such a lack of research that attempts to bridge the theoretical/empirical gap (Chandler, 2002) (Mick & Buhl, 1992).

## **The Thesis Structure**

### **Chapter 1 New media and HCI**

This chapter identifies the problem domain in relation to understanding new media. It explores the existing literature in the field, and is an attempt to identify what new media

is, what its characteristics are and how it is related to older media. The crucial aspects of this chapter focus on notions of new media, such as hypermedia and immediacy, the traditional cognitive models of HCI, the phenomenological approach to HCI and existing developments in the field of computer semiotics. As such, this chapter offers a map of the research territory and a positioning of this thesis within the field.

## **Chapter 2 Semiotic Theory**

The second chapter focuses on a reassessment of the numerous branches of semiotic theory, in an attempt to outline the specifics of important semiotic concepts, which may or may not be relevant to understanding new media. It is an overview of the fundamentals of semiotic theory that constitutes the basis of ideas, tools and techniques that are employed throughout the thesis.

## **Chapter 3 Applied Semiotics**

Chapter three goes on to explore the use of semiotic theory as applied in different domains other than HCI. This chapter focuses on uncovering how semiotics is useful in analysing and understanding different sign systems. It aims at disclosing commonalities across these domains that might be applicable to new media research. The reason for this broad ranging exploration of diverse fields is based partly on the inherent multidisciplinary approach used in HCI research and on the need to understand how semiotic theory works outside of its primary domain of language. Areas that are explored include: information design, advertising, architectural semiotics, wayfinding, product design, and web design.

## **Chapter 4 The Semiotic Analysis of Three Mobile Phones**

In Chapter 4 a number of different semiotic techniques developed for ‘old media’ are employed to analyse mobile phone interfaces, with a view to exploring the relevance of existing semiotic approaches in relation to new media artefacts. Taken as a whole, this chapter clearly shows the strengths and weaknesses of existing semiotic theory. It pinpoints a difference in analysing static texts and dynamic interactive texts, as well as highlighting the lack of a user perspective in traditional semiotic approaches.

## **Chapter 5 An Integrated Semiotic Model of Interaction with New Media**

This chapter identifies the fundamental problems in applying semiotic theory to understanding new media explored in the previous chapter. In solving these problems, a proposal is put forward for a model of interaction that is based on semiotic ideas in

relation to embodiment. The model is an attempt at synthesising theories via the ideas of Jakob von Uexkull (Sebeok, 1979), that produces a unique framework for understanding interaction with new media that focuses on the interpretation and manipulation of signs by an embodied user.

### **Chapter 6 Methods**

This chapter outlines the methodological approach used in the studies conducted for this research. It develops the argument for a qualitative semiotic data gathering approach to exploring the meanings that users develop and use during interaction. It also deals with the practical issues of developing a method of investigation and sets the ground rules for the following studies, combining phenomenological data gathering techniques and analysis using semiotic theory.

### **Chapter 7 Interacting with the Hypermedia of Photoshop**

This chapter is a detailed qualitative analysis of three individual user studies. It links the proposed model with data from the real world and it uncovers some of the codes that users employ while interacting with new media systems of this kind. Also, three zones of interaction emerge from the grounded aspects of this study, which was something that was not expected at the outset. These zones are considered in relation to the purpose of this thesis, but not explored in depth. As such, they offer the starting point for further work beyond the remit of this thesis.

### **Chapter 8 Interacting with the Immediacy of Virtual Environments**

This chapter is an attempt at a further exploration of the model in relation to a virtual environment that promotes immediacy. New media that promote immediacy behave differently from those that are based on hypermedia. The exploration highlights some of these differences, while providing further evidence for the proposed model and uncovering further user codes employed in understanding the virtual environment.

### **Chapter 9 Conclusions**

In this chapter the answers to the research questions are discussed in relation to the development of a semiotics of new media. All the studies are evaluated in relation to the model and future work is proposed that might include further evaluations of the model in different domains. The evolution of the model is also proposed that might include the zones and meanings, as well as a proposal for understanding the user/designer relationship from a semiotic perspective.

## Summary

The thesis presented here starts from the premise that new technology is transforming the world around us, by providing new mediating and communicating opportunities. It then goes on to propose that these transformations in media result in transformations of the signifying systems that we use in our daily lives. Therefore, a semiotics of new media must be explored. In proposing a semiotics of new media, this thesis re-evaluates the semiotics of numerous old media domains. In doing so, the thesis presents a list of criteria that should be included in a semiotic theory of new media. This set of criteria is then developed into a semiotic model of new media that specifically deals with the problems of interaction and the interpretation of interactive sign systems. Empirical studies are conducted to explore the model and ascertain the suitability and robustness of the semiotic criteria within the model when applied to real world new media interactions. This thesis contributes to an understanding of how users make sense of their interactive encounters with new media sign systems from a semiotic perspective.

# 1 New Media and HCI

Human Computer Interaction is recognised as a highly multidisciplinary domain of research, with contributions made from computer science, cognitive psychology and phenomenology to name but a few. Before considering some of these different approaches in relation to this thesis, it is important to reconfirm the focus of this thesis, by making a distinction between approaches to ‘traditional HCI’ and approaches to ‘New Media’. In this thesis, approaches to traditional HCI are considered to be concerned with activities, such as task based analysis, interactive systems design, user centred design, usability and systems evaluation, in relation to developing interactive technology. While new media can be considered from a traditional HCI perspective as a strand of interactive technology, this thesis argues that an alternative perspective must be considered, one that takes into account the history and theory of older media, in order to fully grasp the changing landscape of media technology.

It is important to understand that research focused on new media is not simply just about understanding interactive systems or computer support tools. It is about understanding the repercussions of the transformation in already existing media caused by the amalgamation of older media forms with interactive digital technology. It is this transformation that has created new media and it is this transformation that demands the re-evaluation of existing media theories.

The most important aspect of this, in relation to the thesis presented here, is the historical grounding of new media in the arts where there is a strong desire to support the creative endeavours of the people who use them. Or as Marshal McLuhan put it, to make technology become the “extensions of man” (McLuhan, 1994). It is argued in this thesis that the birth of new media resides in the experimental impetus of the American art scene during the ‘50s and ‘60s, where the boundaries of convergence in existing media were first tested and artists began to embrace the world of newly invented technology. New media has thus evolved through the assimilation and convergence of existing older media into new computerised technology that not only supports sign

systems that are associated with older media, but also eventually alters them, creating new media with its own sign systems that must be understood in order to interact.

The relationship between sign systems, media and the people that use them has a long theoretical history known as semiotics. It is also argued in this thesis, that a re-evaluation of a number of concepts from semiotic theory is appropriate for understanding the characteristics of some of these new media and theorising about the way in which people interact with them, thus offering a fresh perspective on new media theory.

## **1.1 The Avant-Garde and The Birth of New Media**

Vannevar Bush is generally credited as the first person to conceive of computers as media. In his 1945 essay 'As We May Think' (Packer & Jordan, 2001), Bush proposes a solution to the problem of storing, accessing and manipulating the increasing amounts of information of his day. Based on library processes for the mechanical retrieval of microfilm, his 'Memex' (memory extender) was conceived as a device that could trace the human capacity for associative indexing of information. As users traversed through the physical database of information, the Memex would remember the links that were made by an individual creating a trail through the information, much like a train of thought. Bush's proposed idea is widely accepted as being the first incarnation of what Ted Nelson would later call 'Hypertext.'

The invention of 'Hypertext' by Ted Nelson, although traced back to Vannevar Bush's Memex machine, really originates in trends within the avant-garde and conceptual art movements of the time. The likes of John Cage, Robert Rauschenburg, William Burroughs and their associates were all interested in pushing the boundaries of their chosen medium, exploring notions of randomness and chance as a tool for making art (Osborne, 2002; Packer & Jordan, 2001; Pritchett, 1993). Several of these artists employed the idea of the 'cut-up'. Literally cutting up sections of text, musical scores, sound recordings or images and rearranging them with other elements in a kind of collage. Building the first attempts at new types of narrative and media exploration. Indeed, Ted Nelson saw the ideas behind the Memex as a potential way to write non-linear narratives or texts that were inspired by the novels of William Burroughs (Burroughs, 1968, 1971). As Nelson envisioned it, 'Hyperlinks' would allow discrete

portions of computerised text to be linked together into ‘Hypertexts’ and accessed in a non-sequential fashion. This would allow writers to produce work that challenged conventional notions about hierarchies and linear reading. This is exactly the same subversive attitude towards conventional media that was at the heart of the artistic movements of the time.

Similarly, these artists were also exploring the notion of rule-based systems to create artworks. John Cage, for example, wrote many scores that were simple instructions for the performer, without writing a single note of music. Allan Kaprow formulated a set of rules as a medium through which anyone could take part in one of his ‘happenings’. The Fluxus movement, in general, contributed to ideas of ‘intermedia’, where multiple media (music, dance, painting, sculpture etc.) converged in performances that finally resulted in ‘scores’ and ‘instructions’ becoming artworks in themselves (Osborne, 2002).

These notions challenged the accepted understanding of the artwork and indeed the artists’ medium, often attempting to combine different media together into collages made from various physical objects, sound and light, performance or indeed all of these elements at once. Along with a desire within the avant-garde to challenge the relationship of the artist and the viewer (beginning with audience participation), these notions exist as part of a tradition of the subversion of traditional art forms, artistic expression and the use of creative media, which is directly related to the climate of exploration and invention in the late ‘50s and early ‘60s America, that spawned today’s personal computer. Artists and engineers collaborated on numerous projects at this time, e.g. Rauschenberg’s collaboration with Billy Klüver from Bell Laboratories in Experiments in Art and Technology (E.A.T.), (Mattison, 2003). While it may be too much to suggest that the avant-garde had a direct part to play in the invention of the personal computer, it is possible to say that the spirit of exploration and the desire to push the boundaries of multiple media, championed by these artists, finally found its ultimate expression in the form of today’s convergent new media.

Engelbart’s invention of ‘bitmapping’ for example, combines different aspects of physical materials and rule based systems to make a direct connection between the electrons that flow through the processor, memory and screen of the computer, and the

binary codes/rules that manipulate them. The direct switching of the processor and the firing of the electrons at the screen become directly affected via the mouse (Paul, 2003). Light, electricity, memory and binary code have become the constituent parts of a new medium.

Alan Kay and Adele Goldberg in their 1977 proposal for the ‘Dynabook’ put forward a compelling argument for considering the computer as a medium in its own right, stating that:

“Devices which variously store, retrieve or manipulate information in the form of messages embedded in a medium have been in existence for thousands of years... The computer, viewed as a medium in itself, can be all other media... moreover this new ‘meta medium’ is active - it can respond to queries and experiments.” (Packer and Jordan, 2001 pp 169-170)

This is perhaps one of the clearest insights into the relationships between artistic and scientific exploration that has pushed forward the development of modern computer systems. For example, the notion of the database as a source material that is manipulated by users/artists via algorithms and rules (or coded messages) that describe their intentions formally (Manovich, 2001), is one of the latest theories of new media that has its roots in this fertile territory.

## 1.2 The Computer as Medium

Computers consist of many different elements that make them what they are. The 1s and 0s of binary code are just one element along with others such as; software, hardware, colour monitors, and electricity, all of which combine in different situations of use, from word processing to exploring virtual environments, to give the computer its unique place as a mediating device in today’s society. This fairly traditional view has long been established in HCI circles, but thinking of the computer as a medium in its own right, with each of these elements contributing different qualities to it, asks a different set of questions. Malcolm McCullough, for example, points out that different media have different affordances and constraints (McCullough, 2001). Computerised media, in particular, appear as abstracted versions of older media i.e. a metamedium. We never see the 1s and 0s let alone touch them or manipulate them as people do with the base material of more traditional media. So how can we understand the qualities of a medium that seems so far removed from its basic characteristics? What are the qualities

that make something a medium and what exactly do we hope to gain from thinking about computers in this way?

### 1.2.1 An Artistic Medium?

Artists, artisans and trades people have an uncanny tacit knowledge of the medium they work with. Painters understand not only the colours that they apply to their canvases, but also the consistency of their paints, how to mix them and how long they will take to dry. Sculptors have a vast amount of knowledge about how to manipulate raw materials such as clay, wood, steel and marble. This knowledge is developed through a particular understanding of the characteristics of such materials, even down to different types of wood or different types of paint, for example. These characteristics provide the user, painter or sculptor, with useful knowledge about the kinds of things a material can be used to express. For example, clay is a particularly good medium for modelling the human figure. It is malleable, with just enough resistance to hold the shape it has been formed into. It can be squashed, torn, formed, built up and shaved away as desired. Its qualities afford this type of use, just as much as they constrain its use as a material for building chairs.

The concept of 'affordance' (Norman, 1998) is something that has often been expounded in traditional HCI literature as a design principle, where everyday things, to paraphrase Norman, are designed with the user in mind to afford a particular use. For example, chairs afford sitting, stairs afford climbing, hammers afford hitting. This idea is also known in design circles as 'form follows function' whereby economical design is achieved through first establishing its purpose and then designing it to execute this purpose as effectively and economically as possible. The problem with affordance in relation to HCI is that computers have very few properties that behave in the same way as traditional materials. Computers do not behave like clay or wood, nor do they afford sitting or climbing. If form follows function, what computers do afford is computing. However, the development of new media appears to be changing that. McCullough, for example, advocates the abstraction of craft to the point where new digital media compute things like the consistency of paint or resistance of materials to recreate the specific feel of certain creative activities. These new media are still emerging and evolving as technology develops, but the main driving force behind them remains the artistic desire to create and express ideas. Attempting to understand the characteristics

of new media from this perspective is essential if we want to understand our attempts to interact with them and what they might afford.

### 1.2.2 A Mass Medium?

In his book, from 1964, “Understanding Media” (McLuhan, 1994) Marshall McLuhan shows a fundamental concern with the electrification of communication mediums in the form of Global TV networks, and industrialised societies. His statement “The Medium is the Message”, is an attempt to address the way in which the electrification of media affected the way in which we communicate. In other words, McLuhan explores how new mediums, particularly TV, affected the messages that we make.

McLuhan’s focus is on the very nature and qualities of the materials used to express messages (McLuhan, 1994 p12), and can be considered to derive from concerns within the arts. Cubist, Futurist, Dadaist and Bauhaus ideas focused on the characteristics of various media for making art (Genesko, 1999), resulting in the exploration of the qualities of materials in late modernism and notions of mediation and ‘intermedia’ explored by the conceptual artists and American avant-garde, as discussed earlier. McLuhan’s concerns with the electric qualities of mass media can be considered as an extension of these ideas. For him, it was the very characteristics of electricity and light, inherent in the medium of television that afforded the extension from localised communication to global communications and reshaped the way in which we construct, transmit and receive our messages. Key themes that are central to much critical media theory, are the social and political repercussions of a move towards a larger passive receiving population, coupled with a monopolisation of the powerful message making elite. Mass media is essentially one-way traffic, from producers to consumers, or authors to readers in semiotic terms.

Traditional HCI tends to understand new media in a similar way, with giant design corporations e.g. Microsoft and Apple, producing computer systems for the mass market. Indeed, like McLuhan’s television, some of the constituent components of a computer are light and electricity, which are central to understanding the computer’s capacity for screen-based input/output of communication elements over vast networks. However, McLuhan’s notions of mass media become problematical in relation to HCI because of the shift away from the broadcast and passive reception of media to the interactive view that is now inherent in all aspects of computer operation. The problem

here is with understanding the change in characteristics derived from an inherently global medium e.g. TV, that undergo transformation through computerisation and hence localised interaction. The reception of messages is no longer passive but interactive in the case of new media. An interesting aspect of this then, is the blur between the role of the author and the reader, where users are much more in control of how they interact with and interpret the material they receive, as well as being increasingly in possession of the skills to participate in the construction and transmission of their own messages. Indeed, the open source community is very much predicated on the importance of free access to software and participation in the production of it. Users and designers become one.

### **1.2.3 A New Medium?**

In terms of trying to understand the computer as a medium (Andersen, Holmqvist, & Jensen, 1993) it can easily be argued that these new digitised media are best understood in terms of binary code. While this is ultimately true on one level, there is a big difference between the qualities of new media supported by computers these days and the qualities computers were originally designed with. Early computers were calculating machines, where programmers spent their time writing software and inputting commands laboriously, either to calculate something or to control some other machine. Computers these days are complex convergent multimedia machines that are networked with one another, not only in the work place but also in the home. Users do not directly manipulate the binary code. They manipulate convergent abstracted sign-systems, the ‘meta medium’ of Kay and Goldberg, in order to perform everyday tasks such as banking or shopping. While binary code still remains, sign systems that represent concepts and familiar activities have been introduced as an interface for interaction allowing us to understand them in our own terms. The new media sign systems that represent word processing, for example, are essentially the old media sign systems of typing and type setting that have been assimilated into computer culture. Similarly, the new media sign systems used to represent Photoshop are the old media sign systems of painters and artistic practitioners. As technology has developed, more and more sign systems from older media have been assimilated, through abstraction, into the language of the computer interface. At least, this seems to be the trend.

However, while understanding the sign systems associated with older media may be a relevant starting point, arguably it is not enough. The very combination of these sign

systems with computer technology has given rise to new versions of these sign systems, and these new versions continue to evolve as technology advances. The computers of the future will be distributed everywhere. The boundaries between computing and living will become more and more blurred as we not only interact with, receive and transmit through, but also wear and live inside computer-supported environments. New media is rapidly becoming part of the fabric of our day-to-day lives and understanding the characteristics of this media is becoming an essential aspect of 21<sup>st</sup> century living.

### **1.3 The Characteristics of New Media**

Computers have become highly complex devices that consist not only of simple computational forms but also of complex cultural forms (sign systems) derived from the older media that they have now assimilated (Manovich, 2001). The parameters, and qualities of the computer as a medium have increased dramatically as they have taken these new forms on board. New media retains some of the qualities of both artistic media and mass media. However, the very nature of these older media forms has been subject to change by the qualities of the computer and must now be understood within a new contexts (McCulloch, 1996, 2001). With the relationship between old and new media in mind, it is important to establish the fundamental characteristics of what aspects of old media still apply to new media and more importantly, what is ‘new’ about new media?

#### **1.3.1 From Old to New Media**

A number of different theorists have attempted to identify the characteristics of new media. Many of their ideas are similar, but few of them offer terminologies that provide a clear definition of what the fundamental features of new media are. Largely, this is because there are wide ranges of new media types that do not always combine the same characteristics. Therefore, it is only through scrutinising a wide range of media that recurrent characteristics can be identified.

Christiane Paul classifies a number of characteristics of the new medium in her book “Digital Art” (Paul, 2003), in particular she notes that its features are; recombinant, interactive, participatory, dynamic and customisable. Randall Packer and Ken Jordan also provide a categorisation of the characteristics of multimedia in their book “Multimedia from Wagner to Virtual Reality” (Packer & Jordan, 2001). They include integration, interactivity, hypermedia, immersion and narrative in their definitions.

Similarly, Lev Manovich provides another list of characteristics taking care to separate some of the differences between old and new media in his book “The Language of New Media” (Manovich, 2001). Essentially, Manovich’s new media characteristics are: Numerical representation, where all new media objects are composed of digital code i.e. binary; Modularity, where new media elements, be they images, sounds, shapes or behaviours, are represented as collections of discrete samples (e.g. pixels, polygons, voxels, characters or scripts); Automation, the possibility of creating or modifying new media elements through the use of pre-programmed templates or algorithms e.g. applying filters to images in Photoshop; Variability, new media objects are not something that are fixed and immutable. Unlike older media, new media objects can exist as numerous different versions of the same thing; Transcoding, the translation of one thing into the format of another e.g. the colours of a picture into sounds.

While there are many different kinds of terminology used to describe new media, it is clear that many of them have overlapping descriptions. For example, much of what Paul terms as ‘recombinant’ is the same as what Packer and Jordan call ‘integration’ or Manovich terms ‘modularity’. In considering all of these descriptions together, it is important to identify the essential characteristics of new media that set it apart from older media and traditional interactive technology, while being derived from the combination of the two.

### **1.3.2 The Digitisation and Abstraction of Older Media Forms**

The digitisation and abstraction of older media forms into the domain of interactive technologies are essentially what set new media apart from old media. New media are abstracted digital versions of older media that retain some of their initial characteristics such as paint colours, mixing and brushes. However, these are transformed by taking on digital qualities e.g. storage as binary data, multiple versioning, transcoding and digital manipulation via algorithms. New media include digitally abstracted versions of drawing, painting, filmmaking, music production and writing. They are essentially different from traditional technologies and machinery, in that there is an important focus on the manipulation of materials that attempts to retain the feel of older media, while capitalising on the storage, versioning and networking possibilities offered by digitisation.

### **1.3.3 The Convergence of Multiple Media Forms and Technology**

Another essential aspect of new media is the convergence of media forms that come about through digitisation. The “intermedia”, so sought after by the avant-garde artists of the ‘60s, becomes a reality in new media technology. Multiple images, multiple film clips and multiple sound sources become integrated in interfaces and artefacts. Convergence goes further still, when mobile phones for example, become smart phones, capable of transmitting and receiving video messages as well as making phone calls, sending texts and acting as an alarm clock. Convergent mobile new media promise the possibility of ‘anytime anywhere’ communication facilities where we can create, send and receive multi-media messages allowing for the further production and interpretation of participatory cultural elements. This again is different from traditional technology, where the extent of convergence was once the ‘calculator digital watch’ or even the ‘tea’s made’. The convergent functionality of new media is about the production, communication and interpretation of messages on a global scale.

### **1.3.4 The Interactive Production and Interpretation of Meaning**

Interactivity deserves some special consideration in relation to the position taken in this thesis, as both Paul and Manovich claim that the over use of this term has in some way rendered it at best confusing and at worst meaningless. From a traditional HCI perspective, Heath and Luff (Heath & Luff, 1996), in their studies of the London underground control room, contend that interactive technologies offer the potential of interaction ‘with’ and interaction ‘through’ them. Interaction ‘with’ involves the manipulation of the interface to perform certain tasks, whereas interacting ‘through’ is the resultant goal achieved by interacting ‘with’, such as sending a message to someone at another computer over a network or perhaps printing a finished document after a spell of word processing.

While Heath and Luff’s interaction ‘with’ and ‘through’ still hold true for new media, clearly new types of interaction with the convergent multiple sign systems of new media demand better understanding. Interaction with new media is not just about ‘with’ and ‘through’. Interaction with new media is about the relationship between the production and interpretation of new media sign systems. For example, traditional media, such as film, TV and even painting, were largely focused, by an elite, on the production of messages for consumption by the masses. While this is still very much the case, new media brings the relationships between the designer/user, author/reader and

producer/consumer into question. There is a blurring between what were once sharply defined roles.

Older media have always been interactive for those that have attempted to use them to express themselves, but they have not always been interactive in the same sense for the interpreters of those expressions. Traditional painting is about an artist interacting with the medium of paint to produce visual messages that are interpreted by a viewer. The new media equivalent sees an artist having to interpret complex manufactured sign systems in order to interact with and customise digitised paint. At the same time, this artist is using that system to produce artwork to be interpreted by other viewers. If this artist's goal is to produce interactive art, the role of the viewer is no longer about the passive interpretation of art but about the active manipulation of interactive media in order to make sense of it. The boundaries between author and reader have been eroded, as are those between producer and consumer.

The traditional HCI view of the designer/user maintains the separation of the two with designers designing interfaces to be 'used' by users. The convergent nature of new media brings this sharply into focus, by highlighting that it is no longer adequate to think of designers and users in this way. Designers and users both interactively produce and interpret interfaces at different times and in different ways. When Manovich states that:

“Modern HCI is by definition interactive. In contrast to earlier interfaces such as batch processing, modern HCI allows the user to control the computer in real-time by manipulating information displayed on the screen. Once an object is represented in a computer, it automatically becomes interactive. Therefore, to call computer media 'interactive' is meaningless- it simply means stating the most basic fact about computers.” (Manovich, 2001 p 55)

He is correct, however by adopting a traditional HCI approach, he fails to understand the key aspect of interaction with new media, which highlights the change in relationships between major stakeholders such as designers and users. Where Manovich terms everything rendered by computers as interactive, Paul makes a distinction, in relation to digital art, that helps to clarify a difficulty with the term in relation to the production and interpretation of new media:

“Ultimately, any experience of an artwork is interactive, relying on a complex interplay between contexts and productions of meaning at the recipient’s end. Yet, this interaction remains a mental event in the viewer’s mind. When it comes to experiencing traditional art forms: the physicality of the painting or the sculpture does not change in front of his or her eyes. With regard to digital art, however, interactivity allows different forms of navigating, assembling, or contributing to an artwork that go beyond this purely mental event.” (Paul, 2003 p 67)

Interaction with new media then, relies on the oscillation between two poles, consisting of both the interpretation of the presented complex interface/content sign systems on one level and the participative manipulation, or ‘use’ of those sign systems, to produce transformations in the content in order to complete the experience.

New media are essentially older forms of media that have been transformed by convergent interactive technologies, blurring the boundaries between author/reader and production/consumer relationships. This thesis argues that traditional HCI methods are not fully equipped to successfully articulate such interactions and that semiotic theory, considered in relation to HCI, might offer an alternative approach.

### **1.3.5 Two Types of New media**

The broadest and arguably the most useful approach to understanding different types of new media, are those defined by Bolter and Grusin. Bolter and Grusin (Bolter & Grusin, 1999) concentrate on the notion of ‘remediation’, identifying two types of media, ‘immediacy’ and ‘hypermediacy’ as a background to their argument that all new media attempt to present themselves as something entirely new and unique, when in fact, they are better understood as refashioned or ‘remediated’ versions of older media.

#### **1.3.5.1 Immediacy**

The first form of media that Bolter and Grusin (Bolter and Grusin, 1999 pp 21-30) discuss is media that promotes the feeling of “immediacy” or “immersion”. That is, media that attempts to erase itself in the process of mediating, giving the illusion of non-mediation (Lombard & Ditton, 1997). Bolter and Grusin identify that this type of media attempts to present more and more of the world to the viewer, as if it were under her immediate control, promoting a sense of ‘presence’, in situations that would otherwise be impossible without actually being there.

An example of this type of media would be a flight simulator that offers a virtual first person perspective of flying a plane. Bolter and Grusin argue that the flight simulator is a 'remediation' of the televisual experience, which in turn, is a remediation of cinema or photography that portrays the same scenario. Each successive remediation is considered as an upgrade, a step closer to reality for the viewer. The medium by which the experience is conveyed, is either hidden or systematically removed from the experience, resulting in a unified space of reality and the illusion of non-mediation. The notion of 'telepresence' for example (Waterworth & Waterworth, 2003; Slater, 2003; Lombard & Ditton, 1997; Schuemie et al, 2001; Riva, Davide & Ijsselsteijn, 2003), is the feeling of being immersed in a mediated virtual environment, while physically being located somewhere else (Witmer & Singer, 1998) without necessarily being aware of mediation taking place, thus the experience of the flight simulator is experiencing the virtual environment as your 'immediate' surroundings. That is to say, that the media presented to you is done in such a way as to make you believe that you are actually flying a plane.

Oliver Grau's book "Virtual art" (Grau, 2003), traces the development of this type of immersive technology back through the renaissance to the frescoes of ancient Rome, where some interiors were painted with representations of outdoor scenes on a grand scale. Particular aspects of new media that follow this trend are digitally rendered 3D graphics, digitally composite photo-realistic images and photo-realistic virtual environments (Fencott, 1999, 2001).

### 1.3.5.2 Hypermedia

The second type of media that Bolter and Grusin identify is in effect the exact opposite of the first. This type of media is identified as 'Hypermediacy' (Bolter and Grusin, 1999 pp 31-44). Hypermedia is perhaps best understood as the combination or recombination of various older media types (i.e. signs and symbols) into multimedia presentations or interfaces that overtly display the nature of the mediating technology. Microsoft Word, for example, is profuse with discrete signs and symbols that constitute the make up of the medium. Moreover, other signs and symbols from other programs can be integrated into the mediated workspace. For example, Endnote and Acrobat can be used in conjunction with Word, producing a combined 'hypermedium' with which to manipulate documents. Indeed, documents might be linked to other documents both on or offline extending the hyper connections. All of these connections are made explicit by having some symbol or sign represent them.

Essentially, hypermedia is the combination of fragmented media elements through connection rather than the seamless integration of elements into one presented reality or space. Bolter and Grusin again identify that while this is promoted in new media as a particularly new phenomenon, it is in fact evident throughout the history of media, from medieval illuminated manuscripts through to the collages of modern art and on to the present day graphical interfaces of computer systems.

Packer and Jordan also define hypermedia as the connections between different discrete media elements that provide a personal trail of association between them (Packer and Jordan, 2001, pxxxix). Paul also discusses this fragmentary, yet integrated, multiplicity in relation to new media art installations that combine numerous physical and new media elements in the space of a gallery. These installations constitute information spaces, offering interactive and participatory roles to the viewer in making the artwork. Examples of new media that follow this trend are graphical user interfaces, the World Wide Web, augmented reality and ubiquitous computing.

### 1.3.5.3 Continuing Remediations

In both immediacy and hypermedia, new media present themselves as better than old media and essentially different from one another. However, Bolter and Grusin point out that new media in particular shows a propensity to oscillate between these two modes of representation, highlighting the interdependency of one upon the other. The desire for representations that promote immediacy traditionally drives the process of remediation, ultimately revealing the nature of the mediating technology:

“The process of remediation makes us aware that all media at one level are ‘a play of signs,’ which is a lesson we take from post-structural literary theory. At the same time this process insists on the real, effective presence of media in our culture.” (Bolter and Grusin, 1999, p 19)

Paul contends that the opposite trend is also in effect. On one hand, the ability offered by new media to combine different kinds of media together completely alters the way in which we perceive these media. On the other, this same recombination of old and new forms of media that produce integrated and seamlessly collaged images that defy pictorial logic goes against the idea of multiplicity, ultimately eroding the boundaries between them, resulting in a singular homogenous digital medium.

What seems like the relatively new phenomenon of ‘New media’, in fact stems from what is actually a long and continuing development of older media. The fundamentally important thing in all of this, is the way that computing technology has revolutionised all of our existing media activities, from paper to film, becoming integral in the production and reception of its various forms and sign systems. Moreover, as technology develops, the integration and networking capabilities that computers have brought to older media continue to affect these sign systems and ultimately the very fabric of our world.

## 1.4 Human Computer Interaction

While this thesis attempts to relocate the discussion of new media beyond the confines of HCI, in the domain of media history and theory, it is clear that the contribution that can be made to this discussion, in terms of HCI, should not be ignored. HCI is a complex and multi faceted area of research that continues to defy description in simple terms. Although the name suggests that HCI is simply the study of human interaction with computers, it belies the diversity and growing number of these interactions within a culture increasingly saturated with computational devices. According to the Association for Computing Machinery (ACM):

“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” (Hewett et al., 1992 p 5)

Or as Jenny Preece puts it:

“Human-Computer Interaction (HCI) is about designing computer systems that support people so that they can carry out their activities productively and safely.” (Preece et al., 1994 p 1)

Although these two statements by major contributors in the field are both over ten years old, one can begin to grasp the main concerns that are right at the heart of HCI research. Primarily, HCI is concerned with ensuring the development of computer systems that take into account human needs and requirements, resulting in systems that support human activities effectively. Simple as this may sound, HCI has long struggled to cope with the myriad problems that the integration of computers and society has yielded over

the past thirty years. The very pace with which personal computing has evolved, along with its incursion into the home and work place, has had a societal impact on a global scale, which has altered, and will continue to alter the way people work, communicate and entertain.

#### **1.4.1 Cognitive Psychology and HCI**

Arguably, it is cognitive psychology and its concern with understanding human behaviour has been the biggest single contributor to the development of fundamental HCI theory.

Cognitive psychology is largely based on the principle that all activity engaged in by human beings, whether it is mental or physical activity, is characterised by their ability to process raw sensory data. This information is considered to be the result of stimulation across all five senses (touch, taste, smell, sight and hearing). This is seen as the input to the human information processing system that is manipulated in the brain by a number of discrete stages, resulting in an output manifested by some sort of action (Dix et al., 1998).

“The main objective in HCI has been to understand and represent how humans interact with computers in terms of how knowledge is transmitted between the two. The theoretical grounding for this approach stems from cognitive psychology.”  
(Preece et al., 1994 p 62)

Particularly important concepts from cognitive psychology are:

- The input to output process including encoding, comparison, response selection, and response execution.
- The relationship between these mental processes and those of attention and memory access.
- Concepts of perception such as the constructivist and ecological approaches.
- The multi-store model of memory including sensory, short term and long term memory stores.
- Recognition Vs Recall.
- Concepts about knowledge representation and organisation in the form of mental models.

### 1.4.2 Conceptual Modelling

The notion of conceptual modelling has proved to be a pivotal development in HCI. Conceptual modelling is a person's ability to interpret the visible structure and functionality of a device based on previously developed mental models that have been derived from prior experiences with similar devices (Norman, 1998). The idea that people develop an understanding of how to use a device through experience, and furthermore, adapt existing mental models to similar devices, has provided a basis within HCI to predict human behaviour at the interface.

This understanding of human behaviour, derived from cognitive psychology, has given HCI a number of conceptual models that say something useful about human computer interaction. These models, such as the model human processor and the related GOMS (Goals, Operations, Methods and Selection) were among some of the first models to be used in HCI as methods that see human computer interaction simply as an extension of human information processing. That is to say, that all aspects of computer operation, from the information displayed on a screen to the sensitivity of a keyboard, are considered to be sensory input for humans to process. Moreover, in computer science, similar ideas have manifested as metaphors for the operating systems within computers, particularly the early development of Artificial Intelligence (Hailes, 1999). Essentially, computers too are seen from the same input/output information processing point of view.

The Model Human Processor (Card et al, 1983 p24) is a detailed model of how computer users process information that is intended to help designers predict how users will behave. It is an attempt at modelling the activities in the user's brain and consists of specialised processing units and memories that are characterised by speed, decay time, capacity, encoding (Figure 1.1). The principles of the model human processor rely on the idea that users act rationally, most of the time, and that the goals and tasks that they attempt to execute are constrained by their processing limits. Perceiving the system and processing the information takes time, depending on the intensity of the stimulus, the information load and how well practiced the user might be. The model human processor then identifies where these limits are and attempts to address them in the design of computer systems, hopefully making them easier to use.

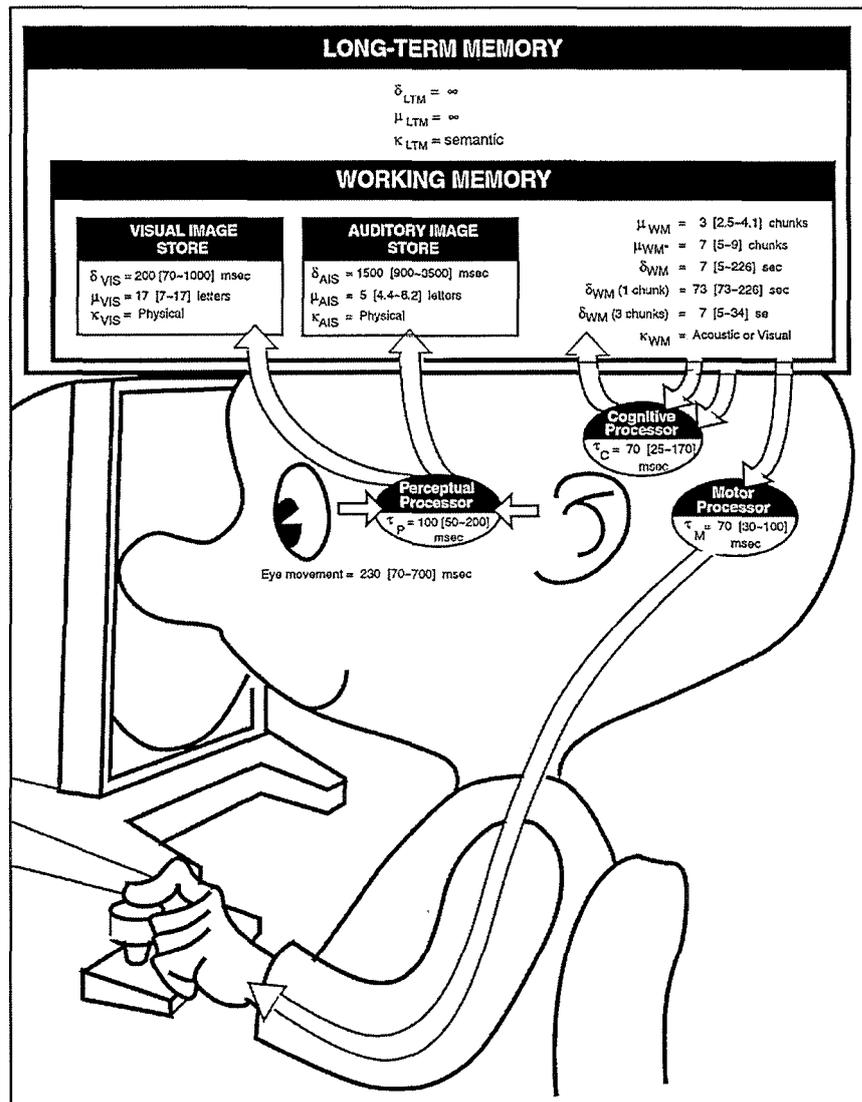


Figure 1.1 The Model Human Processor (Card et al, 1983)

### 1.4.3 Execution/Evaluation Cycle

Norman’s execution/evaluation cycle (Norman, 1998) in particular has had a major influence in characterising HCI. It is based on the cognitive model of information processing, where one step follows another in terms of perceiving a system state and then acting according to that information. The sequence of stages continues over and over throughout an interaction until the established goal has been achieved.

Norman’s execution/evaluation cycle:

- Establish the goal.
- Forming the intention.
- Specifying the action sequence.

- Executing the action.
- Perceiving the system state.
- Interpreting the system state.
- Evaluating the System state with respect to the goals and intentions.

While this cycle of events can start from anywhere in the loop, the two most important parts of it are carrying out actions on the world (execution) and comparing what happened with what was expected to happen (evaluation). These give rise to Norman's gulfs of execution and evaluation, where the user has to establish how to translate his/her intentions into actions and then how to understand the effects of those actions on his/her goals. Norman bridges these gulfs by promoting the ideas of clear mappings between the users intentions and the system interface through high visibility and feedback that allows the user to determine whether his/her goals have been satisfied by those actions on the system.

While these models developed in HCI have provided a high level of conceptualisation of the process of human computer interaction, they have tended to concentrate on modelling activity inside the human brain, rather than looking at the activity of interaction as a whole. This has resulted in a concern within HCI circles that, although the cognitive approach has been useful in understanding human behaviour, it is not entirely adequate as a method for understanding HCI. McCarthy & Wright (2004), for example, point out that Norman's execution/evaluation cycle is only really useful so long as we are concerned with the "Planned actions of individuals" (p 7), but is lacking when we start to try and understand the meaningful or emotional aspects of interaction.

"It is becoming increasingly recognized that a cognitive perspective of the individual user performing various tasks at the interface is an inadequate conceptual framework for HCI. Specifically, the traditional cognitive approach has neglected the importance of how people work in the real world when using computer systems. Moreover, there has been a lack of consideration of other aspects of behaviour besides how users process information at the interface – namely how people interact with each other, and other objects besides computer systems, in the environment they are in." (Preece et al., 1994 p 68)

#### **1.4.4 HCI and New Media**

Changes in technology are bringing computers into the realms of already established media, resulting in new types of interaction. Digital convergence has brought TV,

video, audio, multimedia and computers closer together in the form of new media. With this in mind, practitioners of HCI have had to consider new ways in which these different types of interactions with technology are understood and used by people.

Indeed, the field of HCI has undergone something of a transformation over the last ten years, in that it has embraced new ideas from an increasingly diverse range of disciplines, such as phenomenology, ethnomethodology, semiotics and social science in the search for new theories and descriptions (McCarthy & Wright, 2004; Dourish, 2001b; Hailes, 1999). Computer supported co-operative work (CSCW), for example, involves social theories of distributed cognition that explore groups of people interacting socially, often across great distances through interactive technology (Dourish, 2001b). Similarly, ubiquitous computing explores theories that try to understand the convergence of communication and computational technology, which has extended from the work place into our everyday lives (Dourish, 2001a, 2001b; Moran & Dourish, 2001).

Increasingly, the environments we live in are becoming computerised through the placement of embedded media devices that are networked together. Interaction then takes a leap from the desktop model to a far more complex contextually defined type of interaction, where different convergent layers of media are engaged with simultaneously at any one time. Thus, it is not always the case that HCI theories, which concentrate on issues of usability or breakdowns in the gulf of execution and evaluation, are the most effective in articulating the problems of interacting with new media.

For example, reading is a completely different experience to organising files in a folder. Similarly, watching a video clip is quite different from playing a simulated driving game. The problem with new media is that they often have the capacity to offer all of these modes of interaction together at the same time. Arguably, interaction with multiple media elements is sometimes better viewed in terms of the production and interpretation of meaning rather than in terms of executing goal driven tasks. As advances in technology bring these media together, the demands on the theories that HCI uses to understand their interactions increase dramatically. Thus, the cognitive psychology approach, although still the mainstay of HCI theory, struggles to provide theories that can articulate the specific problems of these new kinds of interaction.

## 1.5 The Phenomenology of Being

The philosopher Edmund Husserl developed the concept of phenomenology to describe the experience of things in a manner that did not reduce them to mere scientific data (Dourish, 2001b). For Husserl, an individual's experience is the experience of 'something'. By focusing on the act of 'experiencing', rather than an objective concern about the thing being experienced, or the subjective experience of the person who was having the experience, Husserl developed a way of understanding what it means to exist in the world that is based on the nature of experiences with its phenomena.

Carrying on from but rejecting much of the work of Husserl, Martin Heidegger grounds his conception of what it is to 'be' simply in 'being'. That is to say, his fundamental conception of what it is to 'be' is that human beings exist as 'being-in-the-world' (the hyphenation represents the closeness of being and world, there are no gaps between the two) (Dreyfus, 1990; Mulhall, 1996). The very nature of our being is directly related to the world, that is to say, that our particular type of being would not exist without the world, it would be some other type of being. Moreover, Heidegger makes explicit the idea that the nature of our being-in-the-world is not only related to the world we inhabit, but to the fact that we are aware that we exist in that world. In short, a fundamental aspect of our being-in-the-world is that we are concerned about our being-in-the-world. One other fundamental aspect to Heidegger's conception of 'being' is that our being-in-the-world is being-with-other-beings (beings as people, things or other entities). These other beings may or may not have a concern for being with us, but we most definitely have a concern for being-with them as part of our being.

### 1.5.1 Ready-to-hand Vs Present-at-hand

Heidegger essentially posits two different ways of being-in-the-world in relation to other beings, ready-to-hand and present-at-hand. Heidegger's conception of things as ready-to-hand is unique to him and is based on his fundamental concern with being-in-the-world as an everyday experience. Heidegger claims that our everyday encounters with things are the 'first' way in which we come to understand them. That is to say, that our being-in-the-world and our concern for being-in-the-world are first and foremost 'disclosed' to us through our use of the phenomena that we encounter everyday. Contrary to this, Heidegger explains the concept of present-at-hand as our ability to reflect upon the phenomena that we encounter and upon our encounters with it. Present-

at-hand is an essentially different ‘disclosure’ of being. Heidegger’s famous example of the hammer is used to explicate these ideas. Heidegger states that a hammer is experienced as ready-to-hand in our everyday experiences when we use it. What is disclosed about it, through our being with it, is different from our thinking about what it is. He explains that while we are using it we are not reflecting on its use, we are doing something different, we are being-with the hammer, doing hammering. Conversely, when the hammer breaks, or no longer functions as we expect it to, our being-with the hammer in ‘hammering’ changes. We start reflecting on the nature of the hammer and our concern is why it is no longer ready-to-hand. We have moved to a different mode of being, that of the hammer being present-at-hand.

### **1.5.2 Authentic Vs Inauthentic Being**

Related to these concepts of Ready-to-hand and Present-to-hand are the concepts of authentic and inauthentic being. For Heidegger, authentic being comes about through experiencing the world as ready-to-hand i.e. in its firstness, its primary authentically disclosed state. Inauthentic being then, for Heidegger is the experience of being-in-the-world that is predominantly based on the reflection of what being-in-the-world is about. A particular aspect of this authentic/inauthentic split posited by Heidegger gives rise to the notion of non representational activity while acting in a ready-to-hand way and representation based activity in reflection. This representational/non-representational dichotomy has been a bone of contention in Philosophy and cognitive science for a long time now. It is from this point of view that Heidegger is effectively able to attack the entire western philosophical tradition, because he sees it as essentially reflective, without concern for the everyday way of experiencing the world as ready-to-hand and therefore inauthentic. It is also important to note here, Heidegger’s theological background in relation to his explanation of the phenomenology of being. It’s easy to see the remnants of biblical schooling in his authentic/inauthentic split that echo the fall of Adam in Genesis. Similarly, the inescapability of this original sin threads its way through “Being and Time” (Mulhall, 1996), as Heidegger emphasises the nature of our ‘thrownness’ in to an inauthentic world where we should seek authentic experience, as if seeking our way back to the garden of Eden.

### **1.5.3 Phenomenology and HCI**

In their book "Understanding Computers and Cognition, a New Foundation for Design" (Winograd & Flores, 1986) Winograd and Flores put a case together that intricately

points out the underlying assumptions of the ‘rationalist tradition’ in computer science and the effects it has on, so called scientific endeavour as a whole. They then take on a pro Heideggerian position that is rooted in phenomenology and hermeneutics as the basis of a new computer design paradigm aimed mostly at the AI community. Winograd and Flores claim that the cognitive scientific approach to understanding computers and their use is:

“Based on an experimental approach in which progress is made by performing experiments that can directly judge between competing scientific hypotheses about the nature of cognitive mechanisms” (Winograd and Flores, 1986 p 24)

That is to say, that they see it as restrictive, laboratory controlled empirical data gathering that generates laws that can supposedly be applied to more general cases, but which has no reference to real world case studies. From this position, they argue that cognitive scientific approaches based on the rationalistic tradition are fundamentally flawed because they have no grounding in reality. Offering an alternative to this situation, they outline four main ideas that are based on Heidegger’s ‘Being and Time’ as a contribution to HCI:

- The assumption of a hermeneutic position makes us aware that it is impossible to find a neutral standpoint from which we can see our beliefs objectively, because we always operate within the framework that they provide.
- “Practical understanding is more fundamental than detached theoretical understanding” (Page 32). Our primary understanding of the world is derived from experiencing the world as ready-to-hand. Our ability to reflect on the world that surrounds us comes after our ability to act in it.
- The rejection of the idea that we relate to things, primarily, through having representations of them in our minds. It is possible that our ability to act in the world does not rely on any prior knowledge of the world but simply in our familiarity of being-in the world.
- Social activity is the foundation of meaning. There is no individual point of view that can have an interpretation of something that is not linked in some way to social structures. (Winograd & Flores, 1986, pp 32-33)

Other theorists that draw upon the work of Heidegger in relation to computation and technology include Richard Coyne's "Technoromanticism" (Coyne, 1998, 1999) and Paul Dourish, (Dourish, 2001b)

#### 1.5.4 Embodied Interaction

Paul Dourish's ideas about embodiment are also derived from the work of the phenomenologists outlined above (Dourish, 2001b). Dourish takes the common ground that they share in their approaches as the basis for the development of his ideas about embodied interaction. Firstly, he notes that for the phenomenologists, embodiment does not just mean a manifestation of the physical. More importantly, he points out that it means "being grounded in everyday, mundane experience" (Dourish, 2001b, p125) i.e. being-in-the-world. Secondly, Dourish notes that the phenomenologists tend to focus on the practice of everyday engagement with the world i.e. on the accomplishment of tasks that shape and are shaped by our existence in the world. Finally, Dourish points out that this situated practical activity in the world is the source of our meaning making. Our ability to act and be acted upon in our environment is what gives our lives meaning. His definition of embodied interaction is then given as "the creation, manipulation and sharing of meaning through engaged interaction with artefacts" Dourish, 2001b, p126).

Dourish then goes on to discuss the important aspects of meaning that are central to embodied interaction: ontology, intersubjectivity and intentionality. Dourish explains that ontology is about the separation, identification and relation of entities based on the differences and similarities that are disclosed as we experience them. "Ontology deals with how we can describe the furniture of the world" (Dourish, 2001b, p129). Intersubjectivity is about sharing our understanding of the world, derived from our ontological relationship to it. The problem of intersubjectivity is that, while we can each experience the world in an ontological sense, how can we know that each of us is experiencing the same things, given that we do not have direct access to each other's thoughts and experiences. Intersubjectivity for Dourish is about establishing the common ground between people interacting in a shared world. The third aspect of meaning that Dourish focuses on is 'intentionality'. He states, "Intentionality is the term philosophers use to refer to the 'directedness' of meaning." (Dourish, 2001b, p134) and suggests that this directedness is the relationship between entities such as thoughts, memories and utterances and their meanings. Dourish points out that this is a very

tricky subject that is still at the centre of continuing debates in philosophy and cognitive science.

Bringing these ideas together, Dourish introduces the notion of coupling. Essentially, Dourish posits that intentionality sets up the relationship between embodied action and meaning (Dourish, 2001b, p138). Coupling is how this relationship is managed to become effective, i.e. it is the connection between a directed intention and its effect in the world. To paraphrase Heidegger for example, coupling is the relationship between the intention to hammer a nail into a wall (perhaps to hang a picture on), the physical entities in the environment and the mechanisms of meaning that allow the hammering activity to take place.

All of this offers a great deal in terms of establishing a strong philosophical position in relation to understanding the user and the users body in terms of interacting with the world. Indeed, as can be seen from Dourish's work and from Winograd and Flores, the embodied perspective is strong in helping to develop HCI theory. This type of understanding has been particularly effective in helping to understand tangible computing and aspects of ubiquitous computing, where bodies interact with the physical interfaces of computer systems, rather than concentrating on a cognitive approach. This type of approach also offers a great deal in relation to the same kind of physical aspects of new media. However, like traditional HCI, it lacks the ability to ground new media in terms of older media. Without this connection, one would have to develop a phenomenological position that considered the whole history of media, so that the difference between new and old media could be explored thoroughly. Unfortunately, this is beyond the remit of this thesis. However, this is not to say that some aspects of the phenomenological approach are not useful to understanding new media. Indeed, as will be seen in chapter 5, a relationship between semiotics and embodiment is established in order to develop an integrated semiotic model of interaction with new media.

## **1.6 Semiotics**

Semiotics is the study of sign systems e.g. written and spoken language, map making, drawing and painting, photography, architecture and film. The aim of semiotic theory is to understand the structure of sign systems in relation to the way that they convey

meaning. In other words, semiotics is about understanding how people both produce and interpret complex signs, messages and texts. Semiotics takes the view that texts can be formed in any medium that can be organised in order to convey some kind of meaning. For example, sheet music is a visual text read and interpreted by a musician in order to produce music. Similarly, the music produced by the same musician is a text to be interpreted by the people that listen to it. An important aspect of semiotic analysis is in identifying the relationships between specific sign types within structurally organised groups of signs in order to examine the way in which meanings are produced by both authors and readers. Originally, in linguistics, this was considered in terms of an overarching structural view that focused on understanding the rules of sign production and reception. However, semiotics has moved on from this position and while structuralism is still an important aspect, post-structuralism brought with it the need to understand the relationships between sign systems and the contexts in which they are encountered. These contexts include not only the further sign systems of multiple concurrent media, but also the social, cultural and political systems that produce, maintain and suppress different types of meaning and meaning making activities. Semiotics then, is a critical theory that explores all sign making and interpreting activity in numerous media domains.

### **1.6.1 Semiotics and HCI**

Over the past decade or so Semiotics has begun to emerge as an interesting area of research in relation to HCI issues. Only a handful of experts have really made any headway in bringing semiotics to HCI. Among them are Peter Bøgh Andersen's Danish group of semioticians and Clarisse Sickenius de Souza's Semiotic engineering Group (SERG) in Brazil (see Chapter 3.1). However, the diversification of HCI issues has continually brought semiotics into the spotlight as media and technology collide. Semiotics is in itself a multi disciplinary field, but more importantly, semiotics by its very nature, is critical of every discipline it comes into contact with. In relation to concerns within the HCI community, this promises to be a very useful tool in developing new ways to comprehend interaction across multiple new media, different environments and ubiquitous systems.

To some degree, the introduction of a semiotic approach to HCI has resulted in even more diversification, with numerous ideas citing various semiotic theories. This may seem to be an increasingly fragmentary development in HCI. However, the concerns of

HCI in terms of designing usable systems remain intact. The advantage that the inclusion of semiotics in HCI research has brought, is new possibilities of criticism through an overarching discipline already equipped to analyse convergent media, such as TV, cinema, theatre, etc. that HCI is having to account for as it addresses new media. As Andersen puts it:

“Semiotics is ‘the mathematics of the humanities’ in the sense that it provides an abstract language covering a diversity of special sign-usage (language, pictures, movies, theatre, etc.). In this capacity, Semiotics is helpful for bringing insights from older media to the task of interface design, and for defining the special characteristics of the computer medium.” (Andersen, 2001 p 419)

Andersen’s development of a semiotic approach in “A Theory of Computer Semiotics” (Andersen, 1990) comes from a concern within HCI to design systems that successfully support tasks in work environments. Andersen brings semiotics to HCI from his background as a linguist and focuses on the unique characteristics of language in the work place. As he sees it, the context of the work environment has a direct affect on the language that people use to talk about the tasks that they are performing in that environment. This he sees as an excellent place for semiotics and linguistics to enter the field of HCI, where signs are the vehicles that express related concepts, similar to the use of words in language. With this in mind, he develops a tentative method for interface design based on a semiotic analysis of language in the work place. Through using semiotic techniques from linguistics, he proposes the study of semantic fields related to keywords from the work environment as the basis of interface design.

Like Andersen, SERG have been researching the relationship between semiotics and HCI for a number of years now. Based in Brazil and directed by Clarrise Sieckenius de Souza, they are concerned with the application of semiotic theory to the entire process of interface design (de Souza et al., 2001b; de Souza, Prates, & Carey, 2000). For the most part, their input seems to be strongly related to usability in terms of the ability of an interface to communicate its functionality by itself. In their paper “A semiotic engineering approach to user interface design” (de Souza et al., 2001b) propose their outline for a semiotic engineering approach to HCI:

“We suggest that the main contributions of semiotic theory in supporting HCI design are: to provide designers with new perceptions on the process and product of HCI design; to bind together *all* the stages of software development and use, giving them a unique homogeneous treatment; and to pose innovative questions that extend the frontiers of HCI investigations.” (de Souza et al, 2001, p 461)

The main thrust of the SERG approach is the viewpoint that a user interface can be seen as a “One shot message” (Prates, de Souza, & Barbosa, 2000a, 2000b) sent from a designer to a user, which can be seen as a representation of the users needs as defined by the designer. Furthermore, this message contains a number of smaller messages that constitute the functional aspects of the interface, which are delivered and articulated by the signs that the designer has chosen to represent them.

Andersen and SERG are not the only experts who look to semiotics as a method for encompassing the diversity of HCI issues. Individuals, such as David Benyon, Mihai Nadin, Frieder Nake and Susanne Grabowski, among others, have further perspectives on the use of semiotics in HCI. A special edition of the Knowledge Based Systems journal (2001) highlights these approaches, which are summarised below:

Benyon is of the opinion that semiotics has something to say about concepts of navigation in what he terms ‘information spaces’ (Benyon, 1994, 1998, 2000, 2001). Through an understanding of how signs function in environmental contexts, Benyon is able to bring to computing notions about navigation in virtual environments. Indeed, through the common understanding of semiotics, Benyon shows how real environments and virtual environments are fundamentally similar. The notion of the information space is then extended to encompass all human activities that require an understanding of environmental signs.

Nadin is another believer in semiotics’ ability to deliver useful concepts to HCI from the multitude of disciplines it touches on (Nadin, 1997a, 1997b, 2001). As Nadin says, “One cannot not interact and because interaction is based on signs, one cannot not semiotize.” (Nadin, 2001). Nadin calls for a radical re-evaluation of HCI in semiotic terms. He points out that semiotics can be used as a unifying foundation in HCI from system design to the usability testing concerns of SERG. He also calls for a fundamental change in academic programs, which should include semiotics as part of the curriculum in interaction design.

Nake and Grabowski have a fairly technical view of semiotics in relation to HCI. They are concerned with the differences between how humans and computers interpret signs. They point out that human interpretation of signs is based on knowledge and social codes, whereas computer interpretation has to be seen as an act of signal processing dependent on the commands of a computer program. Although similar, these two things are fundamentally different. With this in mind, they argue that a semiotic approach is useful in engaging with this dichotomy because it can take into account the transformation process from sign to signal and back again. Through its notion of sign systems as codes, semiotics levels the field enabling HCI to look at software and its commands in relation to human activities of sign processing (Nake & Grabowski, 2001).

### **1.6.2 Semiotics and New Media (Narrowing the focus)**

The Argument presented in this thesis is that traditional HCI theories are not quite sophisticated enough to articulate an understanding of emerging characteristics of new media. In the arts, the history of media spans centuries while the history of HCI spans only decades. As old media forms collide with each other and with technology to produce new media, it is clear that HCI theory lacks the kind of historical perspective needed to articulate the transformation in media that is taking place. From the psychological approach, the traditional user/computer or designer/user models are still useful for explaining interactions within clearly defined system parameters. However, they do little to explain the growing complexity of interactions with new media, nor do they offer adequate explanations of the changing relationship between author/reader in relation to the production and interpretation of meaning in interactive sign systems.

HCI requires new theories by which to understand new forms of interaction with these new technologies. Unfortunately, this splits the already multidisciplinary field of HCI into further fragmentary areas of research that run the risk of becoming exclusive e.g. CSCW, ubiquitous computing, virtual environments. Despite the inevitability of this process, some degree of unification would remain useful, particularly when encounters with new media seem to be impacting on all of our lives. Phenomenology offers HCI a useful perspective that focuses on the nature of being-in-the-world that grounds it in the perspective of the user. This is evident in the sociological and ethnomethodological perspectives described by Dourish (Dourish, 2001b) and has become a major factor in

the move towards user centred design. Again however, while this position offers much to HCI in terms of developing the user perspective, it is not critical enough to articulate the complex sign systems of new media.

Semiotics on the other hand, while having had a relatively long association with HCI, has as yet not been fully explored in relation to the nature of evolving interactive media. Previous semiotic theories of computing (Andersen, 1990) are specific to the technology of that age and draw very little from the broad spectrum of semiotic theories and approaches that are available from other media in various domains. Indeed, it is perhaps this untapped strength of semiotics, where theory is already abundant with regard to 'old media', that could now offer insight into the three main characteristics of 'new media'.

#### **1.6.2.1 The Problem of Digital Abstraction**

From linguistics to graphics, advertising and architecture, existing semiotic theory offers a potential root for an overarching semiotics of new media that might be flexible enough to articulate the problems of the transformation of old media into new. Initially, research in this area needs to be employed to uncover the related concepts from old media that are pertinent to a semiotics of new media, in order to cross-fertilize terminology and concepts from field to field. This firmly places the study of new media within the historical tradition of the arts and media studies, rather than limited parameters of HCI.

#### **1.6.2.2 The Problem of Convergence**

Multiple images, film clips, sounds and sign systems have converged to produce new media. Furthermore, convergence continues as we see multiple functions being integrated into singular devices. Mobile phones, for example, are now capable of transmitting and receiving photographic and video messages as well as making phone calls, sending texts and acting as an alarm clock. These types of communication facilities, where we can create, send and receive multi-media messages, become increasingly difficult to understand. Turning towards semiotic theory offers the potential to be critical of such devices, both in terms of the way their sign systems are constructed and in the interpretation of them. This is particularly important because the convergent functionality of new media is about the localised production, communication and interpretation of messages expanded on a global scale.

### 1.6.2.3 The Problem of Interactive Interpretation

New media are essentially older forms of media that have been transformed by convergent interactive technologies, blurring the boundaries between designer/user, author/reader and producer/consumer relationships. Interaction with new media relies on the interpretation of complex interface/content sign systems as well as the participative manipulation or ‘use’ of those sign systems that produce transformations in the content in order to complete the experience. While traditional HCI methods can successfully articulate aspects of interaction, it falls short in articulating complex interactions with new media. Semiotic theory has a history of considering such problems, but has only recently been brought to bear on interactive systems. Research in this area needs to capitalise on and go further than the research conducted by Andersen, SERG and others. Furthermore, and perhaps more importantly, semiotics needs to successfully assimilate at least some of the traditional HCI perspective in relation to interaction. For example, it is not enough to use terminology from film studies or linguistics to critique elements of an interactive video display. Some new form of integrated semiotic theory that is unique to the characteristics of new media is what is required.

It is at this point that the first research question, which is central to this thesis can be defined:

**“Having defined the characteristics of new media, what aspects of existing semiotic theory in relation to older media are relevant to the development of a semiotic theory of new media?”**

With this in mind, the first aspect of research presented in this thesis focuses on developing a theoretical review of semiotic principles that are relevant to new media, which are informed by the semiotics of older media but governed by its relationship to HCI. This ‘semiotics of new media’ aims to include the same principles of HCI but focuses more specifically on issues of new media, such as the interpretative interaction with convergent media technologies and the problem of the author/reader (designer/user) relationship.

## 2 Semiotic Theory

Given the nature of the proposed research into semiotics and new media, it becomes particularly important to thoroughly understand the intricacies of existing semiotic theory and how it might provide useful concepts for dealing with the problem of understanding new media. Moreover, it is important to start with the basics of all semiotic theory that lies in linguistics and move progressively through its evolution into new domains in order to gain a broad understanding of the numerous semiotic concepts. Drawing heavily on the work of Daniel Chandler and his book “Semiotics the Basics” (Chandler, 2002). This chapter concentrates on outlining and explaining major concepts from the history of semiotic theory, while chapter 3 concentrates on semiotic theory as applied to different domains. Chandler provides a very clear and succinct explanation of all the major semiotic terminology, and as such, provides a very useful and digestible reference for semiotic terminology. Martin and Ringham’s “Dictionary of Semiotics” (Martin & Ringham, 2000) has also been an invaluable source of definitions.

### 2.1 Basic Semiotic Theory

As stated in the previous chapter, semiotics is the study of sign systems in order to understand how people both produce and interpret complex signs, messages and texts. Semiotics takes the view, that texts can be formed in any medium that can be organised in order to convey some kind of meaning. Semiotics then, is a critical theory that explores all sign making and interpreting activity in numerous media domains.

#### 2.1.1 Ferdinand de Saussure

The study of semiotics came into life at the beginning of the 20<sup>th</sup> Century largely due to the work of Ferdinand de Saussure in the field of Linguistics (Saussure, 1966). He posited that words, in order to convey meaning, consisted of two distinct parts. Firstly, the ‘signified’, that is the part of the word that pertains to its meaning and secondly, the ‘signifier’, which is the part of the word that is representative of that meaning. The signified is considered by Saussure to be the concept that exists within the mind. This may be a set of experiences, impressions or perhaps feelings related to an object or situation e.g. the concept of what a dog is. This is intrinsically bound to the signifier

which is representative of that concept, be it the sound image, visual image or for that matter tactile image of it e.g. the letters D. O. G. signify the concept of dog. Together, the signifier and the signified combine to become a sign. That is, a sign, according to Saussure, is what is experienced when someone comes into contact with a set of stimuli that can be equated to a mental concept (Figure 2.1).

“I call the combination of a concept and a sound-image a *sign*, but in current usage the term generally designates only a sound-image, a word, for example (*arbour*, etc.). One tends to forget that arbour is called a sign only because it carries the concept “tree,” with the result that the idea of the sensory part implies the idea of the whole.” (Saussure, 1966 p 64)

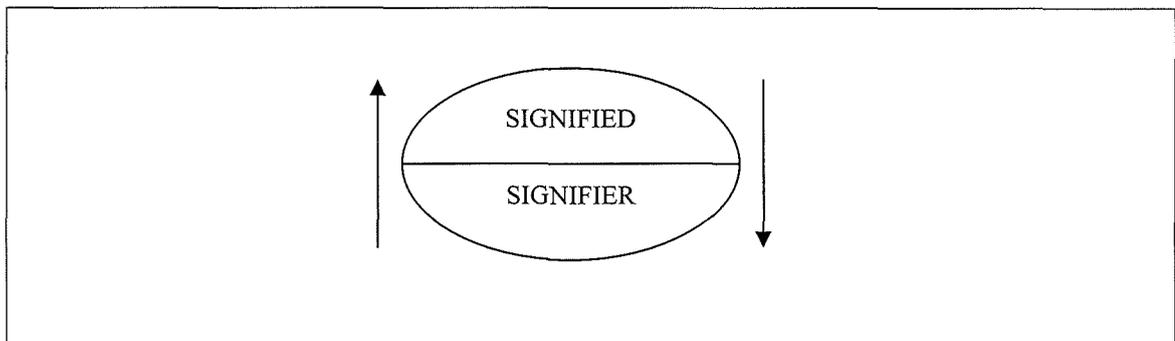


Figure 2.1 Saussure's Sign (Saussure, 1966)

Saussure is not entirely clear as to the role of the signifier in this relationship. He actually claims that both the signifier and signified are to be conceived of as mental concepts that occur in relation to perceived external phenomena. This clearly creates some difficulty in placing signs. Do they exist in the real world? Or do they exist only as mental constructs? Saussure's diagram of the sign (Figure 2.1) misses out some of this discussion i.e. it does not include the external phenomena. Thus, Saussure's lack of precision in his definition of a sign is inherently problematic. The common understanding taken from Saussure is that the signifier is the physical phenomenal part of the sign and the signified is the meaning represented by that physical phenomena, a definition that is elucidated by Hjelmslev some years later, which will be discussed shortly.

Fundamental to Saussure's thinking, is the arbitrary relationship between the signifier and the signified. For Saussure, there is no connection between a word and the concept it represents other than that which is agreed by the rules of language e.g. a dog is called a dog because we all agree to call it so. Essentially, these arbitrary conventional rules

have become known in semiotics as ‘codes’, which we use to interpret signs (Eco, 1976). Saussure’s thinking here is defined by his separation of language as system *langue*, and language as instances of speech *parole*. Saussure’s school of semiology was largely concerned with understanding the relationships between words in *langue* as a system of signs, which take primacy over instances of speech. Later semioticians would contend this point, arguing that there is no separation between the two.

### 2.1.2 Saussure’s Speech Circuit

Saussure’s model of the ‘speech circuit’ (Figure 2.2) is an early model of the communication process that occurs as two people talk. Essentially, it is a linear model of communication whereby the listener comprehends what the talker is saying through simply sharing the same set of cultural conventions of language.

“Suppose that the opening of the circuit is in A’s brain, where mental facts (concepts [signifieds]) are associated with the representations of the linguistic sounds (sound-images [signifiers]) that are used for their expression. A given concept unlocks a corresponding sound-image in the brain; this purely *psychological* phenomenon is followed in turn by a *physiological* process: the brain transmits an impulse corresponding to the image to the organs used in producing sounds. Then the sound waves travel from the mouth of A to the ear of B: a purely *physical* process. Next, the circuit continues in B, but the order is reversed: from the ear to the brain, the physiological transmission of the sound-image; in the brain, the physiological association of the image with the corresponding concept. If B then speaks, the new act will follow – from his brain to A’s – exactly the same course as the first act and pass through the same successive phases.” (Saussure, 1966 pp 11-12)

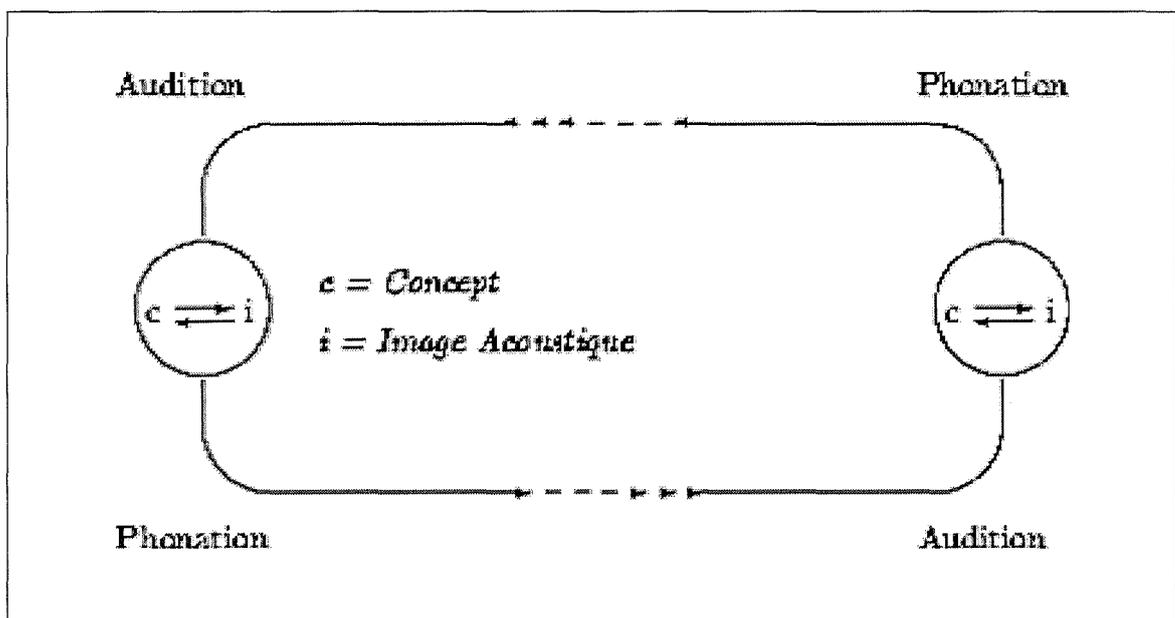


Figure 2.2 Saussure’s ‘speech circuit’ model of communication

Effectively, Saussure views this process as transparent. In other words, because the two people communicating with each other share the same rules of language, the meaning that is transmitted by person A is the same as that received by person B. This is a very naïve way of viewing communication. Later semioticians and communication theorists contend this point by highlighting the complex process of contextualisation and interpretation within the author/reader relationship (Chandler, 2002; Barthes, 1972, 1977).

### 2.1.3 Syntagmatic and Paradigmatic Dimensions

It was also Saussure who first proposed the idea that meaning was derived, not just from simple signifier/signified relationships in themselves, but from the differences between these relationships as understood in reference to the overall system of signification or *langue* (Saussure, 1966). These differences operate in two different dimensions: the syntagmatic dimension and the paradigmatic dimension.

#### 2.1.3.1 Syntagms

Syntagms are combinations of signs that are put together in an organised way to produce some form of meaningful whole. Sentences, for example are syntagmatic, in that they are ordered combinations of signs written one after the other to produce a meaningful statement. Martin and Ringham's definition (Martin & Ringham, 2000 p129) proposes that "The term syntagm designates two or more lexical units linked consecutively to produce meaning. The combination of an adjective and a noun – such as 'human life' or 'beautiful day' – offers an example of a syntagm." In this way, syntagms are often considered to be sequential in character, where meaning is derived temporally from 'chains' of signifiers, as in speech, music or dance.

However, syntagms can be considered in terms of spatial relationships as well (see Chapter 3.3). Examples of 'spatial syntagms' exist in much of the visual arts e.g. painting, sculpture and even architecture and as such are the combinations of different shapes, forms and colours that are organised in different physical positions to produce some form of meaningful or aesthetic whole (Chandler, 2002; Kress and van Leeuwen, p183).

### 2.1.3.2 Paradigms

Contrary to the common definition of a paradigm as an overarching theory or understanding of some particular subject; a semiotic paradigm is a group of signifiers or signifieds (signs) that are in some way associated with one another or are members of the same overarching category, each one being significantly different from the others. (In this thesis the word paradigm is used solely in its semiotic context and attempts are made to refrain from using its Khunian meaning to avoid confusion).

In language paradigms work as groups of words such as nouns or verbs that are used to substitute one another in the construction of sentences. E.g. in the sentence ‘the cat sat on the mat’ ‘cat’ is replaceable by ‘dog’ or ‘man’ and ‘mat’ is replaceable by ‘rug’ or even ‘chair’. Martin and Ringham define a paradigm like this:

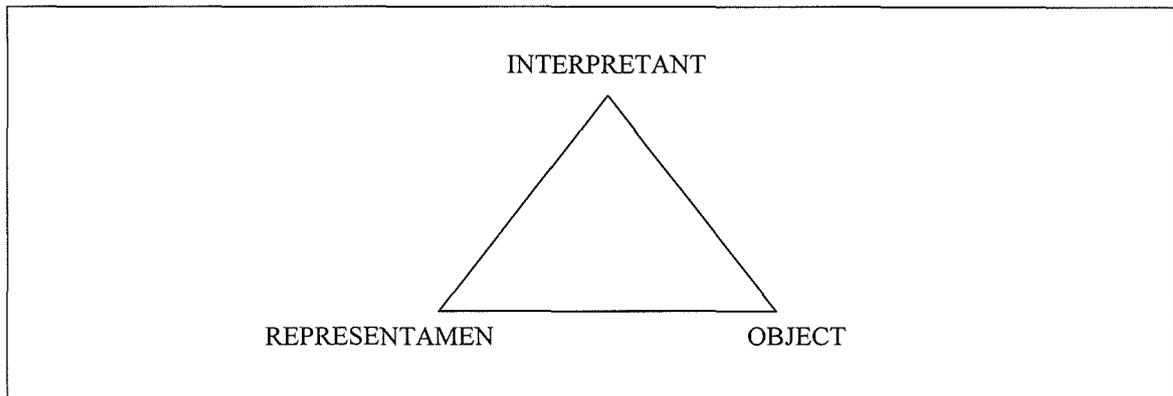
“The term paradigm refers to a group of sentential units susceptible to occupy the same place, or replace each other, in a syntagmatic chain. In other words, paradigmatic elements exist on the vertical axis of language and could be substituted for one another in the same set. The relationship they entertain is one of equivalent of opposition. Thus ‘building’, ‘house’, ‘hovel’ or ‘palace’ may be substituted for ‘dwelling’; on the other hand, ‘out’ could be replaced by its opposition ‘in’ in the sentence ‘she stayed in’ instead of ‘she stayed out’”. (Martin & Ringham, 2000 p98)

The semiotic analysis of paradigms concentrates on aspects of substitution particularly on the connotations that derive from the associated words that are alternatives to a chosen signifier. What is important to think about here, is how a syntagm or text would be altered if certain paradigms were exchanged for others from similar or even different categories. The ‘commutation test’ derived by Roman Jakobson (Chandler, 2002) does exactly this. It is a particular technique used by semioticians that is aimed at uncovering paradigmatic themes that underlie the texts they are analysing.

### 2.1.4 Charles Sanders Peirce

Alternatively, and without knowledge of Saussure, Charles Sanders Peirce developed an all-together different conception of the sign at around about the same time. Peirce’s conception of the sign consists of three distinct parts the object, the representamen and the interpretant (Figure 2.3). For Peirce the object of a sign was something that could exist either outside the mind or inside the mind, but is deemed to be the actual experience of some kind of physical phenomena. This he also called ‘firstness’. The representamen is that which is substituted for the actual object, in that it stands in for or

represents it, this is 'secondness' (commonly understood as the signifier of a sign). The interpretant is the mental concept by which the relationship between the object and the representamen is understood, this includes previous experiences of the object and alternative representamens by which an explanation of the relationship can be elucidated, 'thirdness' (Cobley, 1996; Peirce, 1931-1958).



**Figure 2.3 The triadic relationship of the sign (Peirce, 1931-58)**

Peirce's conception of the sign, like Saussure's, is something that is conceived of as happening in the mind, and like Saussure, Peirce is not entirely consistent in his definitions. By giving the object the dual quality of being able to exist both inside and outside the mind he opens his theory to the possibility of the mind actually containing real objects, which is simply not the case. Moreover, it is not always clear whether this object is the real object referred to by a representamen, or whether it is the physical phenomena of the representamen.

To confuse matters further, Peirce develops the concept of Semiosis, whereby an interpretant can become a representamen in relation to the meaning derived from an alternative interpretant which in turn too can become a representamen, and so on. E.g. A picture (representamen) might show a man being hung on a cross, interpreted as the crucifixion of Christ (interpretant). This (interpretant) might in turn come to represent the Christian faith (representamen), which in turn might be interpreted (interpretant) as the struggle between good and evil. Evil might then be interpreted in some demonic sense, represented by some devilish image. Thus, the train of semiosis develops. Peirce's theories are difficult to grasp, not least because of the complexity of his ideas and grounding in phenomenology, but also because of the long period of time over which they were written (Cobley, 1996).

### 2.1.5 Icon, Index, Symbol

An important aspect of Peirce's work was in defining and describing different sign types. Building upon his notions of firstness, secondness and thirdness, Peirce developed the notions of icon, index and symbol as an initial sign type categorisation.

#### 2.1.5.1 Icons

Peirce describes iconic signs as representing their objects via a similarity. Essentially, icons have features or qualities that resemble those of the objects they represent. E.g. all pictures, paintings and photographs are essentially iconic because they attempt to faithfully represent a recognisable image of their subject matter. Arguably, signs can never be totally iconic. There is often some element of symbolic convention or indexical relationship at work at the same time. Diagrams, for example, represent their object via conceptual likeness, while containing some symbolic quality to them that is understood via conventional interpretation. Photographs, on the other hand, have strong elements of an indexical nature about them. Thanks to the effects of light on the chemical paper, they are directly related to the objects they represent via the light bouncing off them.

Iconic signs often feel closer to reality than indexes or symbols. This is because, as pointed out by Barthes (see section 2.2.3.1), such signs do not draw attention to their mediation, seeming to present reality more directly than other signs. However, even the most realistic images are not exact replicas of what they depict. It is not often that representations are mistaken for what they represent, unless perhaps they are representations of representations, such as faked masterpieces.

#### 2.1.5.2 Symbols

Symbolic signs are signs that refer to their objects by virtue of a law or set of socially derived rules that cause the symbol to be interpreted as referring to that object. Thus, similarly to Saussure, Peirce views symbolic signs as conventional signs. Generally, symbolic signs have no relation to their object other than the accepted conventions. They don't look like them nor have they any direct relation to them as indices do. Essentially, they are signs that have an arbitrary relationship to their objects. Words, books, and mathematical symbols are good examples of symbolic signs.

### 2.1.5.3 Indices

An index essentially 'indicates' something. For example, the position of the shadow on a sundial indicates the time of day in relation to the position of the sun. A paw print made by a cat indicates the path that it has travelled. The symptoms of an illness are manifest indications of the infection causing them. There is a direct link between the object and the sign. Indices are signs or imprints often left in one physical entity, possibly a medium, by the passage of another physical entity that uses that medium. There is a clear connection here between the signifier and the signified, the form and the content.

## 2.2 Further Semiotic Theory

Both Saussure and Peirce represent the beginnings of two schools of thought that are generally considered to be quite different to one another. The European tradition of Saussure has perhaps undergone the most heated debates and perhaps the most transformations in terms of extensions and revaluations of semiotics as a critical tool. To this end, Peirce's theories have in general not been fully integrated into the European school of thought, with perhaps only Sebeok and Eco bringing the greatest attention to his work (Cobley, 1996)

### 2.2.1 Louis Hjelmslev

Within the European tradition, Hjelmslev formulates a major extension to the work of Saussure by redefining the concept of the sign in two ways (Hjelmslev, 1961). Firstly, he reconsiders the relationship between the signified and the signifier (or content and expression to use his terms). Secondly, he swaps them over, giving precedence to the expression (signifier) rather than the content (signified), but still maintaining the idea that there cannot be one without the other. On both sides he then splits them further into relationships of form and substance, the substance of expression and the form of expression for the signifier; the form of content and the substance of content for the signified (Figure 2.4).

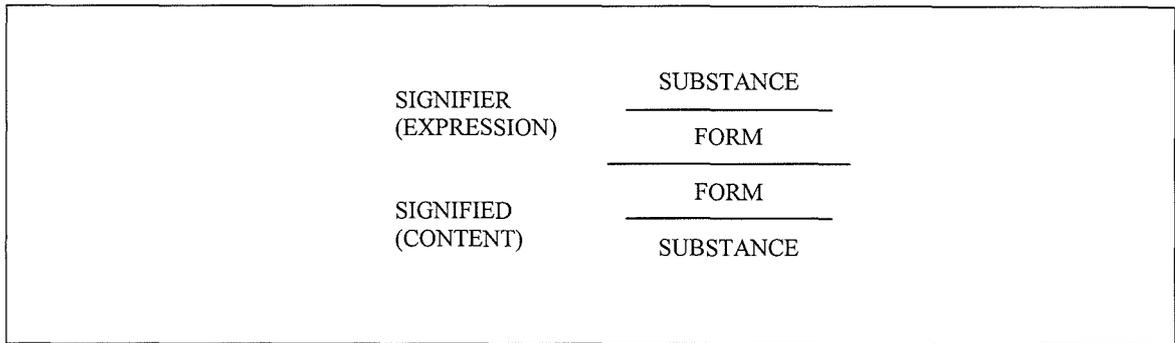


Figure 2.4 Hjelmslev's model of the sign (Hjelmslev, 1961)

Hjelmslev characterises the substance of the signifier as the physical materials of the medium e.g. sound, light, wood, or stone. It is part of the perceptual input that comes from the environment that must be processed in order to be interpreted as a sign, an idea which is close to both Saussure's and Peirce's conception of the phenomena of a sign (Gottdiener & Lagopoulos, 1986). The form of the signifier is that which is recognised through codes as a representation, similar to Saussure's initial conception of the signifier. It is syntactic and structural. On the other side of the relationship, the form of the content is the way that concept has been coded, its semantic structure. The substance of the content is the amorphous concept in the brain, which may be akin to Peirce's notion of 'firstness' (Peirce, 1996), that which is pure experience or idea that is formless.

One can think of all of this in terms of a statue of a figure from Greek mythology. The substance of expression is the stone that is used to produce it and the form of expression is the shape of the body that it takes on as a representation. The form of the content is the identity of the person that the statue represents, e.g. Zeus or Hermes, and the substances of content are the ideas that these two figures might represent. In the case of Zeus, the concept of the divine or all knowing, for Hermes, the principle of transformation or contact between the heavens and the earth.

### 2.2.2 Denotation, Connotation and Metaphor

Other significant aspects of theory that Hjelmslev brings to semiotics are the concepts of 'denotation', 'connotation' and 'metalanguage'. Hjelmslev first formulates these concepts around his explanation of Saussure's sign as essentially 'denotative', that is to say, that there is a one-to-one 'literal' relationship between the signifier and the signified (Chandler, 2002). Hjelmslev goes on to propose that beyond this there are other levels of meaning that occur when signs interact with each other or are

experienced in different contexts. These ideas are further expanded by Roland Barthes (1996).

### 2.2.2.1 Denotation

The term 'denotation' in general refers to a signifier/signified relationship that is instantly understandable with no ambiguity. According to Daniel Chandler, denotation is defined as:

“The definitional, literal, obvious or common sense meaning of a sign.” (Chandler, 2002 p140)

However, while analysing the photographic message (Barthes, 1977), Barthes uncovers that denotation is in fact a special kind of connotation. Barthes realises that in general, what we consider as the signified in any sign act is in fact a potential meaning, a realm of possibilities, which are all connotative and unique to each individual, depending on context and the cultural codes they are in possession of. This connotative realm is then aligned through cultural conventions and codes to produce the illusion of denotation. The photographic image in particular produces the illusion of denotation because of its iconic nature. It appears to be virtually identical with its signified, thus it appears to be utterly denotative.

### 2.2.2.2 Connotation

Connotation is generally considered to be a secondary level of signification that, according to Hjelmslev and Barthes, occurs when an initial denotative sign is taken as the signifier for another signified. This process is a possibly infinite process that can give rise to many different connotations that, as Eco (Eco, 1976) points out, are not only dependent on the initial denotation but also the circumstances and context in which the initial sign occurs. Along side this, connotation is dependent on the socio-cultural codes that an interpreter is in possession of. Chandler defines connotation thus:

“The term 'connotation' is used to refer to the socio-cultural and personal associations (ideological, emotional, etc.) of the sign. These are typically related to the interpreter's class, age, gender, ethnicity and so on. Signs are more 'polysemic' –more open to interpretation- in their connotations than their denotations.” (Chandler, 2002, p 140)

Similarly Martin & Ringham define connotation thus:

“Connotation refers to a procedure whereby a term, in addition to meanings allotted to it in a dictionary (denotative meaning), acquires additional significance resulting from the context in which it is applied. In this sense, the signifier ‘white’, apart from denoting a colour, might connote ‘desire’, ‘absence’, ‘spirituality’, ‘death’, etc., depending on the conditions of its application...The distinction between connotative and denotative terms is frequently blurred.” (Martin & Ringham, 2000, p 42)

### 2.2.2.3 Metalanguage and Metaphor

Another aspect of the so-called secondary level of meaning that occurs as part of signification is that of metalanguage. Metalanguage is identified By Hjelmslev and Barthes as an aspect of signification that occurs when an initial denotative sign (signifier and signified) is taken as the signified of a different signifier. This is the ground for ‘figurative’ or ‘metaphorical’ signification (Chandler, 2002 p 124) whereby a signified concept, referring to one particular domain, is described by signifiers from another. For example, ‘the ship ploughed through the water’ or ‘the ship sliced through the water’. Each one refers to the same motion of the ship ‘sailing’ on the water but uses different signifiers from different domains of knowledge to describe the action. This sets up a metaphorical relationship between the domains of ‘sailing’ and ‘ploughing’. Similarly, the signifier of ‘ship’ and the signified of ‘shipness’ are referred to metaphorically in the terms ‘Starship Enterprise’ from the television show Startrek and ‘ships of the desert’ referring to camels. Indeed, in the case of the Starship Enterprise, the whole notion of ships and ‘shipness’ is transferred from one domain (the sea) to an entirely new one (outer space) and is used as a metalanguage to describe this new domain. (Metaphor is used as a singular example of metalanguage throughout this thesis based on the idea that they share the same fundamental signifying characteristics).

Martin and Ringham define ‘metaphor’ thus:

“The term metaphor designates the procedure by which a given sentential unit is substituted for another, thereby transforming its original semantic charge. In other words a substitute name or descriptive expression is transferred to some object/person to which it is not literally applicable: ‘Pilgrimage’, for instance, is employed instead of ‘life’, ‘burning fire’ to express the notion ‘love’, ‘lamb’ to describe a child etc.” (Martin & Ringham, 2000, p 84).

Lakoff and Johnson argue that ‘the essence of metaphor is understanding and experiencing one kind of thing in terms of another’ (Lakoff and Johnson, 1980 p 5). They also argue that while this metaphorical understanding operates at a general

cultural level, it is fundamentally grounded in the sensory-motor capacity of our bodies (Lakoff and Johnson, 1999).

It is important to note here that metaphor and connotation are very closely linked, as they are both aspects of a second level of signification that is built onto an initial denotative level of signification. Connotation and metaphor offer the potential for additional meaning making beyond denotative principles that is intrinsically linked to the cultural codes and semiospheres (domains of shared sign systems) which individuals take part in. Connotations and metaphors are not fixed meanings, they are entirely dependent on the contexts and circumstances in which codes are brought to bear on interpreting sign vehicles.

### 2.2.3 Roland Barthes

Essentially, what Barthes picks up on are the notions of ‘connotation’, where the expression/content relationship of one sign can become the expression for another sign; and ‘metalanguage’, where the expression/content relationship of one sign in turn becomes the content for a different sign (Figure 2.5). This is somewhat akin to Peirce’s notion of unlimited semiosis whereby the interpretant of one sign can become a representamen for another sign ad infinitum (Brandt, 2000).

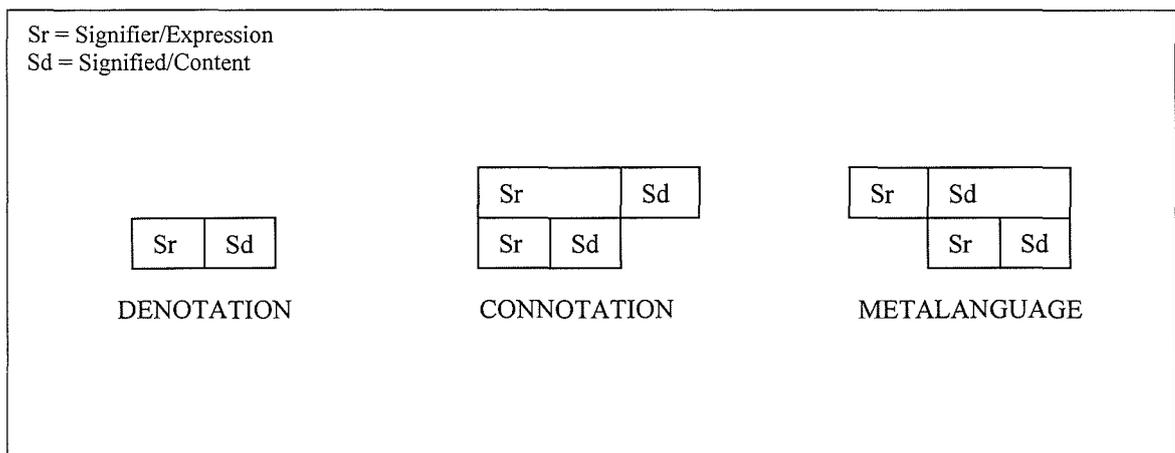


Figure 2.5 Barthes’ Model of Denotation Connotation and Metalanguage (Cobley, 1996)

“The first system is then the plane of denotation and the second system (wider than the first) the plane of connotation. We shall therefore say that *a connotated system is a system whose plane of expression is itself constituted by a signifying system...*In the second case of derivation, the first system becomes, not the plane of expression, as in connotation, but the plane of content, or signified, of the second system. This is the case with all *metalanguages: a Metalanguage is a system whose plane of content is itself constituted by a signifying system*” (Barthes, 1996 p 129-130)

Going back to the example of the Greek statue mentioned earlier. The statue is denotative in as much as it stands as a physical expression of the conceptual content of Zeus. According to Barthes' Diagram (Figure 2.5), the connotative aspects would be additional meanings above the denotative level where the statue of Zeus, as a whole, becomes an expression of the 'greatness', 'mysteriousness', and 'civilized' aspects of Greek culture. Alternatively, an example of metalanguage might occur when the qualities of the Zeus statue are attributed to someone who perhaps looks like the statue in some way. Thus, the statue becomes the metaphorical content for an expression describing that person.

#### 2.2.4 From Transparent Communication to Opaque Mediation

Like Saussure, Barthes was also interested in the communication process. Unlike Saussure however, he did not think of it as a transparent process. Drawing on the work of Shannon and Weaver, Barthes shows not only how texts are messages sent from an author to a reader, but also that the reader is in control of interpreting the message. In this way of thinking texts are much more ambiguous and open to interpretative readings, opaque rather than transparent.

Like Saussure's speech circuit, where a reader or listener instantly understands a message sent by an author. Shannon and Weaver's model (Figure 2.6) tends to reduce the idea of meaning to that of packets of information that are transmitted from a sender to a receiver.

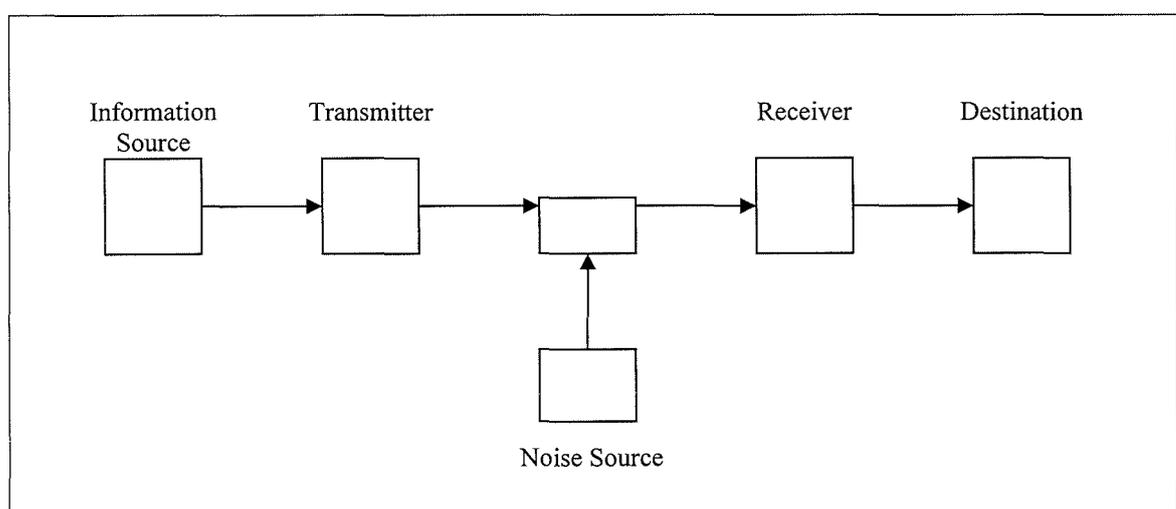


Figure 2.6 After Shannon and Weaver (Heath and Bryant, 2000)

This is very useful for understanding communication technologies but not so good for understanding how we interpret messages, as it takes no account of the importance of socio-cultural codes in the process of reading and decoding messages. In “Image, Music, Text” (Barthes, 1977), Barthes draws upon Shannon and Weaver’s model to describe the photographic message thus:

“The press photograph is a message. Considered overall, this message is formed by a source of emission, a channel of transmission and a point of reception. The source of emission is the stuff of the newspaper, the group of technicians certain of whom take the photo, some of whom choose, compose and treat it, while others, finally, give it a title, a caption and a commentary. The point of reception is the public, which reads the paper. As for the channel of transmission, this is the newspaper itself, or more precisely, a complex of concurrent messages with the photograph as centre and surrounds constituted by the text, the title, the caption, the layout and in a more abstract but no less ‘informative’ way by the very name of the paper.” (Barthes, 1977 p 15)

In using Shannon and Weavers model, Barthes actually manages to semiotically articulate the author/reader problem of this still simplistic view, by highlighting the opaque nature of the received message and the contextual elements that contribute to interpretation of it. His exploration of denotation, connotation and metalanguage give rise to a concern with the layers of meaning that arise within the reading process. Indeed, Barthes looks deeply into these ideas in “Mythologies” (Barthes, 1972) and “Image Music Text” (Barthes, 1977) where he further explores the notion of connotation in relation to what he describes as the third level of meaning, that of modern ‘myth’ building. Particularly, he focuses on the notion of deconstructing ‘texts’ to explore the relationship between author and reader, in terms of denotation connotation and metalanguage. In ‘the photographic message’ (Barthes, 1977) he says:

“In addition to ‘perceptive’ connotation, hypothetical but possible, one then encounters other, more particular modes of connotation...Faced with such and such a townscape, I *know* that this is a North African country because on the left I can see a sign in Arabic script, in the centre a man wearing a gandoura, and so on. Here the reading closely depends on my culture, on my knowledge of the world.” (Barthes, 1977, p 29)

Barthes then goes on into the realm of cultural semiotics, opening up signification in relation to the wider issues of the relationship between context and social codes. Social codes being the ways in which different strata of society engage with their surroundings, resulting in the development of cultural mythologies. For example, in

“Mythologies”, Barthes critically analyses aspects of popular culture, such as the perceived wholesomeness in an advertisement for pasta and the superiority evident in haircuts from films depicting Romans.

### **2.2.5 Umberto Eco**

This widened horizon of semiotics developed by Barthes is what gives Umberto Eco the background to his unifying theory of semiotics. Also based on much of the research performed by Hjelmslev, his “theory of Semiotics” (Eco, 1976) is a highly developed re-evaluation of the major branches of semiotics from both the Saussurean and Peircean schools of thought. Eco produces not so much a new definition of the sign but a definition of the sign that takes into account the myriad social, cultural and contextual issues that underlie every instance of sign use. In doing so, Eco proposes a theory of semiotics in terms of the use of signs as acts of coding and decoding messages with reference to sets of culturally defined conventions. The socio-cultural aspects of semiotics and the importance of context in evaluating meaning are central to his theory.

Based on the work of Katz and Fodor, Eco develops a dynamic model of the semantic aspects of signification that takes into account the circumstances and contexts on which the denotation and connotation of signs are so dependent. Eco’s conception of signs as aspects of codes, which run along and across the various social groups which make up society as a whole, are based on the notion that for a sign to be understood the reader has to be ‘in possession’ of the correct code to interpret it. It is this coding and decoding of signs, which Eco attempts to model in his revised Katz and Fodor (KF) model (Figure 2.7).

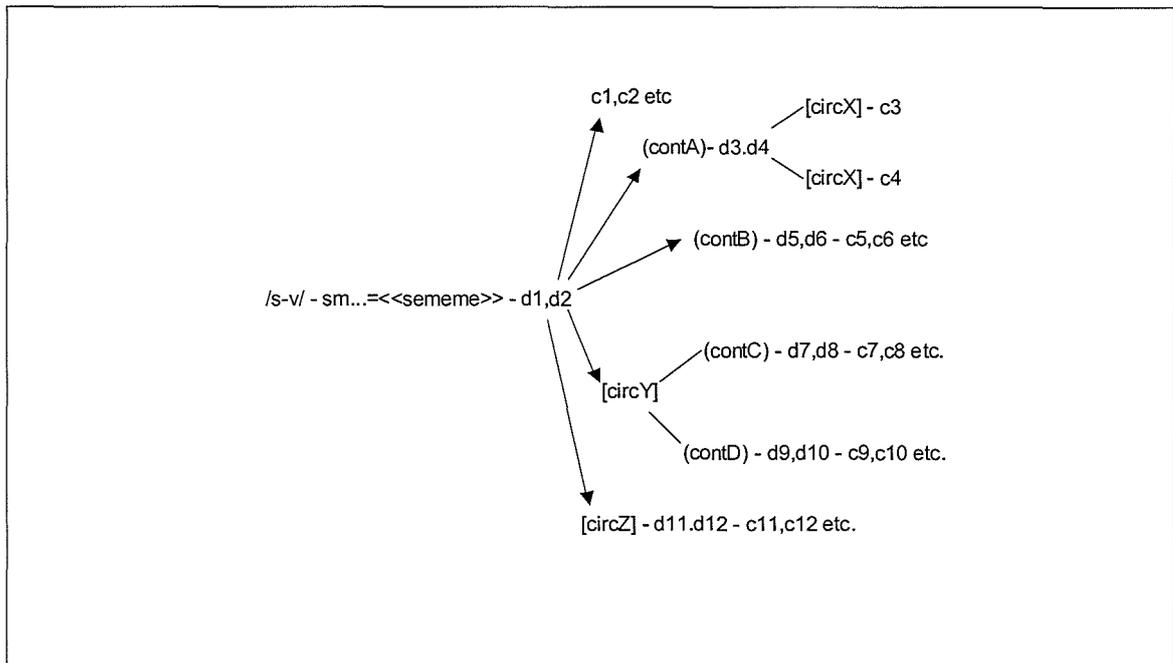


Figure 2.7 The revised Katz and Fodor (KF) model (Eco, 1976)

In explanation: a sign vehicle  $/s-v/$  is a signifier which is formed by a set of syntactic markers ( $sm$ ). This sign vehicle then has a meaning  $\ll sememe \gg$  that can be either a denotation  $d$  or a connotation  $c$  depending on the context (other signs within its system ( $cont$ )) and circumstances (signs outside of its specific system [ $circ$ ]), with which it is encountered. The contextual and circumstantial parameters in which the sign vehicle is encountered affect the type of meaning that the sign vehicle may pertain to. In other words, the denotative and connotative meanings that a sign vehicle might have alter depending on when and where the sign vehicle is encountered (Eco, 1976, p 105). For example, the word 'blue' might be encountered in relation to 'sky', 'grass' and 'feeling'. Each alternative word alters the meaning of blue offering different denotations and connotations. 'Blue sky' simply denotes the colour of the sky. 'Blue Grass' is a type of American folk music. 'Feeling Blue' connotes an emotional state.

### 2.2.6 Codes and Social Semiotics

Social theories of semiotics are very much concerned with the way that semiotics has developed in relation to socio-cultural issues. For Umberto Eco, for example, meaning is no longer considered to be an individual construct, as in the arbitrary semiotics of Saussure. It is now seen as the result of a process in which an individual takes part in society through the coding and decoding of his/her relationship with the cultural values and societal norms of the time.

“Codes, insofar as they are accepted by a society, set up a ‘cultural’ world which is neither actual nor possible in the ontological sense; its existence is linked to a cultural order, which is the way in which a society thinks, speaks and, while speaking, explains the purport of its thought through other thoughts. Since it is through thinking and speaking that a society develops expands and collapses, even when dealing with ‘impossible’ worlds, a theory of codes is very much concerned with the format of such ‘cultural’ worlds, and faces the basic problem of how to touch contents.” (Eco, 1976, p 61)

Daniel Chandler states, “A code is a set of practices familiar to users of the medium operating within a broad critical framework” (Chandler, 2001 p147-148), they are not just the conventions by which we communicate, they are more correctly “systems of related conventions which operate in certain domains” (p149). That is to say, that certain codes are specific to certain activities, realms of knowledge or encountered phenomena. Chandler offers three main groups of codes that are derived from the work of Umberto Eco, Michael Halliday, Gunther Kress and Theo van Leeuwen, which he identifies as particularly important:

- Interpretative codes: perceptual codes (Gestalt psychology), ideological codes.
- Textual codes: scientific codes, aesthetic codes, rhetorical codes, mass media codes etc.
- Social codes: verbal language, bodily codes, commodity codes, and behavioural codes.

#### **2.2.6.1 Interpretive codes**

Interpretive codes have to be able to represent aspects of the world outside of their particular set of signs. They have to be able to represent objects and their relations in the world outside the representational system. In doing so, they offer a number of ways in which objects can be represented, and related to each other. Chandler’s outline of perceptual codes brings with it notions from Gestalt psychology, which propose that human visual perception is predisposed to interpreting the world in a certain way. Indeed, from a semiotic perspective, concepts such as background/foreground, proximity, and similarity that structure our perceptual processes fit well with Kress and Van Leeuwen’s notions of analysing visual images.

### 2.2.6.2 Textual codes

Textual codes are codes that have the capacity to form complex groups of signs or 'texts' that are coherent within themselves and within the context for which they were produced. For example, the visual grammar of Kress and Van Leeuwen offers the potential for different compositional arrangements that allow the realization of different textual meanings. Chandler puts it thus:

“Every text is a system of signs organised according to codes and subcodes which reflect certain values, attitudes, beliefs, assumptions and practices. Codes transcend single texts, linking them together in an interpretative framework, which is used by their producers and interpreters. In creating texts, we select and combine signs in relation to the codes, which we are familiar. Codes help to simplify phenomena in order to make it easier to communicate experiences. In reading texts we interpret signs with reference to what seem to be appropriate codes. This helps to limit their possible meanings. Usually the appropriate codes are obvious, ‘overdetermined’ by all sorts of contextual cues. The medium employed clearly influences the choice of codes.” (Chandler, 2001, p157-158)

In particular, Chandler tries to put across the way in which aspects of texts signify which particular codes should be used to decode them. Some of this is apparent in the medium. That is, certain aspects of a medium give us clues or afford us an insight into which codes are appropriate for decoding it. For example, in film, the nature of the medium gives us clues about the way it has been put together, the types of shots used, the lighting, the genre (documentary, science fiction, film noir etc.) all give us clues about how we should interpret the film. Understanding the medium provides us with an understanding of how to decode it.

### 2.2.6.3 Social codes

Perhaps it is Roland Barthes who is best known for his treatises on texts, codes and decoding. In “Image Music Text”, (Barthes, 1977). Barthes explores many of these issues, opening up notions of text from a strictly literal understanding to encompass, photography, graphic design, advertising and film. In “Mythologies” (Barthes, 1972), for example, Barthes explores these ideas moving towards an exploration of social codes by examining aspects of fashion, sport, films and other cultural domains. Barthes makes us explicitly aware of how, as Chandler puts it, “We communicate our social identities through the work we do, the way we look, the way we talk, the clothes we wear, our hairstyles etc.” (Chandler 2001, p 154) resulting in social codes that Barthes labels as modern myths.

These social codes have to be able to manifest the relations between the producer of a sign or complex of signs, and the receiver/reproducer of that sign. That is to say, they have to be able to manifest the particular social relations between the producer, the receiver and the object represented. (Kress & van Leeuwen, 1996). The debate about whether these codes structure society or whether society structures these codes still goes on and is a central concern in the work of social semioticians such as Michael Halliday (Halliday, 1978), Robert Hodge and Gunther Kress (Hodge & Kress, 1988).

### **2.3 The Relevance of Semiotic Concepts to New Media**

The concept of codes is particularly relevant to developing a semiotics of new media, because it identifies new media objects as texts that can be decoded or even recoded culturally by a user (reader) at the interface level (Friere, 1995). It is important here, not to confuse cultural codes with binary code or programming, even although there is something inherently semiotic about them. Binary code and programming exist as undisclosed entities to most users and are only relevant as cultural codes to those people that have absorbed them at a cultural level. While Manovich (Manovich, 2001), contends that the domain of binary code and programming (namely software engineering) provides the potential for new cultural codes that describe aspects of new media, he essentially agrees that new media come with the social and cultural coding that is appropriate to the old media from which they are derived. Of course, these older cultural codes of styles and genres impact on our understanding of new media, but Manovich's awareness of the newness of new media (as outlined in chapter 1) alters these codes, resulting in new codes, relevant specifically to the culture of new media. A semiotics of new media, must at some level, be able to take this into account, perhaps in some way establishing new media 'mythologies', as Barthes might do were he alive today.

An important aspect of understanding the codes that users might employ in relation to coding and decoding (authoring and reading) new media texts, is the way in which new media signs induce examples of denotative, connotative and metaphorical meaning in users as they interact. By exploring the meanings of denotations, connotations and metaphors that are derived from interaction within the contexts and circumstances of new media, the codes that are used to interpret new media signs, might be uncovered.

SERG's approach to communicability evaluation shares a basic understanding of these ideas as an underlying, if unrealised principle. For SERG (Prates et al., 2000b) a computer interface is a "One shot message" sent from a designer to a user, much as Barthes describes a newspaper article. The communication principle from author to reader is important here because while this one shot message is sent from one to the other, it is only through interacting with it, rather than simply reading it, that users encounter and transform the many other messages that are embedded in the interface. The one shot message is in fact a dynamic text that is interpreted through interaction, rather than reading. However, where SERG identify this concept of the interpretation of new media texts, they are not concerned with understanding the meaning making processes of users, nor are they concerned with establishing the myths or codes that are at work in new media objects. Instead of exploring the meanings that users make while interacting they provide predefined tags for users as a way of identifying the breakdowns in the communication process at the interface as a form of usability evaluation (see Chapter 1.6.1).

At the more structural level of the medium, some of the semiotic concepts outlined above also have a particular relevance to the development of a semiotics of new media. For example, new media interfaces are full of paradigmatic structures that are often articulated into syntagms through user interaction. Buttons and hyperlinks often have different states that change as the mouse is rolled over them or when they are clicked. Often this signifies some form of functionality or different meaning from its original state to the user. Similarly, the sequential and spatial syntagms as outlined above are exactly what Andersen refers to when he discusses the notions of sequential and concurrent chains of signs in computer interfaces. As such, these notions are essential in understanding new media, particularly new media that foregrounds symbolic operations and manipulation of the medium as signs.

In terms of sign types, the concept of iconicity is particularly relevant to notions of immediacy in new media outlined by Bolter and Grusin (see Chapter 1.3.5) regarding the way in which they attempt to hide their mediating properties. In opposition to that, the notion of symbolic signs are central to new media particularly in relation to Bolter and Grusin's notion of hypermedia, which foregrounds the medium itself. Windows for

example, are not iconic representations of actual windows but symbolic representations of the window concept. Also, the index is an interesting concept in relation to new media as it is not strictly identifiable in itself but it is an essential part of most signs in new media particularly symbolic signs. For instance, the line drawn on the virtual paper of a drawing package is an index of the movement of the users drawing hand, which is symbolically represented on screen by coloured pixels. These sign types sit alongside those defined by Andersen. Sometimes overlapping, they potentially provide more leverage in understanding the relationships between the convergences of media types in new media applications.

### **2.4 Conclusion**

All of the semiotic concepts discussed in this chapter offer the potential for the further understanding of the remediation of old media in all its new forms. Not only do they offer ways of formalising the descriptions of new media objects or artefacts, they offer a different perspective for understanding how meaning is derived through interpretation and interaction with new media. However, while these concepts offer the potential for the development of a semiotics of new media, it is not yet clear how their relationships with older media can be applied to new media. These ideas are developed in the following chapter.

## 3 Applied Semiotics

Following on from the semiotic concepts introduced in Chapter 2, this chapter explores the relationship between semiotics and other media domains such as cinema, product design, architecture and graphic design. The aim is to pinpoint important concepts from semiotic theory used to understand old media that could be applied to a semiotics of new media.

### 3.1 Computer Semiotics

Andersen's development of a semiotic approach in "A Theory of Computer Semiotics" (Andersen, 1990) comes from a concern within HCI to design systems that successfully support tasks in work environments. As he sees it, the context of the work environment has a direct affect on the language that people use to talk about the tasks that they are performing in that environment. This he sees as an excellent place for semiotics and linguistics to enter the field of HCI, where signs are the vehicles that express related concepts, similar to the use of words in language. With this in mind, he develops a tentative method for interface design based on a semiotic analysis of observing language in the work place. Through using semiotic techniques from linguistics he proposes the study of semantic fields related to keywords from the work environment as the basis of interface design. This attention to the work environment remains the focus of most of Andersen's work where he concentrates on semiotics as a method of gathering user requirements for building computer systems.

The second and perhaps the most interesting contribution he has to offer is his taxonomy of computer based signs and concepts surrounding the process of interaction itself. What Andersen does that is unique is to study the signs present in an interface and classify them in terms of their functional operation into types of signs with particular features:

- **Handling features:** are those features that are produced by the user acting on the system signs via input devices such as keyboard, mouse, joystick etc.

- **Permanent features:** are generated by the computer and remain constant throughout the lifetime of the sign serving to contrast it to other signs.
- **Transient features:** are features that change as interaction takes place within the system. Transient features serve to symbolize the different states that signs can have in relation to the actions that change them (Andersen, 1990 p176).

Aspects of Andersen's taxonomy of signs are outlined below:

- **Interactive signs:** Interactive signs are unique to computers. They are distinguished from other signs by permanent features such as shape and size, but the unique features that make them interactive are the handling features that allow for the transformation of other signs within the interface. To this end interactive signs are generally representative of our manipulating activities.
- **Actor Signs:** In effect actor signs are signs that are set in motion by users. They often begin at the start of a program e.g. when game play is activated, or they sit dormant waiting to be activated by a user. They tend to have an activity or function, which they perform either autonomously or through user interaction. Buttons are a good example of this. They tend to denote a function, performed by the computer, which is related to the task in hand. This is engaged with through the use of an interactive sign as controlled by a user. Actor signs then are generally representative of computer functions and contain permanent and transient characteristics.
- **Controller signs:** Controller signs only change the properties of other signs not of themselves. They are often invisible in themselves, only making their presence known through the effect they have on other signs, e.g. when the cursor changes depending on what is positioned over.
- **Object signs:** Object signs are predominantly the signs which interactive signs are used to alter. They have permanent and transient features but they cannot be handled like interactive signs. E.g. the paper in a drawing program.
- **Layout signs:** Layout signs are signs that set the scene or as Andersen puts it 'mere decoration'. They are blessed only with permanent features (Andersen, 1990 p199-213).

This taxonomy is generally based on the analysis of computer interfaces that were being devised towards the end of the 1980s and early 1990s. While everything that Andersen outlines in this taxonomy is still relevant today, it is arguable, in relation to new media, that many new sign systems have since been assimilated into computerised technology. Andersen's taxonomy is essentially restricted to describing the relationships between signs that are specific to an older generation of computer systems. While many of the sign types he describes are very much in use today, they are accompanied by the sign systems of film, TV, 3D graphics, virtual environments and other forms of new media. It is essential then, to reconsider the limitations as well as the strengths of Andersen's work in relation to new media.

Another particularly important set of ideas that Andersen identifies are the notions of sequential and concurrent syntagms. These are borrowed from structural linguistics to describe how computer based signs organised within interfaces. Andersen makes a distinction between verbal signs and computer based signs based on the fact that computer signs exist in relationships with other signs that are both concurrent and sequential at the same time, unlike verbal signs that only exist sequentially. In order to make sense of this feature of computer-based signs Andersen looks for alternatives to structural linguistics to describe them. Interestingly, he turns his attention to other expressive media most notably those of theatre and dance. It is from these artistic forms of expression that he finds similar notions to what he describes happening in an interface.

“All theatrical signs, in particular the actors themselves, are part of both concurrent and sequential chains. On the one hand, the collection of actors present on a stage at the same time forms an important type of concurrent chain... On the other hand, an individual actor goes through some kind of change during the play.” (Andersen, 1990, p 217)

Andersen is proposing a theory here that looks at the process of interaction based on the notion that it takes place through the manipulation of the signs within the space of an interface over a period of time. This perspective is not entirely unique to a semiotic approach, Brenda Laurel's "Computers as Theatre" also makes a contribution here in relation to narrative in computer games (Laurel, 1993).

What is really interesting about Andersen's "Theory of computer semiotics", is revealed more by what structural linguistics cannot describe than by what it can. Andersen's insistence on using structural linguistics to explore computer-based signs highlights their unique qualities and brings about a realisation of the inadequacy of using linguistic semiotic theory to describe the multitude of signs that are interpreted during interaction. His use of descriptions from other media domains, in relation to the theories he develops, points towards a need for a much broader semiotic approach to HCI, which is particularly relevant to understanding new media and the problems that are specific to it.

Andersen's later work (Andersen, 1999, 2001; Andersen & May, 2001; May, 2001) develops his ideas in relation to the computer interfaces used for navigating and manoeuvring ships in the maritime domain. Particularly May and Andersen focus on the analysis and identification of the necessary constituent parts of tailorable interfaces that can be modified by users as their information requirements alter. This work continues Andersen's interest in using the semiotic analysis of language in work domain situations as the basis for developing signs for computer based support. Andersen's most recent work has seen him move these interests into the mobile and ubiquitous computing domains. Here he has begun the development of a formal notation for understanding 'digital habitats' and complex mediation across multiple systems, which can be used to describe complex activities involving multiple users and information artefacts (Andersen, 2004; Brynskov & Andersen, 2004; Andersen & Bodker, 2004).

### **3.1.1 Semiotic Engineering Research Group (SERG)**

As well as Andersen, the Semiotic Engineering Group (SERG) has been researching the relationship between semiotics and HCI for a number of years now. The main thrust of the SERG approach is the viewpoint that a user interface can be seen as a "One shot message" (Prates, de Souza, & Barbosa, 2000a, 2000b) sent from a designer to a user, which attempts to communicate its functionality as clearly as possible. Furthermore, this message contains a number of smaller messages that constitute the functional aspects of the interface, which are delivered and articulated by the signs that the designer has chosen to represent them.

These ideas have been developed into what SERG call a "Communicability Evaluation Method" (Barbosa, Prates, & de Souza, 1999; Prates et al., 2000a, 2000b), which is

comprised of three stages. During the first stage, a set of predefined words or ‘Tags’ (e.g. error, lost, confused, success) are given to users that might describe the situations that they will find themselves in during monitored interaction. Interactions are recorded verbally and through video screen grab techniques, so that actual interface activities can be correlated to the use of the tags. In the second stage the tags are interpreted by mapping them against a set of established evaluation criteria, much as would occur in many usability evaluation techniques. The final stage of ‘semiotic profiling’ is completed by comparing the tags, related to the evaluation criteria, to the signs that exist in the interface. This stage is completed by a semiotics ‘expert’. Exactly how this is done remains undisclosed in the SERG papers. To a certain degree, this contributes to a kind of mystification of the role of semiotics in HCI. It is possible that the detail of the semiotic profiling process is too complex a process to explain in the papers they have written on the subject. Alternatively, it may be that their method is not specifically focused on a semiotics of interaction per say, preferring to include the skills of a semiotics expert in the HCI design process.

What SERG have done in developing this approach is to devise a usability evaluation method inline with field observation techniques from HCI, which uses ideas from semiotic theory as a basis. Their notion of the one shot message and their ideas about the relationship between the designer and the user as mediated by the interface are all clearly derived from semiotic concepts (see Chapter 2). However, they have not developed semiotic theory in relation to HCI in the way that Andersen has. By concentrating on the details of developing a semiotically informed design methodology they have managed to frame the use of semiotics in relation to breakdowns in usability within HCI. This is a useful contribution to the HCI debate as it brings semiotics and HCI closer together. Thus throwing the semiotic spotlight on some crucial HCI issues such as the relationship between the designer, the interface and the user.

## **3.2 Cinema**

Christian Metz (Metz, 1974, 1986) is probably the most well known advocate of semiotic theory in relation to cinematic criticism. Metz explores the relationship between notions of cinema and film. Particularly he looks at the relationship between codes that exist in cinema and films as distinct entities. This treatise then places the film or films, as individual messages with specific attendant codes, within the context of

cinema, which has its own set of codes. This he sees as a problematic relationship for a semiotics of film, one of many, where specific codes relevant to specific domains from film, cinema and other language systems that constitute aspects of film structure, overlap as well as remain distinct.

A particularly interesting feature of Metz's work is his explication of syntagms and paradigms in relation to film structures. He is particularly aware of the syntagmatic structures that exist in films, both the obvious temporal ones as well as the spatial ones. A significant aspect of this, to which he constantly returns, is the lack of a smallest semiotic unit in film. Metz considers this problem to be derived from the multiplicity of codes that have been assimilated into film due to its convergent nature. In visual terms, he proposes that 'shots', in relation to language, are a type of smallest unit, which are more like statements than like individual words. This being a significant difference in the useful identifiable smallest unit of film compared to the smallest unit of language.

His 'Grande Syntagmatique', as it is known in its shortened form, is essentially a categorization of 'shots' and sequences of shots that make up the rhetoric/grammar of film structure as he sees it. As such, in this revised category (Metz, 1986), he proposes eight separate categories of syntagms that exist paradigmatically for filmmakers to select and structure narratives in filmmaking through the structuring of 'shots':

- Autonomous shots: singular episodic plot periods.
- Non-chronological sequences (Parallel Syntagms): contrasting sequences of alternating images structured A, B, A, B etc. that are considered to present two different events or places existing at the same time.
- Non-chronological sequences (Bracketed syntagms): groups of shots that are all different but pertain to the same meaning without any reference to chronological order.
- Chronological simultaneous syntagms (descriptive): sequences of events presented chronologically that pertain to the description of a place or events that are occurring simultaneously.
- Alternate narrative syntagms: contrasting sequences of events presented alternately and pertaining to the chronological order of the plot.

- Scene: a single succession of events taking place in one place, similar to the notion of the scene in theatre.
- Episodic sequences: a chronologically ordered series of shots separated optically, by fades and wipes etc, but related temporally to the plot line.
- Ordinary sequences: sequences of shots that drive the narrative along but that miss out unimportant detail.

Throughout all of this Metz constantly returns to the problem of the minimal unit, or lack of it, in film semiotics. Thus a semiotics of film requires an understanding of, not just the rhetoric of filmmaking, but also the nature of a medium that carries so many different language systems in it, not least language itself, which has its own semiotic structures outside of film. In this respect, he points out that syntagms in film are constructed homogeneously and heterogeneously across channels, or 'series' as he calls them (Metz, 1974, p 174). These include; visual series, linguistic series, sound effect series, musical series and credits. Metz explains further:

“The axis of simultaneity in fact includes two axes: there is the rectangle of the screen, with all the spatial co-presences that it allows- and on the other hand the simultaneous syntagms which may be established between different series but in a synchrony of perception: between a visual element and a sentence heard at the same moment etc.” (Metz, 1974, p 174)

From this he proposes that there are: - homogeneous temporal syntagms (the sequences in different channels), homogeneous simultaneous syntagms (in the image, i.e. the composition of visual components), heterogeneous simultaneous syntagms (across channels at the same moment) and oblique syntagms (relating for example visual elements with speech that comes after it).

Metz goes on to discuss the problems of this in relation to decoding films. He focuses his attention on Hjelmslev's concepts of 'form/material/substance' (Metz, 1974, pp 208-211) in relation to the problem of the film as medium. In this way he continues to develop the problem of a general semiotics of film based on the fact that film is in fact a meta-medium that brings different mediums together into one system. Metz seeks a general semiotic theory of film but finds that semiotic analysis has to take into account the different codes that come with each element of the material of expression that constitutes a film. Thus his 'Grande Syntagmatique' focuses only on the image track

and makes no attempt to understand the compositional structure of images or the oblique relationships between sound and moving images. Furthermore, Metz explores the formal problems caused when one set of codes from one domain are transferred to a similar, yet very different medium. For example, Metz points out that Film, by dint of its recording nature, produces mechanical reproductions of reality. This results in analogous signs that bare a denotative relationship to the filmed object. This is possibly better understood as the concept of 'immediacy' or fidelity, inherent in the iconic nature of photographic signs as identified by Barthes. While this similarity is useful in understanding film, it is inherently problematic because the temporal nature of the newer medium. Film transforms the still image into a succession of moving images over time. The forms of the images are altered by the moving medium, which provides new information for the decoding of the medium as film. The medium is the message, as McLuhan once said (McLuhan, 1994). This is true in as much as the medium of film essentially determines the type of messages that can be carried as content. In short, the semiotics of film is extremely complex because there are so many media components assembled together in one message.

### **3.3 Visual Semiotics**

In 'Reading Images' (Kress & van Leeuwen, 1996) Gunther Kress and Theo van Leeuwen concern themselves primarily with the task of isolating and defining the different methods of construction used in image making that allow meaning to be conveyed. Their in-depth study of all kinds of images leads them away from traditional semiotic evaluation, in the sense of procuring meaning through the relationships between the various signifiers in an image and into a deeper concern with the syntactic construction of images as a whole.

This primary focus on 'compositional structure' is then placed in the wider context of the process of representation in relation to the wider still contexts of social, psychological and political factors that come into play when an image is produced. Kress and van Leeuwen build on the notion of a producers 'intention' as the dominant factor in sign production, which is 'motivated' against a background of necessary contexts, which remain an intrinsic part of any image that s/he may produce. This notion has a strong sociological basis in the work of Michael Halliday (Halliday, 1978) and bears a relation to Eco's studies of context and circumstance (Eco, 1976) and

separates them from Peirce's system of categorization, which they view as unmotivated and arbitrary (Peirce, 1931-1958).

“In our view signs are never ‘arbitrary’, and ‘motivation’ should be formulated in relation to the sign-maker and the context in which the sign is produced, and not in isolation from the act of producing analogies and classifications. Sign-makers use the forms they consider apt for the expression of their meaning, in any medium in which they can make signs...all linguistic form is used in a mediated, non-arbitrary manner in the expression of meaning.” (Kress & van Leeuwen, 1996,p 7)

From the point of view of ‘motivation’ and ‘background’, Kress and van Leeuwen start to build a theory of production, which focuses, on the producer rather than on an overriding system. As they see it, a producer/sign-maker has a meaning that they want to express. This meaning is then clothed or ‘coded’ into a form provided by a medium (substance), which is the most appropriate given the context in which a model reader will witness it. This point of view does not deny the existence of an overriding system (i.e. a system of codes) but merely concentrates on the agency of the producer in choosing the form best suited to his/her purpose.

“Communication requires that participants make their messages maximally understandable in a particular context. They therefore choose forms of expression which they believe to be maximally transparent to other participants.” (Kress & Leeuwen, 1996, p 11)

To further develop their theory Kress and van Leeuwen expand their ideas of ‘motivation and ‘background’ in relation to the social semiotics of Michael Halliday, particularly his work ‘Language as Social Semiotic’ (Halliday, 1978). From Halliday, Kress and van Leeuwen adopt the notion of the ‘metafunction’. This is broken up into three separate sections in Halliday’s ‘Social Semiotic’, which Kress and van Leeuwen use as the basis for their own studies into visual grammar.

Within the broad territory defined by each of these metafunctions Kress and van Leeuwen define the aspects of image construction that constitute their visual grammar. Suffice to say that what Kress and van Leeuwen have succeeded in achieving in “Reading Images” is the production of a dictionary of terms that describe pictorial elements and methods of image construction, which have been developed over hundreds of years. In semiotic terms, this constitutes a translation from a visual form into a linguistic one, allowing the development of a critique of visual culture. This is

something that Kress and van Leeuwen view as extremely important, in relation to the social, psychological and political contexts that they place sign-makers in.

### 3.3.1 Visual Grammar

Visual grammar considers the composition of spatial syntagms with regard to the ‘informational value’ of the positioning of elements within an image. From a particularly Western perspective, Kress and van Leeuwen propose that the ‘left side’ of an image is the ‘Given’ side; the already known side; the start of an idea, as in the headline or opening paragraphs of a magazine article for example. The right side is the ‘New’ side, often a photograph, in the case of magazines. It usually demands attention or is problematic in some way. The left to right direction of reading also forms some kind of narrative that is linked to sequential syntagms in a way. Obviously, this does not apply in cultures where signs and symbols are arranged to be read up and down or from the back of a book to the front as in Chinese or other Asian cultures.

For Kress and van Leeuwen, aspects of images that are spatially organised in the top section of images are considered to be ‘ideal’ ‘good’ or ‘whole’, while elements that are in the lower sections of images are considered to be ‘Real’, ‘Base’ or generally more down to earth. This is particularly true of paintings that contain religious motifs. Finally, when a pictorial element is presented in the centre of an image, it is presented as a nucleus of information around which all other elements become marginalized, subservient or dependent. These ideas are closely related to notions about embodied understanding that Lakoff and Johnson define in their work on metaphor theory (Lakoff & Johnson, 1980, 1999) where they consider orientation metaphors in relation to conceptual understanding of the world. The spatial organization of syntagms then, derive much of their meaning in relation to bodily understanding and orientation in the world.

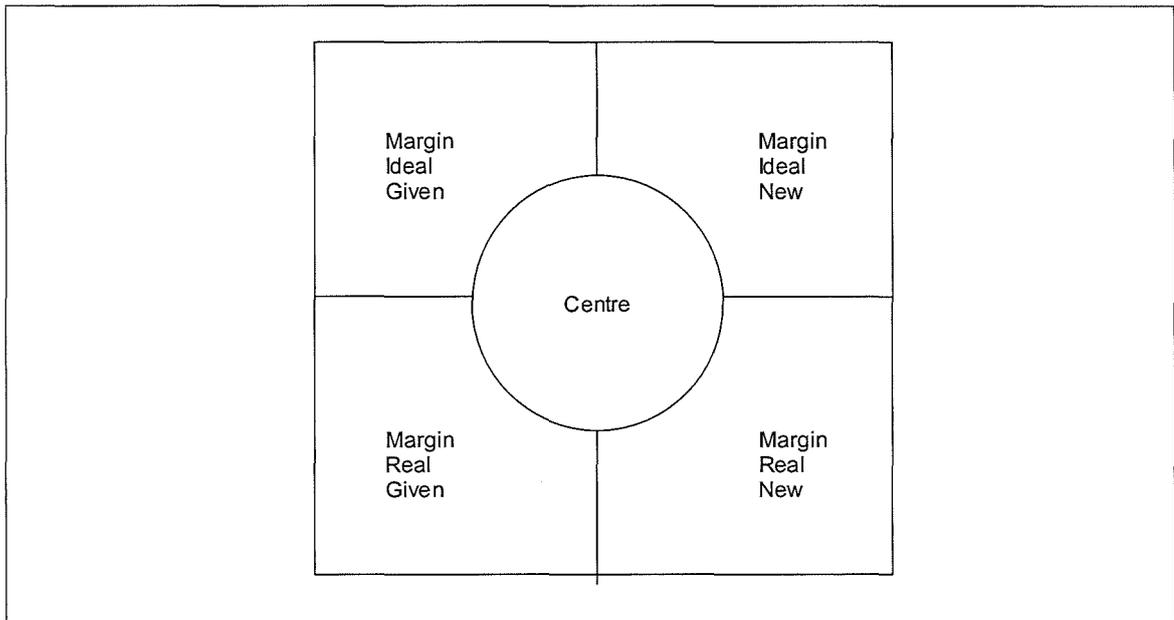


Figure 3.1 Kress and Van Leeuwen's Visual Grammar (Kress and Van Leeuwen, 1996 p208)

Other aspects of visual structure that Kress and Van Leeuwen discuss in terms of importance to analysis are the Saliency of objects e.g. size, sharpness of focus, tonal contrast, colour contrasts and placement; framing e.g. the degree by which units of information are demarcated as independent from others, and the liner/nonlinear composition of texts e.g. the use of subheadings, emphatic devices, numbered lines, tables, diagrams and so on that encourage readers to scan or skip read the information instead of reading it in a standard sequential mode. Hypertext is a perfect example of this.

### 3.4 The Semiotics of Graphics

The father of modern graphic design undoubtedly has to be Jacques Bertin. His influential work in the 60's and 70's "Semiology of Graphics" (Bertin, 1983) and "Graphics and Graphic Information Processing" (Bertin, 1977) amounted to a radical shake up of the cartographic community of which he was part. Deeply influenced by Saussure and the subsequent Paris school of semiotic thought, Bertin sought to redefine graphic traditions based on semiotic theory.

Bertin proposes a fundamental difference between pictograms (figurative or representational images) and that of graphics. As he sees it, figurative images are polysemic, that is ambiguous, which places the interpretation of the image in the hands of the reader, a particularly semiotic point of view. In graphics, Bertin proposes the

monosemic system where all elements have meaning attributed to them in the form of a legend or key, which is defined well before the graphic is viewed. This is a conventional approach much like that proposed in Saussure's linguistics.

In terms of the monosemic system that Bertin proposes, he relates graphics to mathematics particularly through the definition of variables in each. On the other hand, he draws a very sharp distinction between the two in terms of their different natures. Mathematics is temporal or linear in nature as opposed to the spatial/relational nature of graphics. This linear quality of maths is best exemplified according to Bertin in music, and further into other acoustic systems such as speech. For Bertin the strength of graphics lies in the eye's ability to take in vast amounts of data in three dimensions at a glance, rather than having to judge differences over time as the ear does.

“In an instance of perception. Linear systems communicate only a single sound or sign, whereas spatial systems, graphics among them, communicate in the same instance the relationships among three variables” (Bertin, 1983, p3)

Bertin defines the scope of the graphic system as the two planar dimensions of X and Y, in combination with the retinal variables size, value, texture, colour, orientation and shape. These are equivalent to a Z dimension related to the eyes ability to differentiate between types of graphic mark. As such combinations of these marks can be used to convey the relationships between great numbers of quantifiable data values. Bertin then goes on to divide graphic representations into four different types which are dependent on the correspondences between visual components placed on the two dimensional plane:

- Diagrams: are defined as the correspondence between all the divisions of one component and all the divisions of another component.

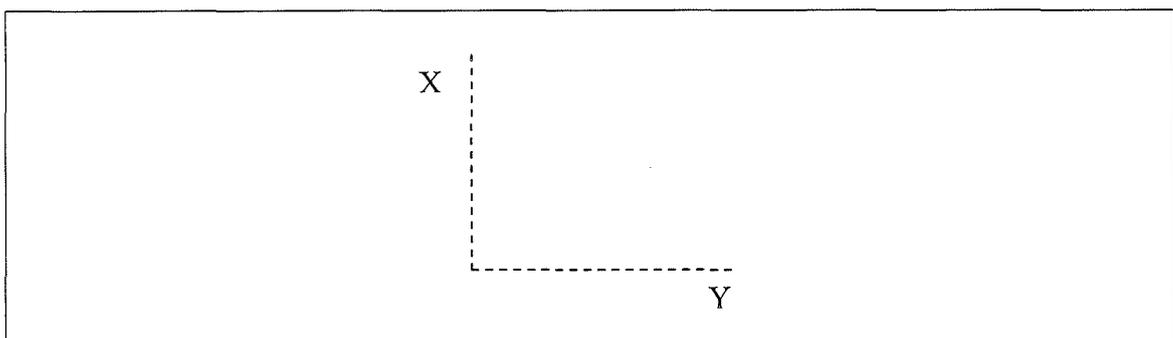


Figure 3.2 Diagrams, after Bertin



- Symbols: are defined when the correspondence is not established on the plane, but between a single element of the plane and the reader, the correspondence is exterior to the graphic.

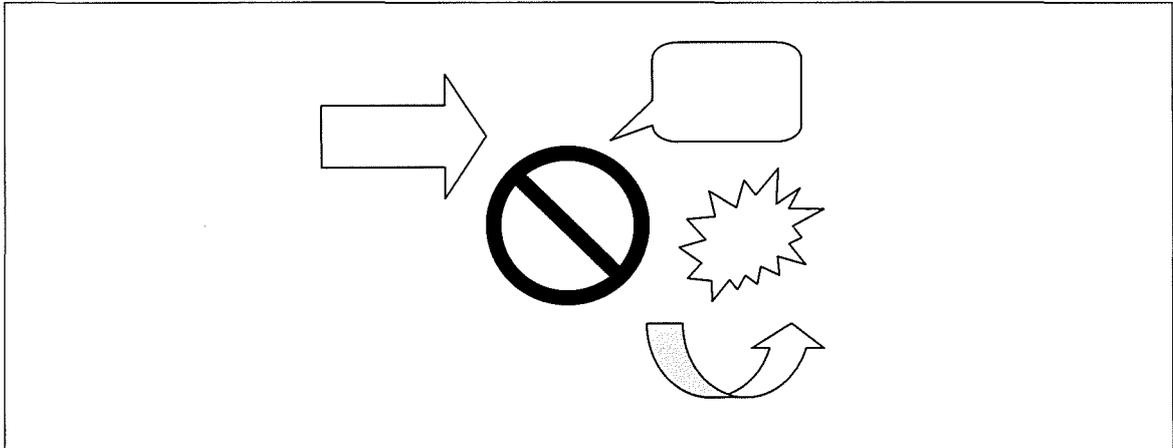


Figure 3.5 Symbols, after Bertin

### 3.4.1 Graphics and Pictograms

The last of Bertin's definitions is that of a symbol/pictogram, and as such falls largely outside of the kind of graphics that Bertin wishes to promote. Interestingly, research into symbols, pictograms and their communicability (Barnard & Marcel, 1984) highlight some of the issues Bertin points out.

“There are two immediate implications for symbols and pictograms. One is that issues associated with the specific visual characteristics of graphic representations should be considered within some broader framework of human communication and the assumptions it reflects. The other concerns the extent to which graphic resources (e.g. colour, relative size, representational style) can be interpreted systematically to serve communicative functions.” (Barnard, Marcel, 1984, p 39)

Barnard and Marcel define symbols and pictograms differently from Bertin and see a distinction between the two within what Bertin claims as the ‘figurative image’. Symbols for Barnard and Marcel are much more abstract and give no hint of their meaning through some figurative representational relationship. In short, they are arbitrarily associated with their meaning. To an extent this puts them within Bertin's definition of a Graphic. That is, within the definition of a sign that is assigned a monosemic meaning through the application of conventional rules and not through a metaphorical relationship to a real world object.

A more useful way of understanding this debate from a semiotic perspective is through applying the categories defined by Charles Sanders Peirce as outlined in Chapter 2. In this respect what Bertin considers to be a graphic can be considered as a Peircian symbol, that is to say, that it is utterly reliant on an understanding of agreed conventions and codes for its understanding. Bertin's figurative image is representational, as are Marcel's pictograms. These both follow, more or less, what Peirce's outlines as an Icon. Beyond this of course we have Peirce's Index, which is not mentioned explicitly in graphical terms, although the size of plots such as the height of a bar chart has an indexical relationship to the data being displayed.

There is considerable debate within the information design community however, as to the effective communication of these two types of graphics. Bertin's symbolic graphics obviously adhere to strict visually grammatical rules that define how they are to be interpreted within a given context. This is fine in terms of vast amounts of quantifiable data that, although readable in an instant, still requires considerable textual notation to identify which elements mean what. Pictograms or Icons, on the other hand, are instantly identifiable in relation to a much looser set of values that are associated with the sign on a cultural level. Here there is imprecision in meaning with variations of form and a multitude of unique interpretations from reader to reader. This however does not dismiss the very usable qualities of pictograms in conveying particular concepts within particular cultural spheres.

Robert Dewer (Dewer, 1999) explores this vast grey area of symbols and pictograms in terms of their communicability defining an effective symbol thus:

“Initially, it must command attention or be easily detected by the person who needs the information. It must be legible at the appropriate distance and must often be legible when seen for a very brief time.” (Dewer, 1999, p 286)

Dewer proposes a number of methods for conducting communicability tests on symbols, from laboratory tests where groups of users are shown a symbol and asked to say what it means, to comprehension estimation where users are asked to gauge what percentage of the population they feel would be likely to understand a given meaning associated with a sign. Throughout all of these tests Dewer underlines the part that context plays in establishing meaning. This then places Bertin's distinction between

pictograph and graphic at two ends of a sliding scale. The meaning of pictographs is defined by the cultural context in which they are encountered in and the meaning of Bertin's Graphic relies on particular and detailed definitions prescribed along with the image. Iconic images are more likely to be understood in terms of cultural coding practices rooted in everyday experiences, whereas symbolic coding becomes the province of specialist domain codes that are often provided along with the graphic such as explanations of mathematical formulae.

### 3.4.2 Tufte

Another interesting figure in the graphic design community is Edward Tufte. Effectively he stands out amongst the crowd as a modern day Bertin, carrying the flag for consistent and disciplined graphical design procedures. He proposes a number of ideas similar to Bertin, but none quite as radical or structured. Tufte's approach unlike Bertin's is based on a set of principles derived from the collection and analysis of hundreds of graphical problems/solutions from all over the world. His three books "The Visual Display of Quantative Information" (Tufte, 2001), "Envisioning Information" (Tufte, 1990) and "Visual Explanations" (Tufte, 1997) exist as a beautifully presented collection of various and exotic graphical forms taken from throughout history. In this sense Tufte is like a scientist collecting specimens to examine in detail aiming to uncover underlying principles. The principles he uncovers such as, Data density, Maximising data ink and the removal of Chart Junk, all bear striking similarities to Bertin's ideas but without the formal rigour. As such, Tufte's data design is largely based on common sense approach derived from his examinations. However, within the information design community there are few who have done so much to gather together and critically engage with such variety of graphical forms.

## 3.5 Maps and Wayfinding

It is perhaps quite telling that it was within the cartographic community of France that Bertin's ideas had the greatest impact. In terms of representing the various types of information required in map-making, Bertin provides a very precise and systematic method. All maps heavily rely on the addition of a legend by which their secrets can be deciphered, in particular the relationships between places and routes to get from one place to another. However, despite Bertin's assertion that a monosemic graphics provides precision, using maps is not a straight-forward procedure as Paul Mijksenaar points out (Mijksenaar, 1999):

“It is a fallacy to think that maps are much easier to read than text. Reading maps, just as reading directions and graphics, requires a certain level of knowledge and training. The different ways of depicting information on maps belong to the set of map conventions, and most of them have to be learned.” (Mijkensaar, 1999, p 218)

This is a view similarly put across by Barnard and Marcel:

“Effective use of abstract form rests on the assumption that users will come to learn, either incidentally or through tuition, the relationships between form and meaning.” (Barnard and Marcel, 1984, p 43)

Mijkensaar points to the several different layers of information that are woven into maps which makes them unique ‘information presenting artefacts’, (Mijksenaar, 1999) where the user has to browse through the information presented, using his knowledge of map conventions to decipher the maps codes.

In “Theory and research in design of ‘you are here’ maps” (M. O’Neill, 1999) Michael O’Neill discusses maps in close relation to the cognitive processes of navigating around an environment. Casting the ‘wayfinding’ process as the way in which we use perceptual input from the environment to find our way around, O’Neill proposes guidelines for ‘You are here’ (YAH) map design based on two cognitive models; ‘Route’ maps, which contain information about places and how to get to and from them, and ‘Survey’ maps that contain knowledge about the relationships between places in terms of distance and direction. O’Neill posits that:

“An understanding of the process by which people create a cognitive map and use that information, must be incorporated into YAH map design. An understanding of the wayfinding process is also important. The information goals of the signage system, the purpose of a typical visit, and the user group characteristics need to be understood. Most important is the understanding that signage of YAH maps and building design form a system of information representation to the user, which need to be integrated into any potential solution.” (M. O’Neill, 1999, p 231)

Along with Michael O’Neill, the work of Romedi Passini (Passini, 1992, 1999) stands as a landmark in the development of wayfinding theory and in the development of information design to support this task. Like O’Neill, Passini takes a cognitive approach to wayfinding activities, which is essentially based on the same two cognitive models:

- The linear sequential model - which is based on an egocentric view of an individual moving through space.
- The spatial model – which is based on a non-egocentric view of the organisational structure of a place, or places in relation to one another.

Passini proposes that:

“Spatial orientation or the semantically more appropriate term of wayfinding can be defined as a cognitive process comprising three distinct abilities: a cognitive mapping or information generating ability that allows us to understand the world around us; a decision-making ability that allows us to plan actions and to structure them into an overall plan; and a decision-executing ability that transforms decisions into behavioural actions. Both decision making and decision execution are based on information generated by cognitive mapping.” (Passini, 1992, p 46)

Both wayfinding paradigms for information processing have been borne out through extensive testing on users in a number of environments, particularly shopping malls and busy inner city areas. The users were asked to draw maps of the area they had been engaged in finding their way around. All of the maps that were drawn could be categorized into either one or the other of the wayfinding paradigms (Passini, 1992).

Passini develops an active model of wayfinding based on the decisions people make in relation to both the cognitive map they have of a place and the information they pick up from the environment. This moves the position of the cognitive map from a stable picture of an environment to one in flux where the map is constantly changing in relation to information that is acquired and information that is forgotten (Passini, 1992). His wayfinding model also shows the importance of the difference between the expected image, i.e. that in the mind, and the perceived image in making decisions.



“The relation of people to the city goes beyond perceptual recognition and introduces the role of ideology. In short, the inhabitant of the city does not adapt to an environment, rather residents play a role in the production and use of the urban milieu through urban practices.” (Gottdiener, 1986, p 7)

Here Gottdiener, focuses his attention on the social construction of space that is the result of the interplay between different cultural groups and the codes with which they relate to both one another and their environment. His conception of space is built upon Hjelmslev’s definition of the sign. Particularly Gottdiener focuses on the Form/substance relationship within the signifier.

Gottdiener sees this as fundamental to understanding the way people relate to their environments. The substance of the signifier for Gottdiener relates to the physical existence of spatial elements, the objects. The form part of the signifier is how that physical substance appears to an individual, which is dependent upon the social codes he is equipped with. For example, a set of stairs in a plaza for a pedestrian offers the opportunity to walk up or down them depending on orientation. For a sixteen-year-old BMX fanatic it offers the possibility of a number of stylistic variations of ‘air time’ as he attempts to jump them:

“Urban structures act as stimuli because they have become symbols and not because they support behaviour by facilitating movement.” (Gottdiener, 1986, p 8)

Umberto Eco’s Approach to Urban semiotics is very similar to Gottdiener’s. Eco’s seminal essay “function and sign: semiotics of architecture” (Eco, 1986), originally published in 1969, relates semiotics to urban space as the ability of spatial configurations to communicate their function successfully.

At the core of Eco’s approach is of course the system of codes that people use to communicate with one another. Like Gottdiener, Eco views architecture as spatially embodied forms that communicate their function as a result of the social and cultural forces that have brought them into being. In short, architectural forms are signs that communicate their use. Whereas Gottdiener stresses the social aspects of reading the environment based on the possession of codes, Eco favours the notion of denotation and connotation as primary and secondary messages. (Writing after Eco, Gottdiener’s conception amounts to a far more flexible and sophisticated variation of Eco’s ideas).

“The Principle that form follows function might be restated: the form of the object must, besides making the function possible, denote that function clearly enough to make it practicable as well as desirable, clearly enough to dispose one to the actions through which it would be fulfilled.” (Eco, 1986, p 63)

Eco also defines the specific architectural codes that operate at different levels within a building. At the construction level a building amounts to a congregation of beams columns, slates, flooring etc. Here nothing is communicated apart from what can be termed Technical codes. The second level as Eco sees it is the syntactic level where spatial types become articulated e.g. stairways in relation to floors, windows in relation to walls, roofing in relation to floor plans etc., these amount to a set of grammatical architectural rules where roofs are always at the top of a building and stairs never go through windows. The third level of codes is the semantic level, where architectural elements such as roofs and stairs denote and connote different functions on different semantic levels e.g., from the primary function of a roof to keep off the rain, to the grandeur of a cathedral dome, to the expected sociological behaviour of being underneath that dome. This is perhaps the level that the BMX rider operates at in relation to his/her decoding of the environment as a potential play park.

Eco’s primary contribution to architectural semiotics comes from these definitions of type, particularly the restrictive rules he uncovers within his second level of syntactic codes. Here Eco defines architectural forms and indeed the practice of architecture from the point of view that architectural codes:

“Establish not generative possibilities but ready-made solutions, not open forms for extemporary ‘speech’ but fossilised forms – at best ‘figures of speech’, or schemes providing for formulaic presentation of the unexpected (as a complement to the system of established, identified, and never really disturbed expectations), rather than relationships from which communication varying in information content as determined by the ‘speaker’ could be improvised.” (Eco, 1986, p 76)

Eco then defines architecture as the rhetorical play of already existing figurative forms, an organising activity rather than a truly creative one. However, Eco is quick to point out that architecture still manages to renew its forms from time to time and that originality in architecture derives from the architect’s ability to bring new ideas from other disciplines into the way in which traditional architectural forms are organised:

“The architect, in practice, is continually obliged to be something other than an architect. Time and again he is forced to become something of a sociologist, a psychologist, an anthropologist, a semiotician.” (Eco, 1986, p 82)

Eco’s semiotic appraisal of architecture then, grasps quite clearly the semiotic nature of spatial elements in their relation to human activity. Eco’s inclusion of the notion of architect as ‘speaker’ also furthers the idea of spatial organisation in terms of semiotic messages that are designed into the form of the space itself. Both Gottdiener and Eco are very aware of the semiotic capacity that architecture has in terms of form and function. Each of them, in their own terms, defines the environment as a group of messages or text that can only be read by a user in terms of the socio-cultural codes that they have at their disposal. Moreover, Eco extends this to the restrictive rules of construction that architects operate within which are themselves the result of socio-cultural norms.

### **3.7 Product semiotics**

Susan Vihma uses semiotic theory to explore the nature of product design in order to develop an analytic method that is derived from the sign categories of Peirce (Vihma, 1995). Vihma sees the form of the object, i.e. the overall physical construction of it, as part of that which has been designed and therefore as having been designed by some person, in line with its purpose and functionality. By exploring the structure of products in semiotic terms, Vihma manages to articulate the parts of designed products, which can be viewed as communicative of its purpose and function. In this way, she categorizes aspects of designed products in functional terms with a semiotic framework that sees a designed product as a bundle of concurrent messages or text, not unlike Barthes.

Underlying Vihma’s approach is a clear understanding of the social attitudes to products that are central to an individual’s social development in a culture already heavily dependent on products in every day use. She is acutely aware of the role of human cognition in the use of objects, and she realises the connection between cognitive development and socio-cultural issues. Furthermore, Vihma’s semiotic approach focuses on the relationship between signs that are distributed on a mass social level and signs that are encountered daily by individuals seeking to perform specific tasks. For

Vihma the designed product sits central to these issues because of its ubiquitous place in society and its ability to communicate its function through its form as a sign.

In Vihma's work there is a strong relationship between the form of an object and the material of which it is constructed. She sees this relationship as fundamental to what the product can communicate. Vihma draws on this notion of affordance (Norman, 1998) to explain the central issues of design in terms of form and function. Vihma extends the purely perceptual notions of affordance of an object by linking it to the human need to interact with its environment.

“When people move around in the environment, they do not perceive colour and form as such on surfaces; instead they perceive the affordance of various surfaces and lay-outs of surfaces in space...People do not perceive good form, abstract form, mathematically elegant form as such in their everyday environments. What is seen is rather different opportunities to act, such as walking, sitting, resting, climbing, moving, etc.” (Vihma, 1994, p 49)

Vihma takes this relationship between humans and objects further by characterising the world of objects as signs that communicate their function. Also, she includes in this relationship the idea of human motivation with regard to the types of activities that people want to do. Thus, she puts the user in an active position that reads the environment depending largely on what he wants to do there. So, despite the fact that a chair affords sitting, if the user wants to pass it by she will.

Taking this point of view Vihma then develops a working semiotic model of product design based on a Peircean conception modified from Max Bense:

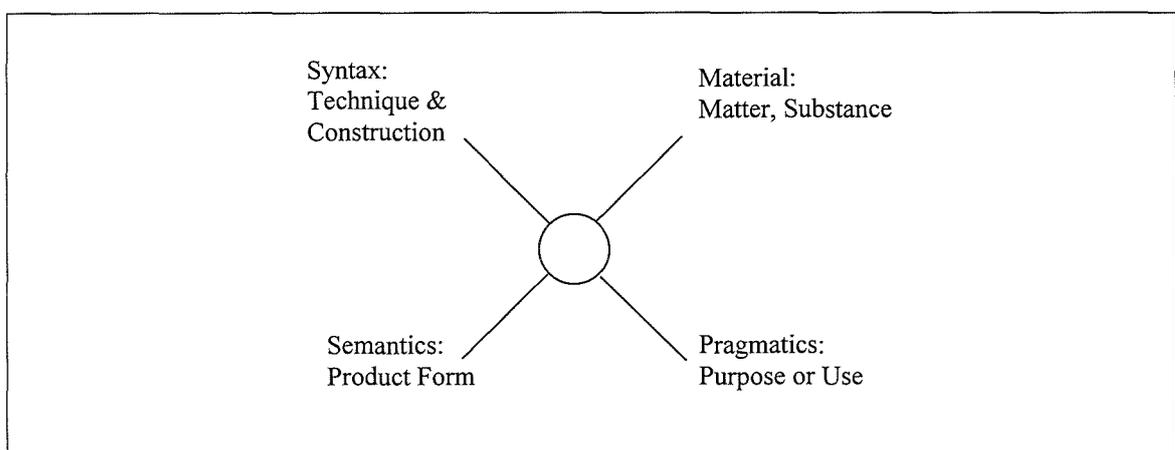


Figure 3.7 Dimensions of a design product (Vihma, 1994, p 50)

Here the object is at the centre of two axes, the ends of which represent important aspects of product design from a semiotic point of view. For example, Semantics and Material provide one axis with product at the centre as formed matter. Interestingly Vihma relates syntax to pragmatics, which places the product in the middle as purpose articulated into the components of construction that serve that purpose.

Vihma allies herself to Peirce's ideas in principle but openly agrees that categorization cannot be definite. She agrees that all interpretations have to be based, as Eco, Halliday and Kress say, within social and cultural contexts. However, Vihma has some interesting ideas about the formulation of a standard against which inter-relations can be measured. This standard is always in a constant state of flux existing internally in the mind. It is constantly checked, used, rechecked and altered according to new information that is processed in relation to it.

Following on from this, Vihma goes on to develop, much as Kress and van Leeuwen do for visual semiotics, a taxonomy of the major functional aspects of product design in relation to Peirce's categories of Icon, Index and Symbol. These range from the tradition of form in a product's development, through colour and style, to the sound of use and noise of a product. Then Vihma uses these categories to talk about design issues across a number of design products such as household irons and phone boxes. Using them to comment on the difference between a product's perceived functionality compared to its actual functionality, Vihma manages to successfully highlight the differences between good and bad design through semiotic comparison.

### **3.8 Advertising**

David Mick's meaning based model of advertising experiences (Mick & Buhl, 1992), emphasizes the consumers perspective focusing on the actual meanings created by users of advertising material. The model is based on a phenomenological inquiry of users 'life stories' developing an understanding of users 'life themes' and 'life projects', the underlying principles and goals by which they live and make sense of their lives. These themes and projects are then compared against responses that the same users make in relation to advertisements that they are shown. The subsequent analysis then clearly links participants world views, as 'life themes' and 'life projects', with the meanings they make when confronted with different advertising information. Whether people like,

dislike, associate with, or are influenced by advertising can be seen as a direct relationship between the advertising material, life themes and projects. Advertising material is often created based upon assumptions about the way certain demographics should respond to the material. Mick and Buhl look at this more closely, taking what is essentially a user centred approach to understanding how people respond to advertising based on life themes.

A further interesting aspect of David Mick's work is his approach to advertising language, which considers adverts as rhetorical figures (McQuarrie & Mick, 1996). McQuarrie and Mick here are interested in exploring the 'artful deviations' of advertising rhetoric that works at different levels; statements, rhymes, puns, metaphors, tropes and schemes are all explored in relation to levels of complexity and user rating. Their work is particularly focused on understanding user responses in decoding different types of rhetorical form based around two particular levels of increasing complexity. They place schemes and tropes within the semiotic notions of over-coding and under-coding respectively. Over-coded figures are generally less complex resulting in reduced cognitive load making them easier to understand and quicker to grasp. Under-coded figures are generally more complex than over-coded ones, thus they require more cognitive activity to understand and therefore take longer for users to respond to. Interestingly, this extra cognitive load in understanding complex advertisements come with its own reward increasing the likelihood that users will remember and enjoy the advertisement. The down side to this, is that advertisements that employ complex rhetorical tropes take longer to understand and are therefore not considered to be the best way to communicate to users in situations where cognitive load is already high, e.g. when users are distracted such as driving a car or performing some other activity.

Simply put, schemes such as repetition and alliteration are simpler, less deviant from the norm, not very attention grabbing, easier to understand but less memorable. For example an old advertising slogan for Penguin biscuits was "P-P-P-Pick up a Penguin". Repetition and alliteration make it simple and easy to understand, as does the relationship between the name of the biscuit and the actual Penguins used to promote the biscuits that appeared in the advertisements. On the other hand, complex tropes such as metaphors and puns are more deviant, more attention grabbing, and more difficult to

understand but generally more memorable. The Silk-Cut cigarette advertising campaign is a good example of this. Initially billboard advertisements started by showing a huge piece of purple silk that had a long slash cut across it. There was no title, no wording and crucially no name associating the product with the image. Over a period of time, as the advertisements permeated cultural consciousness, variations of the ad were produced such the purple silk and scissors version or purple silk patched up with elastoplasts. The Silk-Cut campaign was a long-term advertising strategy that relied upon the ability of ‘readers’ to establish the links between the elements in the image and the product being advertised.

These two semiotic studies of advertising are both focused on the decoding of cultural material by users. They both explore the semiotics of advertising in relation to the actual responses made by users of that material. This is particularly unusual in semiotic theory and shows evidence of empirical data that supports an understanding of how users actually make sense of signs in advertising as opposed to more traditional semiotic analysis of texts performed by experts.

### **3.9 Towards a Semiotics of New Media**

In relation to a semiotics of new media, Metz’s work is particularly interesting because of its focus on the syntagmatic structure of film, which is echoed in the sequential/concurrent chains of signs in the work of Andersen. Bertin also makes a similar distinction between graphics as a spatial form of data organization, and mathematics, in the form of aural information, as a linear one. The distinction between these two types of information appears again in the concepts of map design and wayfinding. Essentially, spatial = survey, concurrent; and linear = route, sequential. It is apparent then that these two types of structuring occur in a number of media types that are ‘remediated’ by new media. Indeed these two concepts should be considered as important elements in the development of a semiotics of new media.

In wayfinding for example, Passini (Passini, 1992, 1999) identifies these two types of structures in the way that people acquire mental models of their environments, based on their interactions as they move through it. Spatial models are derived from the relationships between buildings/places, as they exist in space, and sequential models are derived from buildings and places in relation to moving from point A to point B. These

two types of mental model encourage the viewpoint of Benyon (Benyon, 2000, 2001; Benyon & Hook, 1997) that human computer interaction can be abstracted in terms of navigating through ‘information space’.

There is a strong connection between the way people understand the actual physical structure/signage of buildings and the information structures of computer interfaces. The position and type of information that are constructed in both buildings and websites for example take both a physical form and the form of a sign at the same time. Benyon argues, not dissimilarly to Gottdiener (1986), that:

“A semiotic analysis of space recognises that there are many different views of space and that space is a subjectively defined concept. There is a context to space, which needs to be communicated, negotiated and understood between people.”  
(Benyon, 2001, p 428)

This he places as central to understanding both real and virtual environments. Moreover, Benyon also proposes that the extension of this concept is particularly applicable to information systems where a user’s orientation and navigation are essential to facilitate effective interaction. From an architectural perspective this is related to Eco’s levels of meaning and architectural rhetoric. The ability of users to recognise and understand the common forms in the structures of buildings is what allows them to navigate through them. Similarly the ability of users to recognise the rhetoric of new media sign systems is what allows them to interact. Furthermore, it is this ability of the user to read these structural elements in relation to particular social codes that allows the user to interact with both real spaces and information spaces in different ways, e.g. the BMX rider or the hacker both appropriate spaces for their own use. For new media this is relevant to many emerging technologies that are shifting the location of our interactions, particularly the effect of the embedded devices of ubiquitous computing on the nature of information spaces, augmented reality systems and virtual environments. If the very substance of our world, as in the forms of architecture, can be articulated as messages and texts by semiotic theory, then HCI would do well to understand the implications of this within the realm of new media.

Returning now to Metz, the problem that semioticians face in attempting to develop a semiotics of new media is clearly identified. Through Metz’s attempts to develop a semiotics of film, it becomes apparent that film uses codes and analytic frameworks that

are derived from different domains. In short, film is in itself a meta-medium like new media technology is today. In relation to developing a semiotics of new media, this is extremely relevant. Contemporary new media can be, as Manovich (Manovich, 2001) contends, seen as a further development of the problems that Metz elucidates in his work. One of the characteristics of new media outlined in Chapter 1 highlights the convergence of media forms and sign systems. In understanding interaction with new media from a semiotic point of view, we have to understand many different convergent media elements that combine in spatial and sequential syntagmatic structures, resulting in new codes by which to understand them.

Andersen's work, unlike Metz's, does provide a minimal unit of analysis in the form of his interactive sign types. However, this minimal unit is continually under threat due to the expansion of new media, which introduces many more concurrent and sequential syntagmatic structures that are similar to those described by Metz in relation to film. Andersen's model perhaps works best in closed operating systems that are arbitrarily defined and symbolically graphical (Andersen, 1999; May, 2001; May & Andersen, 2001). A fully defined rhetorical understanding of new media would be a very different matter as, like film, it is composed of so many different media elements, as well as being uniquely interactive. As Metz discovered with his proposal of the 'Grande Syntagmatique', a semiotic analysis of film, if taken to its normal stringent and exhaustive conclusions, becomes an extremely cumbersome and unwieldy undertaking. This is something that has the potential to occur in the analysis of any given new media object and perhaps should be born in mind when considering the limits to which semiotic analysis can be applied to new media.

Visual semiotics also offers insight into the nature of syntagmatic structuring. More specifically it offers insight into the concurrent syntagmatic structuring of signs in single images. Essentially visual semiotics takes us inside the sequential syntagmatic structuring of Metz's 'shot' and explores the grammar of the visual organisation of information in individual images. From the size and shape of elements in images, to their position and their relationship to one another, visual semiotics offers an understanding of syntagmatic compositional techniques that might be appropriate for the display of screen based information. To a large extent in new media, much of this visual organisation is the province of graphic designers with natural talent but through

visual semiotics the somewhat mystical world of the designer becomes a little better articulated.

Bertin's semiology of graphics has a lot in common with both the visual semiotics of Kress and van Leeuwen and the ideas of the Gestalt psychologists, which focuses on the perceptual propensity of people to distinguishing between various distinct forms amongst a mass of spatial data. In terms of new media, Bertin's ideas are probably most relevant to those involved with data visualisation. His approach is aimed at developing a visual system that is based on the function of the eye in relation to visualising quantifiable data. Much of his work focuses on developing easily readable statistical graphs and population mapping images. Indeed Stuart Card (Card, 2003) and others (Jakobson, 2000) have already drawn on these ideas in relation to visualising database information and building three-dimensional data visualisations.

Also relevant to new media is the interesting debate in graphics about the communicability of different visual forms such as pictograms, graphics and symbols. In semiotic terms these are best described as icons, indexes and symbols. These terms and the debate that surround the effectiveness of their counterparts in graphic design seems totally relevant to the development of a semiotics of new media because icons, indexes and symbols seem to be exclusively what people interact with while using contemporary new media technology. Simply looking around the graphical elements of a word processing interface is enough to make this explicit. Tool bars and drop down menus are examples of nothing other than icons, indexes and symbols. A great deal of the visual aspects of new media are bound up with these semiotic definitions in relation to those of other theorists e.g. Andersen.

In terms of interface design, HCI experts clearly play a part in creating products. In order to establish the types of messages products convey, Vihma develops a product semiotics that focuses on the role products play in society as much as their physical make-up. Vihma also looks at issues of communicability and usability in terms of signs, which also remains a fundamental concern of HCI. Indeed the paper 'Form is Function' (Westerlund, 2002) considers Vihma's ideas in relation to the analysis of websites as designed products. It picks out the importance of user experience and expectations in interpreting designed texts and uses Vihma's methods of analysis to analyse a number

of sites. It does not however explore user interactions with the sites or the meaning making processes that users employ while interaction takes place.

This fits well with the studies conducted in relation to advertising where users were studied in relation to their expectations and interpretations of cultural material. Some of these tests were concerned, in part, with the effect that cognitive loading of both simple and complex rhetorical figures had on those interpretations. Fundamentally, it was noted that greater complexity in rhetorical signs leads to a greater cognitive load for the interpreter. While this is nothing particularly new in relation to HCI, it can be seen that information design is about producing messages in the most compatible form, using the most appropriate medium for specific contexts where cognitive load is a major factor in interpretation.

From Bertin's visually ordered groupings of quantities to Passini's wayfinding signs, to be effective, information design must clearly represent it's meaning within a clearly defined context. As such, this amounts to a kind of semiotics where the use of specific forms for specific types of information are necessary within specific contexts.

In a way this is exactly what has happened as software technology and programming languages have developed. The people that manipulate and control the systems have the greatest understanding of the rhetorical forms and codes (as in programming languages) that are relevant for using them. However, the language of new media is evolving to include more and more cultural elements as the convergence of media and technology becomes accessible to millions of people. Interactivity challenges our understanding of how people read texts. We are seeing a shift away from the needs of specific monosemic sign systems and a move towards more culturally defined systems of signs that are dependent, not only on the underlying structures of new media, but also on the social and cultural codes of the individuals that use them. Moreover, these new sign systems are emerging from the transformation of old cultural codes that are being remediated by the development of new technology.

### **3.10 Defining what is Relevant to a Semiotics of New Media**

So the question still remains:

**“Given the characteristics of new media, what aspects of existing semiotic theory in relation to older media are relevant to the development of a semiotic theory of new media?”**

In answering this question, an attempt is made to draw together all of the important aspects of semiotic theory and applied semiotics that have been discussed in the first three chapters of this thesis. More specifically, a list is drawn up that identifies the aspects of existing semiotic theory, which have been taken from theories about older media and are deemed to be relevant to the development of a semiotics of new media.

Metz provides a starting point and a clear warning about the transference of sign systems from one domain to another that result in the transformation of codes used for understanding them. In short, the same principles apply here. What is important to gain from an understanding of semiotic theory across a number of different older media domains, are the commonalities that apply across all the domains, which in some way converge in new media. The concepts outlined below can be considered as moving from important aspects of semiotic theory that deal with concepts associated with signifieds, through to concepts that deal with the structural elements of signifiers. This is by no means an attempt to give primacy back to the signified in relation to semiotic theory. Instead, it is a pragmatic solution to proposing a semiotics of new media from an HCI perspective that understands the importance of the user.

### **3.10.1 Codes**

Codes, in a sense, are the ultimate prize of any semiotic endeavour. To identify the social and cultural elements of how individuals make sense of their experiences of any media they encounter is the aim of any semiotic analysis. In relation to new media, the importance of being able to identify the social and personal codes that users employ in understanding these new phenomena is paramount. The question often asked in relation to HCI research or the design of modern computer systems is; ‘How do we get inside the mind of the user’. Traditionally, this has been treated as a psychological problem involving understanding mental and physical processes in the brain. Semiotics’ concern with the analysis of codes bypasses this problem, establishing an alternative position that is concerned with the way in which users make sense of their experiences of media. The concept of codes is particularly relevant to developing a semiotics of new media because it identifies new media objects as texts that can be decoded or even recoded culturally by a user at the level of the medium. This is particularly important because of

the recombinant and remediated nature of new media, where the social and cultural codes of users that are related to older media are in the process of evolution due to the development of new mediating technologies. It is possible that the best that one might hope to get, in terms of understanding this shift in coding structures, is through establishing how new media technologies have altered codes that are associated with older media.

### **3.10.2 Denotation, Connotation and Metaphor**

An important aspect of establishing the codes that are relevant to the coding and decoding of new media texts is the way in which the structuring of new media signs promote different levels of meaning. Observing examples of denotative, connotative and metaphorical meaning in users as they interact offers the potential to understand the dynamic nature of interpretation during the process of interaction. Considering the denotative, connotative and metaphorical aspects of new media in this way, brings us to the Umwelt as the well of personal, social and cultural constructs from which they establish their world view (Mick & Buhl, 1992). By exploring the denotations, connotations and metaphors that are derived from interactions with new media, the codes that are used to interpret new media signs might be uncovered.

### **3.10.3 Rhetoric**

The Rhetorical forms of new media are as yet undefined, or more probably, still evolving. This is most apparent in the further convergence of media where rhetorical forms from older media are being reformed. For example, where Metz's 'Grande Syntagmatique' delineates the rhetorical forms of the 'shot' available to the director of a film, interactive digital films alter these rhetorical forms, in relation to their content and structure. This is perhaps most obvious in the random access to sections of film re-categorised as 'chapters' in DVDs or the non linear editing possibilities offered by modern video editing software packages. By contrast, the rhetorical forms of architecture have been reasonably well established over hundreds of years into recognisable and reusable entities. In film these recognisable entities are the motifs or stylistic aspects of films that establish genres such as the Sci-fi movie or film noir. Advertising too has its identifiable genres; car adverts, whisky adverts, hair products etc. While the same is true in film, advertising in particular is constantly trying to redefine these 'cliques' of cultural coding in order to promote a brand by being novel and inventive. One of the goals of a semiotics of new media might be to establish the

rhetoric of stylistic elements and genres that are specific to new media. This in itself is dependent on understanding the structural possibilities of the medium and the meanings that these structures have for their users.

#### **3.10.4 Syntagmatic Structuring**

A significant number of the theoretical positions reviewed in the previous chapters touch upon the issues of sequential and spatial structuring. Some people are predisposed to either one or the other in terms of mental modelling, even although we can all do both. Sequential modelling (allied to linguistic understanding) is our primary mode of model building because we first experience new things as an event stream (Passini, 1992). Spatial modelling is related to continued exposure to environments and to formal spatial arrangements of media elements. The twin notions of spatial and sequential syntagmatic structuring apparent in semiotic theory, are interesting when considered in relation to the interactions of user with new media systems. Perhaps in developing a semiotics of new media it might be possible to consider the signs and structures designed by the makers of computer systems as paradigmatic categories to be formed into syntagms by users as they interact. In this way, users would become their own structural interactive editors or navigators, organising their syntagms into the relevant narratives appropriate for the activities they are involved in. Notions such as these are essential in understanding new media, particularly new media that focuses on the manipulation of signs as a medium.

#### **3.10.5 Sign Types**

There are more likely to be multiple meanings and ambiguity in richer pictorial/Iconic symbols than there is in symbolic sign systems where meaning is attributed via strict conventions. Similarly, there is more potential for richer and more complex meaning as media converge. Different media channels carry different messages that often have to be interpreted in synchronisation. The search for a minimal unit or sign type is a difficult task, as Metz identifies. Andersen's classification of sign types specific to computers of more than a decade ago remain relevant today in relation to the computational aspects of new media established by Manovich. However, the continued influx of new sign types from remediated media challenge the capacity of Andersen's sign types to provide an adequate description of many new media elements. In short, a re-evaluation of sign types is necessary in light of the convergence of various media. With this in mind it seems appropriate that the Peircian concepts of icon, index and

symbol, be reconsidered in addition to Andersen's sign types, as the basis of a more appropriate typology that is adaptable to the changing face of new media. Additionally, an understanding of sign types must also consider aspects of substance, form and syntax as well as the semantics of new media.

### **3.11 Summary**

The development of a semiotics of new media must then take into account all of these factors. It must maintain the central position of the user in applying social, cultural and personal aspects of coding and experience. It must consider the different levels of meanings interpreted by users interacting with such systems as well as identifying the combinations of signs that occur during interactions with new media systems. It must also operate both sequentially and concurrently in its analysis of these syntagmatic structures. In addition, it must also consider these structures from a rhetorical point of view that includes relevant aspects of old media codes, but more importantly, it must develop new definitions that are appropriate for understanding and criticising interactions with contemporary digital media.

## 4 Testing Semiotic Analysis on Three Mobile Phones

Considering the theoretical position that has been presented in this thesis so far, it is at this point important to recap on what has been outlined up until now. The characteristics of new media have been defined and the problems specific to understanding it have been identified (Chapter 1). The fundamentals of semiotic theory, from conceptions of signs to social and cultural coding have been discussed in relation to understanding new media (Chapter 2). Important semiotic concepts that are relevant to the development of a semiotics of new media have been identified, in answer to the first research question (Chapter 3). It is at this juncture that the second research question asked in this thesis can be addressed:

**“How might the concepts identified as relevant to the development of a semiotic theory of new media be combined to produce a model of interaction with new media systems?”**

This chapter attempts to address this question in relation to the problems of applying semiotic theory to the practicalities of interacting with new media. From the previous review of semiotic theory, a number of relevant semiotic concepts have been established in relation to understanding new media. The purpose of this chapter is to further explore some of the semiotic techniques outlined in Chapter 3 in order to identify their strengths and weaknesses in analysing interactive systems. Mobile phones have been chosen here because they sit somewhere between traditional HCI artefacts and new media. While these particular phones are now quite old, they still exhibit the kind of digital abstraction and media convergence increasingly evident in new media artefacts. They are interactive sign systems, the interfaces of which must be interpreted in order to operate them. The aim here is to apply semiotic approaches from older media domains to an investigation of these new media systems, in order to highlight which aspects of semiotic theory are appropriate for dealing with issues of convergence, interactivity and the author/reader relationship.

## 4.1 Rationale

The first analysis is made using an adapted version of Vihma's product semiotics. Phones are excellent examples of media that exist as products that can be bought 'off the shelf', and as such, it would seem most appropriate to use Vihma's analysis techniques to establish which aspects of semiotic theory can be said to manifest in such products. The second analysis is made using Kress and van Leeuwen's visual semiotic method. This has been chosen as a complementary approach to Vihma's, because the operation of mobile phones relies heavily on visual representation and Kress and van Leeuwen's method provides the most in-depth analysis of visual grammar. The third and final analysis is made using Umberto Eco's modified KF model, where it is employed specifically to focus on the process of interaction with the phones interfaces. This is a much more detailed analysis, as it considers interaction over time and is a first attempt to understand how the structuring of concurrent and sequential syntagms affects meaning. The ultimate aim of this study is to successfully identify which aspects of older semiotic theory remain relevant to new media, while highlighting the need for a semiotics that is specific to new media. Photographs of the three phones are given below and should be used as a constant reference throughout the analyses.



Figure 4.1 Three phones: the Panasonic GD35, Nokia 5110, and the Nokia 6150

## 4.2 Product Semiotics Applied to Three Mobile Phones

The first method employed in analysing these three mobile phones is Vihma's product semiotics (Vihma, 1996), which has been adapted and tested by Bosse Westerlund in relation to analysing websites (Westerlund, 2002). Essentially, the technique proposed by Westerlund involves two distinct stages. The first is an analysis of functionality, which is employed to discern, what a product does, or in the case of design, establish what a product should do. The second stage is to employ Vihma's classification of sign types, and their various elements, in analysing the product. The concern in this study is to focus only on the second stage, as it is only this stage that is inherently semiotic.

### 4.2.1 Vihma's classification of sign types in relation to product design

Below is a table that describes each of Vihma's sign types along with the characteristics that are important to analysing product design. It should be noted here that Vihma's sign types are based on Peirce's conception of the sign and his subsequent identification of icons, indices and symbols.

#### Icons

The tradition of form	Normally used as a reference for the design of new product. Conformity with a product tradition and especially any divergence from it will be noted and can function as a sign.
Colour	May often refer to a quality: e.g. white can refer to cleanliness. ( <i>Connotative</i> )
Material	May often refer to quality, e.g. gilding indicates wealth; - concrete, emotional coldness. ( <i>Connotative</i> )
Metaphor	The resemblance of a particular object to some other object from another domain, often not a designed object. For example the front of a car might resemble a face.
Style	The period styles like art nouveau, 1950's etc.; moreover geometric classifications like "spherical" vs. "square" styles. Here again, conformance and divergence from well-known styles (if any) will be salient.
Environment	Some industrial products are designed for a specific environment, e.g. kitchen, bathroom etc.; others may have the (false) appearance of being so designed, e.g. a sports car appearance.

**Indices**

A pointing form	Arrows and pointers are often found on operating buttons of machines; sometimes the product itself has such a form.
Traces of tools	Characteristic marks from tools used to make the product in manufacturing e.g. the seam on plastic parts from injection moulding.
Marks of use	Abrasions, dents, flaws, dirt etc.
Other traces	Rust and corrosion. Drops of water on the surface of a bottle indicating cool drink
Light and sound	Often indicate the technical functions of appliances and computers.
Noise	The sound of a product in use.
Smell	The distinctive smell of certain products e.g. leather.
Touch	The feel of a certain material may indicate quality or by lifting a container you can find out if it is empty or not.
Graphic figures	If they are integral parts of the product itself. E.g. the yardstick with scale and numbers to indicate measurements.

**Symbols**

Graphic symbols	Logotypes, on-off buttons, washing instructions on textiles etc.
Symbolic colour	A red carpet signifies the high society of fame fortune and royalty. ( <i>Connotative</i> )
Symbolic form	Uniforms often denote type of job, rank etc.
Position and posture	Compositional arrangement e.g. closeness, above or below, etc.
Material	The quality of a certain type of material used in dress making for example may signify social status or the character of an event.

The process of analysis is simply to use Vihma's sign type characteristics as a checklist by which to evaluate a product. One simply moves through the list establishing whether or not the product displays any of the characteristics described and notes down what they are. Westerlund points out that not all of these elements are useful in relation to the analysis of websites. Similarly, not all of these elements are expected to be useful in the analysis of the phones attempted here. However, it is expected that the phones, as products, should be quite susceptible to this type of analysis. In this study each

individual phone is analysed separately and comparisons are discussed afterwards. It should be noted that this technique is not considered to be an exhaustive one but one that provides vital semiotic information about products to designers in a standardised format.

#### 4.2.2 Analysing the GD35

<b>Sign type</b>	<b>Description</b>
<b>Icons</b>	
The tradition of form	This phone follows the form of traditional telephones, mobile and otherwise in that it has the earpiece at the top and mouthpiece at the bottom, although these are not made overtly obvious. Similarly in a traditional mobile phone configuration of it has an aerial top left, a screen and a keypad.
Colour	Black, in this context is associated with the corporate world in which mobile phones were born, connoting a sense of seriousness
Style	Rounded curves
Environment	Again the corporate world is associated with the mobile phone even although they are now utterly pervasive in modern society.
<b>Indices</b>	
A pointing form	Pointing forms are evident on a centrally located button, indicating four directions of menu navigation.
Light and sound	This phone has a number of ring tones that signify incoming calls and the delivery of text messages. As well as a vibrate function that performs the same indicative functions silently.
Graphic figures	There are two graphical figures on this phone that behave in an indexical way: the first indicates the amount of power that the battery has left and the second indicates how good the reception of the phone is. One is a graphical representation of a battery that empties as power reduces, the other is a segmented representation of an aerial that reduces or increases as signal strength varies.
<b>Symbols</b>	
Graphic symbols	<p>There are a number of graphical symbols evident on this phone. These can be broken down into two groups. Those that belong to the screen and those that belong the buttons.</p> <p>The screen symbols generally denote menu choices or the display of information such as date/time and the input of data such as writing text messages.</p> <p>The button symbols generally denote the function of pressing that button, e.g. the phone logo indicates the button to press to call someone, the signs on the keypad denote which numbers appear on screen when they are activated. Some of the buttons however do not clearly denote their function. The buttons directly below the screen and the button stamped with the letter</p>

	<p>c.</p> <p>Additionally, there is a logo printed on this phone below the screen.</p>
Symbolic colour	The central button on the phone is a different colour from all the others reinforcing its significance in the operation of the phone.
Position and posture	<p>The most salient aspect of the phone is obviously the screen, signifying its importance to the operation of the phone. The screen elements are arranged with a logo central, battery power top left corner, signal strength top right corner and menu options in both bottom corners.</p> <p>Interestingly the biggest button on the interface is positioned centrally on the phone also indicating its importance to the phones operation.</p>

#### 4.2.3 Analysing the Nokia 5110

Sign type	Description
<b>Icons</b>	
The tradition of form	Again this phone follows the form of traditional telephones both mobile and otherwise. The earpiece at the top is made quite obvious and is one of the most salient aspects of the phone. There is no evidence of a mouthpiece at the bottom. In the tradition of mobile phones it has an aerial top right, a screen and a keypad, as well as an on/off switch (top right).
Colour	Dark Grey, again this colour tends to denote the sobriety of the corporate world
Style	Rounded curves
Environment	Again the corporate world
<b>Indices</b>	
A pointing form	There are two pointing forms situated to the right hand side of the phone, on two separate buttons that are above and below each other, indicating up and down menu navigation.
Light and sound	This phone has a number of ring tones that signify incoming calls and the delivery of text messages. As well as a vibrate function that performs the same indicative functions silently.
Graphic figures	There are also two graphical figures on this phone that behave in an indexical way: the first indicates the amount of power that the battery has left and the second indicates how good the reception of the phone is. Battery power is indicated by a small battery logo with segmented bar above it that reduces as battery power fades. Similarly signal strength is indicated by an aerial graphic with a segmented bar above it which alters in relation to signal strength.
<b>Symbols</b>	
Graphic symbols	There are a number of graphical symbols evident on this phone. These can again be broken down into two groups. Those that belong to the screen and those that belong the

	<p>buttons.</p> <p>The screen symbols generally denote menu choices or the display of information such as date/time and the input of data such as writing text messages.</p> <p>There are two buttons on this phone that do not clearly denote their function, one is the central button that has a blue bar across it the other is the button left of it that has the letter c stamped on it.</p> <p>The keypad symbols generally denote which numbers appear on screen when they are activated.</p> <p>Additionally, there is a logo printed on this phone above the screen.</p>
Symbolic colour	The on/off switch is red indicating its importance. The symbol on the central button is blue identifying it as different from all the other buttons.
Position and posture	<p>Interestingly the most salient features of this phone, apart from the screen, are the earpiece situated above it and the largest button situated in the middle of the phone.</p> <p>The screen elements themselves are arranged with a logo central, battery power to the right, signal strength to the left and menu option below centre.</p>

#### 4.2.4 Analysing the Nokia 6150

Sign type	Description
<b>Icons</b>	
The tradition of form	Once again this phone follows the form of traditional telephones both mobile and otherwise. The form of the earpiece differs from the other two and is linear rather than round. Again there is no evidence of a mouthpiece at the bottom. It has an aerial top right, a screen and a keypad, as well as an on/off switch (top right).
Colour	Black, again this colour tends to denote the sobriety of the corporate world.
Style	Rounded curves.
Environment	Again the corporate world.
<b>Indices</b>	
A pointing form	There are two pointing forms situated centrally in the phone on two separate buttons that are above and below each other, indicating up and down menu navigation.
Light and sound	This phone has a number of ring tones that signify incoming calls and the delivery of text messages. As well as a vibrate function that performs the same indicative functions silently.
Graphic figures	There are also two graphical figures on this phone that behave in an indexical way: the first indicates the amount of power that the battery has left and the second indicates how good the

	reception of the phone is. These signs are absolutely identical to those found in the 5110.
<b>Symbols</b>	
Graphic symbols	<p>Again there are a number of graphical symbols evident on this phone, which can again be broken down into two groups.</p> <p>The screen symbols generally denote menu choices or the display of information such as date/time and the input of data such as writing text messages.</p> <p>The keypad symbols generally denote which numbers appear on screen when they are activated.</p> <p>There are also two buttons on this phone that do not clearly denote their function. Each one is a mirror image of the other and carries the same blue sign as the central button on the 5110. They are also positioned centrally at either side of the phone in the manor of unidentifiable buttons on the GD35.</p> <p>Additionally, there is a logo printed on this phone above the screen.</p>
Symbolic colour	The on/off button is red indicating its importance. Blue bars on the unidentified buttons indicate their importance.
Position and posture	<p>There are no overtly salient features to this phone as all of the buttons are of a similar size.</p> <p>The screen elements themselves are arranged with a logo central, battery power to the left, signal strength to the right and menu options in both bottom corners.</p>

#### 4.2.5 Findings

There are many obvious similarities in form and function across these three mobile phones. The somewhat repetitive nature of each analysis makes this patently clear. All show the same iconic features that are part of the telephone tradition; they are all similar in colour, they all have earpieces, aerials, screens, and keypads, which are organised in the same sort of configurations. Also, they all exhibit indexical features of remarkable sameness. They all have pointing forms, ring tones and graphical features that perform the same indexical functions, even although their form might vary from phone to phone. Lastly, the symbolic features of all three phones are again remarkably similar. They all exhibit evidence of similar symbols in both the screen elements that display menu choices and information, as well as in the buttons of the keypad.

While the similarities between these phones identify the presence of the three sign types in the interface, it is in the differences between the signifiers and arrangement of

signifiers in these three phones that semiotic analysis comes into its own. For example, where one phone signifies its navigational elements with a large central button containing four arrows, the other two have only an up and down navigational signification. The arrows used to represent these functions also vary while the function remains the same. Similarly, the organization of these elements varies from phone to phone while functionality and meaning are maintained. Some signs indicate the same meanings across phones while having a different syntactic structure or position. Here we have found evidence not only of icons, indices and symbols but also of the arrangement of signs into concurrent syntagmatic relationships that vary slightly from phone to phone. This is also exhibited on the screens where battery life and signal strength are displayed in similar ways across the phones but occupy completely different areas of the screen. In short, the organisation of phone elements, those that follow a traditional pattern and those that vary from phone to phone exhibit evidence of what Eco identified as 'rhetorical' forms (see Chapter 3.6).

However, this particular analysis technique does nothing to engage with the problem of interactivity. It stops short at uncovering the structure and meaning of interface elements. It does nothing to articulate how meaning unfolds as users interact with the phone.

### **4.3 Visual Semiotics Applied to Phones**

This study uses the visual semiotic techniques of Gunther Kress and Theo Van Leeuwen (as outlined earlier in Chapter 3.3) as a method for evaluating the three mobile phones. Bearing in mind that Kress and van Leeuwen's theories are geared more towards the analysis of visual surfaces such as paintings and diagrams, rather than mobile phones, it is not expected that all of their techniques will be useful in this analysis, although some results in certain areas are expected to be revealing. Employing the techniques of visual semiotic analysis involves studying the three phones in relation to: narrative processes, conceptual representations, analytical processes, representations and modality, as well as informational value and salience. Unlike the study above, where each phone was treated separately, all of the phones are discussed together in relation to these concepts.

#### 4.3.1 Narrative Processes

Narrative processes are indicators of visual narrative. Kress and van Leeuwen specifically identify the diagonal tension between organised visual elements to express this. On serious contemplation of the surfaces of the phones, it becomes evident that there is no trace of such visual narrative processes. That is to say, that within the inter-relationships of the components of the interfaces there is no strong diagonal, which attempts to convey transactional actions to the observer. Of course, it is evident that there are many different components in the interface, which are related to one another in some way. However, it would appear that within their organisational structure there are no stories to be told and therefore no narrative processes. Where arrows do appear on the phones, e.g. on some of the buttons, they do not fall into the category of narrative process as defined by Kress and van Leeuwen, which specifically focuses on directional relationships between pictorial elements. The arrows on the phones do not point to other elements of the phone directly, although there may be some narrative processes hidden within the functionality of the phone such navigational aspects hinted at by the arrow buttons.

#### 4.3.2 Conceptual Representations

Within all three phones it is apparent that there is an underlying structure described by Kress and Van Leeuwen as a “multileveled overt taxonomy”. This is where elements are organised into a visual hierarchy. The space occupied by the screen in all three phones is the super ordinate element of the taxonomy, all other elements are therefore subordinate to the screen. This is emphasised by the screen being placed above the other button elements even although they are related to the operation of the information on the screen. On the GD35 the large silver button in the centre of the phone, directly beneath the screen, is set above the importance of the smaller operational buttons that occupy the rest of the interface. So we have a three-tier taxonomy. This is also similar in the other two phones although the size and position of the central button varies; there is still a cluster of buttons that surround a central larger one. This in itself is another visual hierarchical organization of elements.

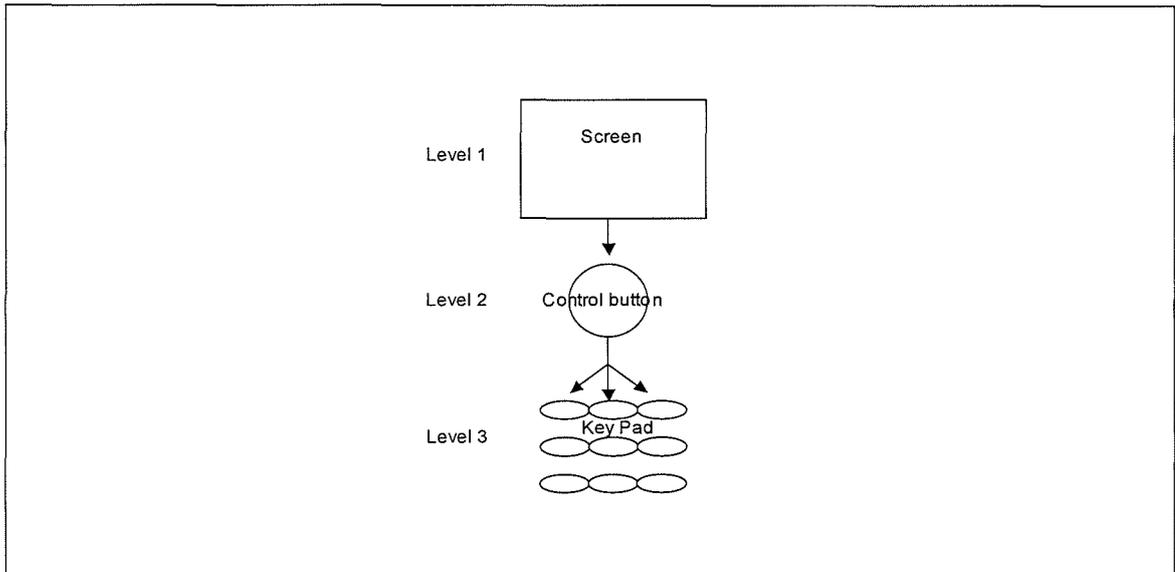


Figure 4.2 Multilevel taxonomy in the GD35 phone

### 4.3.3 Analytical Processes

It might be argued that the different component parts of the phones are organized through what Kress and Van Leeuwen call ‘exhaustive analytic process’, i.e. the component parts of the phones may be organized in such a way as to make obvious all of their features. However, this point of view breaks down in terms of interface structure because many of the phones’ features are hidden away from sight, in the memories and central processing units of the phones. These are accessed at different times through the screen and are therefore not displayed simultaneously, which means that the phones are not possessed of any analytical display of functions. That is to say that the component parts of the interface do not correspond directly to the phone’s features. This not a particularly useful analysis tool.

### 4.3.4 Representation & Interaction

Kress and Van Leeuwen’s definitions in this section are taken largely from the study of paintings, photographs and TV. Although their ideas of interaction seem to be applicable they, are couched in terminology that is entirely inappropriate for dealing with Human Computer Interaction, i.e. interaction defined as the active manipulation of a computer interface. Therefore, no significant data about the phones interface can be determined by the application of this particular set of definitions.

#### 4.3.5 Modality

Similar to the section above the definitions outlined by Kress and Van Leeuwen seem inapplicable in this form of analysis.

#### 4.3.6 Informational Value

Looking for evidence of a 'left/right' organisational structure one immediately notices that this is a prevailing method of organisation across all the phones in a number of ways. Firstly, there are the logos Panasonic, Vodaphone, Nokia etc. above and below the screens. As obvious as this may seem, the positioning of these two logos has an important effect. The positioning of these words, next to the most salient component of the interface, ensures maximum impact in displaying the manufacturers and the network provider's names whereby no interaction, or even cursory glance at the phone, is passed without their authority. More subtly though, the left/right direction set up by the logos next to the screens primes users for information delivered in left/right fashion by the screen itself. Secondly, the Keypad buttons are also numbered from Left to right, as are the letters. This is of noticeable significance when you take into account the function of the buttons when sending 'text messages'

Looking for 'top to bottom' organisational structure within the phones interfaces what becomes apparent is the taxonomic structure as outlined in the conceptual representation section thus: Screen, Control panel, Keypad. Using Kress and Van Leeuwen definitions the screens are the 'Ideal' top part of the phones and the Keys are the 'Real' lower half of the phones. This is interesting because the focus of attention is on the screen when using a phone, but the keys, being in the 'Real' section of the phone, are given to the user as tangible, usable artefacts. It should also be noted here that this arrangement has a long history of development through typewriters, TV remote controls, Computers and on into mobile phones as a fairly standard form of representation during text manipulation. It also further separates the graphics on screen from the graphics on the buttons. The buttons are interactive while the screen elements are only there to display information. Centrally there is the control panel, with a central button in all the phones. The other buttons are out in the margins of the central band. This ensures the relationship of dominance/subservience outlined earlier in conceptual representations.

#### 4.3.7 Saliency

As noted earlier, the most salient component of the phones interfaces are the screens. This is because of their size (they take up about a third of the available space), their position and because of the surrounding facing that stands out against the body of the phone. In the case of the GD35 this is silver, in the case of the other two they are black. The second most salient components of the phones are the central control buttons. In keeping with the taxonomic structure outlined earlier, the position size and colour of these buttons give them very important characteristics. Their centrality means that they are a strong point of focus. When the phone is held ready to be used the user's thumb sits directly over them suggesting that they might be the most used button on the interface. Their size, usually the biggest button on the interface, gives them a tremendous pull in terms of usability. They almost want to be pressed. Clearly there is a strong relationship between these buttons and the screen above.

The subordinate function buttons in the mid section of the phone are arranged around the central button and marginalized. In terms of saliency they seem less significant as a grouping than the keypad. However, their position above the keypad gives them a sense of hierarchical power within the taxonomic structure. They are clearly related to the function of the central button. An interesting aspect of this is the difference between the three phones here. On the GD35 the central button has arrows on it that seem to denote navigation or direction. Similarly, the 6150 has central buttons that show arrows but only up and down. On the 5110 these directional buttons are to the left of a larger central button, still forming a central group that are interrelated. On each phone the screen is situated at the top and below are the keypads.

The square formed by the regimental grouping of the keys into the rows and columns of the keypad takes up a significant portion of the space on the interface. Thus, due to its form, as a group, it has its own sense of weight within the interface structure as a whole, forming the culturally recognisable unit of the telephone touch-tone keypad, common to all manner of modern phones. This last aspect in itself produces a strong sense of saliency in that it is a very recognisable form.

#### 4.3.8 Findings

Considering the suitability of this type of analysis in relation to the mobile phones, it is apparent that there are only a few concepts that are any use in evaluating them. This is

because this technique is derived from concerns with the visual aspects of images rather than interactive objects. Nevertheless, a number of concepts when applied do provide some data about the semiotic nature of the phones.

Avoiding any useable terminology for categorising sign types per se, Kress and van Leeuwen's theories concentrate on uncovering the organisational or as they term them 'grammatical' relationships between visual elements. In this way, aspects of the hierarchical relationships between phone elements are identified on two occasions. Moreover, a propensity is identified within all of the phone structures to promote a left-to-right reading of elements both on the screen and in the organisation of the buttons themselves.

The two types of organisational structuring identified in this study then appear to be equivalent to the structuring of interface signs as concurrent syntagms. It is the similarities between phones that confirm this, whereby the various forms of elements that differ from phone to phone purport to similar sorts of functionality across phones. In short, while the signifiers alter in look and location across the three phones, their meanings stay the same. It is only possible to understand this from a semiotic perspective if the interfaces of the phones are considered as a paradigmatic *langue* (as Saussure would describe it) of phone signs organised into concurrent syntagmatic relationships. Again, this type of analysis fails to really get to grips with the process of interaction. While it uncovers hints of it within the signs e.g. the navigational buttons, it has not mechanism by which to deal with the sequential aspects of interaction analysis.

#### **4.4 Eco's Revised KF Model Applied to Phone Symbols**

This study differs from the other two in that it is not taken from a domain of applied semiotics but relies on Eco's theory of semiotics directly. Like the previous two studies the aim is to evaluate the elements of the phone interfaces in relation to the concepts identified as relevant to new media. The premise here is that Eco's revised KF model, where denotations and connotations are dependent on the context and the circumstances of organisational structuring, should be directly applicable to the phone elements as signifiers that bear meaning. Therefore, the established method of analysis equates context (Cont()) in the diagrams presented below) with the sequence of screens that are displayed through interaction and circumstance (Cir[]) with the concurrent structuring

of signs on each screen. In doing so, the revised KF model is adapted to analysing sequential and concurrent syntagms within phone interfaces. It is important to point out here that in the diagrams presented below connotations are omitted purely because of the number of images and the space they would take up. Where possible connotations are at least alluded to if not explicated in the supporting text.

#### 4.4.1 The perceived meanings of phone signs

According to semiotic theory (Eco, 1976; Hjelmslev, 1966; Anderson, 1990 ) semantic fields are essentially the range of possible meanings that are associated with any particular sign. In this respect, a semantic field of a specific word contains the synonyms of that word e.g. beautiful: - good-looking, gorgeous, stunning, attractive. All of these words are related in meaning and the use of the sign ‘beautiful’ may refer more closely to one of these other words depending on its context of use.

In relation to the signs on the phones, it is interesting to explore their semantic fields because they are relatively new cultural phenomena that consist of new and old signs. With this in mind, it is the control section of the phones and the screen that are most interesting. Buttons are designed with symbolic codes that are supposed to communicate their function, while screens consist of integrated symbols that communicate information to the user about the functioning of the phone.

On the 5110 and the 6150 there are two buttons one above the other that have arrows printed on them. On the 5110 they are to the right hand side of the phone. On the 6150 they are in the centre of the phone. On the GD35 there is a large central button that has arrows pointing up, down, left and right. The possible meanings of this sign in relation to different contexts are outlined below using Eco’s Revised KF model (Figure 4.3).

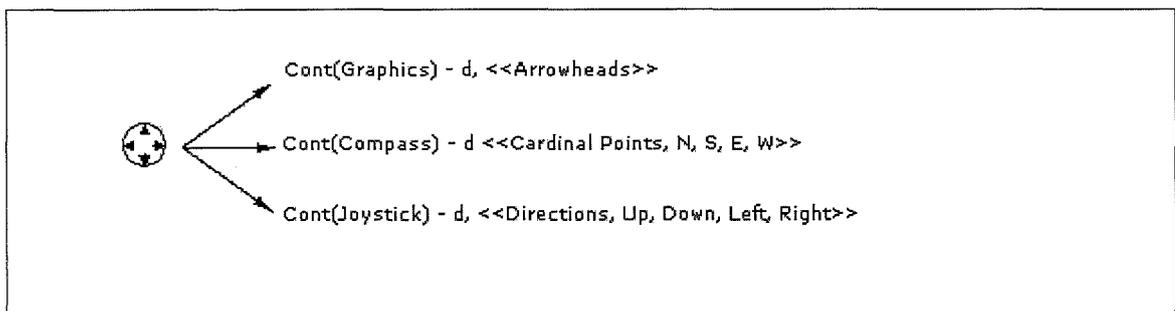


Figure 4.3 The semantic field of the arrow signs on the GD35

In this diagram the button is presented on the left hand side. The arrows point towards the contextual situations in which the sign might be encountered and the subsequent denotative meanings associated with them I.e. the semantic field of the sign. Culturally then, this sign has a number of different meanings associated with it that are brought to an interaction. It is not exactly clear what the button is for but the signs on the button denote something about navigation or direction. The same can be said of the arrow buttons on the two other phones (see Figure 4.1). This particular sign carries connotations with it too, in as much as the directional aspect of its compass form bring to mind the NATO logo.

Similarly on the GD35 and the 5110 there is a button with a ‘C’ symbol printed on it. The possible meanings of this symbol outlined as a semantic field is given below. Obviously there may be other contexts in which the symbols in these diagrams might have different meanings. The examples given are purely illustrative and not exhaustive.

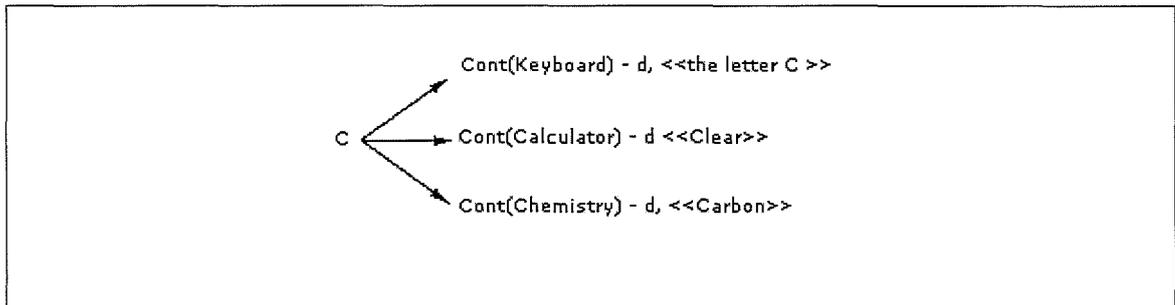


Figure 4.4 The Semantic Field of ‘C’ on the GD35

Figure 4.4 shows how the different contexts that the ‘C’ symbol is used in can offer multiple meanings. It may purely denote the verbal or written phoneme ‘C’. It may denote the ‘clear’ function on a calculator or it might denote the element of Carbon in chemistry.

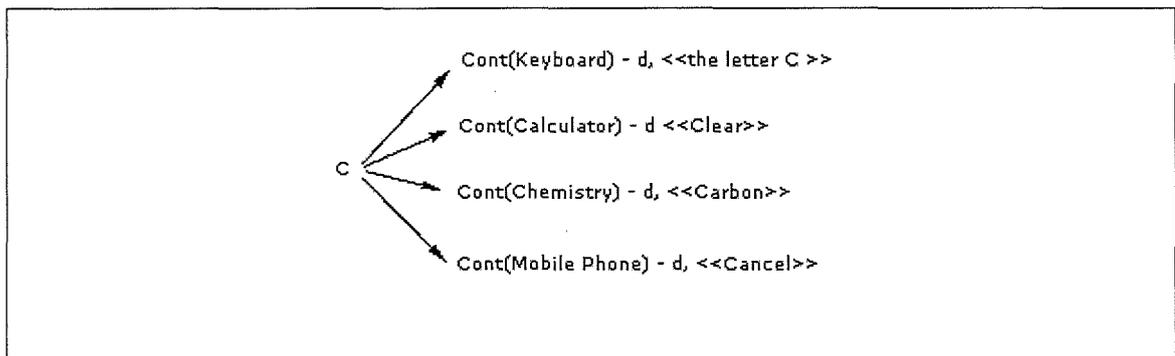


Figure 4.5 The extended semantic Field of 'C' on the GD35

In the case of the mobile phones though, it becomes apparent through interaction that 'C' stands for the 'Cancel' function (Figure 4.5). Therefore the semantic field for 'C' is extended and while it denotes 'Cancel' in the phones it retains these other possible meanings, the context of the mobile phone interface perhaps connoting meanings associated with a keyboard or calculator.

#### 4.4.2 Analysis of Interaction Using Eco's Revised KF Model

Taking a single symbol as a starting point an exploration can be made, using Eco's revised KF model of its functional meaning throughout the process of interaction. The sign (Figure 4.6) only appears on the GD35 while buttons with a similar position on the 6150 have a small blue dash on them, as does the central button under the screen on the 5110. It is not at all clear what this sign means or indeed if the buttons on the GD35 perform the same functions as on the other phones.

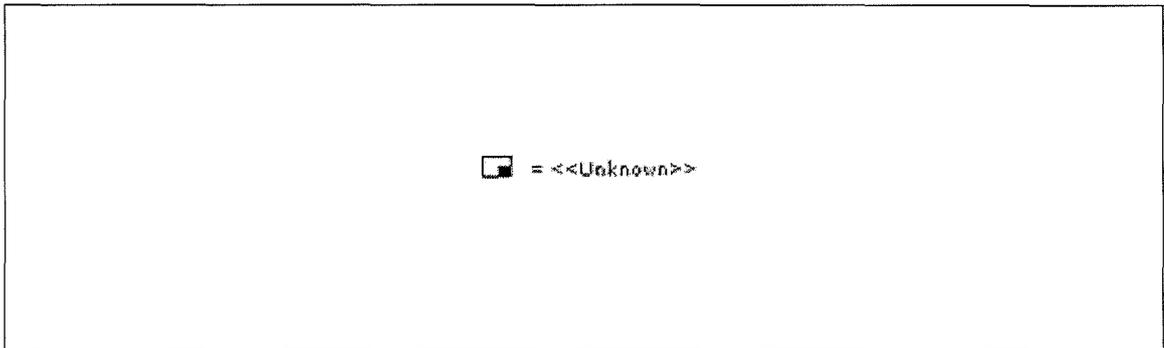


Figure 4.6 The semantic Field of an unknown sign

At first glance this symbol is very difficult to decipher, as it bears no relation to any of the external codes used on the phone. Therefore it must be unique to the interface (although similarities may exist in other mobile phone interfaces). It is constructed from a large rectilinear shape, which has a smaller dark filled rectilinear shape occupying its bottom right hand corner. The problem here is that Eco's formula seems largely useless because the sign is so new. However, if we follow his rationale and attempt to shed light on this rectilinear sign by exploring the context of its use we can pick up some clues as to its meaning.

What needs to be taken into account in relation to interactivity is the fact that, as Andersen points out (Andersen, 1990), it is not until a button is pressed that its

functional meaning is ultimately revealed. Therefore, the proof of what the sign is attempting to communicate is only verified through interacting with it. An entirely new form of semiotic model may be required to account for this type of activity but this does not mean that Eco's formula cannot be used at this stage.

Presumably, considering the nature of activating buttons, when the button is pressed some activity will occur within the phones system. This gives us two distinct semiotic phases, if we consider that by pressing this particular button this activity will be registered on the screen. So what does the change in state say about the functionality of the button and does this shed any light on the meaning of the sign printed on the button?

Given the fact that the meaning of a sign in Eco's model is entirely reliant on its denotations and connotations in relation to differing contextual and circumstantial variables, it follows that the complex alterations in meaning that arise when a sign is viewed in different situations can be captured by it. This flexibility in Eco's model then results in an opportunity to view those. That is to say, it allows the mapping of different stages of meaning that are denoted and connoted by the signs of a system when the state of that system is altered during an interaction.

Choosing the interaction goal of 'check messages' for the study of the mobile phones limits the number of stages mapped. Concentrating only on the GD35 interface, the meanings of the active button signs are mapped here in relation to the circumstances and context denoted by the other signs in the interface. Initially, it is not clear as to what some of the control buttons signify but through studying the interaction with the device it becomes apparent that they hold a close relationship with the signs displayed on screen and with each other.

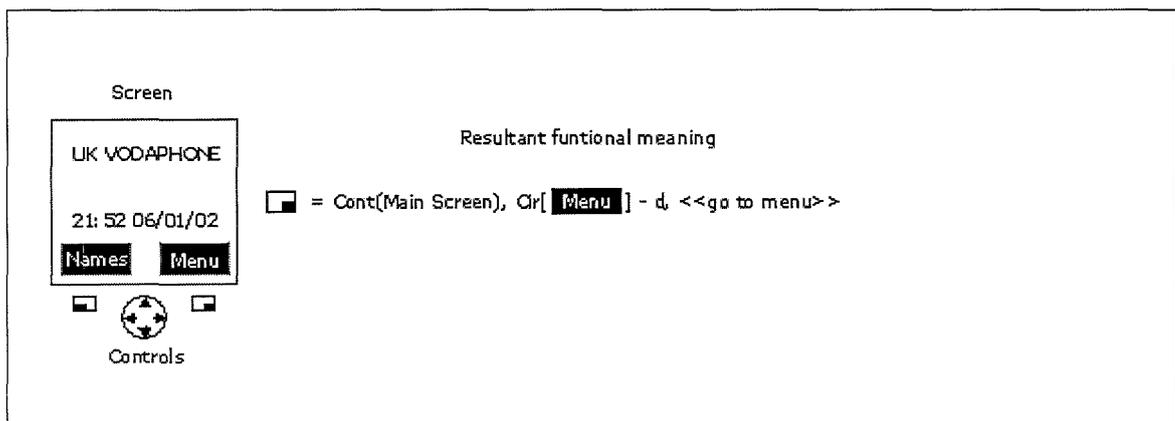


Figure 4.7 The Main screen of the GD35 (Note: all diagrams omit connotations due to space restrictions)

Figure 4.7 shows what the initial screen looks like at the start of interaction along with the corresponding semantic field of the right hand button in relation to the displayed information. By focusing on the meaning of the active sign at each stage of the interaction, it is possible to see how the operation of the device is conveyed through the relationships between its signs. As the interaction takes place the signs change and meanings are altered. Sign elements come together over time in order to form sequential syntagms that the user interprets as the interaction takes place. On the ‘Main Screen’ the function of the right hand button is denoted by [menu] in the black square at the bottom right of the screen. Eco’s model shows how the action of pressing the button results in the function <<go to menu>>.

- **User Action:** Press the right hand button.
- **System State:** The Screen now shows a list of functions with an arrowhead pointing from left to right at the beginning of the first heading on the screen.

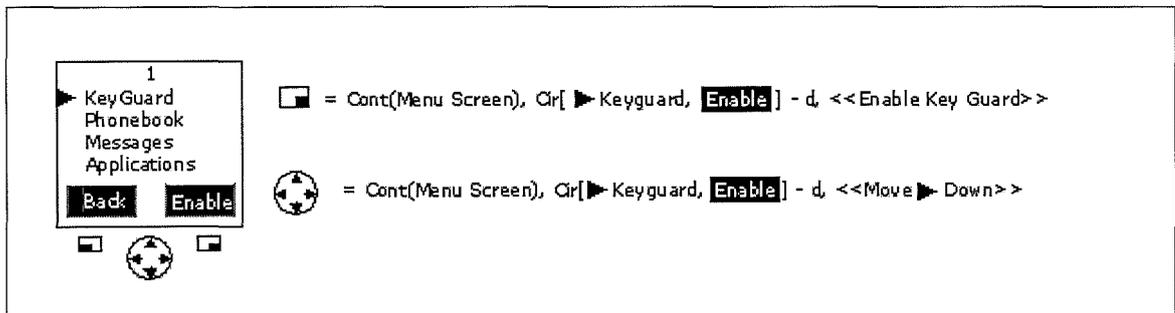


Figure 4.8 Menu screen

Figure 4.8 shows how the functional meaning of the right hand button has altered. Pressing the button will not result in the same operation because the circumstances have changed. These changes are indicated by the presence of a list, an indicator arrow to the left of the screen and [Enable] in the bottom right of the screen. Here the interaction moves to a different input button that performs a different function which has a meaning all of its own. Looking at both buttons with Eco’s model begins to show how complex the relationships are across the signs. Both signs convey information in terms of the the focus of action, switching the operative mode between them through the signs on the interface. The right hand button denotes <<Enable Key Guard>> as its function. This is not an action that will move the user closer to achieving the goal i.e. the combination of

displayed signs does not mean what the user wants to communicate to the phone. The user is forced to look elsewhere on the interface for a possible action that will move them further forwards. This is where the information supplied by the signs in relation to the Navigation button fulfils the intention of ‘checking messages’. The signs have to be organised in the correct syntagmatic structure in order to proceed correctly, otherwise an alternative function of the phone will be brought into operation.

- **User Action:** Use the Navigation button to scroll down the choices one at a time.
- **System State:** The indicator arrow moves down to the next heading on the list and the number at the top of the screen changes from 1 to 2. ‘Menu’ is displayed instead of ‘Enable’.

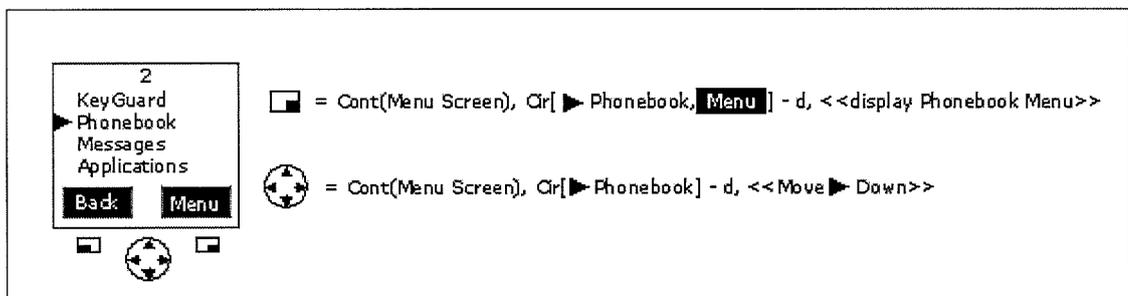


Figure 4.9 The menu screen stage 2

The next screen (Figure 4.9) shows how the meanings of the two buttons interrelate with one another. The function <<Move Down>> is directly related to the change in state of the right hand button <<display Phonebook Menu>>. Again this is not the meaning the user is looking for. The concurrent syntagm created between the signs on the screen and two button signs generates the meaning <<Move Down>>, which in turn moves focus to the down arrow at the bottom of the navigation button in order to get to ‘Messages’.

- **User Action:** Use the Navigation button to move down to ‘Messages’.
- **System State:** The indicator moves down to point at ‘Messages’. The number shows three.

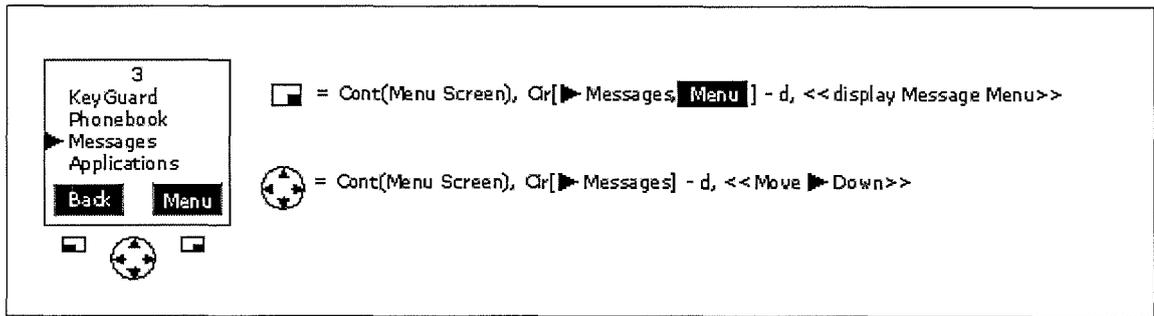


Figure 4.10 The menu screen stage 3

Having now reached the ‘Messages’ option (Figure 4.10) the right hand button becomes the focus of activity again. The indicator arrow is pointing at the choice the user wants to make. Also, it is apparent that if the Navigation button is pressed again the user will go too far down the list. By using Eco’s formula at this level it can be seen how the various functional meanings of the signs are created as the user moves through the interaction. Moreover, it is possible to see how meaning is made through understanding the relationship of the signs that are constructed within the interface. In other words, it is the users syntagmatic structuring of the signs in the interface that is a central part of interaction.

#### 4.4.3 Comparisons Across Three Phones

Looking at just one sign it is possible to see how Eco’s model can act as a map of its various functions across the different contexts and circumstances within the interactive possibilities of the phone. Figure 4.11 shows the map of related functions that the right hand button has in the various stages of the ‘Check Messages’ interaction. The structure of the semantic tree becomes more complex as various configurations of signs are revealed according to the differing Circumstances and Contexts that occur throughout the interaction. In all the phones examined, similar screen states and relationships between the signs in the interface were encountered.

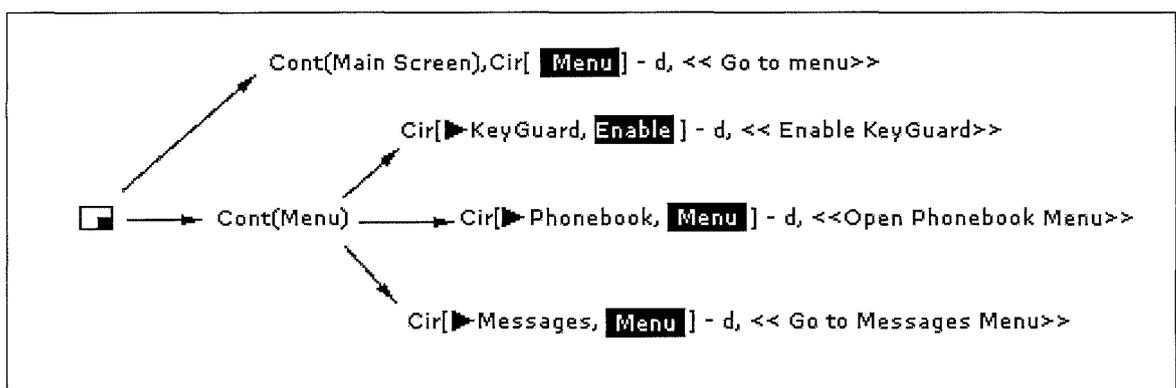


Figure 4.11 A functional model of meaning for the Panasonic GD35 Select button

If this mapping were to continue over every interaction that the button has a relationship with, it could be shown just how complex the construction of meaning with regard to this sign is within the device as a whole. This can be seen as a map of the operation of the button from which a concept is derived about its operation. In general terms, while there are a number of different denoted meanings related to this button a close look at them reveals that a lot of them have a similar meaning. What is learnt about the button is that it operates across the signs in the interface as a 'Select' button. The abstract concept derived from its operation is one that allows you to make a selection choice based on the complex arrangement of interface signs at any moment throughout the interaction. Thereby we have some notion related to the sign about the concept with which it operates.

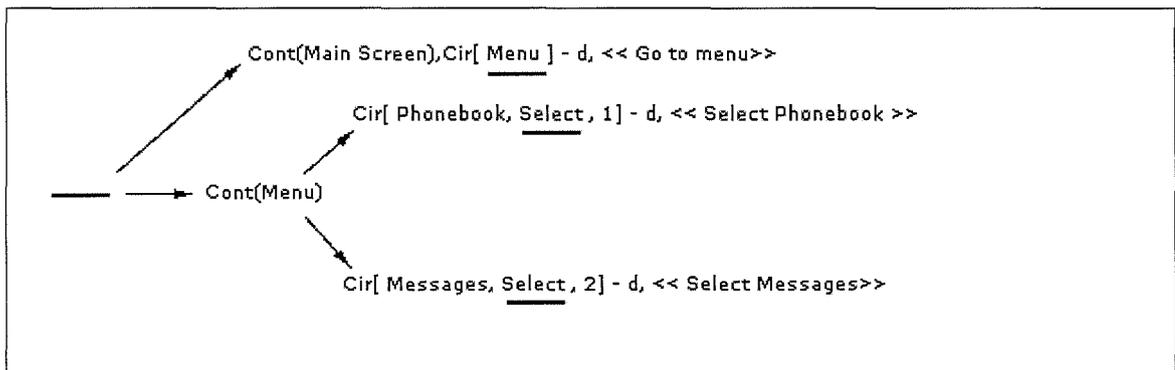


Figure 4.12 A functional model for the Nokia 5110 Select button

In the other phones (Figure 4.12) similar patterns of meaning structures emerge through analysing interactions within their specific system of signs. The middle button on the 5110 and two buttons on the 6210 have blue lines across them. Despite the differences in the position, size and form of symbol on these buttons, they behave just like the select buttons on the GD35.

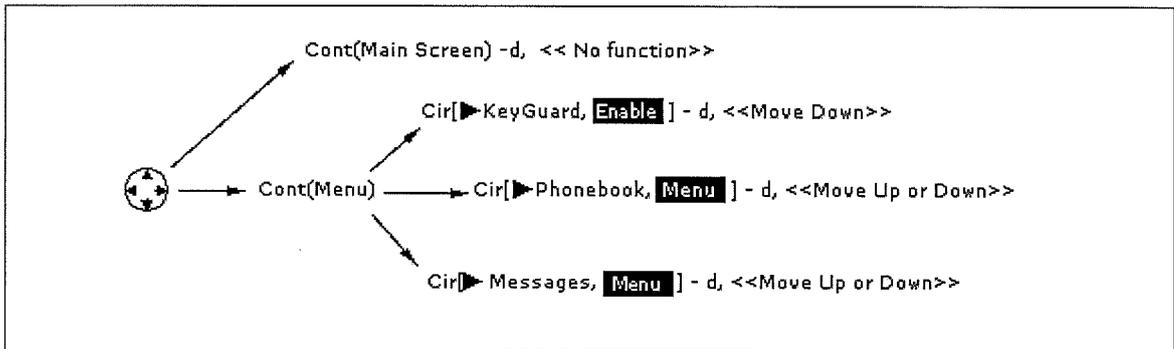


Figure 4.13 A functional model of the GD35 Navigation button

In the same way other buttons across the phones behave in similar ways. For example, the arrow buttons mentioned earlier Figure 4.13. Although on all the phones they appear graphically distinct they not only have similar semantic fields, but in practice they actually operate in very similar ways across the phones Figure 4.14.

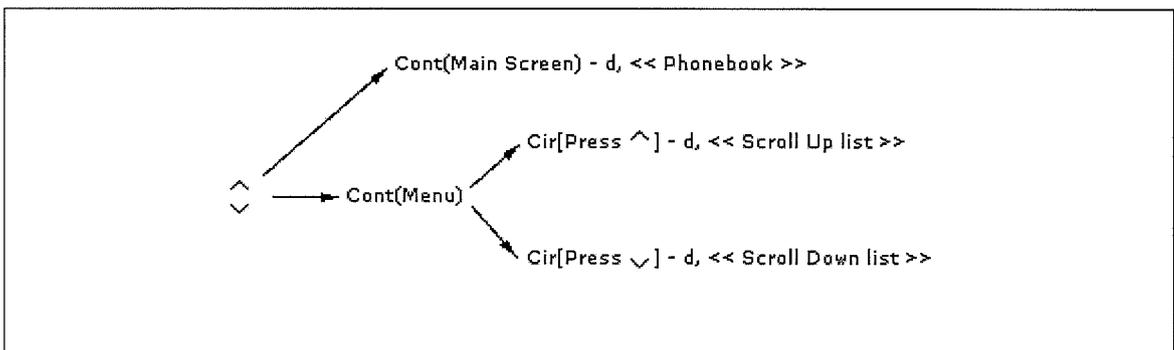


Figure 4.14 A functional Model of the Nokia 6150 navigation button

Both the GD35 and the 5110 have a button marked with a 'C' but the 6210 does not. The function of this button is not immediately apparent but after some investigation it becomes clear that the general function of the button is as a 'Cancel' button (Figure 4.15).

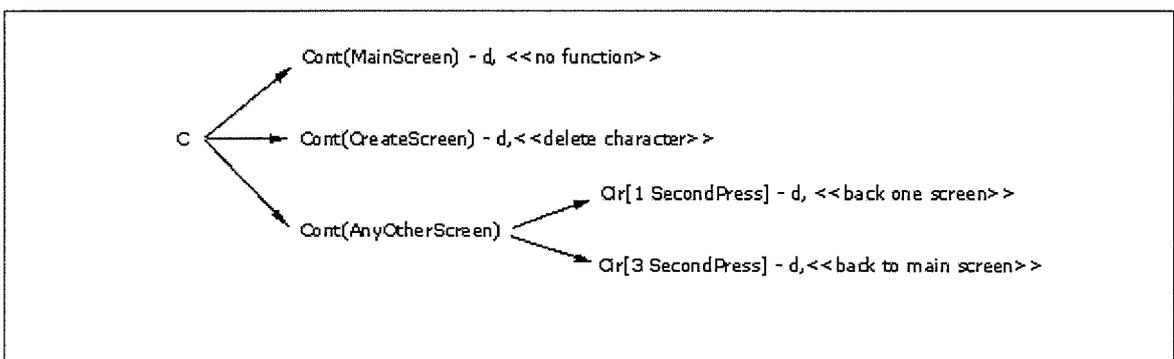


Figure 4.15 The contextual functional relationships of the 'C' button

It operates in different ways depending on the length of time it is held down, but in general it's function is to erase functions that have just been performed, returning to the main screen. The function of this button is identical on both phones Figure 4.16.

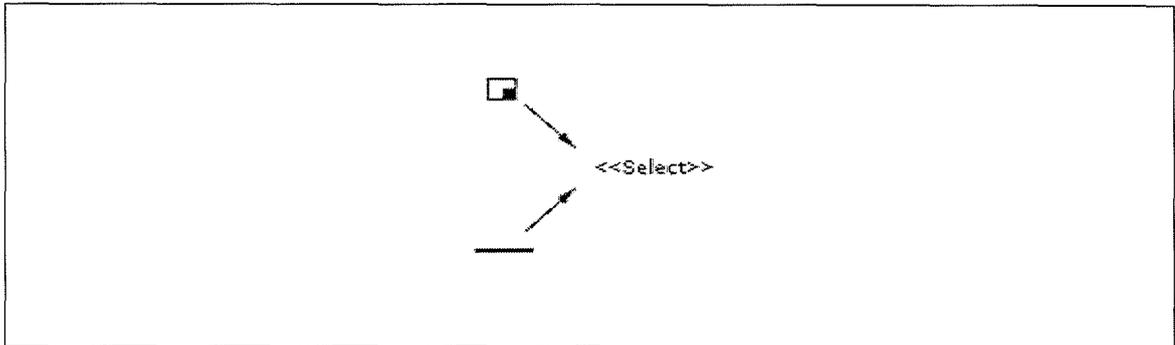


Figure 4.16 Metasympolic aspects of Select signs

Different phones use different symbols yet when one is understood in one phone the principles in application are transferable across phones. While not strictly across domain, this is essentially the principle of metaphor at work (as discussed in chapters 2.2.3 and 4.4), where it becomes possible to substitute the signifier from one phone for the signifier on another while maintaining the same functional meaning (see Figure 4.16 and Figure 4.17).

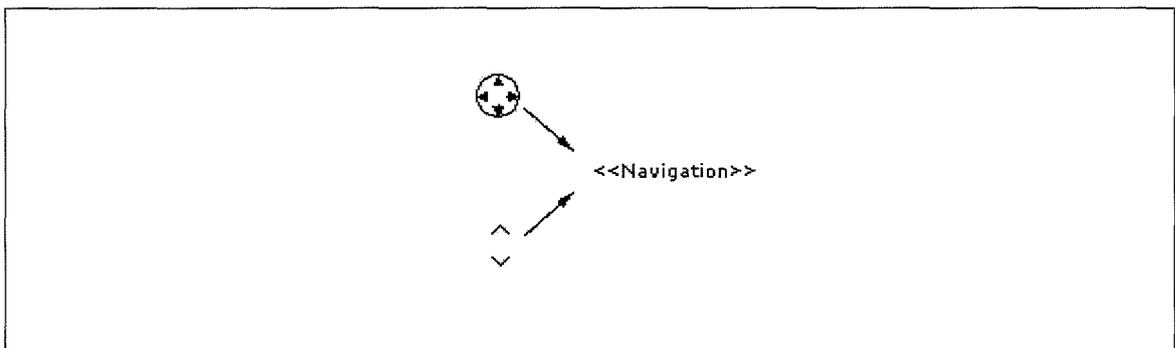


Figure 4.17 Metasympolic aspects of navigation signs

#### 4.4.4 Findings

Consideration of the first part of this study reveals how some signifiers carry a certain amount of cultural baggage with them, which offer a host of potential meanings in the form of a semantic field. Given a certain context and/or circumstance only certain meanings become appropriate. This is how coding and decoding works. Essentially

Eco's theories, the revised KF model in particular, offer an opportunity to articulate notions of decoding in relation to denotations and connotations which are dependent on the context and circumstance in which they are encountered. Indeed, as the second part of this study shows, new signs often have no cultural frame of reference, they are under-coded, and work commences to establish what they mean in relation to the signs around them.

The second part of the study concentrates on exploring the possible meanings of a sign in relation to the changing contexts and circumstances that occur during interacting with the phone. At each stage of interaction the relationships between signs and the resultant meanings are laid bare. This section in particular highlights how the concepts of syntagmatic structuring are articulated during an interaction. Each screen in itself is a grouping of concurrent signs, which are based on the internal paradigmatic structuring of functionality within the phone. The concurrent arrangements of signs in screens allude to interactive possibilities, while the resultant changes in those signs become manifest through the sequential nature of interaction. Manipulating the phones controls to produce the correct sequential syntagmatic relationships out of the concurrent arrangement of signs on each screen establishes an end goal.

While this is only a very short task, this study shows how complex these relationships are, as well as how time consuming it might be to analyse the whole interface. With this in mind section 6.4.3 considers how the semantic fields of signs become extended through establishing a working concept of a sign within a particular set of contexts and circumstances. Moreover, relationships between signifiers can be established when it becomes apparent that they are associated with the same working concept

A difficulty in implementing Eco's formula to interactive interfaces would appear to be that it is far more difficult to establish the context and circumstance of a sign within an interface due to the hidden depths of its functionality within the operation of the device as a whole. Context and circumstance in written texts are constituted by the other words that surround the word or phrase being analysed. Within an interactive interface this remains true, but there may also be many hidden operations that alter the meanings of a sign that only become apparent over time. The difficulty in analysing interaction is that a) it is not always clear what signs initially mean, b) the functional paradigms of the

devices are expressed by signs that have to be learned, and c) it is the sequential process of interacting which creates meaning, even when the interface isn't fully understood.

### 4.5 Discussion

Each of the analytic techniques used in this chapter are different, but each has been used in an attempt to apply some aspect of semiotic theory to the analysis and interpretation of interface elements. While each one has its own particular strengths and weaknesses, the important thing to consider is how the relevant aspects of semiotic theory identified at the end of Chapter 3 have been explored, in relation to the important characteristics of new media.

For example, it is quite apparent in the product analysis, which focuses on a sign type, that icons, indices and symbols are evident across all three phones. This type of analysis was able to identify subtle differences in the construction of these sign types, which while often looking different conveyed the same sorts of meanings across all three phones. The analysis of iconic signs focused on the product itself and not on identifying icons as part of the phones makeup. Indeed, there is no evidence of independent iconic signs on any of these phones. Regarding indices, each phone displayed evidence of exactly the same type of indexical signs relating to both battery power and signal strength, although their position and structure were sometimes different from phone to phone. Furthermore, the analysis of each phone showed that symbolic signs were an integral part of both the screen and the buttons across all three phones.

All three main analyses' provided evidence of the concurrent arrangement of signs across the three phones. The first analysis identifies not only similar syntagmatic structures of signs across each phone, but also different signs across different phones, with similar meanings, that are arranged differently in the interface. Similarly, the second analysis also uncovers these differences, along with the fundamental organisation of mobile phone forms, such as the hierarchical visual structure of position the screen above the control keys. However, this type of analysis is fairly limited in relation to uncovering aspects of meaning over and above the structure of the interface.

In the third analysis, again concurrent syntagmatic relationships are discussed, but more importantly, the third analysis of interaction uncovers the way in which signs are

manipulated sequentially in order to establish meanings. Interaction across all three phones is reliant on the ability of a user to interpret and manipulate signs in both concurrent and sequential relationships. Through exploring semantic fields along with the contextual and circumstantial relationships that establish denotations and connotations, it becomes apparent that many signs in the phones interfaces have many potential meanings. While the analysis predominantly explores how a sign's functional meaning is established through interaction, attention is drawn to the place of this meaning in relation to a wider cultural context. This particular aspect of the analysis highlights the role of the reader as an interactive interpreter of the interface. Meanings are derived through the manipulation of signs within the structure of the interface as well as the realm of potential meanings brought to the interaction by the user.

### **4.5.1 Addressing the Problems of New Media**

The three semiotic analyses presented here do not individually provide examples of all of the relevant semiotic theory identified in the review of chapters 1 and 2. None of them are singularly effective in describing new media artefacts. However, each of the analysis provides evidence for at least one aspect of relevant semiotic theory with significant crossover between them all. When they are considered together, what is found is tentative proof of the appropriateness of semiotic theory from older media in relation to analysing new media. Using semiotic analysis in this way, highlights that elements of older semiotic approaches, while useful, are not enough in themselves. In order to understand interactions with new media, the relevant aspects of semiotic theory must be combined together, in such a way, as to produce a semiotics of new media that is capable of articulating its specific characteristics.

#### **4.5.1.1 Understanding digital abstraction**

Semiotics, as outlined in previous chapters, has been used in many different domains to explore the meanings and meaning making process that occur when people interpret signs. Largely, it has made its mark in cultural and media studies, as a form of critical analysis performed by semioticians who analyse these texts to find the different levels of meanings that can be attributed to them. In relation to the problem of digital abstraction what can be seen so far, is that sign types and terminology from older media domains are relevant to the exploration of new media. Icons, indices and symbols, as well as concurrent and sequential syntagms, are all evident in each of the phone studies. Therefore, semiotic theory does indeed connect the technologies of new media to the

history and critique of older media. In doing so, this semiotic approach provides useful terminology that helps to articulate the problems of new media. It is without doubt useful to think of new media from this perspective.

### 4.5.1.2 Understanding Convergent Media

The detailed semiotic analysis of the convergent aspects of film can be a long and protracted task. Metz's attempted structural analysis of film, while working on the specific level of the shot, begins to break down when he tries to take into account other aspects of the medium. He is right when he considers that there are many different channels of information connected together. There is the order of shots, the composition of the frames in the shot, there are the sound effects, there is the dialogue etc. Metz states that each one of these should be broken down and analysed into channel specific syntagms firstly and then into the syntagms that are created via the connections across the channels as they come together in the film. However, Metz notes that this is almost impossible, not merely because of the massive volume of data that has to be analysed in this way but more specifically, because it is almost impossible to identify an agreed minimal unit for analysis that is specific to film.

In this respect, the same might occur with the analysis of new media. Although Andersen offers the interactive sign as part of a solution to this problem, the interactive sign itself has now become so multifarious due to the convergence of media that it is often not so easy to identify it. Moreover, the level of convergence between media elements in new media systems has far outstripped the classifications given by Andersen nearly fifteen years ago. New types of signs are emerging and new types of interaction are taking place. A semiotics of new media must address this problem by establishing what kind of signs it hopes to identify and how people make sense of interacting with them.

### 4.5.1.3 Understanding Interactive Interpretation

Older semiotic theory, in the most part, is aimed at analysing 'static' texts. I.e. texts constructed by an author where the constituent parts have been organized into a structure that does not change over time. In interactive media, this is not the case. Although designers are still responsible for organising the structure of software applications, the very nature of what makes them interactive i.e. the introduction of the agency of the user, makes semiotic analysis with traditional static methods problematic. The possibility for personalisation and self-organisation, as controlled by the user in

some applications, confounds the traditional static semiotic approach even further. A semiotics of new media has to be able to cope with dynamic texts that alter over time as users interact with interfaces and content.

An interesting central theme of semiotics is the notion of the relationship between the authors and the readers of these texts. Semiotic theory has called this relationship into question; undermining notions that meaning resides in texts in themselves and supporting the notion that the reader makes meaning when the text is interpreted. In relation to developing a semiotics of new media, this is an interesting perspective, because on one level it treats software interfaces as texts that can be analysed by semiotic experts e.g. the communicability and usability of user interfaces (Prates et al., 2000a, 2000b), while on another level the author/reader relationship echoes the designer/user relationship apparent in HCI. The problematisation of this relationship puts the onus of interpretation on the reader, identifying new media systems as opaque texts, the meanings of which are constructed through the interactive production and interpretation performed by the user. Therefore, a semiotic understanding of new media should treat interaction as a process whereby signs are produced, communicated and interpreted by readers that author their own experience and by authors that interpret the work of others in producing new texts. (S. O'Neill, Benyon, & Turner, forthcoming).

## 5 An Integrated Semiotic Model of Interaction with New Media

Understanding the interactive process is one of the central tenets of HCI research; therefore any theory developed in relation to HCI must address this problem. While this thesis develops an approach from a critical perspective, it is still important to address this problem. Developing a semiotics of new media is thus made difficult because of a fundamental lack of an integrated semiotic theory. Moreover, the singular expert perspective of the semiotician is not immediately compatible with the existing discourse of HCI that focuses on user interactions. HCI is laden with empirical data gathering techniques, from both the traditional and social sciences, that are used to gain insight into user behaviour. Empirical data gathering, in this respect, is something that semiotic theory is not designed to do because its normal focus is on an expert analysis of static texts rather than user interpretations. As such, it suffers under criticism from other disciplines that contend that it is not able to reproduce its findings or defend its claims effectively. Apart from the advertising approach of David Mick (Chandler, 2001, p194; Mick and Buhl, 1992), there is very little work that has been done in semiotics that addresses user meaning making activities. In relation to HCI, what is missing from a semiotics of new media is an understanding of how users interactively interpret the medium they are working in. Specifically, what is lacking in a semiotics of new media is a model of an author/reader who produces, interprets and manipulates the multiple complex signs encountered during interaction. The solution to this problem is presented in this chapter by considering interaction in relation to the theories of Jacob von Uexkull.

### 5.1 Semiotics and embodiment

Von Uexkull was concerned with how organisms relate to their environments and the biological factors that determine what an environment means to an organism (Sebeok, 1979). Or as Thomas Sebeok puts it:

“The fundamental semiotic problem von Uexkull attempted to deal with was to connect the real world with the phenomenal world in a biologically satisfying way, and to give a detailed accounting of what he referred to as a contrapuntal relationship between an organism and its environment.” (Sebeok, 1979, p 196)

This is achieved through what von Uexkull termed as the ‘Umwelt’. For von Uexkull the Umwelt is the world that an organism perceives in so much that perception is the organisation of sensation into recognizable environmental elements, or signs, which may be good, bad or of no consequence to the organism (Deely, 1990, 2001). The fundamental underpinning factor of this perceptual process is the genetic make up of the organism, which defines its sensory/perceptual capacity, as a matter of species.

“Organisms thus perceive not the *Ding an sich*, i.e. ‘things as they are’, but signs, and from these signs, each according to its *blauplan* or blueprint, build up mental models of the world that are equivalent to Peirce’s interpretant, the function of which, according to him, is performed by another sign or set of signs that occur with the given sign, or might occur instead of it.” (Sebeok, 1979 p 195)

Or as Alexi Sharov puts it:

“The main idea of Uexkull is that each component of the Umwelt has a functional meaning for an organism; it may be food, shelter, enemy, or simply an object that is used for orientation. An organism actively creates its Umwelt through repeated interaction with the world... Umwelt-theory also implies that it is not possible to separate mind from the world (matter) because mind makes the world meaningful.” (Sharov, 2001 p 211)

Drawing on Uexkull’s work, Sebeok makes it evident that semiotics is not, as first suggested by Saussure, an arbitrary conventional process but that semiotics is present throughout the animal kingdom, and that humans in particular can be considered to be ‘semiotic animals’ at a fundamental level, i.e. the level of the body.

This brings us to the ontological and epistemological problems of ‘being’ and ‘embodiment’, explored by the phenomenologists (see Chapter 1). Phenomenology and semiotics are often considered to be completely differing schools of thought, which indeed they are. However, this simple division of the two belies the complexity of their relationship. What is not commonly understood is that they often explore the same issues, often overlapping in understanding. Søren Brier, for example, (2001a; 2001b) draws heavily on the work of Uexkull in developing his cybersemiotic model of

knowledge. Brier probes deeply into ontological and epistemological problems in an attempt to develop a 'philosophical framework for a trans-disciplinary information/semiotic science'. In doing so, Brier highlights the importance of understanding ontology from a bio-semiotic perspective, where 'what we can know' is determined by our genetic make up and our genetic make up is determined by environmental evolution. A view shared to some degree by Jorge Conesa (2001) in his 'Semiotic Matrix Theory'.

Interestingly, from a semiotic perspective Dourish's explication of meaning in relation to embodied interaction looks very familiar (see chapter 1.5.4). In considering his explanation of Ontology for example, what Dourish outlines is not that dissimilar to the central themes of semioticians such as Saussure, Peirce and Hjelmslev, particularly linguistic notions based on the importance of the differences between entities as the source for names, i.e. categorisation and typology. Similarly with intersubjectivity, the common ground Dourish alludes to, as part of embodiment, is tackled directly in semiotics with ideas about the Author/Reader relationship as well as the importance of the social coding structures that we use to communicate with. With regard to intentionality, Dourish states that it is "central to any understanding of embodied interaction." This is an important point because computation involves the representation of information and functionality in relation to communication and interaction. Intentionality in itself is a fundamental semiotic problem. In semiotic terms intentionality is about the relationship between the signifier and the signified, the representamen and the interpretant. Intentionality is about the role of the sign in communicating our ideas. Coupling is about the role of the sign and combinations of signs in mediating our activities. The way in which the mouse is coupled to the cursor and in turn the cursor is coupled to the artefacts of the desktop environment can be considered from the semiotic perspective of structured syntagms outlined in Chapter 2. It is interesting to note then, at every turn, as Dourish explains the relationship between meaning and embodied interaction, semiotics has a very strong relationship to the points he makes.

In his paper "Disentangling Notions of Embodiment" (Ziemke, 2001), Tom Ziemke provides a useful categorisation of four different ways of thinking about these issues. As he points out the categories he defines are more like groups of closely related

notions rather than single well-defined positions, it is the last of these definitions that is of most importance here given Uexkull's connections with semiotic theory:

- **Embodiment as 'Structural Coupling'**; the broadest notion of embodiment that does not necessarily require a body, but states that systems are embodied if they are structurally coupled to their environment. This is to say, that the cause and effect of two or more elements on each other in a system requires that each element may affect and be affected by the other element in a coupled relationship.
- **Physical Embodiment**; in this view, embodied systems are required to have a physical body that are engaged in the same relationship as structural coupling.
- **'Organismoid' Embodiment**; requires that embodied systems must have physical bodies with similar sensory-motor capacities as living bodies. This is intended to cover both living organisms and their artificial counterparts e.g. humanoid robots. It also attempts to answer some of the problems levelled at Neural nets which without a body have no up/down, inside/outside conceptions from which to generalize. This is closely related to Lakoff and Johnson's notions of embodied metaphorical cognition.
- **Organismic Embodiment**; the most restrictive notion of embodiment where cognition is limited to organisms that have living bodies. Cognition being what living systems do in interacting with their environments. This notion has its roots in the work of the biologists Jacob von Uexkull and Humberto Maturana.

In line with these definitions, it is important to clarify how this process of interactive semiotic cognition takes place. Essentially, an organism's umwelt is formed by the repetitive experience of interacting with its surrounding environment. All that we know and all that we are has been shaped by this continual interaction. This is true both culturally and genetically. Uexkull characterises this process in terms of the internal physical world of an organism (muscles, receptors, nerves etc.) engaged with the world through its perceptual and motor fields working together, as a functional cycle, to experience its surroundings (Figure 5.1).

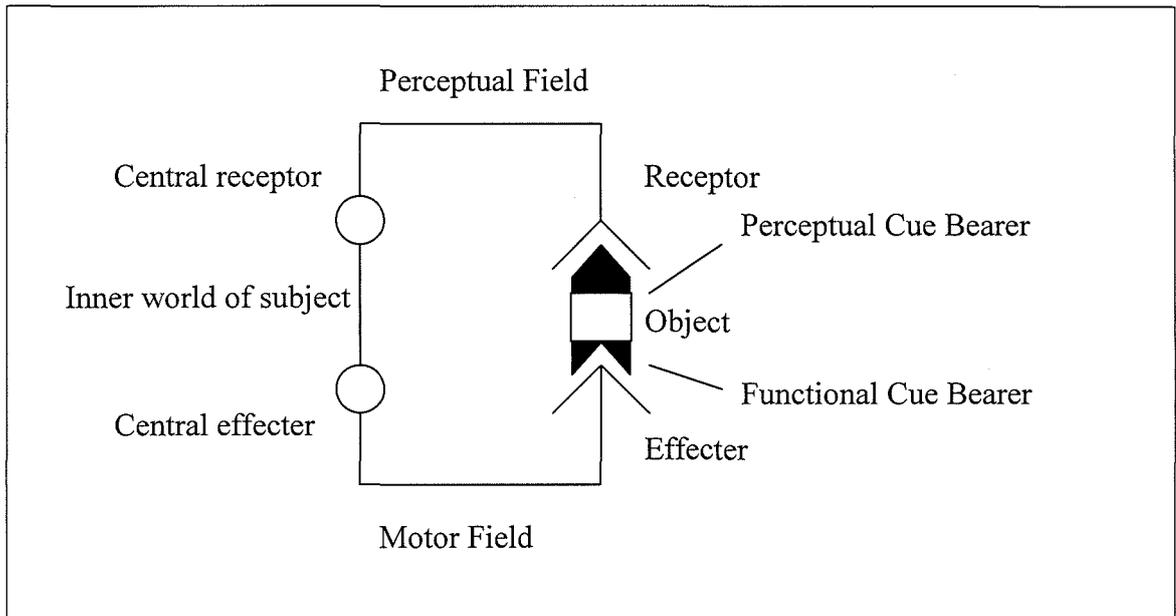


Figure 5.1 Uexkull's functional cycle. (After Uexkull 1957: adapted from Sebeok, 1979)

This is similar to ideas of ecological psychology proposed by Gibson (1977), where information is 'picked up' from the environment by an active organism. Gibson's theories oppose most traditional theories of cognition that assume past experience plays a dominant role in perceiving. It is based upon Gestalt theories that emphasize the significance of stimulus organization and relationships. This idea has been widely accepted in HCI as the concept of 'affordance', where aspects of an environment offer the clues necessary for perception. Don Norman has also drawn heavily on it in his conception of his execution/evaluation loop.

The fundamental difference between von Uexkull's functional cycle and those proposed by Gibson and Norman (Conesa, 2001), is that von Uexkull characterises its operation in terms of signification, rather than in terms of information in a stimulus array that allows us to recognise invariant objects. Uexkull's focus on signification works at a genetic level, where an organism is programmed in its bodily make up to decode the signs in its environment, as a matter of survival. This in turn extends from bodily coding and decoding to cultural coding and decoding. The process is essentially the same. Gibson excludes any notion of higher cognitive function in his theory as it is seen to require the function of information processing. That is to say, that Uexkull's functional cycle is not just perception/action but effectively conception/action made possible through the tight embodied coupling between organism and environment. While similar to Gibson's notion of affordance, this is an important shift in perspective

that considers ‘phenomena’ as signs that are encountered during interaction which provide possibilities for further interaction rather than the goal, task, action, evaluation approach applied to HCI in a major strand of Norman’s work (Norman, 1998).

Thus, the relationship between the subject and the object is dealt with in a pragmatic way, where external phenomena are experienced as signs which are meaningful to an organism and there is no separation of the two (Sharov, 2001), much like the phenomenological perspective.

### 5.1.1 A Motor theory of language

Further bio-semiotic research has extended these ideas to develop a motor-theory basis for the development of language (Allot, 1992 and 1994). The theory is based on functional ideas similar to Uexkull’s, but focuses on the motor activity at a neural level, which is not that dissimilar to the work of Lakoff and Johnson (1980, 1999). The theory suggests that as humans have evolved and become more sophisticated, the modelling systems and motor patterns for activities like movement have over time been transferred to activities involving the production of sound resulting in speech (Allot, 1992). Moreover Allot proposes that:

“For the human or any other creature, the interaction is between the given environment and the inherited neural structures which make perception possible. There is no reason to believe that there is any gap between perception and the world, or language and the world. Our perceptual capacities evolved to coincide with the structure of the world as we find it, because perception evolved in the service of effective action for survival. Perception evolved from the organisation of action, communication evolved from perception, language evolved from communication.”  
(Allot, 1994 p 268)

This is entirely in line with Uexkull’s idea of the *Umwelt*, which Deely places as “central to semiotics” (Deely, 2001). However, Deely goes further. His argument is that language has so altered the human *Umwelt* that humans can no longer be seen to exist in a “semiotic web based only on biology” (Deely, 2001). The motor–theory argument takes this into account through the link between perception and action, stating that within this continual functional process, language is simply an extension of the perceptual modelling capacity turned into action within the *Umwelt*.

Deely’s conception of the *Lebenswelt* (used to describe the language infused semiotic world of humans) is to a greater or lesser degree a glorified *Umwelt* equivalent to and

working in the same way as the one proposed by Allot (Allot, 1994). Kalevi Kull identifies this conception of the semiotic world of humans as a set of interconnected Umwelts or Semiosphere. Which in its own right bears a marked resemblance to both Eco's and Halliday's conceptions of social codes, as well as Brier's cybersemiotic model.

In essence, what is important to grasp here is that we not only experience the world as signs biologically, but that we also live within the production and interpretation of cultural signs that we experience as the world. Uexkull's approach to the world of signification is unique in semiotics because of its grounding in the genetic codes and biological bodies of species. Uexkull's point is that these biological codes that determine and shape all of our experiences in the world, subsequently shape all of the other codes that we produce and encounter on the individual and social level. This is a fundamental concept that grounds semiotics in the ontological and places Uexkull's theories in the company of the phenomenologists and their notions about embodiment.

### **5.1.2 Embodied Cognition**

In both "Metaphors We Live By" (Lakoff & Johnson, 1980) and "The Philosophy of the Flesh" (Lakoff & Johnson, 1999). Lakoff and Johnson argue for the 'embodiment of mind' based on cognitive psychology and hard neuroscience where consciousness is entirely dependent on the existence and activities of the body. They propose that at a deep level there are links between the motor functions of the body, active perception and the neural networks, which develop in relation to these processes engaging in activity in the environment. The relationship between the mind and the body is hard wired within the brain where physical connections allow for the development of metaphorical modelling processes based on motor activity (Lakoff & Johnson, 1999). This is echoed in Allot's view of the evolutionary development of language (Allot, 1992, 1994) where the central view is that the human capacity for language is hard wired into our brains as the perceptual and primal motivating functions of our genetic make up. To back this up, Lakoff and Johnson give countless examples of everyday metaphorical conceptualisations that take as their base domain the bodily experience of existing in the world. From this they derive a number of categories for body based metaphorical understanding of the world we inhabit, some of which are:

- The centre-periphery schema

- The container schema
- The cycle schema
- The path schema
- The part whole schema
- The verticality schema

(Lakoff, 1994; Johnson, 1987, Loos et al, 2004)

What Lakoff and Johnson essentially propose is an understanding of cognition that not only relies on having a body to move around and perceive a world, but more radically, a cognition that is fundamentally related to the sensory motor capacity of the human body as a basis not only for perception but also for conceptualisation (Brandt, 2000). They propose that it is the same bodily structures that move us around and allow us to act in the world that allow us to think. Furthermore, they propose that complex cognitive activity is built up from a number of combinations of these primary metaphorical embodied thinking building blocks. Thinking and meaning making is a continual process whereby we are always modelling our experiences against our previous experiences, from one domain to another, in a metaphorical way, where the very nature of our embodied existence gives us grounds for understanding.

Fauconier and Turner have a similar but somewhat different theory of cognition called “conceptual Integration” (Brandt, 2000; Fauconier & Turner, 1998; Imaz & Benyon, to appear, 2005), whereby distinct conceptual domains are activated simultaneously and connections across the domains are formed resulting in new conceptualisations. Where Lakoff and Johnson’s metaphor theory concentrates on proving the link between conceptualisation domain and the body via primary embodied metaphorical constructs, Conceptual Integration explores the blending of higher order mental concepts that result in new conceptualisations. Fauconier and Turner propose that conceptual integration is a fundamental cognitive process similar to metaphor theory, sharing a common embodied origin, but which often results in the creation of new knowledge, rather than only figuratively understanding one domain in terms of another.

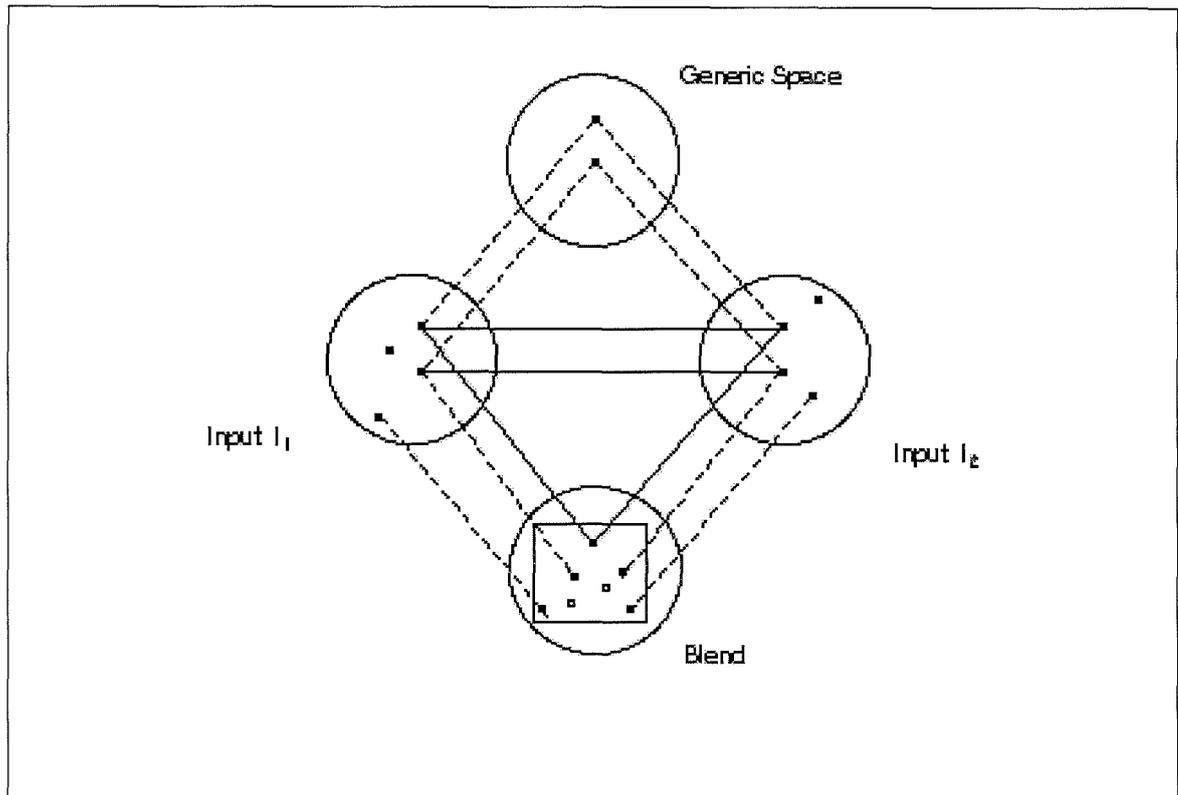


Figure 5.2 Conceptual Integration (Fauconier and Turner, 2001)

As such, this is a model of how the imagination works. It is what makes a train of thought possible. It is the home of creative invention and meaning making. It is in this that we find a relationship with the mechanisms of connotation and metaphor as proposed by Barthes outlined in section 2.1.4.

## 5.2 Building an Integrated Semiotic Model

A central proposition of this chapter is that a semiotic theory of new media requires, at its heart, a model of user interaction that builds upon relevant aspects of semiotic theory, while adapting to the problems of digital abstraction, convergent media and interpretation. To this end, the relationships between semiotic theory and embodiment have been explored in an attempt to find solutions to these problems. With this in mind, the question is asked again:

**“How might the concepts identified as relevant to the development of a semiotic theory of new media be combined to produce a model of interaction with new media systems?”**

Essentially, the answer to this is achieved through focusing on the interpretations made by embodied users that are acting within a semiotic medium. In this way, semiotics

moves away from the concerns of semioticians analysing static texts, towards the concerns of individuals interacting with dynamic convergent media as part of their environment. The model proposed here, relies upon semiotic theory to articulate the mechanisms by which an embodied user makes sense of the phenomena encountered during interaction with new media systems. The central concept proposed in this model is fundamentally based on von Uexkull's theories in relation to notions of embodiment and the Umwelt. Von Uexkull's ideas offer a foundation for a semiotics of new media that characterises the user as an interaction author/reader whose functional cycle is engaged in producing, manipulating and interpreting the signs in the medium. Additionally, the concept of the Umwelt offers a route to understanding user interpretations as cultural codes characterised by denotative, connotative and metaphorical sense making. Outlined below are all the aspects of this model and an explanation of how they are interrelated.

### 5.2.1 Sign Types

In accordance with the sign types of Andersen and notions about information spaces (Benyon, 2000), it is proposed here, that the term 'information artefacts' be used as a catch all category to describe the different types of signs from convergent media that make up new media interfaces. As there is the potential for multiple, richer and more complex meanings as media converge, there is a need to include the Peircian concepts of icon, index and symbol in addition to Andersen's sign types. These provide the basis of a more appropriate typology that is flexible enough to articulate emerging aspects of new media technology. Where information artefacts are proposed as an over arching category of the sign types mentioned here, it does not exclude the potential for other sign types to be identified through the semiotic study of new media. Indeed, different media channels often carry different sign types and the continued influx of new sign types from new media multiplies the messages that often have to be interpreted in synchronisation. Suffice to say, that it is perhaps inevitable that this area of study will evolve as convergence continues. New media therefore, is understood in semiotic terms as a coming together of previously unrelated information artefacts that are derived from the digital abstraction and convergence of disparate sign systems (Figure 5.3).

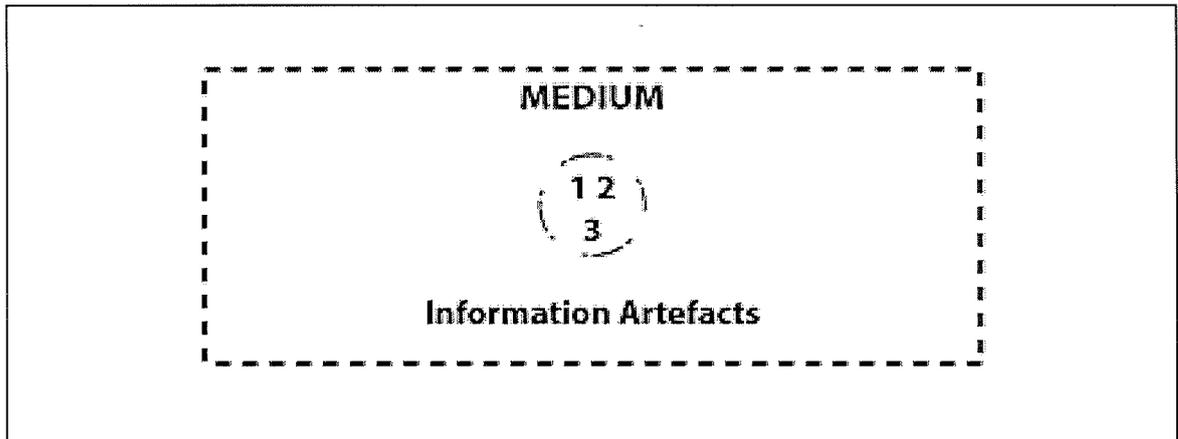


Figure 5.3 Information artefacts organised in a medium

### 5.2.2 Concurrent and Sequential Syntagms

Within this new medium, the information artefacts are organised by an author/designer into concurrent paradigmatic structures. These structures in turn are then interactively interpreted and manipulated into new sequential structures by a reader/user (Figure 5.4). The concept here is that as the user interacts through manipulating the medium over time, sequential syntagmatic structures are formed from concurrent syntagms and the process of sequential reorganisation forms new concurrent syntagms. As a result, users become not only responsible for reading new media texts, but also for authoring, or more correctly, 'editing' their own versions of new media experience. In this way, they are interpreting new media through the process of interaction, organising their syntagms into the relevant structures appropriate for the activities they are involved in.

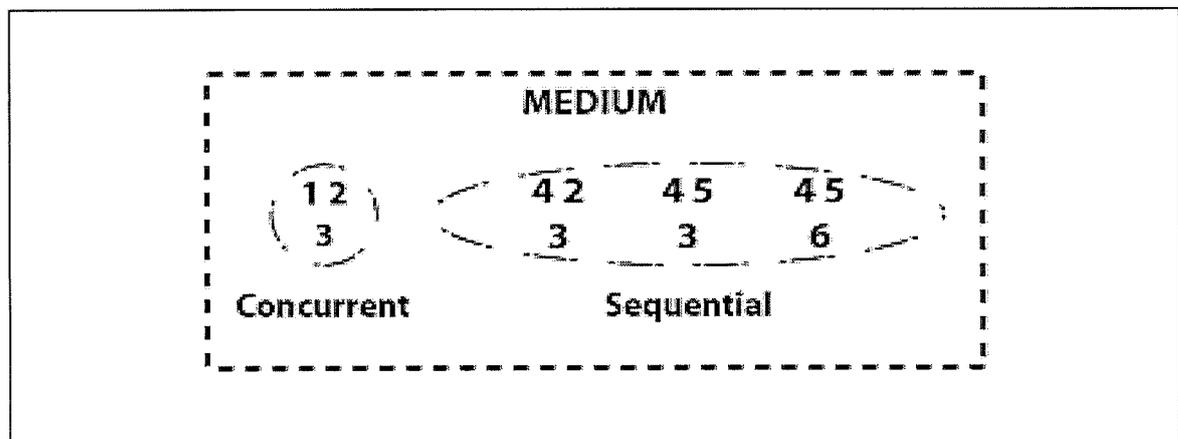
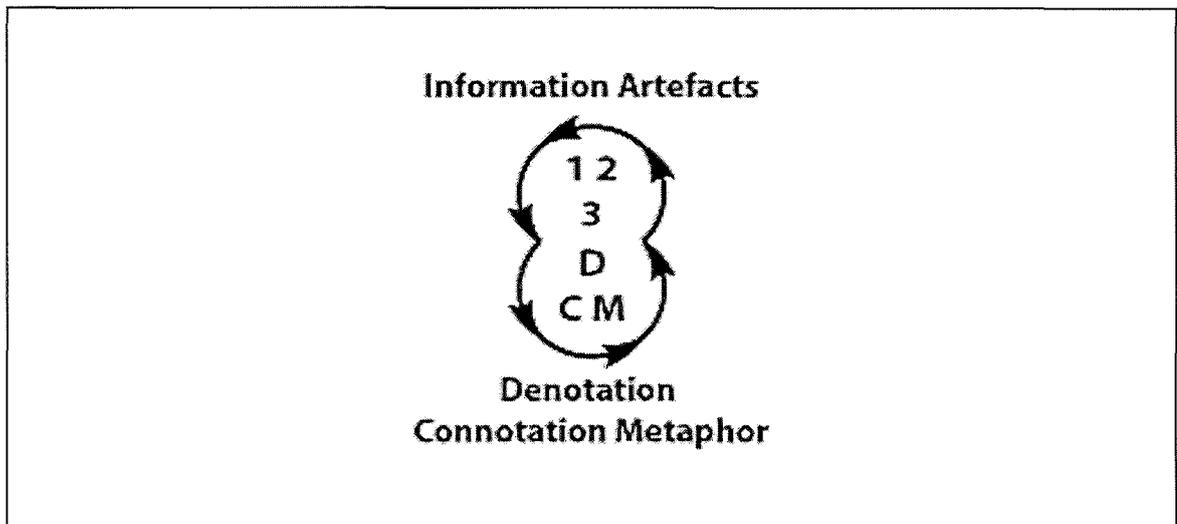


Figure 5.4 Concurrent and sequential structures within a medium

### 5.2.3 The Functional Cycle

What is unique in this description of interaction, is that it captures the process by which users manipulate and make sense of the medium through their functional cycle. It is the tight coupling of medium and umwelt that enable authors/readers to interactively interpret what they encounter. Thus, the direct relationship between interactive information artefacts and the social, cultural and personal codes of the umwelt results in denotative, connotative and metaphorical sense making to take place.



**Figure 5.5** The functional cycle between artefacts and meanings

More importantly, it is the continual looping of the functional cycle over time that leads to the sequential interpretation and manipulation of syntagmatic structures. This then leads to further interpretation and interaction. As the interaction continues to develop over time, the experiential thread created by the continual looping of the functional cycle binds medium and umwelt together, each one influencing the other from moment to moment (Figure 5.6).

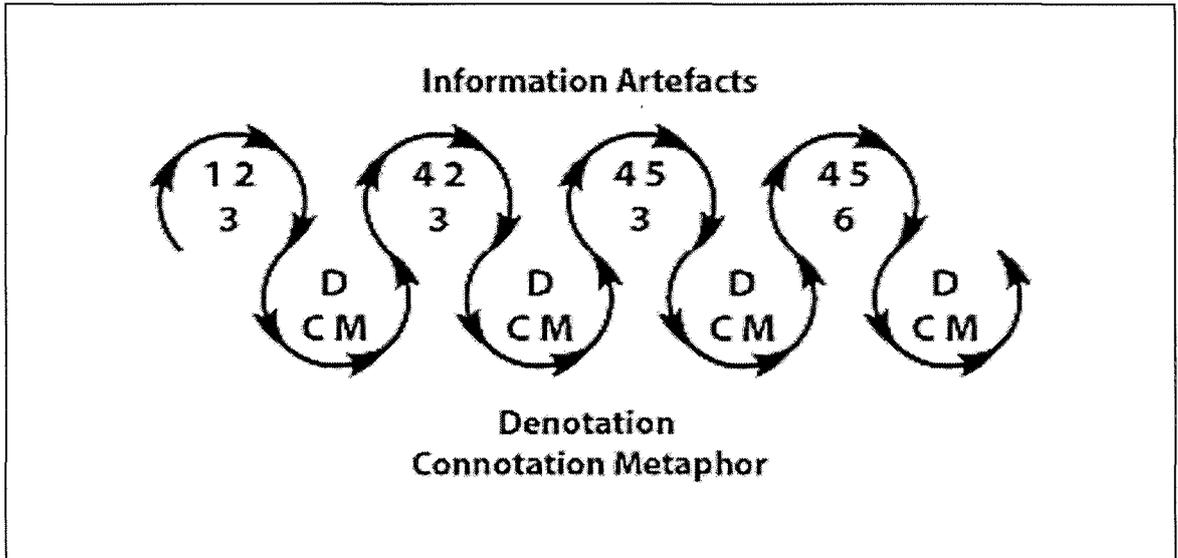


Figure 5.6 The functional cycle looping over time

#### 5.2.4 Denotation, Connotation and Metaphor in the Umwelt

The tight coupling of medium and Umwelt, created by the functional cycle of interpretive interaction, not only leads to denotative, connotative and metaphorical interpretations of new media, it demands them (Figure 5.7). Interaction is dependent on our interpretive capacity in order to continue. If the signs in the system are unknown (i.e. we cannot interpret them) then interaction breaks down. The different levels of denotative, connotative and metaphorical meaning made during an interaction not only lead to a different interpretations, but also to different interactive possibilities that change from moment to moment. This is a much more experimental/playful conception of interaction than Norman's goal driven approach.

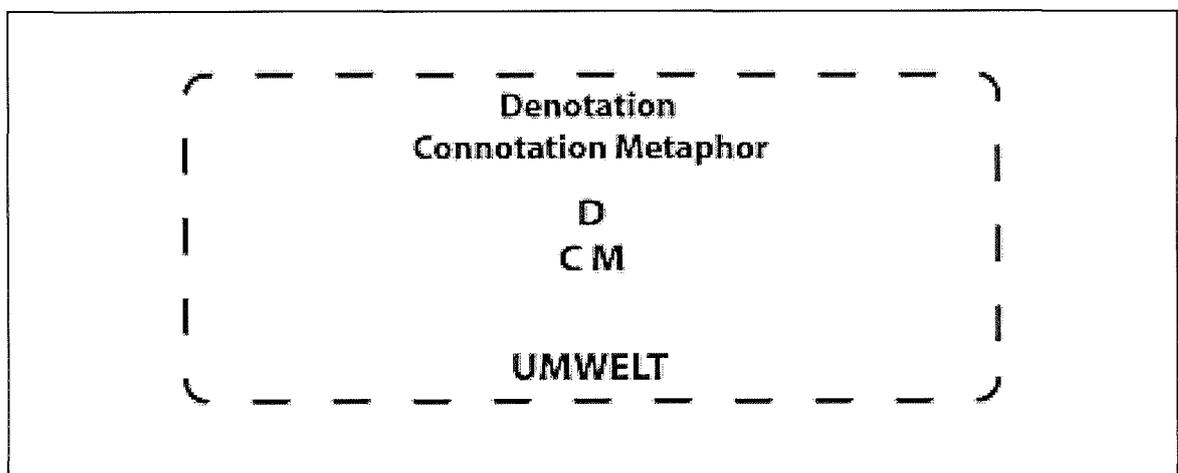


Figure 5.7 Denotation, Connotation and Metaphor in the Umwelt

### 5.2.5 Tying it all Together

The model (Figure 5.8) works like this: The functional cycle of an author/reader encounters and manipulates the ‘information artefacts’ of new media. This activity produces sequential and concurrent syntagms out of the paradigmatic structure of the system provided by the designer. In this sense, interaction is an interpretive process that occurs in the relationship between the encountered phenomena and the denotative, connotative and metaphorical meanings that occur in relation to the author/reader’s Umwelt. In other words, a semiotic model of interaction with new media describes a new media as a number of signs brought together by a designer to form a dynamic, paradigmatic text. This text is then interpreted and reinterpreted over and over by an author/reader, whereby the interpretation and manipulation of existing concurrent and sequential syntagms results in the reformulation of those syntagms and the production of meaning. The tight coupling of the new media signs and the contents of the author/reader’s Umwelt occurs as the functional cycle ties artefacts and interpretations together. Thus facilitating the continuum of the interaction itself. Inverting McLuhan, it could be said that ‘the messages have become the medium’ which are manipulated by author/readers, in order to produce the object of their interaction e.g. a piece of artwork, a selection of tunes on a media player or a new piece of software for somebody else to use.

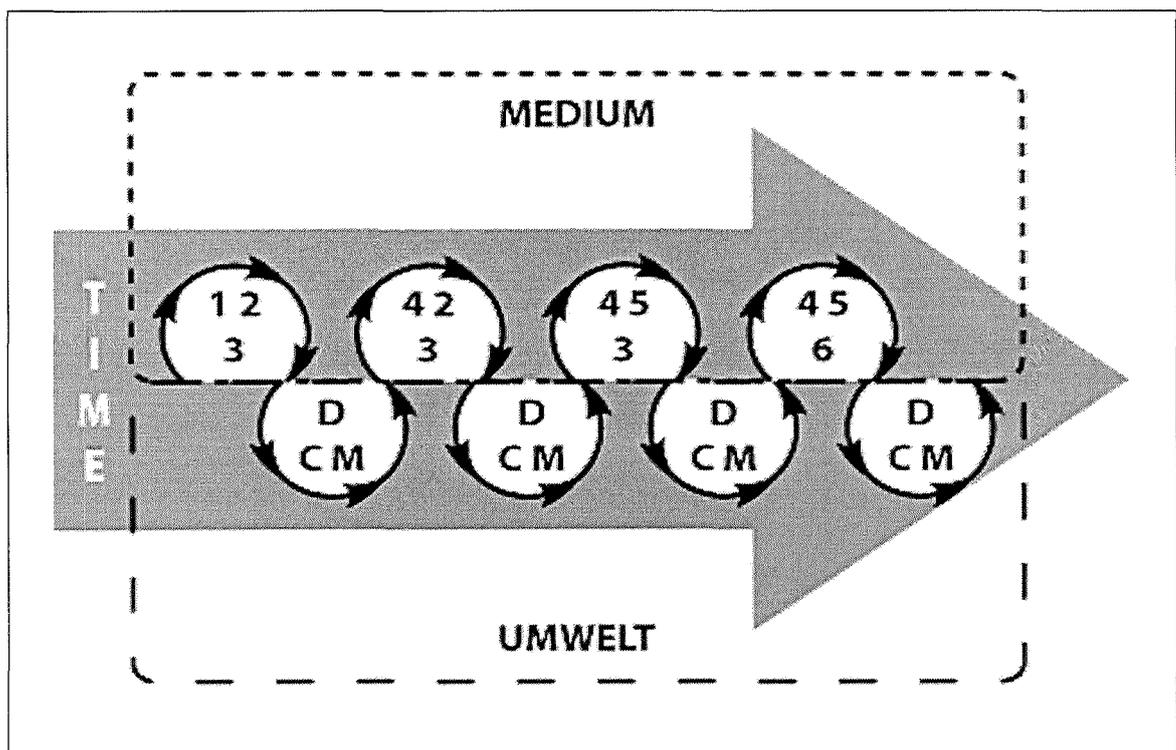


Figure 5.8 A semiotic model of interaction with a digital medium

### 5.3 Summary

At the beginning of this chapter, the second of the research questions that are central to this thesis was addressed in relation to developing a semiotic model of interaction with new media. In addressing this question, the relationship between semiotics and embodiment was explored. This exploration in turn focused on a reassessment of the semiotic theories of Jacob von Uexkull as a source for successfully resolving the problematic aspects of developing a semiotic model of interaction with new media. In this way, all of the identified problems have been offered a potential solution and an answer to the second research question has been provided, in the development of a semiotic model of interaction that is based on concepts derived from the review of theory provided in Chapters 2 and 3.

## 6 Methods

Now that a central theoretical position has been established with regard to developing a semiotics of new media, the third and final research question can be addressed:

**“Can the proposed semiotic theory be applied to the study of new media in order to identify the codes that users employ in understanding their interactions?”**

The key to answering this question is in the establishment, and subsequent application of appropriate methods of research that are based on the theories developed so far, with regard to the relationship between semiotics and embodiment discussed in Chapter 4. The inclusion of a phenomenological perspective offers methods that focus on gathering empirical data through observing user interactions, while semiotic theory offers the potentials of an analysis framework. As has already been discussed, the problem faced by any semiotic theory of new media is in understanding both the medium itself and user interpretations of that medium during interaction. It would then seem appropriate to establish an observational technique that concentrates on the users interpretations of media, while employing the semiotic model of interaction with new media as a framework for understanding the process that takes place during interaction. This has to be tackled through the development of a method that gathers data from a user perspective while taking into account the important aspects of semiotic theory.

### 6.1 Approaches to Data Gathering

In order to understand the process of meaning making during user interaction it is important to be able to probe individual users' experiences. While quantitative data gathering is not irrelevant in HCI research, the argument here is that a qualitative approach has a greater breadth and depth for grappling with a variety of subjective responses to interactive situations. Where quantitative approaches might be able to say something about how many people correctly identified certain signs in an interface or how quickly it took an individual to manipulate a certain sign while performing a task, it does nothing to illuminate the different types of signs that users experience during interaction nor capture anything about the meanings that those encounters have for users. Given that the proposed model (along with the argument put forward in Chapter

5) is based on qualitative aspects of semiotic theory, it seems only right to adopt a qualitative position in conducting research into a semiotics of new media that is, as Immay Holloway suggests: “a form of social enquiry that focuses on the way people interpret and make sense of their experiences and the world in which they live.” (Gittens, 1999).

### **6.1.1 Case Studies**

Case studies are based on an approach that is concerned with gathering empirical evidence about a particular phenomenon (individual, group, institution etc.) within the context of a particular situation (Robson, 2002, 177-185). Typically they involve the use of multiple methods of data collection, such as observation, interviews or questionnaires. Case studies generally have at least some theoretical underpinning but the structure of the study is dependent on how much. For example, case studies can be very flexible if the situation is novel and there is not much theory to go on, conversely they can be less flexible and aimed at establishing the confirmation of a theory. The criticism levelled at case studies centres around this central dichotomy. On the one hand, flexibility gives range to the data collection allowing the capture of many and diverse elements, however the more flexible the study the more data must be included in the selection and analysis process. A more structured case study avoids this problem but it also excludes the possibility of collecting what might prove to important extraneous data.

### **6.1.2 Ethnographic studies**

Ethnographic studies generally focus on establishing a description and interpretation of the culture and social structure of a particular social group (Robson, 2002, p186-190). Rooted in anthropology, ethnography generally involves a researcher becoming immersed in the everyday life of a particular community in order to describe in detail the culture of that particular social group. There are two particular strands to this approach (Silverman, 1993, p 47-58). The first is interactionist ethnography that typically involves the researcher in learning the everyday conceptions of a particular group and showing how meanings arise within this social context over a period of time. Taking the viewpoint of those studied, an attempt is made to develop a formal theory, which is grounded in first hand data (see grounded theory). The second is ethnomethodology where the focus of the study is in providing ‘thick description’ of the behaviours contexts, situations and meanings of a particular social group. Typically this

involves the same kind of immersion of the researcher as in ethnography. However, there is no attempt to theorise about what is observed, rather the focus is on establishing as clear a description as possible of what goes on in the studied group. A central feature of both approaches is that people are studied for long periods of time, possibly years, in their own natural environment. A particular aspect of this technique is participant observation, but other methods can also be used. The main strength of this approach is the production of descriptive data that is essentially free from any pre-conceived notions about the social situation. Criticism of this approach is derived from the concern that researchers may become over involved with the people being studied, e.g. 'going native' hence compromising the research.

### **6.1.3 Grounded theory studies**

Grounded theory is a particular version of ethnography where the main concern is to develop a theory of a social situation, which is 'grounded' in the data derived from the study (Strauss and Corbin, 1998; Robson, 2002, p190-193). This type of research is popular in many applied settings and novel areas of research where few theories are provided as a background. Grounded theory is both an approach to research and a particular systematic way of analysing data, which aims to ensure that theories are built from the ground up out of categories that are identified through an exhaustive analysis procedure. Interviews are commonly used to gather data but other methods are not excluded. Criticism of grounded theory is derived from the perspective that it is not possible to start a research study without some pre-existing theoretical assumptions and that it may be difficult to decide when emergent categories are saturated enough to provide a well established grounding for the accompanying theory.

## **6.2 Qualitative Data Gathering Methods**

Outlined below are brief descriptions of the four main types of research method that are used as data gathering techniques in the above qualitative approaches.

### **6.2.1 Observation**

Observation is used to gather first-hand information about social processes in a naturally occurring context. This involves taking field notes and keeping a record of events and occurrences as they happen during observation. Social science observation is about understanding the routine, mundane everyday activities of people rather than what appears to be exciting or out of the ordinary. It aims to help us understand what is going

on in particular contexts providing information about things that may effect the social situations at a mundane level, revealing the realities of what occurs in the day-to-day occurrences of social groups (Silverman, 1993, p31).

### **6.2.2 Interviews**

According to interactionist ethnography, interviewees are ‘subjects’ who actively experience and construct their social worlds. The most important aspect in studying these subjects is to generate data that provides a genuine insight into these people’s experiences. The main way to achieve this is with unstructured, open-ended interviews usually based upon prior, in depth observation (Silverman, 1993, p91). Open-ended interviews try to understand the meanings that participants attach to phenomena. Ethnomethodologists take the argument further, rarely using interview methods as a way of gathering data, preferring to concentrate on naturally occurring phenomena such as conversations that occur in a particular setting which are recorded at first hand.

### **6.2.3 Texts**

The sociological approach to analysing texts recognises that textual phenomena are always socially defined. Where texts are analysed, they are usually presented as ‘official’ or ‘common-sense’ versions of social phenomena that can be shown to hide underlying meanings through the process of analysis. (Silverman, 1993, p 59). Texts then are the province of hermeneutics and semiotics. Hermeneutics aims to establish the meaning of a text through an understanding of the translation of concepts from an older context into another newer one (Robson, 2002, p196). For example, in a court of law the wording of disputed title deeds or a will may need to be considered in both its original intended context and in the context of the situation in which it is contested. Hermeneutics explores the interpretations and reinterpretations of such texts. Similarly, and more importantly in the context of this thesis, so does semiotics. As has been outlined in much of this thesis so far semiotics treats texts as examples of organised groupings of signs that can be analysed at structural, semantic and social levels. In the context of this thesis semiotics is obviously the more important of the two.

### **6.2.4 Audio and Video Transcription**

The use of recorded data, both audio and video, has become an essential aid to combating the limitations of other qualitative data gathering approaches such as observation and field note taking. By enabling repeated and detailed examination of recorded events and interactions, the depth and accuracy of observations that can be

made is extended. The production and use of detailed transcripts are activities that involve carefully repeated listening to recordings, which often reveals further detail. Moreover, detailed transcripts of recorded data provide a useful tool in presenting details about the research process. The use of video in particular has become relevant in supporting the analysis of naturally occurring social action and interaction in HCI and complex organisational environments where the use of technology is being studied (Heath and vom Lehn, 1998; Heath and Luff, 1996; vom Lehn and Heath, 2002; Nielsen, Clemmensen and Yssing, 2002)

### **6.2.5 Multiple methods**

There is nothing to say that only one method must be used in an investigation (Robson, 2002, p 370). On the contrary, using multiple methods in parallel can offer substantial advantages, even although it is almost guaranteed to add to the length of the investigation period. One particular advantage of using multiple methods is in the reduction of ‘inappropriate certainty’. Where the use of a single method may seem to establish a relatively well-defined result, the use of multiple methods may highlight important conflicting data that calls this into question. Reassessment of the data in relation to multiple methods helps to identify a situation more clearly by including data that a single method may unavoidably exclude. This is known as ‘triangulation’, and provides strength in the form of results from different methods that corroborate each other’s findings.

## **6.3 Qualitative Methods Involving Semiotics**

### **6.3.1 Manning’s Semiotic Fieldwork Approach**

Peter Manning’s book “Semiotics and Field work” (Manning, 1987) is perhaps the only book in existence that considers the use of semiotics from a sociological data gathering perspective. Throughout the examples of the case studies and fieldwork involving real world social systems, from print workshops to police stations he gives a clear outline of his use of semiotics and observational methods in relation to capturing and understanding data about social and cultural codes. Pointing out that the universal nature of communication provides us with evidence of both the natural and cultural factors that encompass our lives Manning states that:

“By attending to the codes that order given domains within social groups, and the meanings and social and behavioural responses that are associated with such coding, a conceptual apparatus for the analysis of culture is created.” (Manning, 1987 p 35)

Essentially, Manning places semiotic analysis alongside other methods as a form of sociology. His semiotic analysis of the coding structures of social systems is offered as an alternative to the ethnographic approaches of other researchers in his field. Importantly, Manning argues that semiotics can be used directly as a data gathering and analytical tool if the focus of the study is the coding structures, messages and meanings that are particular to a specific research domain. In particular he states with regard to one of his studies that his aim is to:

“Determine through observation and interpretation how the messages were defined; what the organizations were viewed as doing with and to such messages; and how codes into which the messages were placed, the social organization of the various subsystems, and the technology employed affected the interpretation of the messages received.” (Manning, 1987 p 52)

### **6.3.2 The Advertising Approach**

David Mick’s approach to advertising research (Mick and Buhl, 1992; McQuarrie and Mick, 1996) as mentioned in Chapter 3, is perhaps one of the very few areas of research that focuses in a phenomenological way on end user interpretation of the sign systems used in advertising. While David Mick’s approach to research shows the successful combination of semiotic theory and phenomenological data gathering, neither of the studies cited seem entirely appropriate or practicable in relation to investigating the meaning making activities of users during interaction. While conducting interviews designed to probe the depths of participant’s Umwelts for life-themes etc. would undoubtedly provide a broad and interesting range of themes that could be used in analysis, it is doubtful that these themes would give any major insight into users meaning-making activities at the local level of interacting in real time with interactive systems. Similarly, an exploration of the rhetoric of system interfaces in relation to user comprehension, although interesting would require the construction of specific test situations or experiments that is not the premise of this investigation.

### **6.3.3 The SERG Approach**

As a semiotically informed research technique, the work of the Semiotic Engineering Group (SERG) appears to be the most relevant in relation to a semiotic approach to fieldwork. Their concern with usability and system communicability (De Souza et al 2000, 2001; Barbosa et al 1999; Prates 2000) is based upon talk-aloud protocols that are

well established within HCI research (Wright and Monk, 1990; Nielsen, Clemmensen & Yssing, 2002), as such provides a well-established framework for conducting observational experiments that support a semiotic viewpoint.

SERG have concentrated their efforts largely on ‘one to one’ interface interactions, which focus on the communicability of the interface in order to establish usability problems. The method that they use consists of three main parts:

- Tagging, SERG use the Lotus ScreenCam software to capture movies of user interactions with the software they are testing. The user utterances are then correlated through a predefined set of ‘Tags’ with the actions that occur at the interface. A form of constrained talk-aloud technique.
- Interpretation, This process links the Tagged data from the movies to a set of standard HCI problems or design guidelines highlighting areas of breakdown.
- Semiotic Profiling, Profiling consists of interpreting the messages that occur around these breakdown areas in order to establish the original designer-to-user message in the interface, hence uncovering usability problems.

While the SERG approach is an entirely relevant and proven semiotic data gathering technique, it does however come with its own peculiar problems when considered in relation to the approach proposed here. Firstly, the use of Screen Cam is not always an entirely appropriate or manageable solution in the fieldwork situation. A better and more flexible solution is the use of a hand held video camera to allow access to different work environments, including those without computers (Silverman, 1993; Lindlof, 1995). Secondly, aspects of the Tagging system and the usability focus of the SERG experiments are not suited to the exploration of the proposed model. Neither is the lack of information on the exact nature of the semiotic profiling section of the SERG approach.

#### **6.3.4 Other approaches exploring semiotics and metaphor in HCI**

Manuel Imaz’s thesis “Applying Experientialism to HCI Methods” (Imaz, 2001) takes an experiential (embodied) approach towards understanding the use of metaphor in HCI. More importantly, drawing heavily on the work of Lakoff and Johnson, as well as the work of Fauconier and Turner, Imaz examines the figurative underpinnings of HCI and software engineering language. From a detailed examination of the major ideas

behind metaphor theory and conceptual integration, Imaz promotes the use of ‘Blends’ in designing interfaces as a formalised activity, opposed to the more usual hidden processes of design that follow similar creative principles.

Imaz identifies from an embodied perspective, that the underlying concepts used in HCI and software engineering can always be retraced and grounded in the types of schemas identified by Lakoff and Johnson (see Chapter 4). Imaz suggests that understanding metaphor and conceptual blending is imperative for building successful interfaces because of the fundamental part that metaphor plays in human cognition according to the experiential position.

Chris Condon’s Thesis “A Semiotic approach to the use of Metaphor in Human Computer Interaction” (1999) reaches similar conclusions to Imaz. Like Imaz, Condon focuses on the use of metaphor in user interfaces, also drawing on the work of Lakoff and Johnson. Condon however does not take a strictly experiential viewpoint, favouring instead to ground his approach in a semiotic perspective. In such a way, Condon explores the ubiquitous nature of metaphor in HCI language, showing that metaphor is everywhere in HCI, from command line prompts to interface metaphors like the desktop. His results also point towards the importance of understanding the nature of metaphor in relation to designing user interfaces.

Indeed with this in mind, Condon proposes the development of semiotic model of HCI that is similarly based on much of the theory presented in chapter two of this thesis. However, unlike this thesis Condon does not attempt to develop a semiotic model of interaction with new media that is grounded in both semiotics and theories of embodiment. Instead, Condon identifies that the acts of interpretation performed by users during interaction result in many layers of meaning or signification. A key aspect of this process that Condon identifies is the process of semiosis that allows connotations and metaphors to occur in relation to denotative encounters with signs. Condon develops an approach to studying the semiotics of HCI that adopts an open-ended interview technique to explore users interpretations of simple interface elements. Thus Condon deals with the problem, also identified in this thesis, of the weakness of semiotic theory in analysing interfaces from a first person expert perspective, by focusing on users interpretations.

Another approach, which takes into account the importance of metaphor in relation to understanding HCI, is that of Dag Svanaes. Svanaes's Book "Understanding Interactivity" (In Press) takes a specifically phenomenological standpoint towards analysing user interactions with interactive systems. Part of his method, explicitly explores Lakoff and Johnson's metaphor theories in relation to interactions with simple interface elements. Svanaes uses grounded theory to identify instances of metaphorical understanding in the talk-aloud utterances of users interacting with his simple experimental system. Svanaes then identifies some of the essential underlying concepts that users employ in understanding simple interactive interfaces. While this type of approach provides a neat way of getting at user conceptions on interaction, the experimental site and simplicity of Svanaes's system offers little explanation of how metaphor works during interactions with complex systems. However, like both Imaz and Condon, Svanaes acknowledges the importance of metaphor as an underlying cognitive aspect of users mind.

#### **6.4 Establishing a research strategy**

Given the arguments proposed in Chapter 5, regarding the relationship between semiotics and embodiment, along with the background of methodological approaches outlined here, it seems entirely reasonable to present a research strategy that uses a number of methods that are informed by both traditional qualitative data gathering techniques and semiotic theory. To this end, it is proposed that two separate studies be conducted to explore interactions with the two main types of new media i.e. Hypermedia and Immediacy. The method of study is then used to explore the adequacy of the semiotic theory in explaining interactions with new media, as well as answering the third and final research question. The table below provides a matrix of the relationships between these studies, their subjects, methods and their aims.

Name	Media Type	Participant	Method	Aim
Study 1: Art/ Photoshop (Chap 7)	Hypermediacy	3 Users	Video observation and Think-aloud protocols. Semiotically informed analysis	To establish how users make sense of interacting with media that promote hypermediacy. Which aspects of the model apply. Uncovering codes.
Study 2: The Botanic Garden (Chap 8)	Immediacy	8 Users	Video observation and Open-ended interviews. Semiotically informed analysis	To establish how users make sense of interacting with media that promote immediacy. Which aspects of the model apply. Uncovering codes.

Table 6.1 Empirical work presented in this thesis

#### 6.4.1 Study 1: Interacting with the Hypermediacy of Photoshop

This study explores the interactions of three expert users of creative media. The first participant is a painter working in his studio. Research here aims to capture data about the process of how he interacts with, and makes meanings from, the elements of his medium while he paints. The other two participants use Photoshop on a daily basis to create graphic designs and artwork for print and interactive media respectively. The aim of investigation here is again to gather data about their working processes of interaction with their chosen medium, paying particular attention to the meanings that they make as they interact. A key element to this study, is the relationship between new and old media in the comparison between the painter and the Photoshop users.

The method employed is that of a talk-aloud protocol, in conjunction with the video capture of interaction. The videos are watched repeatedly and a transcription is made of the participants' utterances. Semiotic analysis is then employed in the form of denotative, connotative and metaphorical coding, in order to identify the codes that all three users employ in understanding their interactions with media. The findings are then discussed in relation to the proposed semiotic model of interaction and how effectively it describes interaction with this kind of media.

### 6.4.2 Study 2: Interacting with the Immediacy of Virtual Environments

The third study moves the site of investigation away from hypermedia type interfaces and into the immediacy of virtual environments. The purpose of the study here, is to explore the proposed model in relation to media that promote immediacy. The study is conducted in conjunction with the BENOGO project, which is a European funded research project that is concerned with developing novel Image Based Rendering (IBR) technology.

A talk-aloud interview is conducted where eight participants are each individually immersed in a virtually rendered photo realistic world over a period of 15 minutes. They are each asked four open-ended questions and video capture equipment is used to record what they say, as well as what they see. The videos are watched repeatedly and a transcription is produced of the participants' responses to the questions. Semiotic analysis is used to identify the denotative, connotative and metaphorical aspects of the participants' responses to the questions. The results are then discussed in relation to the proposed model of interaction, exploring how well the model explains interaction with this type of media.

### 6.4.3 Guiding the Research

Based on the evaluation principles of the researchers outlined above, particularly the work of Manning, Imaz, Condon and Svanaes, a subset of three questions have been devised to guide the practical research in all of these studies, helping to examine the effectiveness of the model and answer the research question proposed at the beginning of this chapter. They are:

- **“What kind of signs do users encounter?”** What kind of signs do users encounter in interactive systems? In what way are they encountered and how do the users define them? Is there any evidence for the existence of specific types of information artefacts in the experience of users?
- **“What do users do with these signs?”** During interaction, what do users do with the signs that they encounter, how do they manipulate them? Is there any evidence for the sequential and concurrent organisation of signs into syntagms and chains as suggested by Andersen?
- **“How do users interpret these signs during interaction?”** What kind of meanings arise as users interact with the system? Is there any evidence for the

existence of Umwelt playing a part in the interactive process? If so, how does it manifest itself? Of particular importance, is the way in which users attribute meanings to the signs that they encounter, that contribute to the flow of interaction.

These three questions are considered in each study and are designed to address the issues of appropriateness of all the components in the proposed model. The aim is to provide verification of their suitability for inclusion in a semiotics of new media. Moreover, the focus that these three questions provide helps to establish an answer to the question of identifying user codes during interaction.

## **6.5 Analysis and Coding**

In both studies, analysis aims to uncover the existence of denotative, connotative and metaphorical types of meaning during interactions. The purpose of this is to show what those types of meanings are and what they say about the kind of interactions that people are engaged in. Below is an explanation of how denotations, connotation and metaphors were identified and applied during the analysis. An important aspect of this approach is to also consider what emerges from this level of analysis as sub codes, or themes, related to these groups. In this way, a grounded theory is developed, where the codes that emerge during the analysis are seen to be the underlying concepts or codes that users employ to understand their interactions with new media. It must also be borne in mind, that while the analysis focuses on user utterances transcribed from video observations, it does not concentrate on these exclusively. The video footage itself provides evidence of interactions with the medium and the utterances provide an insight into users interpretations of those interactions. There is not one without the other. Thus, denotative, connotative and metaphorical coding is based on understanding the relationship between the two.

### **6.5.1 Denotative Coding**

Denotative codes are identified by considering user utterances that refer to the simple signs/artefacts or things in the environment that participants are concerned with using. Put simply, denotations are coded as such, when utterances refer to things that users encounter that can also be clearly observed in the video footage. For example (Table

6.2), when Owen talks about things such as brushes, paint, colour etc. that can be clearly seen in the video footage (see Chapter 7).

<b>Code</b>	<b>Example</b>
Brushes	"I'm going to use a small brush now."  "I'm just cleaning this brush, looking around to see, I've kind of run out of clean brushes."

**Table 6.2 An example of denotative coding from study 1**

### 6.5.2 Connotative Coding

At the level above denotative coding comes connotative coding. Contrary to denotative codes, connotative codes are directly derived from what the participants say about the things in their environment that are not identifiable in the video. That is to say, that connotative codes are based on the visible aspects of denotative elements in the video footage, but which have some other level of meaning attached to them that is only made available by the users utterances. For example, (Table 6.3) when Owen talks of the time of day in his painting, he is talking about the connotative nature of his artwork. In this way, connotative coding attempts to identify some of the cultural meanings that users refer to while interacting with media.

<b>Code</b>	<b>Example</b>
Time of day	"It's kind of, not necessarily intentionally, the colours that I'm using and the way that I'm painting it is making it seem like it's a certain time of day... early morning or just as its about to get dark."

**Table 6.3 An example of connotative coding from study 1**

### 6.5.3 Metaphorical Coding

Like connotative coding, metaphorical coding works on a level above denotation. Therefore, there is always some denotative element at it's root in the video footage. However, metaphorical codes emerge from the analysis of utterances that exhibit phrases that liken the interaction domain to some other external domain, referenced by the user to make sense of the immediate situation. The difficulty in analysing this type of data, comes from the need to develop a feel for the participants way of interacting and to understand the metaphors that are often already at play in interfaces as digitally

abstracted artefacts, e.g. the desk top interface metaphors. All references to digitally abstracted concepts, or external frames of reference, are thus coded as metaphorical following the examples set by Imaz and Svanaes. For example, (Table 6.4) when Diarmid continually refers to an inanimate aspect of his artwork as ‘he’, he is referencing an external concept of male personification.

Code	Example
Personification	<p>“So he’s still there but he’s not got that sort of natural light shadow coming round here so I want to recreate that and just take him right back.”</p> <p>“And then I can sort of numb it down a bit.”</p>

**Table 6.4 An example of metaphorical coding from study 1**

## 6.6 Reliability and Validity

The issue of reliability and validity in qualitative research is an area of much debate (Silverman, 1993, p 153-156). In scientific research, following the objectivist tradition, reliability is based on the stability of the observations made, i.e. whether the application of the research instrument was rigorous enough or not. Reliability then, is threatened by the inconsistencies that may occur in the way a study was conducted. Running parallel to these concerns, are those of validity. Validity is about what an observation shows, i.e. whether the research instrument is accurate enough to be considered as reporting truthfully about the object of interest. Put simply, these traditional assumptions about reliability and validity are not easily applicable to qualitative research that is based on the interpretative activities of a researcher-as-instrument (Lindlof, 1995, p 237).

Qualitative research is essentially based on the notion that the object of observation, particularly in relation to action and interaction within social settings and culture as a whole, are constantly changing. Qualitative research then faces the problem of attempting to address the question of reliability and validity while refusing to adopt an inappropriate traditional objectivist stance. To this end, qualitative research requires the collection of data in a reliable and dependable fashion, that is founded on the application of appropriate methods to the situation, in a consistent and effective manner. Similarly, validity is sought in achieving plausible interpretations of the data through a

sensitive analysis that maintains an awareness of the many possible interpretations that might be applicable.

### **6.6.1 Reliability in the proposed studies**

In relation to the studies outlined above, reliability has been sought by organising the studies in a number of ways:

- While maintaining the focus of the research questions in examining the hypothesis offered by a semiotic model of interaction with new media, the site of exploration has been moved across two different media types to establish the effectiveness of the model in relation to each area.
- While maintaining the focus of the research questions in examining the hypothesis offered by a semiotic model of interaction with new media, different methods have been used in different situations. Study 1 employs talk-aloud video observation protocols, whereas Study 2 employs open-ended interview video observation protocols.
- Examples of utterances from transcripts have been provided within the studies to back up the coding structure where appropriate. Full transcripts and lists of codes have been provided in the appendices.

### **6.6.2 Validity in the proposed studies**

Each study maintains a semiotically informed grounded method in an attempt to identify specific groups of codes in relation to the denotative, connotative and metaphorical aspects of the model, i.e. codes sometimes shift from one type to another throughout the coding process until all utterances have been accounted for. Where deviations occur, the coding structure is modified to accommodate them (Silverman, 1993, p 160- 162) (Lindlof, 1995, p 240). Each study also employs the use of simple counting methods in establishing the range and frequency of elements that are used to identify users codes in relation to their interactions (Silverman, 1993, p162-164) (see chapters 7 and 8). A detailed analysis and discussion is given in each study regarding the findings and the consequences for the proposed model.

## 6.7 Summary

In concentrating on gathering and analysing data, in the way outlined in this chapter, it is proposed that evidence will be found to support the model proposed in chapter 5 and answer the last remaining research question. The end result is a robust semiotic model of new media that takes into account both the importance of the user and the various elements of media that have been identified under the broad categories of both hypermediacy and immediacy. Along with this, the evaluation criteria that have been used to explore these theories can at least be considered as the basis of a semiotically informed technique, which can be used as a method for evaluating interaction with new media technology.

# 7 Interacting with the Hypermedia of Photoshop

Having now established that the concepts integrated into the proposed semiotic model of new media do appear to be relevant for new media devices, it is important to continue from the previous studies explained in Chapter 6. The focus of study here remains an exploration of the proposed model but with one crucial difference. The method used focuses on participant's interpretations rather than those of a single researcher.

## 7.1 Outline

The studies presented here are devised to explore participants meaning making activities while interacting with media that promote hypermediacy. There is a phenomenological basis to the studies involving talk-aloud protocols and the video taping of interactions, as explained in Chapter 5. The aim of the studies is to further identify the relevance of semiotic concepts in the proposed model. In particular the focus of these studies concentrates on the meaning making activities of participants, attempting to relate the signs they encounter to the types of meaning that they make through interaction. A core aspect of this approach is based on the theories of Barthes and Hjelmslev (see Chapter 2), where three types of interrelated meanings are considered: denotation, connotation and metaphor. The primary focus of this study is then to address the final research question:

**“Can the proposed semiotic theory of new media be applied to the study of interactions with media that promote both hypermedia and immediacy, in order to identify the codes that users employ in understanding new media?”**

As participant's interpretations are the focus of this study, the denotations, connotations and metaphors that are identified should be considered as examples of the codes that they employ while interacting with new media. Thus providing insight into participant's Umwelts and a partial answer to the research question concerning hypermedia.

A very small number of participants are used, as the phenomenological aspects of the data gathering and the subsequent detailed analysis are extremely resource consuming activities. As a consequence of this, the findings are in no way statistically significant. However, instances of coding have been counted in order to give an indication of the recurrent themes of meanings (user codes) that appear throughout the studies. The numbers associated with this constitute nothing other than an indication of possible trends in the data. Also, each study of each participant is based on the observation of entirely different situations. As a result, individual differences are inevitable in this type of study. Of course it is expected that each participant, in each situation, will bring his/her own interpretation to the interaction. This is the nature of the Umwelt. It is not a concern of this study to compare the interpretations of participants in different situations but to show that the methods employed in relation to the model can identify types of meaning making activity in the form of denotations, connotations and metaphors across varied situations.

### **7.2 Participants**

There are three individual participants who took part in three separate studies at different times in different places. Owen is a painter. The first study took place in his studio recording his interactions while he painted a picture. The second study took place in Dave's office where he works as a new media designer. It focused on his use of Photoshop software to make images for a project. Similarly the third study records Diarmid, who is a graphic designer, also using Photoshop. This study took place in his design studio. All participants are male. All of them volunteered to take part in the studies. None of them were paid.

In selecting participants it was considered that novice users of technology would struggle with manipulating the medium. While this might highlight issues of usability, as SERG have considered, it would inevitably concentrate on the break downs in meaning making not on the continued process and sequential aspects. It was therefore considered important to focus on expert users actively working with their media on a day to day basis, highlighting the meaning making processes involved in working with both old and new media.

### 7.3 Equipment

Given the broad range of the studies and the different locations, it was not possible to use software capture devices such as 'ScreenCam' (as used by SERG). Instead a video camera and a tripod were used to record a screen view over the shoulder of the participants. A similar set up was devised in Owen's studio to take in the whole of his working space. Video was chosen in line with the talk-aloud protocols because it could capture sound and vision at the same time, which allows for accurate analysis.

### 7.4 Procedure

The video camera was set up in a place near the participant but far enough away as to not intrude directly on his working processes. Preliminary footage was recorded and observed briefly by the researcher to identify the best position for observation. The participant was then asked to talk-aloud as he worked through a 'job' as he normally would do. Generally around half an hour of activity was taped. Some prompting was necessary when participants became quiet, but generally participants talked-aloud quite comfortably. When the job was finished the recording stopped and the study was ended.

### 7.5 Logging and Analysing the Video

The video was observed a number of times to establish a 'feel' for the activities that the participant was performing and for the types of phenomena that were apparent in the environment. During this process, observations were made and logged about the types of activities that occurred at different times and about the information artefacts available to the participant during the interaction (Figure 7.1).

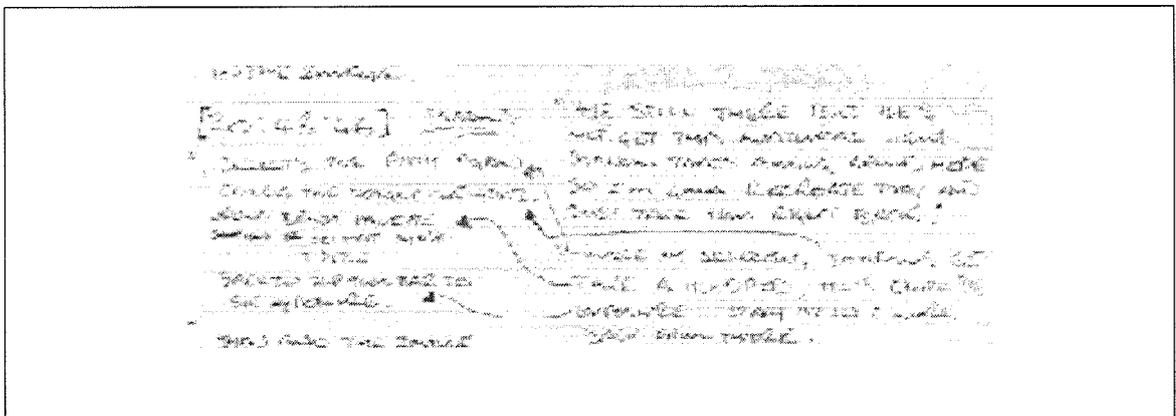


Figure 7.1 Section of initial video observation notes for Diarmid

Subsequently it became apparent that the participants were interacting within what can be described as three distinct 'zones' of activity:

- Zone 1(Reflection), which is a zone where participants move away from the object they are working on and activity ceases
- Zone 2 (Organization), which is where a great deal of activity occurs in relation to manipulating aspects of the medium in an organizational way e.g. changing or washing brushes, mixing paint or changing the parameters in a Photoshop colour palette.
- Zone 3 (Production), which is where participants are fully engaged in working through the medium to produce some sort of artefact, i.e. actually putting brush to canvas or using Photoshop tools to make marks on screen.

These zones are discussed in detail throughout this chapter, as they are a key part of the findings from this study. Suffice to say that the emergent zones played a key role in structuring the analysis, as it was possible from the video to brake down the interaction into discrete time periods where activities took place in these different zones.

After this key phase of the analysis was completed, a continual segment of interaction was identified to allow for very detailed analysis this was usually around 15-20 minutes long. A transcription of the participants' utterances from the video recording was made alongside the discrete timed zones of activity. Different utterances thus took place during different activities in different zones (see Appendix A).

### 7.5.1 Coding

A detailed analysis of the utterances that were transcribed from the video was performed using Atlas TI (trademark software), which is specifically designed for analysing qualitative data (see Appendix B). The transcripts were firstly coded into the emergent zones where they occurred in relation to observations from the video, i.e. chunks of time apportioned to zones 1,2 and 3. An iterative process of coding was then used to code at ground level to establish names for codes appropriate for describing the participants' utterances, i.e. what they were referring to. Then they were coded as denotative if they referred to some visible sign in the participants environment, connotative if they referred to additional meanings not visible but related to visible signs and metaphorical if they showed underlying meanings from different domains as

described in section 5.5. This iterative process moved back and forth between the emergent codes and the semiotic codes. The process took several passes through the data over several weeks. The key factor in this analysis was establishing which zone the utterance took place in, the name of the emergent code derived from what the utterance referred to and whether or not the utterance was denotative, connotative, metaphorical or any combination of these types of meaning. The process continued time after time until the coding possibilities in the transcript were exhausted, becoming stable both at ground level and amongst the semiotic codes. This was not always an easy process as some of the utterances carried multiple meanings, which made it difficult to classify them successfully.

### **7.5.2 Range and Frequency**

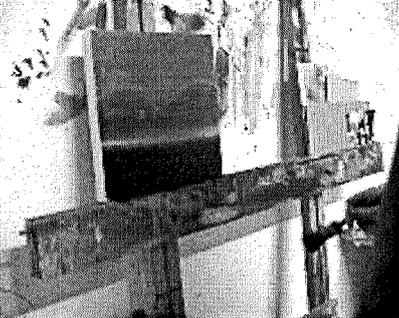
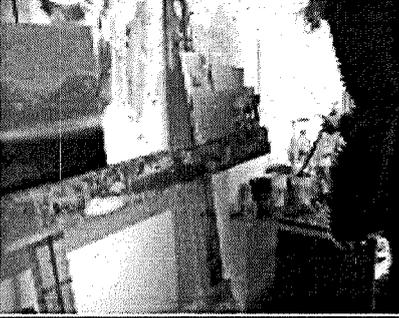
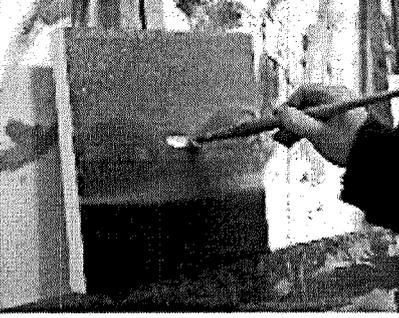
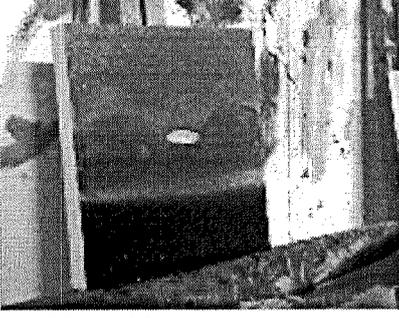
Within each zone of activity the meanings that arise have to be considered in terms of their recurrence over time. Indeed the temporal aspects of meaning making are vital to interaction and the analysis of this is developed in two ways. Firstly, analysis is considered directly in relation to the sequence of events in the video and the meanings made during interaction. This highlights the understanding and manipulation of concurrent and sequential syntagms as a core aspect of the interactive process. Secondly, the temporal coding graphs show the sequences of activities in different zones at different times. However, with the emergence of the different zones of activity comes the question of what types of meaning are active within these different zones and which ones occur time and again. With this in mind, an analysis of the frequency of coding in relation to the number of utterances in specific zones reveals the most prominent aspects of a range of meanings that an individual might have within a specific activity zone. That is to say, that the focus here is on establishing if certain types of activity emerging as zones of reflection, organisation and production are associated more or less with any particular type of meaning e.g. denotative, connotative or metaphorical.

## 7.6 Participant 1 :Owen

Owen is a painter. That is, he is a traditional artist who paints with oils on canvas. Unlike the other two studies this one involved no computer whatsoever as it focused on the activities that Owen performed in his studio whilst painting. Owen started from scratch on a brand new pre-primed canvas. Starting with a medium brush he put some turpentine on the canvas and then turned it upside down to evenly wet the surface. Taking a large brush, Owen then applied some blue paint straight from the palette onto the canvas. He then applied some green in the same fashion with the same brush. Owen then cleaned and dried his brush. Working from a sketch Owen painted two dark shapes at either side of the canvas between the blue and green strips. He then painted in some darker foreground colour, followed by lighter colour in the middle of the painting. His initial intention here was to paint the sea but as his brush touched the canvas he changed direction and painted the sky instead. Using a smaller brush, he then painted in some detail, such as making the horizon line obvious and turning the two dark shapes into what looked like islands. Throughout the painting process Owen held a selection of brushes in his right hand. Each one had a different purpose and they were often used in quick succession as he painted. He also used his fingers from time to time for an unpredictable smudging effect. He often mixed paint on the palette but preferred to paint pure colour straight onto the canvas 'wet on wet' to produce the effects he was after.

In Owen's case it became apparent that his studio environment included an easel, a canvas, a workbench, a mixing palette, paint, turpentine, various pots/cups and a selection of differently sized brushes. While he was painting, he interacted with these various artefacts in different ways. Often he would mix paint, apply paint, clean his brushes, change brushes and stand back and observe his work. A lot of these activities occurred in quick succession but the logging of the videotape allowed for these discrete activities to be captured (Table 7.1).

7.6.1 Observing the Video

Screen	Description	Speech
<p>00</p> 	<p>Canvas blocked in, Owen has brush in hand</p>	<p><b>Me</b>-Why are you using this brush?</p> <p>erm well, I want to use this to get some purer, lighter pigments, and this brush just gives me a straighter edge, a straighter line.</p>
<p>00:00:15:45</p> 	<p>Owen mixes paint off camera</p>	<p>Just going to use some pure... some white with a little bit of yellow mixed in with it.</p>
<p>00:00:25:13</p> 	<p>Owen starts painting directly in the middle of the canvas.</p>	<p>And eh?... Yeh</p>
<p>00:00:32:22</p> 	<p>He stops and steps back and then starts painting above the middle to the left (the sky).</p>	<p>I was initially going to use it to paint the sea but I'm actually going to use it instead to paint the sky.</p>
<p>00:00:34:22</p> 		

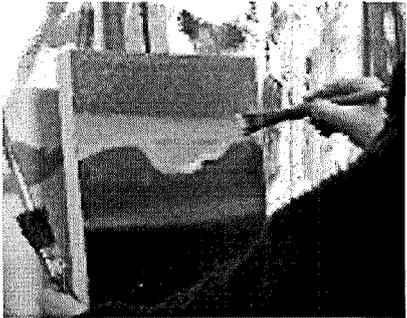
	<p>Owen uses broad strokes to apply the white paint</p>	<p><b>Me</b>-So what are you actually doing here?</p> <p>I'm just blocking in, just giving some definition to the... I'm actually painting some islands again, so I'm just giving some definition to the islands.</p>
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Table 7.1 Logged and coded Transcript of Owen's utterances

In the extract shown above (see Appendix A for full transcript and coding) it is possible to see how signs and artefacts are manipulated, arranged and rearranged into concurrent and sequential forms that affect the meaning making process throughout the interaction. For example, the sequence of events where Owen loads his brush to paint the sea is affected by the concurrent relationships between what has already been painted and the colour being applied to the canvas. In relation to what is already there, Owen decides that the colour he has chosen is better suited to painting the sky than the sea. Meanings occur and decisions are made based on the relationships of artefacts that are arranged concurrently and sequentially as Owen interacts. Owen constructs sequential syntagms from the concurrent possibilities displayed in his environment. Taking a brush and mixing two colours of paint produces a new set of concurrent possibilities depending on the colour of paint in relation to the painting. Similarly, when he paints a straight line he uses a small brush and a straight edge because he knows that this particular structural combination will yield the result he is looking for in relation to the marks he has already made on the canvas.

### 7.6.2 Coding the Zones

As outlined at the beginning of this chapter, what emerges from observing and logging the videos of all of the participants of is a group of 'zones' where different kinds of activity takes place. In Owens case:

- Zone 1 (reflection) is where Owen steps away from the canvas and away from the worktop where his utensils are. In this zone Owen's activities are predominantly concerned with observing the canvas that he is working on.

- Zone 2 (organisation) is where Owen interacts with his medium. Here he is often at the workbench mixing paint, cleaning his brushes or changing his utensils preparing for his painting activities.
- Zone 3 (Production) is where Owen is right in front of the canvas. Here he is working on the painting. He is using his tools to produce a piece of work.

Looking at the sequence of his working pattern, Owen spends approximately 51% of his time in zone 3, which is 51% of his time actually spent painting. He then spends 26% of his time in zone 1 stepping back from, and considering, his work at a distance. Activities in zone 2 take up 23% of his time.

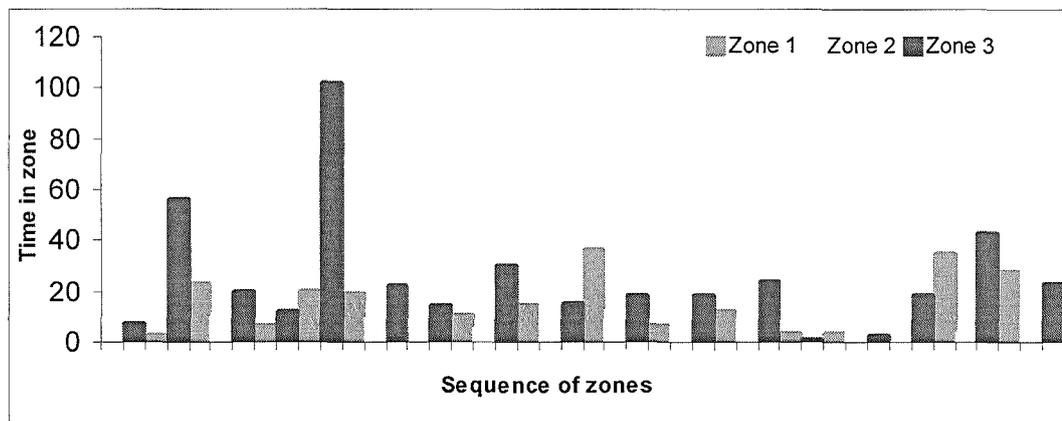


Table 7.2 Owen's zone/time chart

The time chart above (Table 7.2) shows the sequence of progress from zone to zone and the amount of time spent in each zone. Time is measured on the Y-axis, in seconds, and the sequence of zones is plotted on the X-axis. In one section Owen moves in blocks between zones 1 and 3, then he moves between zones 2 and 3. After this he moves through each zone in succession for quite a period of time. This shows that early on he is working at the canvas and then stepping back to observe his work, then working again. In the second section he is priming his tools, then working, then priming his tools and working again. Lastly, during the main section of his interaction he is moving from contemplating the picture to priming his tools to working on the picture in a circular fashion.

### 7.6.3 Coding the Utterances

Below are tables showing the codes that emerged out of analysing the transcript. They are organised by the type of meaning that they represent and alongside are examples of the utterances that support the identity of the codes themselves. Appendix B should be consulted to see further evidence of the coding structures taken directly from the Atlas Ti software.

#### 7.6.3.1 Denotative Codes

Code	Example
Brushes	<p>"I'm going to use a small brush now."</p> <p>"I'm just cleaning this brush, looking around to see, I've kind of run out of clean brushes."</p>
Colour	<p>"I'm gonna bring some lighter colours into it."</p> <p>"So I'm gonna mix some ultra marine with some white."</p>
Fingers	<p>"I'll use my fingers to put a bit of paint on it. Just trying to use something other than a brush at the moment."</p> <p>"Just you get a different effect almost less controllable in a way. You know what effect you are going to get with a brush, you start introducing your fingers and cloths etc and you get a less predictable effect."</p>
Lines	<p>"I'm going to try and straighten up this line a bit."</p> <p>"I'm going to use this wee brush again because it's just going to be a thin line, need a bit of control. I'm actually going to use the straight edge again. Have to find a bit that's not already painted."</p>
Sketch	<p>"Right... I'm just referring to the sketch there and I'm going to change this a bit. Try and alter the composition a wee bit."</p>
Straight edge	<p>"I'm not getting the effect that I need here so I'm going to use a straight edge to do it."</p> <p>"I'm going to use this wee brush again because it's just going to be a thin line, need a bit of control. I'm actually going to use the straight edge again. Have to find a bit that's not already painted."</p>
Paint	<p>"erm well, I want to use this to get some purer, lighter pigments, and this brush just gives me a straighter edge, a straighter line."</p> <p>"The paint is all gathering round the side there; I don't particularly want that to happen."</p>
Tone	<p>"I think its dark enough. I want to bring a bit more light colour into it. In the form of, although it</p>

doesn't make perfect sense, but I want there to be a bright line here of like some kind of light whether its moonlight or sun or whatever."

"Just deciding what colour I want now.. Orange, I quite fancy orange.-Why orange. There's no orange in the painting and I feel like I need a bit of contrast."

### 7.6.3.2 Connotative Codes

<b>Code</b>	<b>Example</b>
Horizon	"There was some of that red left on the brush from blurring in that horizon line."
Islands	"I think I want to give the idea that this island is in front of this one, so I'm going to introduce some colour into that as well."  "I'm actually painting some islands again, so I'm just giving some definition to the islands."
Moonlight/ sunlight	"I think its dark enough. I want to bring a bit more light colour into it. In the form of, although it doesn't make perfect sense, but I want there to be a bright line here of like some kind of light whether its moonlight or sun or whatever."
Sea	"I want a different colour for the sea."  "I was initially going to use it to paint the sea but I'm actually going to use it instead to paint the sky."
Sky	"I'm going to start working on the sky."  "I'm wanting to bring some lighter colour into the sky."
Time of day	"It's kind of, not necessarily intentionally, the colours that I'm using and the way that I'm painting it is making it seem like it's a certain time of day.. early morning or just as its about to get dark."

### 7.6.3.3 Metaphorical Codes

<b>Code</b>	<b>Example</b>
A painting is a container	"I'm gonna bring some lighter colours into it."  "I'm just blocking in, just giving some definition to the..."
A painting is a living thing	"The paint is all gathering round the side there; I don't particularly want that to happen."  "It wasn't necessarily an intentional decision. It's the colours, and the way I'm painting that is dictating that."
Certainty is death	"It's not what I was expecting but I quite like it. I'm not dead certain about this composition but I'm going to carry on with it for the time being."
Composing is touching	"Just painting bands of colour at the moment, probably break up the horizontal composition with some verticals but I dunno, I quite like that."

- "I'm still keeping this fairly loose; I'm not putting any definition into islands or any of it really."
- Getting and giving "erm well, I want to use this to get some purer, lighter pigments, and this brush just gives me a straighter edge, a straighter line."
- "I'm not getting the effect that I need here so I'm going to use a straight edge to do it."
- Painting is a journey "Right it's getting there."
- "I'm happy enough with it just now so I'm just going to keep on, I may change it but...I want a different colour for ...I'm not happy with this green."
- Painting is control "I'm going to use this wee brush again because it's just going to be a thin line, need a bit of control. I'm actually going to use the straight edge again. Have to find a bit that's not already painted."
- "Just you get a different effect almost less controllable in a way. You know what effect you are going to get with a brush, you start introducing your fingers and cloths etc and you get a less predictable effect."
- Paint is mud "It's mixing in with the blue to give a muddy brown but I don't mind that..."
- "I'm starting to mix my brushes a bit now and the colours are starting to get a bit muddy. I'll probably clean them in a minute."
- Painting is unpredictable "It's not what I was expecting but I quite like it. I'm not dead certain about this composition but I'm going to carry on with it for the time being."
- "Just you get a different effect almost less controllable in a way. You know what effect you are going to get with a brush, you start introducing your fingers and cloths etc and you get a less predictable effect."

## 7.6.4 Range and frequency

### 7.6.4.1 Range and Frequency in Zone 1 (Reflection)

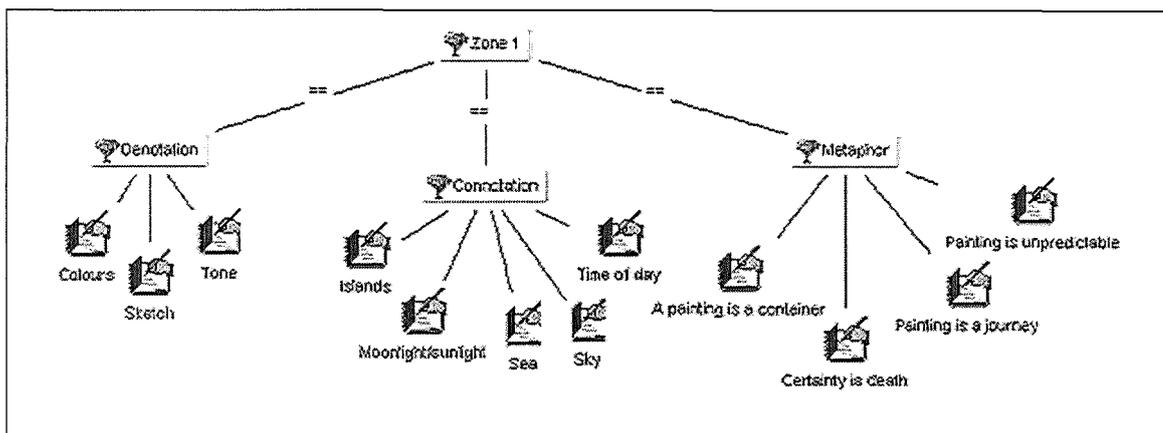


Figure 7.2 The range of codes from Owen's utterances in zone 1

The figure above (Figure 7.2) shows the range of codes that were uncovered during the analysis of utterances in zone 1. The total number of utterances counted in zone 1 is 12. 10 utterances were coded while 2 were undecipherable due to interference. The table below details the frequency with which these codes recur within the utterances.

<b>Denotations</b>	<b>Freq</b>	<b>Connotations</b>	<b>Freq</b>	<b>Metaphors</b>	<b>Freq</b>
Colours	5	Islands	2	A painting is a container	2
Sketch	1	Moonlight/Sunlight	1	Certainty is death	1
Tone	3	Sea	1	Painting is a journey	2
		Sky	1	Painting is unpredictable	1
		Time of day	1		
<b>Totals</b>	<b>9</b>		<b>6</b>		<b>6</b>

Table 7.3 The frequency of codes from Owen's utterances in zone 1

It can be seen that the range of denotations in zone 1 is relatively limited compared to the other types of codes. However, the frequency of coding reveals a different picture. While the denotative level remains limited in range denotations that refer particularly to both Colour and Tone are among the most frequently recurring codes in this zone of activity. The connotative aspects of zone 1 are the widest ranging where five different code groups occur in the same zone, each one has a very restricted recurrence. The metaphorical codes in zone 1 consist of four groups that each has limited recurrences within them.

Owen spends 26% of his time reflecting on his work. When he steps back from the canvas to observe his work he is again predominantly concerned with colours but there is an interesting shift to the connotative level of meaning in his utterances. A whole range of connotative meanings arises from looking at the painting. He talks more about the islands, sea and sky as well as other ideas such as the effect of light he is trying to achieve or the time of day that the picture might evoke.

7.6.4.2 Range and Frequency in Zone 2 (Organisation)

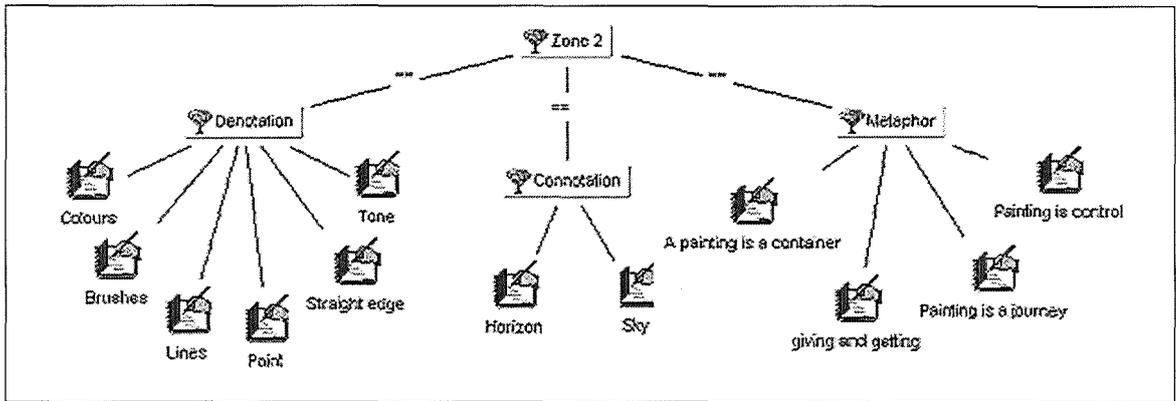


Figure 7.3 The range of codes from Owen’s utterances in zone 2

The figure above (Figure 7.3) shows the range of codes that were uncovered during the analysis of utterances in zone 2. The total number of utterances in zone 2 is 13. All 13 utterances were coded in this section. The table below details the frequency with which these codes recur within these utterances.

Denotations	Freq	Connotations	Freq	Metaphors	Freq
Brushes	5	Horizon	1	A painting is a container	1
Colours	7	Sky	1	Giving and Getting	2
Lines	3			Painting is a journey	1
Paint	1			Painting is control	1
Straight Edge	2				
Tone	3				
<b>Totals</b>	<b>21</b>		<b>2</b>		<b>5</b>

Table 7.4 The frequency of codes from Owen’s utterances in zone 2

In zone 2 the range of denotative codes is much greater than those in the other two categories. Moreover the frequency with which these codes recur in the zone far outstrips the frequency in any other category. Particularly frequently recurring codes are Colours, Brushes, Lines and Tone. The connotative level in zone 2 is extremely low in both range and frequency, while the metaphorical level contains four categories giving it some degree of range. However, the frequency with which these codes recur is somewhat limited.

In this organisational zone the connotative and metaphorical levels of meaning all but disappear. Here, as he cleans his brushes and mixes his paint, Owen's utterances become much more denotative of the artefacts he is using, again focusing on colours, brushes, lines and tone. Owen spends 23% of his time here organising and structuring his activities. There is therefore quite a high concentration of denotative reference here compared to the other zones where he spends more time.

### 7.6.4.3 Range and Frequency in Zone 3 (Production)

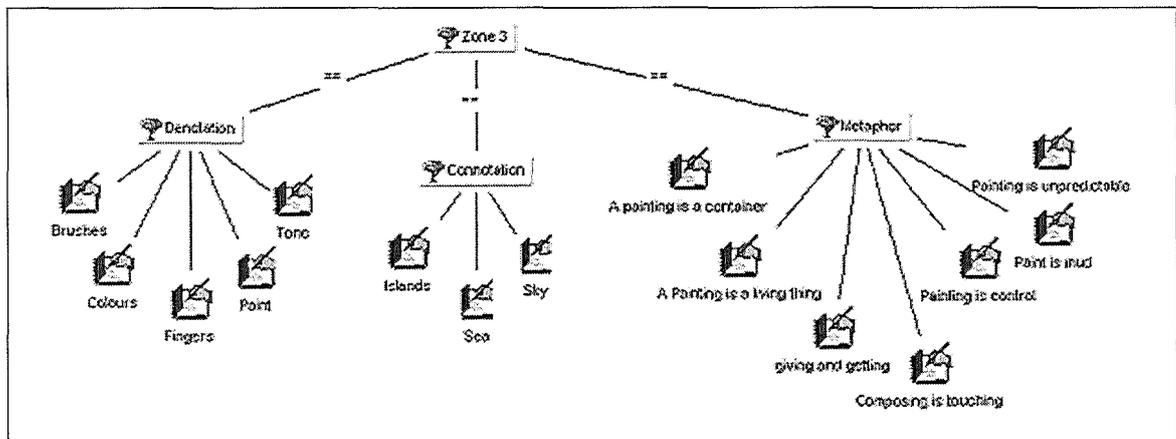


Figure 7.4 The range of codes from Owen's utterances in zone 3

The figure above (Figure 7.4) shows the range of codes that were uncovered during the analysis of utterances in zone 3. The total number of utterances in zone 3 was 20. 18 utterances were coded while 2 were deemed undecipherable. The table below details the frequency with which these codes recur within the zone.

Denotations	Freq	Connotations	Freq	Metaphors	Freq
Brushes	5	Islands	3	A painting is a container	4
Colours	8	Sea	2	A painting is a living thing	3
Fingers	2	Sky	1	Giving and getting	5
Paint	4			Composing is touching	2
Tone	2			Painting is control	1
				Paint is mud	2
				Painting is unpredictable	1
<b>Totals</b>	<b>21</b>		<b>6</b>		<b>18</b>

Table 7.5 The frequency of codes from Owen’s utterances in zone 3

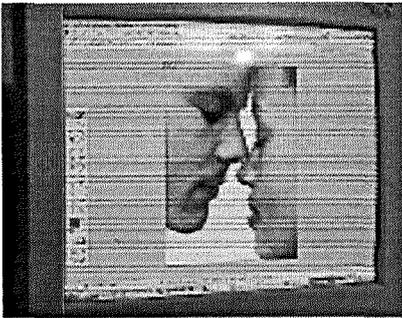
In this zone the denotative level has a considerable range of code types as well as high frequency of recurrence in Brushes, Colours and Paint. There is a limited range of codes in the connotative level that is coupled with a relatively low frequency of recurrence. The greatest range of codes is found at the metaphorical level. There is also a considerable amount of recurrence in the ‘giving and getting’ metaphor, and the ‘a painting is a container’ metaphor.

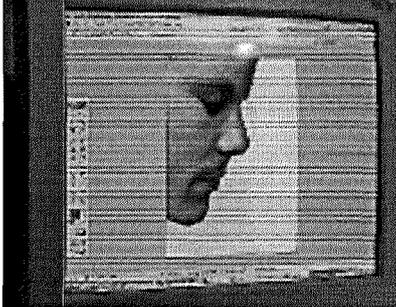
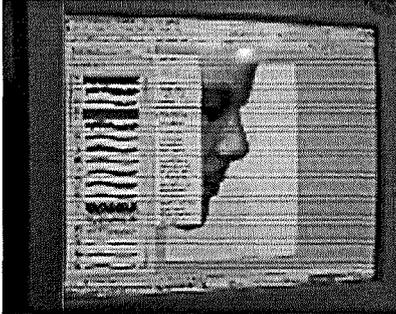
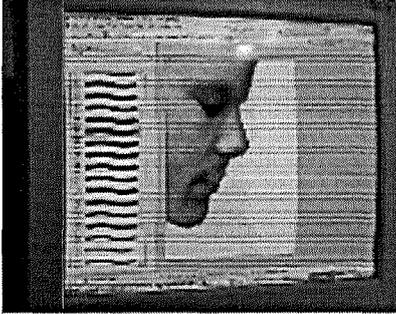
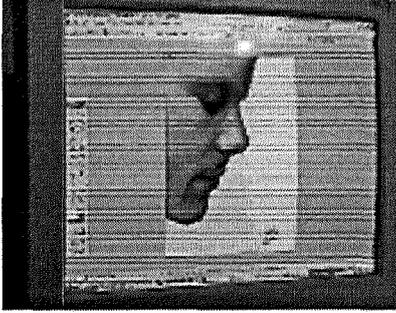
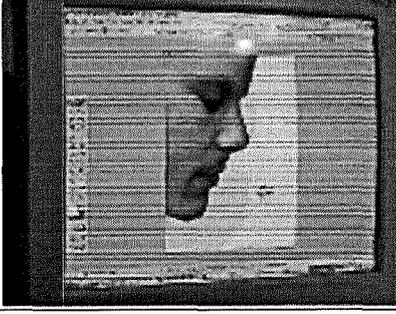
Owen spends 51% of his time engaged in the physical activity of painting in this production zone. While working, Owen is predominantly engaged in using his brushes and different coloured paints to put something into or give something to the physical painting he is working on. The physical painting in itself is viewed as a container, not only for his activities and the paint he is using, but also for the forms he creates such as islands and sea etc. Owen’s meaning making process here seems to be much more metaphorical than in any of the other zones.

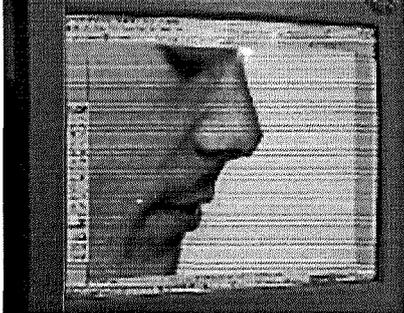
## 7.7 Participant 2: Dave

Dave is a designer who uses Photoshop, an industry standard tool for manipulating and adjusting photographic images. His work is designed for use in new media, websites, CD-ROMs etc. For the study Dave worked on a photo-retouching job. He had a photograph of two people, a man and a woman who were facing each other with their foreheads touching. Dave's job was to separate these faces into two separate images. Both parts of this operation were filmed but the study here focuses on the later part, which involved more work, which is the retouching of the male face, after the female one had been removed from the image. With the male face isolated, Dave proceeded to clean up the image. He selected a big brush from the brushes palette and painted over the remaining areas of original background with white. The initial strokes of the brush alerted him to the fact that it was too transparent so he adjusted the flow rate and opacity to 100%. Dave then zoomed in on the face. He then opened the brush palette and looked for a fairly small round brush with which he could get close to the face. Without disturbing the face image Dave continued to clean up the background until no trace of the original was left. He then zoomed out to get a good look at the image. He considered a few options here concerning the lighting of the image and how best to solve the problem of the flat nose. Using the smudge tool, along with another brush Dave built up the nose and then reshaped it using the eraser tool and various sizes of brush. To finish off the image Dave chose the blur tool and traced round the edges of the face image giving it a uniform quality. An extract from the transcript is given below, reference should be made to Appendix A for the full transcript and coding of the study.

### 7.7.1 Observing the Video

Screen/Time	Description	Speech
22:16:00  22:16:06	Two faces on screen, female selected. Swaps background colour on tool palette. Deletes face.  Points at head with cursor.	I've changed this over so the background colour is white, so when I cut her out white is all we're left with. So the good thing about that is, what we can now do, is a couple of things, is that he's pretty much isolated quite quickly now...there's a little bit on his forehead that you'd probably actually

	<p>Points at grey background with cursor.</p>	<p>never know. You might have to do a wee bit of tweeking but there's not much. So what I'm going to do know is take out the majority of all this junk away.</p>
<p>22:16:27</p> 	<p>Opens brush menu and scrolls up and down</p> <p>Picks a brush, cursor changes on screen. Closes brush palette, checks colour. Tries to paint over grey background. Nothing happens.</p>	<p>What I'll do is select quite a big brush I need quite a natural brush for this to work, it doesn't have to be but it helps. I want something that is fairly solid so this will do.</p>
<p>22:16:43</p> 	<p>Goes to brush parameters changes opacity to 100%.</p> <p>Uses cursor to paint over background (erase grey).</p>	<p>What I'm going to do now is um, its already white so I'm just going to...</p>
<p>22:16:46</p> 		<p>First of all pump the opacity up, pump the flow up to a hundred percent. Just get rid of all this stuff really quickly, just helping to isolate it a bit easier. Try to get as close as I dare without messing up. I released my mouse there so that I've got a save that went into the history panel.</p>
<p>22:16:51</p> 		
<p>22:17:17</p> 	<p>Zooms in close up on face.</p>	<p>So I'll probably just start working on him now. He's quite easy to work on right now.</p>

		
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**Table 7.6** Logged and coded Transcript of Dave's utterances

In this extract (Table 7.6), as with Owen, it is possible to see how signs and artefacts are manipulated, and organized into concurrent and sequential syntagms that affect the meaning making process throughout the interaction. For example, where Dave tries to paint over the grey background he checks that his brush is white but forgets to check the opacity of the brush. The concurrent/sequential relationship between these two signifiers is realised when he attempts to paint and nothing happens. He therefore has to reorganize the syntagmatic relationship in light of the unwanted sequence of events. Indeed, the process of selecting a brush, a brush style, the size of brush, colour, opacity and flow rate amounts to a sequentially structured syntagm just as seen in the study of Owen painting. The difference here of course is that the interaction is with representational signs rather than real objects. It is only when the syntagmatic structure is correctly concurrently aligned through sequential activity that successful manipulation of the image can then take place. In other words, sequences of signs are manipulated to produce new concurrent configurations which are in turn used to manipulate other concurrent signs on the screen.

### 7.7.2 Coding the Zones

In Dave's case logging the video again revealed three distinct zones of activity within which he worked. Unlike Owen however they are not the physical spaces that he inhabited, they are the hypermedia of Photoshop.

- Zone 1 is where Dave could view the entire picture he was working. This is characterized by the 'zoom out' facility in Photoshop and is analogous to the space that Owen occupies when he steps back from his painting.
- Zone 2 is where Dave primes his tools ready for work. Here he chooses brushes, adjusts their size, sets their opacity etc. Here Dave sets the parameters of the

virtual tools that Photoshop provides him with. This is analogous to Owen’s utilities table and mixing palette.

- Zone 3 is where Dave works on his chosen image. Here he uses virtual representations of tools to alter the image in accordance with the parameters he has set for them. This zone is equivalent to Owen’s canvas and is characterized by ‘zooming’ in close to the image.

Dave spent 46% of his time in zone 3 actually working on the image. 27% of his time was taken up with setting the parameters of his tools and 27% was spent ‘zoomed’ out of the working space looking at the image. The diagram below shows the sequence of zone changes as they happen within the session.

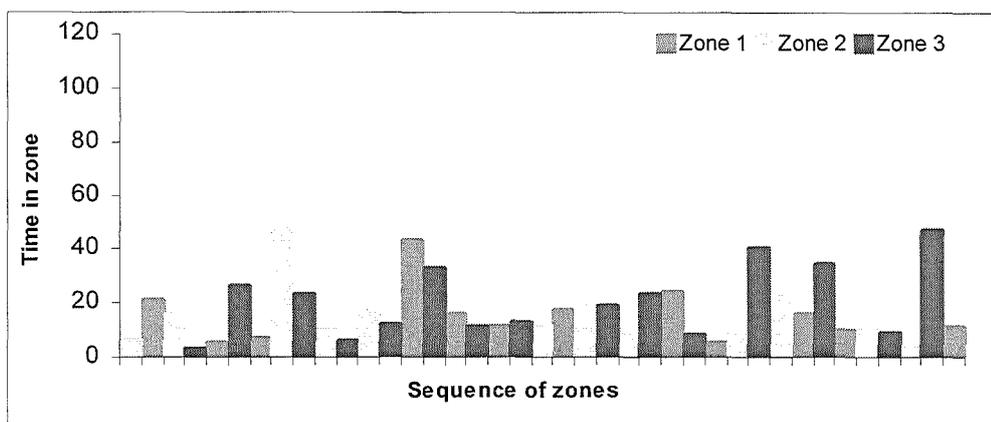


Table 7.7 Dave's zone/time chart

The Time chart shows the sequence of progress from zone to zone and the amount of time spent in each zone. Time is measured on the Y-axis, in seconds, and the sequence of zones is plotted on the X-axis. As can be seen on the chart Dave move's in blocks including organisation and production zones to blocks including reflection and production. Occasionally he moves from organisation to reflection and back again. This shows that he works in sections. Firstly he primes his tools, then looks at the image, then primes some more. He then works on the image, looks, then works some more. After this he primes tools, works, primes tools and works again etc. He never moves in a circular fashion like Owen, preferring to move back and forth across two zones at a time.

### 7.7.3 Coding the Utterances

Below are tables showing the codes that emerged out of analysing the transcripts. Appendix B should be consulted to see further evidence of the coding structures taken directly from the Atlas Ti software.

#### 7.7.3.1 Denotative Codes

Code	Example
Colour	<p>"Now I'm going to start working on his nose. There is some natural red here about 3 pixels back. So what I'm going to do is try and sculpt his nose a bit."</p> <p>"I've changed this over so the background colour is white, so when I cut her out white is all we're left with."</p>
Edges	<p>"Yes, this is a really clean edge, its got a slight blur to the edge. What this means is that when I'm working I can get quite close to it like this."</p> <p>"It just leaves some of the pixels in there, so this is a really nice wee tool to use to take the edge off. I've not gone onto the edge but the blurring takes that edge away that I'm looking for."</p>
History Panel	<p>"I released my mouse there so that I've got a save that went into the history panel."</p>
Image	<p>"That will hopefully be a bit better. One thing I know is that I'm probably going to have the image at about that size. So I know for a fact that that's ok."</p>
Mouse	<p>"Just rolling the mouse a bit , helps me hopefully to not put too much on."</p>
Painting tools	<p>"What I'll do is select quite a big brush I need quite a natural brush for this to work, it doesn't have to but it helps."</p> <p>"What I'll do is probably select a nicer brush than this."</p>
Percentages	<p>"To be productive and still be accurate I'll change the size fairly regularly."</p> <p>"What I will do is put a slight blur on it. So I'll move to a blur tool now and I'll probably pump it down to about 20%."</p>
Pixels	<p>"I can tell you straight away that there is a little thing here. The pixels are a little bit dark and that's causing a little bit of chunking."</p> <p>"Looking for a natural. I want one that's just really round doesn't have much...see these have got pixels in there texture, I don't want that I want something that is just a little bit more flat."</p>

### 7.7.3.2 Connotative Codes

<b>Code</b>	<b>Example</b>
Person	<p>"So the good thing about that is, what we can now do, is a couple of things, is that he's pretty much isolated quite quickly now...there's a little bit on his forehead that you'd probably actually never know."</p> <p>"So I'll probably just start working on him now. He's quite easy to work on right now."</p>
Realism	"Now that looks a bit more realistic for his head there now."
Roman nose	"Noses generally have a bit of a... At the moment he's got a bit of a Roman nose, so I may want to consider... I mean that's fine people would never probably think twice about having a Roman nose but we could give him any nose he wants. (laugh)"
Shadow	"There's not much shadow there, she was creating shadow so we want to trim that away, it saves us having to retouch it."
Tefal guy	"He's a bit of a TEFAL guy at the moment."

### 7.7.3.3 Metaphorical Codes

<b>Code</b>	<b>Example</b>
Giving and getting	<p>"I'm going to have to dump the size a bit here. Not as much as one, just to get this area here."</p> <p>"A wee trick that I'll sometimes use here is to use a much larger brush than I would actually need. What that will do is give a shallower curve."</p>
Good is hot	"See it's got a bit of a flat nose at the moment. What I may do is... I've got options here, I could trim away some of his nose, which might actually be the option because the darkness that we have here is not that hot."
Image is a container	<p>"You might have to do a wee bit of tweaking but there's not much. So what I'm going to do know is take out the majority of all this junk away."</p> <p>"There's a wee bit of patchiness down here as well. When you come out it's not particularly apparent. Might have to go back in there and adjust that."</p>
Painting is aggressive	<p>"What we can do here is that we can change the flow or the opacity so that I can be a bit more aggressive in my painting but it will be slower."</p> <p>"I'll be relatively aggressive to start with."</p>
Painting is cleaning	<p>"Just get rid of all this stuff really quickly, just helping to isolate it a bit easier. Try to get as close as I dare without messing up."</p> <p>"So you can see that I'm getting quite close but not touching it. It's cleaning it quite nicely."</p>

- Photoshop is building "Now I'm going to start working on his nose. There is some natural red here about 3 pixels back. So what I'm going to do is try and sculpt his nose a bit."
- "What I'm going to do is try and rebuild his nose a bit but I want to keep the same colours so I'll bring this shading down there. Give it a little bit more shape."
- Photoshop is cutting "See it's got a bit of a flat nose at the moment. What I may do is... I've got options here, I could trim away some of his nose, which might actually be the option because the darkness that we have here is not that hot."
- "I've changed this over so the background colour is white, so when I cut her out white is all we're left with."
- Pixels are grain "When you come out you can see that it's a bit bitty there."
- "Gives a slight granularity to the surface."
- Physical action metaphor "I'm going to have to dump the size a bit here. Not as much as one, just to get this area here."
- "First of all pump the opacity up, pump the flow up to a hundred percent."
- Spatial metaphor "Ok I'm a wee bit out of control there so I'm going to move down a little bit."
- "Yes, this is a really clean edge, its got a slight blur to the edge. What this means is that when I'm working I can get quite close to it like this."
- Unwanted pixels are junk "You might have to do a wee bit of tweeking but there's not much. So what I'm going to do know is take out the majority of all this junk away."

### 7.7.4 Range and Frequency

#### 7.7.4.1 Range and Frequency in Zone 1 (Reflection)

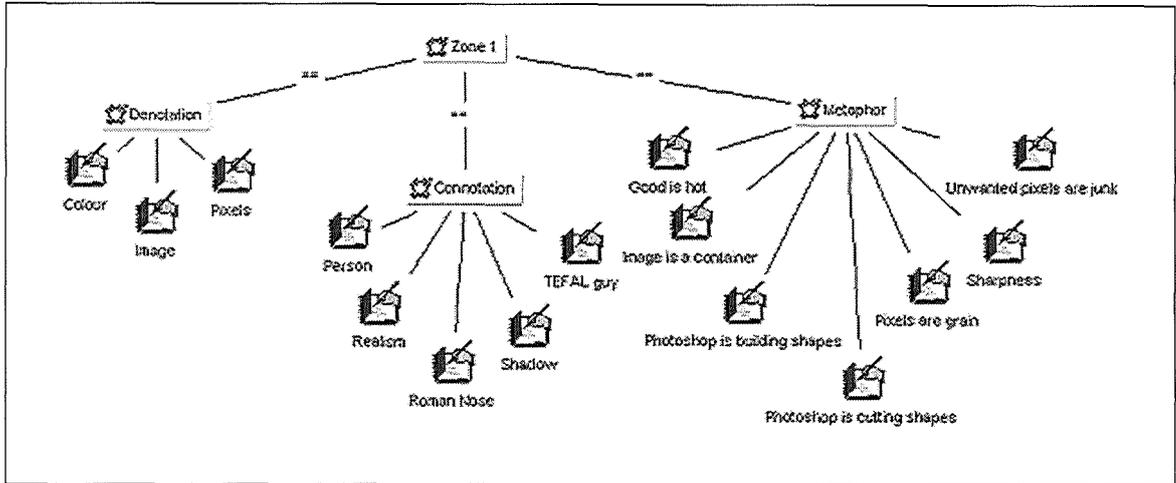


Figure 7.5 The range of codes from Dave's utterances in zone 1

The figure above (Figure 7.5) shows the range of codes that were uncovered during the analysis of utterances in zone 1. The total number of utterances in zone 1 is 17. All 17 utterances were coded in this section. The table below details the frequency with which these codes recur within these utterances.

Denotations	Freq	Connotations	Freq	Metaphors	Freq
Colour	1	Person	7	Good is hot	1
Image	1	Realism	1	Image is a container	3
Pixels	2	Roman nose	1	Photoshop is building shapes	1
		Shadow	1	Photoshop is cutting shapes	2
		TEFAL guy	1	Pixels are grain	4
				Sharpness	1
				Unwanted pixels are junk	1
<b>Totals</b>	<b>4</b>		<b>11</b>		<b>13</b>

Table 7.8 The frequency of codes from Dave's utterances in zone 1

In this zone denotative utterances are very limited in range and in frequency. However, the connotative level of meaning is wide ranging and exhibits a high frequency of recurrence in the Person code. It is the metaphorical level of coding that exhibits the widest range of codes as well as some frequency of recurrence in the ‘Pixels are grain’ and ‘Image is a container’ metaphors.

These metaphors predominantly focus on references to the image and to the pixels he has been working on. Similarly, in this reflective zone where he has ‘zoomed out’ to look at the whole picture, a whole range of connotative utterances occur. This suggests that it is the connotative power of the image that he is most concerned with as he ‘steps back’ to assess his work, as no such level of connotation occurs in any other zone despite only spending 27% of his time here.

#### 7.7.4.2 Range and Frequency in Zone 2 (Organisation)

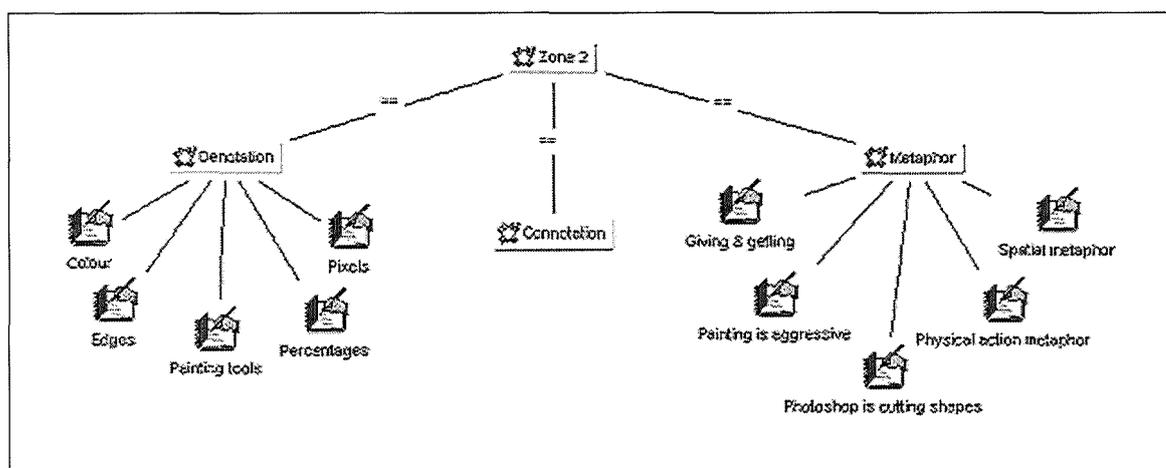


Figure 7.6 The range of codes from Dave’s utterances in zone 2

The figure above (Figure 7.6) shows the range of codes that were uncovered during the analysis of utterances in zone 2. The total number of utterances in zone 2 is 17. All 17 utterances were coded in this section. The table below details the frequency with which these codes recur within the zone.

Denotations	Freq	Connotations	Freq	Metaphors	Freq
Colour	1			Giving and getting	3
Edges	1			Painting is aggressive	1
Painting tools	6			Photoshop is cutting shapes	2
Percentages	4			Physical action metaphor	4
Pixels	1			Spatial metaphor	8
<b>Totals</b>	<b>13</b>		<b>0</b>		<b>18</b>

Table 7.9 The frequency of codes from Dave’s utterances in zone 2

There are five different denotative codes in this zone. ‘Painting tools’ and ‘Percentages’ exhibit the highest frequency of recurrence respectively. There are no connotative utterances here, while there are five different metaphorical codes. ‘Spatial Metaphor’ has the highest frequency of recurrence followed by ‘Physical action metaphor’ and ‘Giving and getting’. A high level of metaphorical codes occurs in all sections of this study. This might be due, in part, to the metaphorical nature of the Photoshop software in that it attempts to recreate a real workspace virtually.

For Dave though, this zone appears to be focused on ideas of organising and manipulating these artefacts in a spatial way. He spends 27% of his time here involved in selecting and setting his tools in the correct way so as to make them effective, employing in both denotative and metaphorical meanings to do so. There are absolutely no connotative utterances at all in this zone.

7.7.4.3 Range and Frequency in Zone 3 (Production)

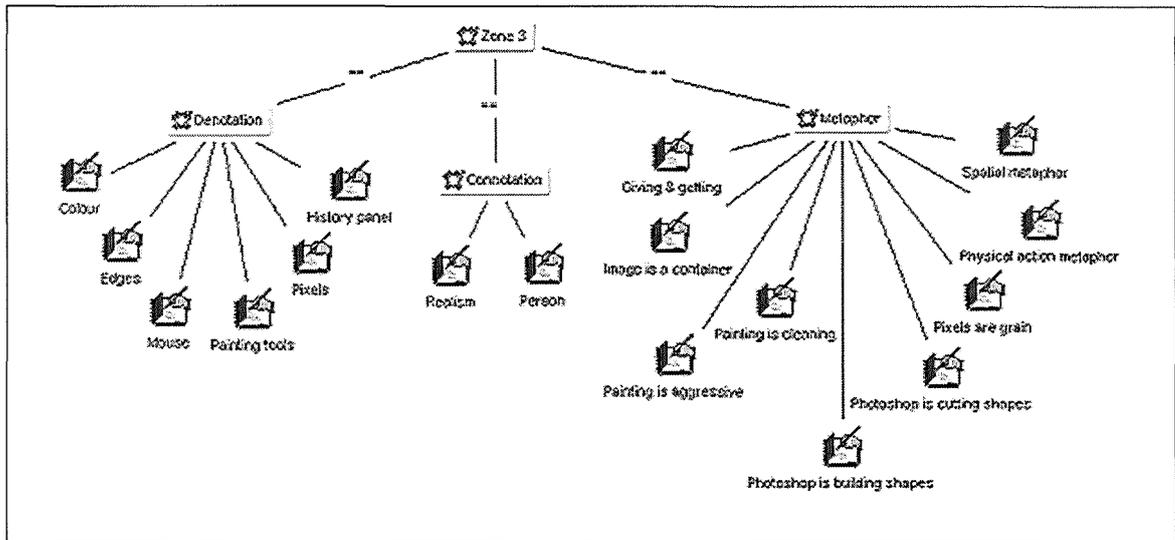


Figure 7.7 The range of codes from Dave's utterances in zone 3

The figure above (Figure 7.7) shows the range of codes that were uncovered during the analysis of zone 3. The total number of utterances in zone 3 is 12. All 20 utterances were coded. The table below details the frequency with which these codes recur within the zone.

Denotations	Freq	Connotations	Freq	Metaphors	Freq
Colour	3	Person	2	Giving and getting	2
Edges	3	Realism	1	Image is a container	3
Mouse	1			Painting is aggressive	2
Painting tools	2			Painting is cleaning	3
Pixels	3			Photoshop is building shapes	4
History panel	1			Photoshop is cutting shapes	3
				Pixels are grain	1
				Physical action metaphor	1
				Spatial metaphor	6
<b>Totals</b>	<b>13</b>		<b>3</b>		<b>25</b>

Table 7.10 The frequency of codes from Dave's utterances in zone 3

The denotative level of meaning exhibits quite a wide range of codes with some element of recurrence in 'Colour', 'Edges', and 'Pixels'. Again the connotative level of meaning

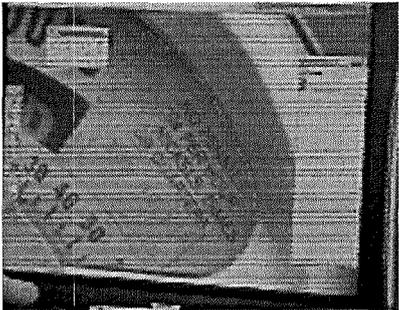
is very limited with only two codes and very little recurrence. The Metaphorical level of meaning in zone 3 contains nine separate codes, which is very wide ranging. Significant levels of recurrence occur in 'Spatial metaphor' and 'Photoshop is building'. There is further recurrence in the 'Image is a container', 'Painting is cleaning' and 'Photoshop is cutting shapes' metaphors.

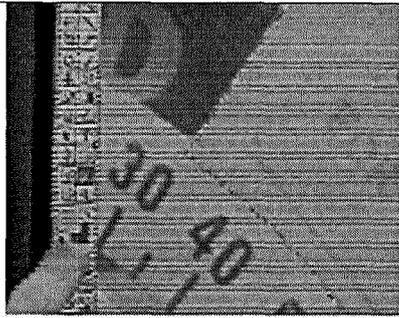
Dave spends 46% of his time in this production zone, which is characterised by a particularly high range of recurrent metaphors. This suggests that Dave understands his activities with the artefacts in this zone from a metaphorical point of view. In particular, the recurrent reference to spatial metaphors and building activities suggests that these are significant underlying concepts that he brings to his interactions. However, This high level of metaphor also points towards the metaphorical design of the Photoshop software, which is successfully being interpreted by Dave. Either way Dave's understanding of the system relies on the nature of the knowledge in his Umwelt.

## 7.8 Participant 3: Diarmid

Diarmid is a graphic designer who uses various software packages, particularly Photoshop to design print-based media. He was observed doing a particular job where he was converting an already existing image of an American parking meter into its British equivalent. This is a process known as photo retouching. Diarmid began by deleting the background layer that came with the original image and replacing it with a red one. He did this in order to pick up on any areas of white surrounding the parking meter that might show up in the finished article. He then duplicated the image to produce a base copy, which he hid underneath the new red background. On discovering two areas of visible white, he then proceeded to use the airbrush tool to cover them over with the same red background colour so they disappeared. Diarmid then turned his attention to the area he wanted to retouch. Using the Pen tool he made a selection of a complicated curved area to the right hand side of the image. He isolated this area by saving it as a 'Path' and then filled this shape with colours sampled from the original image. He then attempted to apply a gradient to this fill so that the colours blended from light at the front to dark at the back. Initially, this did not work and Diarmid then decided to copy the whole shape to a different layer. He then reapplied the gradient fill, which again did not work. He then adjusted the opacity of the fill and reapplied it the wrong way round, which he corrected straight away. The next step in Diarmid's process was to apply a noise filter to this to create a grainy effect similar to the qualities of the original image. After this he used the airbrush again to add some depth of tone to the shadows in this section, matching it as closely as possible to the surrounding colours. This task completed the work on this section of the image. The table below (Table 7.11) shows a section of the transcript, as with the previous studies Appendix A should be consulted for a full transcript and coding.

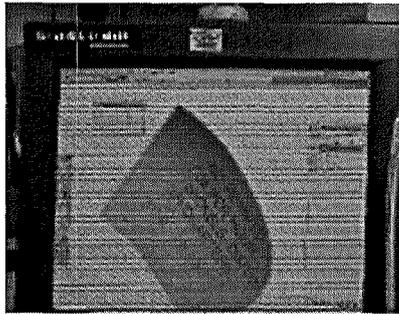
### 7.8.1 Observing the Video

<p>20:45:55</p>  <p>20:46:05</p>	<p>Clicks on eyedropper tool. Clicks on light part of image. Then clicks on dark part.</p>	<p>I'm going to use... this half I'm just going to take it all out. Its got quite a lot of grain about it , so I'm going to take a selection of the front colour using the eye dropper and the back as well. So I've got a really dark brown to beige. That's probably too dark on the background, I want it to look quire realistic so. Again</p>
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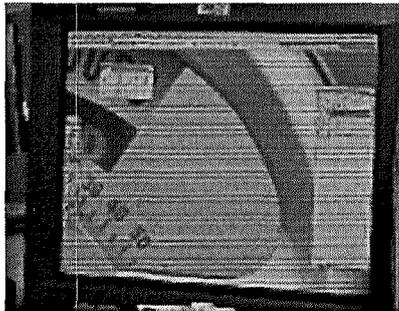
20:46:25

Uses the CMYK palette to compare the numbers of is selection of colour till it is right.



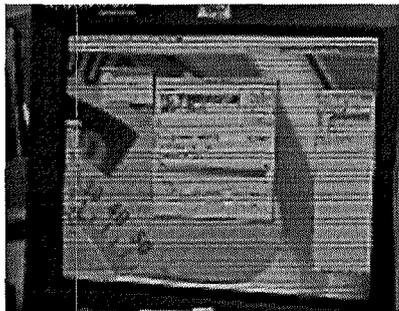
20:46:40

Selects the gradient tool from the tools palette. Then attempts to use it, but decides not to. Goes to Layer Palette and copies the selection to a new layer.



20:47:19

Attempts to apply gradient on the selection with cursor drag, gets nothing. Changes the parameters of the gradient tool opacity, transparency etc.



20:47:27

Applies the gradient fill but gets no gradient. Tries 3 times.



20:47:33

Opens the Gradient Editor selects the gradient. Reapplies the gradient with cursor. Is back to front. Reapplies the gradient correctly.

using the CMYK make up I'm just picking appropriate colours. Put a selection of 1.5 give it a soft feather on that.

I'm going to go to the gradient tool and I'm just going to fill...

No I'm not.

I'm going to layer him up onto a different layer. So I've got a selection there and I'm just going to float him above so that's just that selection there So I'm purely working on a separate layer.

Oh its not working ...what have I got... 20%, don't want transparency, I want normal. So that's a foreground to background colour, like that.

So it actually looks a bit fakey just now.

So that's a foreground to background... that's the other way round.

		
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**Table 7.11** Logged and coded Transcript of Diarmid's utterances

The extract given here again shows some detail of the concurrent and sequential arrangement of signifiers seen in both analyses of Owen's and Dave's interactions. Again it is through the incorrect configuration of syntagms that this is most evident. For example, where Diarmid attempts to apply a gradient fill to a selection, it becomes apparent that the concurrent parameters are not correctly organised so as to facilitate the desired sequence of events. Diarmid tries three times to arrange the signs correctly in order to proceed. This is obviously a complex syntagmatic arrangement that is difficult to get right. As in the other two studies, Diarmid here organises syntagms sequentially so that the concurrent parameters are all set correctly, he then embarks on manipulating the image signs with the composite syntagmatic sign or tool that he has created. Through observing his utterances and the sequence of events, it is possible to see how he moves between zones to sort the problem. Similarly, different kinds of meanings are made during this period of interaction.

### **7.8.2 Coding the Zones**

In Diarmid's case analysis also revealed three distinct zones of activity similar to the ones Dave and Owen work in.

- Zone 1 (reflection) is where Diarmid could view the entire picture he was working. This is characterized by the 'zoom out' facility in Photoshop and is used the same way that Dave uses it.
- Zone 2 (organisation) is where Diarmid prepares his tools ready for work. Like Dave he chooses tools and adjusts their parameters accordingly.
- Zone 3 (Production) is where Diarmid works on his chosen image. Again he operates here in a similar fashion to Dave and Owen, manipulating the artefacts in his environment to transform the image.

49% of Diarmid's time was spent in zone 2 performing operations there. 29% was spent in zone 3 working on the image and the remaining 22% was spent in zone 1, contemplating the image. The Time chart below shows the sequence of progress from zone to zone and the amount of time spent in each zone. Time is measured on the Y-axis, in seconds, and the sequence of zones is plotted on the X-axis.

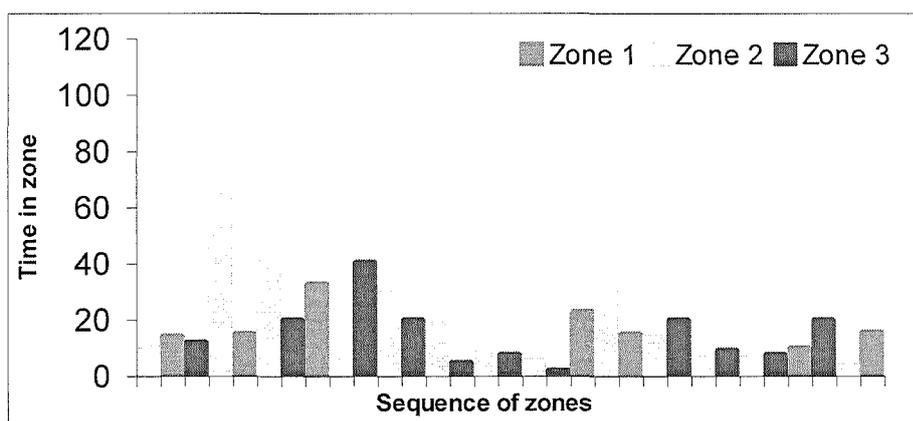


Table 7.12 Diarmid's zone/time chart

Looking at the chart, Diarmid moves frequently from zones 2 to 3 only moving to zone 1 occasionally. This shows that he spends a lot of time priming his tools or operating in this zone. It also shows that in general, Diarmid returns to zone 2 before and after he does anything else. This is quite different from either of the other two studies where the largest percentage of time was allocated to the production zone (zone 3). Diarmid clearly spends a large percentage of his time organising the syntagmatic structure of the signs in the interface before doing anything else.

### 7.8.3 Coding the Utterances

Below are tables showing the codes that emerged out of analysing the transcripts. Appendix B should be consulted to see further evidence of the coding structures taken directly from the Atlas Ti software.

#### 7.8.3.1 Denotative Codes

Code	Example
Background	"Make the selection of the actual background. Selection there."  "Put a new background with a new colour, just using any colour just now. Select All Fill the foreground colour. So that's the full background image, I'm just going to swap the actual order."

- Chequered squares** "First thing we are going to do is delete the background. Because it's going on to a coloured background I delete the actual background. I'm selecting it from the actual path. Set tolerance. Invert it, Go back to layer palette, remove background layer-to-layer zero so I can delete the actual background. So we've got the chequered squares."
- CMYK palette** "That's probably too dark on the background, I want it to look quite realistic so. Again using the CMYK make up I'm just picking appropriate colours. Put a selection of 1.5 give it a soft feather on that."
- Colour** "Put a new background with a new colour, just using any colour just now. Select All Fill the foreground colour. So that's the full background image, I'm just going to swap the actual order."  
  
"Its got quite a lot of grain about it , so I'm going to take a selection of the front colour using the eye dropper and the back as well. So I've got a really dark brown to beige."
- Copy** "I'm just going to duplicate it so I've always got a copy of the original, how it was underneath."
- Edges** "Right I do this so I can actually see you sometimes get wee areas of white, and if I deleted it to white they wouldn't come up. I can also see if there is a need for a cast round there. I saw there's probably a need for a cast round here, it's a wee bit edgy."  
  
"So I'm going to, soften that edge up by deleting it away with a feather on the actual outline."
- Filter** "Now that's a bit more realistic in tone. Colour looks shit so I'm going to apply a filter to it, a noise filter, and then add a shadow to it with the airbrush or one of the other painting tools."
- Image Layer palette** "This is an image you would get off a photo disc."  
"First thing we are going to do is delete the background. Because it's going on to a coloured background I delete the actual background. I'm selecting it from the actual path. Set tolerance. Invert it, Go back to layer palette, remove background layer to layer zero so I can delete the actual background. So we've got the chequered squares."
- Painting tool** "Now that's a bit more realistic in tone. Colour looks shit so I'm going to apply a filter to it, a noise filter, and then add a shadow to it with the airbrush or one of the other painting tools."  
  
"I'm going to go to the gradient tool and I'm just going to fill... No I'm not."
- Path** "So he's cool, I've got the paths there, work path.. call him 'left'. I've got the path there, I can make a selection on him and I can work into that."
- Percentages** "What have I got... 20%, don't want transparency, I want

normal. So that's a foreground to background colour, like that."

"So make my selection, shadows 65, take a 100, he's quite big."

Photo disc

"This is an image you would get off a photo disc."

"This is how they come off a photo disc. It comes with a Path."

Selection

"So he's cool, I've got the paths there, work path.. call him 'left'. I've got the path there, I can make a selection on him and I can work into that."

"So I've got a selection there and I'm just going to float him above so that's just that selection there So I'm purely working on a separate layer."

Type

"I Need to ...Make it British effectively. So I'm going to loose all that type around here. Change expired to penalty, leave the limit 2 hours and then just make it as realistic as possible."

### 7.8.3.2 Connotative Codes

**Code**

**Example**

British

"I Need to ...Make it British effectively. So I'm going to loose all that type around here. Change expired to penalty, leave the limit 2 hours and then just make it as realistic as possible."

Halo

"That's about right. Just tidy that selection, I've got a halo from filling it previously."

"I'm just going to delete the edge, like burn it away, you can see that its just softening up that halo, just giving it a soft edge to make it more realistic."

Realism

"I Need to ...Make it British effectively. So I'm going to loose all that type around here. Change expired to penalty, leave the limit 2 hours and then just make it as realistic as possible."

"That's probably too dark on the background, I want it to look quite realistic so. Again using the CMYK make up I'm just picking appropriate colours. Put a selection of 1.5 give it a soft feather on that."

Shadow

"So he's still there but he's not got that sort of natural light shadow coming round here so I want to recreate that and just take him right back."

"Ok so that starting on the shadows now I go on to mid tones and I take him to 20."

Shit

"Now that's a bit more realistic in tone. Colour looks shit so I'm going to apply a filter to it, a noise filter, and then add a shadow to it with the airbrush or one of the other painting tools."

### 7.8.3.3 Metaphorical Codes

Code	Example
A tool is fire	"That's slowly but surely burning him in."
A tool is a place	"I'm going to go to the gradient tool and I'm just going to fill... No I'm not."
Hiding metaphor	"I'm just going to duplicate it so I've always got a copy of the original, how it was underneath."  "Because I've got a selection I'm just going to hide it, Its got an actual feather on the selection."
Image is a container	"There's still a bit of a feather there but I'll go back in and fix that."  "Going to use the pen tool. Take that out."
Personification	"So he's still there but he's not got that sort of natural light shadow coming round here so I want to recreate that and just take him right back."  "And then I can sort of numb it down a bit."
Selecting is touching	"Just roughly make a loose selection Based on the pen again. Because it's quite curvaceous, good word, using the pen tool because you get a lot more control than going straight in with say a lasso tool. Just tweaking that one."
Soft & hard	"So I'm going to, soften that edge up by deleting it away with a feather on the actual outline."  "I'm just going to delete the edge, like burn it away, you can see that its just softening up that halo, just giving it a soft edge to make it more realistic."
Spatial metaphor	"I'm going to layer him up onto a different layer."  "I'm just going to duplicate it so I've always got a copy of the original, how it was underneath."

### 7.8.4 Range and Frequency

#### 7.8.4.1 Range and Frequency in Zone 1 (Reflection)

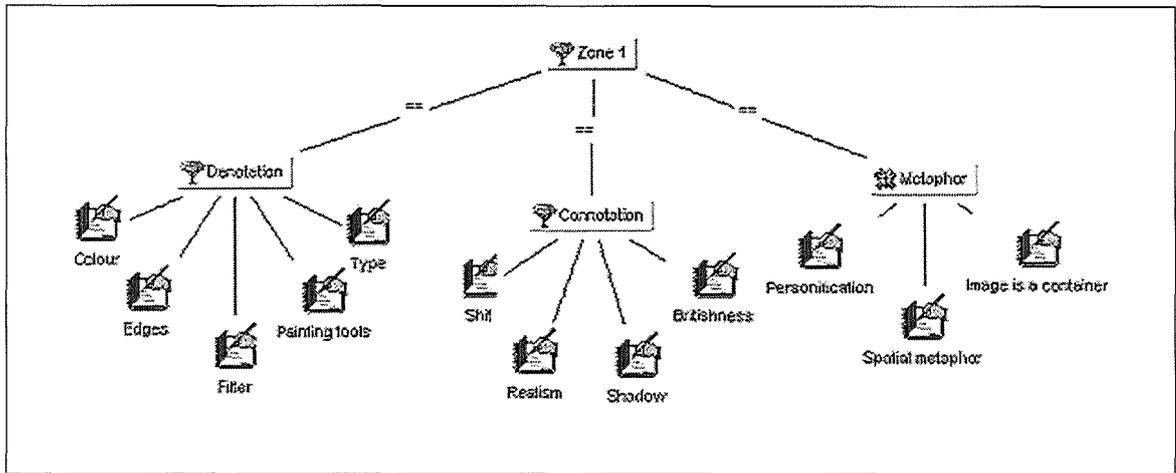


Figure 7.8 The range of codes from Diarmid's utterances in zone 1

The figure above (Figure 7.8) shows the range of codes that were uncovered during the analysis of zone 1. The total number of utterances in zone 1 is 8. 7 were coded while 1 was without content. The table below details the frequency with which these codes recur within the zone.

Denotations	Freq	Connotations	Freq	Metaphors	Freq
Colour	1	Britishness	1	Image is a container	1
Edges	1	Realism	2	Personification	3
Filter	1	Shadows	2	Spatial metaphor	2
Painting Tools	1	Shit	1		
Type	1				
<b>Totals</b>	<b>5</b>		<b>6</b>		<b>6</b>

Table 7.13 The frequency of codes from Diarmid's utterances in zone 1

Here there are 5 separate denotative codes with a relatively low level of recurrence. There are only four codes in the connotative level with 'Realism' and 'Shadows' showing some level of recurrence. The Metaphorical level has the least range of codes but the highest levels of recurrence for this zone, 'Personification' exhibiting the most.

While it is difficult to identify which type of meaning predominates in this reflective zone due to the similar levels of recurrence and frequency, it is interesting to consider this in relation to the amount of time spent here. Diarmid spends only 22% of his time reflecting in this zone, therefore a low level of utterances occurs. However, in relation to the other zones where he spends more time (29% producing and 49% organising) there is still a slightly higher level of connotative references than in any other zone.

7.8.4.2 Range and Frequency in Zone 2 (Organisation)

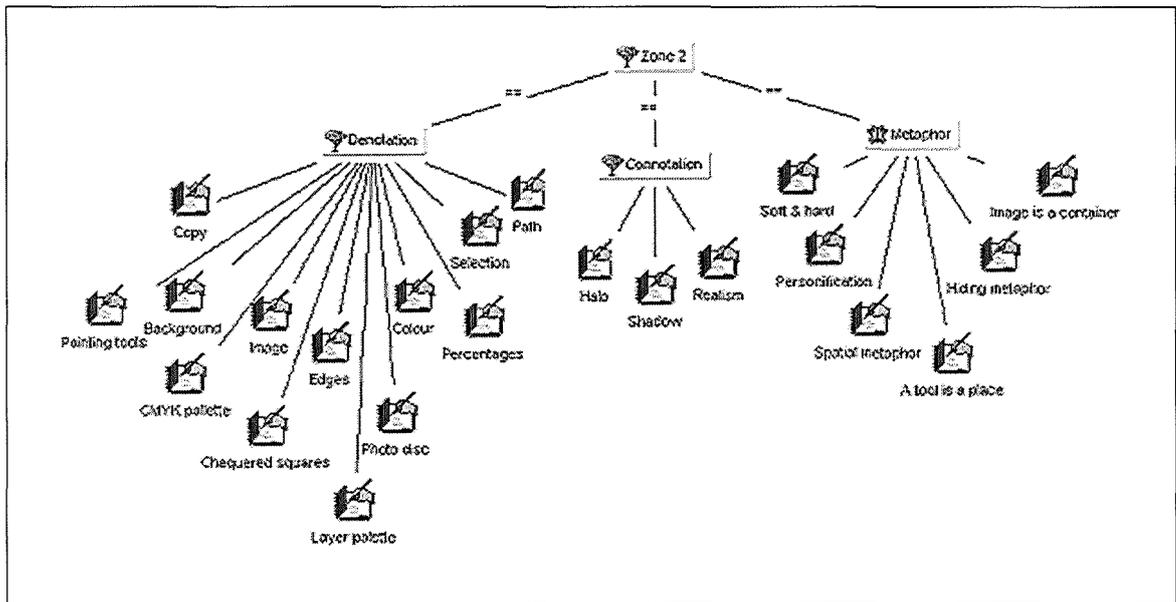


Figure 7.9 The range of codes from Diarmid's utterances in zone 2

The figure above (Figure 7.9) shows the range of codes that were uncovered during the analysis of zone 2. The total number of utterances in zone 2 is 24. 23 were coded while 1 was without content. The table below details the frequency with which these codes recur within the zone.

Denotations	Freq	Connotations	Freq	Metaphors	Freq
Chequered Squares	1	Halo	1	A tool is a place	1
CMYK Palette	1	Realism	3	Hiding Metaphor	4
Colour	4	Shadow	1	Image is a container	6
Copy	1			Personification	4
Background	4			Soft & Hard	1
Edges	2			Spatial Metaphor	4
Image	2				
Layer Palette	1				
Painting tools	2				
Path	3				
Percentages	5				
Photo disc	2				
Selection	5				
<b>Totals</b>	<b>33</b>		<b>5</b>		<b>20</b>

Table 7.14 The frequency of codes from Diarmid's utterances in zone 2

In this zone the denotative level shows a huge range of different codes found in the utterances. Some of them have quite high levels of recurrence, particularly 'Percentages' and 'Selection'. The connotative level has a very limited range of codes with only 'Realism' showing any recurrence. The metaphorical level has a range of six different codes, four of which have a relatively high level of recurrence, particularly the 'Image is a container' metaphor.

Diarmid spends most of his time in this zone (49%). Here he organises the syntagmatic structure of the artefacts in order to interact with the system. Like Dave, he sees their parameters and alters their configuration. The huge range of denotative utterances, coupled with the high levels of recurrent metaphor, suggest that he understands the multitude of system artefacts in terms of strong underlying concepts. In particular, he talks of the image as a container and spatially about how he is working on screen. Diarmid also has the propensity to call all of the objects he is manipulating 'He', as a form of personification.

7.8.4.3 Range and Frequency in Zone 3 (Production)

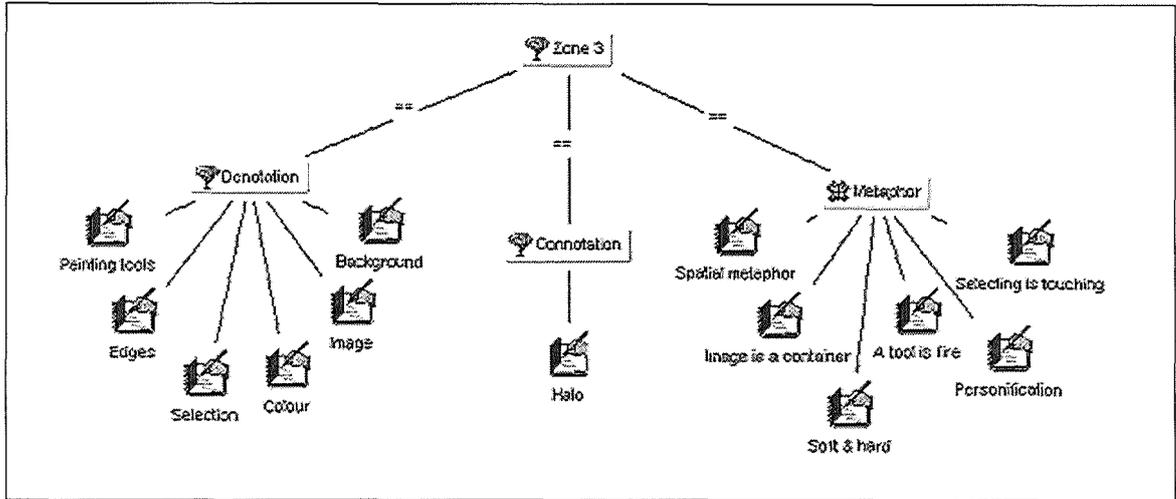


Figure 7.10 The range of codes from Diarmid's utterances in zone 3

The figure above (Figure 7.10) shows the range of codes that were uncovered during the analysis of zone 3. The total number of utterances in zone 3 is 8. 7 were coded while 1 was regarded as without content. The table below details the frequency with which these codes recur within the zone.

Denotations	Freq	Connotations	Freq	Metaphors	Freq
Background	2	Halo	1	A tool is fire	2
Colour	1			Image is a container	1
Edges	1			Personification	1
Image	1			Selecting is touching	1
Painting tools	2			Soft & Hard	1
Selection	2			Spatial Metaphor	1
<b>Totals</b>	<b>9</b>		<b>1</b>		<b>7</b>

Table 7.15 The frequency of codes from Diarmid's utterances in zone 3

There are six different codes in the denotative level with very little sign of recurrent frequency. The connotative level of meaning is very limited in both range and recurrent frequency, while there are six different metaphorical codes in Diarmid's zone 3 utterances with very limited recurrence in all of them.

Diarmid spends quite a significant amount of time (29%) in the production zone operating on the image with the painting tools but he also performs a lot of work on the image through the functionality of the organisation zone. This shows his preference for working on the image through the signs in the system rather than on the image directly. In itself this zone is bereft of any significant recurrent themes that underlie his working processes.

### **7.9 Discussion**

The discussion here focuses on answering the three research sub questions as outlined in Chapter 5.

#### **7.9.1 “What kind of signs do users encounter?”**

Information artefacts are easily identifiable in the data particularly with the Photoshop users. For example, the symbols and icons such as the paintbrush or eraser on the screen represent the various tools that the artist might use. These are metaphorical representations of real objects that are denoted in the interface. Dave chooses the brush tool because he knows that particular icon allows him to engage with that particular type of functionality in Photoshop. Similarly for Owen, the real objects themselves are the information artefacts because they have information about them embedded in their form. The thick round sable brush or the 2-inch flat brush do different things because they are a different shape and have different bristles. Owen recognises this information and uses it to great effect in his work. So in the real and the computer based environments the information artefacts operate in a similar way, even although one is often based on a metaphorical notion of the other.

#### **7.9.2 “What do users do with these signs?”**

Watching Owen work, it is easy to see evidence of the functional cycle as he strokes his brush across the canvas. His choice of brush, the colour he mixes, the marks he makes, the shapes that appear in the painting, the adjustments in colour and tone that he makes all come out of a continual process of observing, considering and acting on the elements in his painting environment. For Diarmid too this is the same. He zooms in and out of his work to see the changes he has made, to assess his work in order to know what to do next. They are both reading and interpreting the signs in their environments, including the ones they are making, in order to know how to proceed. The functional cycle encompasses all three zones of activity, where the participants move to and from each zone in a fairly fluid and intuitive manner. Some times their intentions are realised and

at other times unforeseen actions are forced upon them by the nature of the medium that they are using. Meanings are constantly shifting from denotative to connotative to metaphorical and back, in no particular order, as interaction takes place.

It is this fluid sense making activity which is central to interaction and which results in the making of sequential syntagms or chains of signs out of all the concurrent ones that exist in the environment. Concurrent signs in general are the information artefacts that exist in the same space at any one time, forming the medium that the user interacts with. For Owen these are all of his brushes, the types and colours of paints available to him and the arrangement of his workspace. For Diarmid and Dave the concurrent signs are those that are programmed into Photoshop, the various tools, filters, icons, menus, etc. that they have at their disposal. As each participant interacts with their chosen medium, different strings of signs emerge. For Owen, this can be seen in his mixing of paint or the positioning and adjustments of the elements in his painting. For Diarmid and Dave, sequential syntagms are even more apparent as screen upon screen of signs are manipulated throughout their interactions. So Andersen's Concurrent/Sequential Paradigms are more than evident in all cases.

### **7.9.3 "How do users interpret these signs during interaction?"**

As Owen operates in his painting environment he uses real tools to affect the image he is making. His understanding of this process is put across in a predominantly denotative fashion as he describes the tools he interacts with. Owen also exhibits some level of metaphorical understanding in the way he paints. To him a painting is an object that acts as a container into which he can put things into or get things out of. Dave works in a very similar fashion but his understanding of the way he works is much more driven by metaphorical constructs. Along with the container metaphor Dave makes use of spatial metaphors and building metaphors in talking through his working processes. Diarmid operates mostly in zone 2, demonstrating a massively denotative understanding of his working environment. Like Dave and Owen this is underpinned by a strong metaphorical understanding that employs very similar metaphors similar to their own, particularly the container metaphor and the spatial metaphors. All three of them predominantly use connotative language when they are talking about the image they are working on. This tends to happen when they are in the reflective zone more than in any other zone.

## 7.10 Zones

One of the most striking things about these three studies is the emergence of the three zones of interaction. In Owen's case, where he is painting in a real environment the zones are completely obvious upon watching the video. They are the physical and inhabitable spaces where he works. They are part of the nature of being a painter. In the case of the software-supported environments, clearly a desktop metaphor is at work in the design of the interface. There is a flat screen space where the image sits which is the production zone, a range of represented tools that surround it that is the organisational zone and the zoom facility supports a reflective zone, allowing the user to step back from or closer to the image. Dave and Owen both work mostly in the productive zone, that is, they both work a lot with the image itself. They select artefacts from the organisational zone in a similar way and they both use reflection to assess their work as it progresses. Unlike the other two, Diarmid spends most of his time conducting operations in the organisational zone where he performs actions indirectly on the image as well as creating complex sign/tools (syntagmatic structures) to work on the image with. He does however, use reflection and production in the same way as Dave and Owen.

The study seems to suggest, although by no means conclusively, that denotative type meanings occur largely in relation to the organisational zone of interaction (Zone 2), connotative type meanings occur largely in the reflective zone (Zone1) and metaphorical meanings occur in relation to the production or making zone (Zone 3). Of course the relationships between zones and types of meaning is not mutually exclusive. Indeed, just as the zones of interaction are interrelated, as users move freely between them, so too are types of meaning with denotation, connotation and metaphor often being entirely dependent on one another. Looking at the zones on their own, it can be seen that they are very closely interlinked and open to one another to allow for the fluid movement of the user that inhabits them.

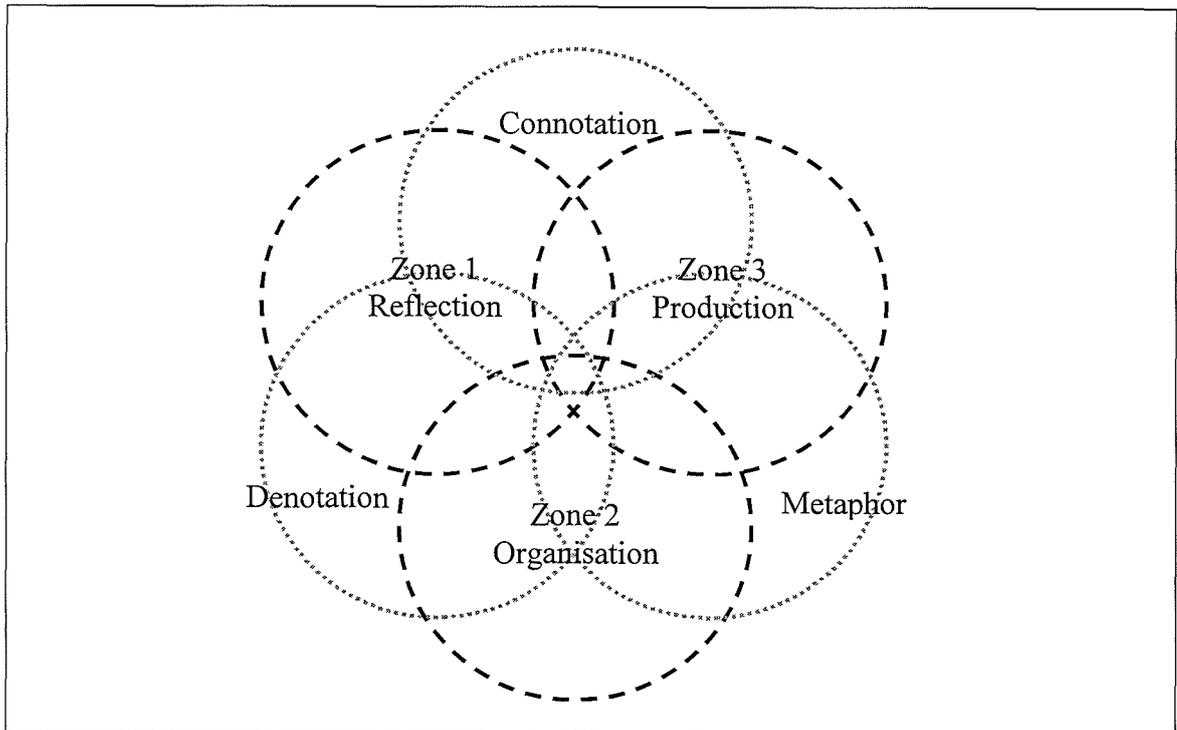


Figure 7.11 A proposed model of zones and meaning

Effectively the user is inhabiting an information space constructed of signs (Benyon, 2001), which mediates his interactions and is understood through different levels of meaning at different times during the interaction. The zones represent different aspects of the interaction process, such as reflection, organisation and action.

It is perhaps not particularly revelatory to find that there are metaphors at work in the software environments. Most software interfaces employ some level of metaphor in their design these days. What is interesting to see is that some of these metaphors particularly in the organisational zone correspond directly to those in the real world. Even more interesting is that expert users, as in Diarmid's case, begin to use these system metaphors as if they were entities in themselves i.e. they are more denotative. It is perhaps even more interesting (in relation to the last remaining research question) to see that the metaphors that are not inherent in the environment, e.g. the container metaphor and building metaphor, are brought to bear on understanding the interaction process. It is here that the semiotic analysis of user interaction has begun to uncover the underlying codes that users bring to interactions with hypermedia. It is here that an answer to the final research question might be found. Indeed the connotative and metaphorical interpretations of the participants in this study, in the form of ground level

codes, gives some insight into the cultural and experiential aspects of an individual's Umwelt that are drawn upon during interaction.

### **7.11 Summary**

The studies presented here explore the proposed model from an embodied/semiotic perspective. The method employed is initially phenomenological in its data gathering but then semiotic in its analysis. The findings from these studies successfully identify all aspects of the model and show how the interaction process of embodied participants manipulating signs to form concurrent and sequential syntagms is informed by codes in participants umwelts, which are employed to make sense of the interaction. Thus, an affirmative answer to the third research question emerges regarding the identification of participants codes.

## 8 Interacting with the Immediacy of Virtual Environments

Having now extensively explored all aspects of the proposed model through the analysis of mobile phones and participant interpretations of interacting with their media. The focus of investigation now shifts away from a concern with hypermedia and on to the exploration of semiotics and immediacy.

### 8.1 Background

The study presented here was undertaken as part of the BENOGO project, which is a European funded project that investigates the concept of ‘presence’ in virtual environments (VE) (Arnsfang et al, 2002; O’Neill, Benyon & Turner, 2003; McCall et al, 2004a, 2004b; McCall, O’Neill & Carroll, 2004; Turner et al 2003; Turner, turner & Carroll, to appear). The main focus of the BENOGO project is to explore the possibilities that new photo-realistic image based rendering technology (IBR) offers for making representations of real places.

In relation to the development of the semiotic model of interaction with new media, presented in this thesis, the BENOGO project offers a unique opportunity to extend the exploration of the model to include the immediacy of virtual environments. A medium that promotes immediacy, as outlined in chapter 1 is a type of media that attempts to erase itself in the process of mediating, giving the illusion of non-mediation. This is in keeping with a strand of presence research based on media theory that defines a sense of presence as “the perceptual illusion of non-mediation” (Lombard and Ditton, 1997).

Considering this in relation to the proposed model, it is important to once again to make clear the differences between hypermedia and immediacy. Hypermedia has been shown so far to consist of many sign types, particularly symbols that can be manipulated and organised into syntagmatic arrangements. Immediacy by its very nature attempts to rid itself of this facility. The BENOGO project in particular is concerned with photo-realism, which instantly means that signs encountered in this study are most likely to be iconic rather than symbolic. In relation to the model then, it seems quite obvious that

syntagmatic arrangements of signs will not be uncovered. However, all other aspects of the model should be identifiable in the study. In particular this study aims at exploring participants' umwelts for the underlying codes that they employ in making sense of their media encounters.

The study presented here is based on Talk-aloud protocols discussed in Chapter 5 and was undertaken as part of the BENOGO project's first testing schedule (demo1). It was performed in conjunction with a post-immersive structured interview and more traditional questionnaire type approaches of measuring presence. The data from this study is presented here in some detail along with descriptions of the procedures, the equipment and the participants.

### **8.2 Participants**

Eight participants were invited to take part in this part of the study (3 female, 5 male). It was conducted in tandem with the semi-structured interviews, where ten other participants were involved. The researchers took turn about with the equipment to facilitate the smooth flow of participants through the various parts of the study (only the talk-aloud study will be presented here as it was conducted solely by myself). All of the participants were Danish and all of them were considered to have a fairly high command of the English language based on our informal questioning. There also seemed to be a strong representation of participants with a high awareness of virtual reality technology as all participants worked in the Computer Vision Media Technology (CVMT) labs at Aalborg University. All participants took part on a voluntary basis and all of them were offered refreshments at the end of testing.

### **8.3 Equipment**

The BENOGO equipment consists of a high-powered PC running Linux and proprietary software developed by the partners of the BENOGO project. The PC is linked to a tracking system, a head-mounted display (HMD) and a 4-speaker system that surrounds that participant. The HMD displays high quality real-time rendered photographic images or real places that have been augmented with computer graphic elements. The PC is located in a separate room from the other equipment to reduce noise intrusion. An extra monitor is run from the PC to the same room as the equipment and a video camera is set up to record the view from the monitor. The monitor displays the same view as the

left eye of the HMD. The video camera is then able to capture exactly what the participant sees as well as being able to capture the ambient sound from the soundscape and the utterances of the participant during immersion (Figure 8.1).

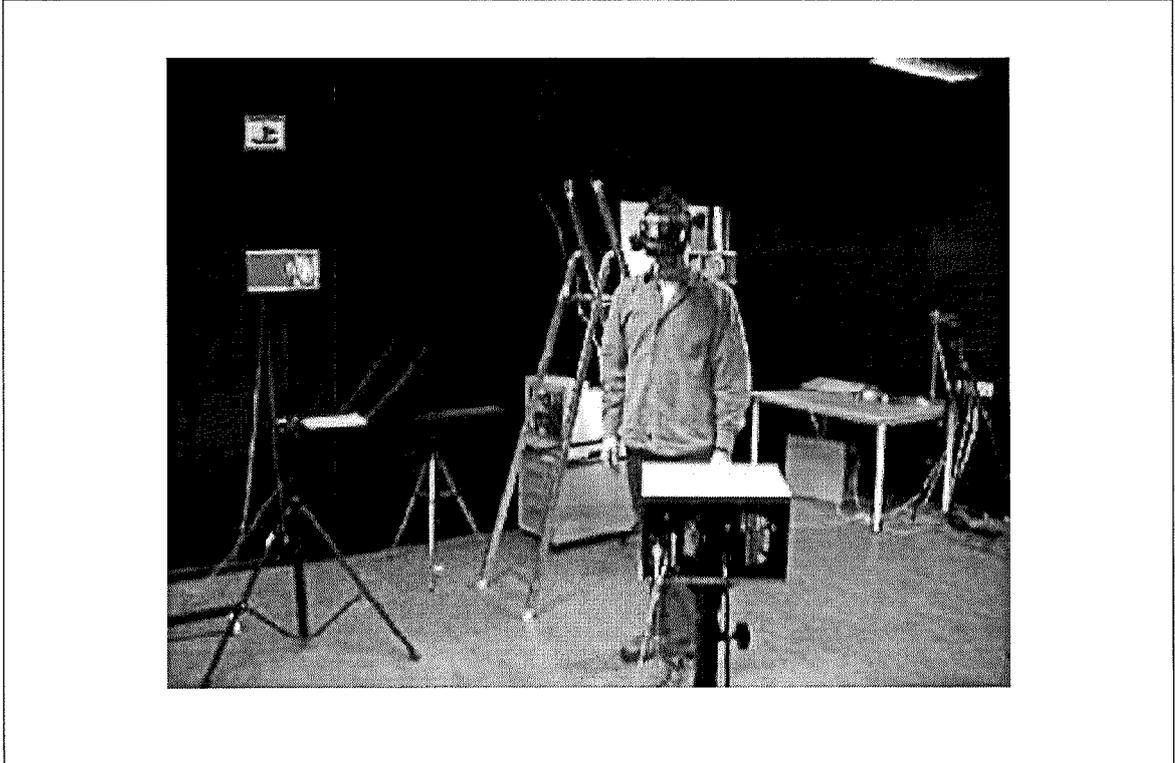


Figure 8.1 Using the Benogo system

#### 8.4 Procedure

Participants were required to complete an Immersive Tendencies Questionnaire (ITQ) (Witmer and Singer, 1998) as another part of the over all presence study, before any exposure to the environment. For the Talk-aloud part of the study each participant was asked to stand in a central position surrounded by the four speakers and to wear the HMD, they were informed that they could turn 360 degrees in either direction, look up and down but their physical movement would be restricted by the cables supporting the HMD. The images displayed were photographic images of a real botanic garden rendered in real-time. They were presented in such away that they fully immersed the viewer in a virtual world that could be observed in all directions but not moved through or interacted with in any other way. All participants were asked to explore the virtual environment for a little while. The videotape was set to record after the participant had put on the equipment and the talk-aloud/ interview began. They then spent around 10 minutes immersed in the environment.

The Talk-aloud interview procedure consisted of four main areas of questions that were designed to ask about the users' experiences and meaning making activities whilst immersed in the VE. These were: descriptions of the environment, associations/significance and meanings of things in the environment, the realness of the environment, other aspects of the experience of being in the environment. The actual questions used are presented along with the data in the forthcoming sections of this chapter.

After the talk-aloud procedure was completed, which took no longer than ten minutes, the participants removed the HMD and were moved to another part of the Laboratory. Here they undertook another questionnaire for another part of the study. After this had been completed the test was over. Finally, they were provided with refreshments at the end of the studies.

### **8.5 Logging the Video**

The videos from this study were transferred from the tapes to a digital format and then viewed a number of times to get a feel for the data. Transcriptions were made of the participant's utterances, which were split into groups of answers related to the specific parts of the interview. These were then bundled together so that all of the participants' utterances related to a specific section of the interview could be analysed at the same time using Atlas Ti software. The four different sections of the interview were then analysed separately, the data from which is presented later in this chapter. The approach to coding is the same as that described in Chapter 5 and is outlined below in relation to this study. A significant difference between this study and those described in Chapter 7 is the lack of an immediate emergence of the zones on watching the videotapes. The implications of this are discussed in the conclusions of this chapter. Raw transcripts can be found in Appendix C.

### **8.6 Coding and Analysis**

The types of codes presented here represent different types and levels of meaning that can be present at the same time in any given utterance. In this respect, all utterances can be coded as denotative, connotative or metaphorical either separately or at the same time. Coding then is an exhaustive process that seeks to extract all of these different levels of meaning that exists as a network within the participants' utterances. The

structure of the talk-aloud interview and the lack of emergent zones means that the data presented here is organised and presented in a different way to that in Chapter 7. Again however it must be stressed that coding was not always an easy process as some of the utterances carried multiple meanings, which made it difficult to classify them successfully.

### **8.6.1 Denotative Coding**

Utterances are coded as Denotative if they refer to something that is immediately identifiable in the participants' environment or on the videotape. Denotations are then subcoded in accordance with the different channels that are supported by the technology. The visual channel (V) refers to anything that the participant sees. The audio channel (A) that refers to anything the participant hears, and the augmented channel (Au) that refers to visually augmented computer graphics. Alongside this coding is the star (\*) code. This code identifies denotative utterances that contain reference to elements of the environment that are related to the medium itself rather than the content. In particular, this identifies technical aspects of the medium that seem to intrude on the production of the immediate pictorial space of the environment, i.e. these are examples of a disruption of immediacy. This includes things that are experienced as visual distortion/pixelation, stereo/depth perception effects etc. The tables provided in each section of the interview offer this information along with data on the recurrent frequency of the codes.

### **8.6.2 Connotative Coding**

Utterances are coded as connotative if they refer to things that are not immediately identifiable in the environment or videotape but which are provided by the participants' responses to the environment. Particularly, connotative coding is used to identify the associations, significances and meanings that the participants generate themselves as they encounter the environment. As a result, connotative coding attempts to uncover what aspects of a participant's Umwelt are activated by the sign elements in the VE.

### **8.6.3 Metaphorical Coding**

Utterances are coded as Metaphorical if they display any reference to cross domain mapping as per the definitions given by Roland Barthes (see chapter 2) and more importantly, Lakoff and Johnson's notion of metaphorical cognition (see chapter 1). Details of these definitions have also been discussed in chapter 5.

## 8.7 Range and Frequency

Range and frequency simply refer to the different types of sub-codes that emerge from the utterances in each section of the probe and how often they recur. Unlike the previous studies in Chapter 7, all participant responses are collated here in order to speed up the analysis process. This was a pragmatic step, taken because the exploration presented here is laboratory based, involving greater numbers over shorter times, unlike the previous studies, which were field based.

## 8.8 Descriptions

This section of the interview is designed to get at the denotative aspects of meaning making during immersion in the environment. As such, it is most like a traditional talk-aloud approach where participants talk at length uninterrupted about what they see. It consists of two parts:

- “Take your time, have a good look round and then describe to me what you can see.”
- “Is there anything else you can see?”

This is an attempt to get at the meanings that participants make of the phenomena that they encounter as they are looking around.

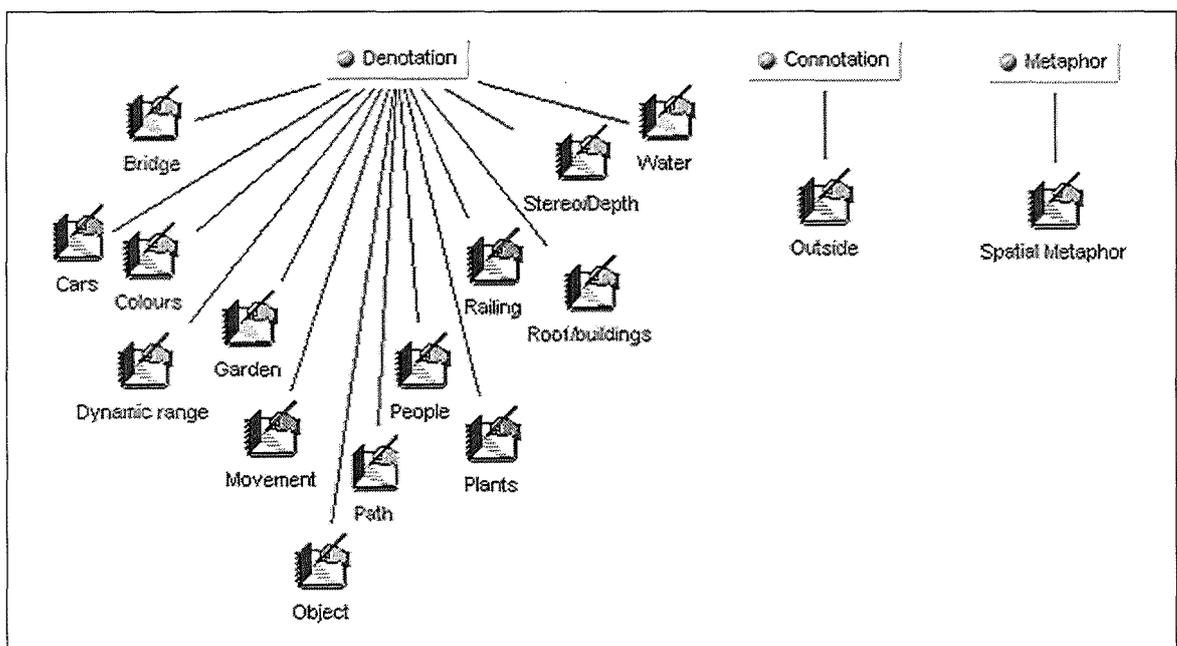


Figure 8.2 Coded responses from the description probe

The descriptive focus of the questions tends to result in utterances that are generally denotative. That is to say, that the phenomena encountered by the participant, while in the environment, denotes something to the participant that they, in turn, denote in their utterances. Some examples of utterances and coding are given below. A full list is provided in Appendix D:

Code	Example	Type	Freq
Bridge	When I turn to the right I can see a bridge, a white bridge. Some palms.	DV	11
Cars	I can hear some cars or something outside,	DA	1
Colours	A railing just where I'm standing, a bridge, a blinding window, there are some strange colours on some of the plants.	*DV	1
Dynamic Range	A big pole, there is a very low dynamic range	*DV	1
Garden	Well I'm in a botanical garden.	DV	7
Movement	I see a very strange movement up in the air as if I am turning at the same time.	*DV	1
Object	Ok, the lake, the pond, with some plants on the water. I told you this object. Trees all around.	DAu	9
Outside	I can hear some cars or something outside,	C	1
Path	There is something down there, a kind of a path.	DV	3
People	I think there's some water down here, and there might be a person over there, and there's, its really dark around here but there are some trees	DA	1
Plants	I'm in a kind of big house made of metal and glass; there are lots of plants.	DV	19
Railing	And right in front of me I can see a white fence and there's a big step down on the other side of the fence to some more plants and I think some water.	DV	5
Spatial Metaphor	There is another bridge by the three rings. There is a path over me. I think that's it.	M	19
Stereo/Depth	I see stereo, I feel depth in the plants I can see what's behind them in the back.	*DV	1
Water	In front of me I can see a plant. I first realise now that I am standing in front of water, a small lake with plants floating on the top, I thought it was the floor underneath but of course its water that s very obvious now.	DV/DA	11

Table 8.1 Type and frequency of descriptive codes

**Key:** D = Denotation, C = Connotation, M = Metaphor, V = Visual, A = Audio, Au = Augmented, \* = Medium/Form.

It is evident in the denotative aspects of the utterances that there is sometimes a disruption between the elements depicted in the VE e.g. plants, bridge etc. and technical intrusions to the visual medium. In terms of frequency, this disturbance recurs a lot less than the identification of the elements depicted in the environment. However, this is not to say that the disturbance is not always there. The evidence here suggests that these disturbances can be considered as much a part of the experience of being in the VE as the depicted elements themselves.

Given the focused nature of the questions in this section it is not surprising that connotation does not feature strongly here. However, It is interesting that while describing the environment participants tend to use spatial metaphors; ‘up above me’, ‘down there’, ‘to my left’ etc. (See Appendix D) to locate the elements in the environment. This is interesting, because on the one hand it seems entirely natural to do this as the participant is completely immersed in the displayed scene. However the scenes are essentially flat two-dimensional photographs of a real environment that are put together to produce an illusion of space that they cannot directly interact with or move around in.

## **8.9 Significance and Meaning**

This section of the probe is designed to get at the connotative and metaphorical meanings that participants might use to explain their relationship with the environment. It consists of four questions:

1. “As you look around do you have any associations with what you see?”
2. “What things do you think about as you look around?”
3. “Is there anything that you see that has a particular significance for you?”
4. “Is there anything here that reminds you of anything else?”

There were a number of misunderstandings in relation to questions 1 and 3 that contain the words ‘association’ and ‘significance’ respectively. While the participants all had a

very good grasp of English, these two questions proved to be a stumbling block and some participants reported that they didn't understand the questions. Happily, the other interview questions seemed to illuminate this problem and participants were able to contribute answers to this section.

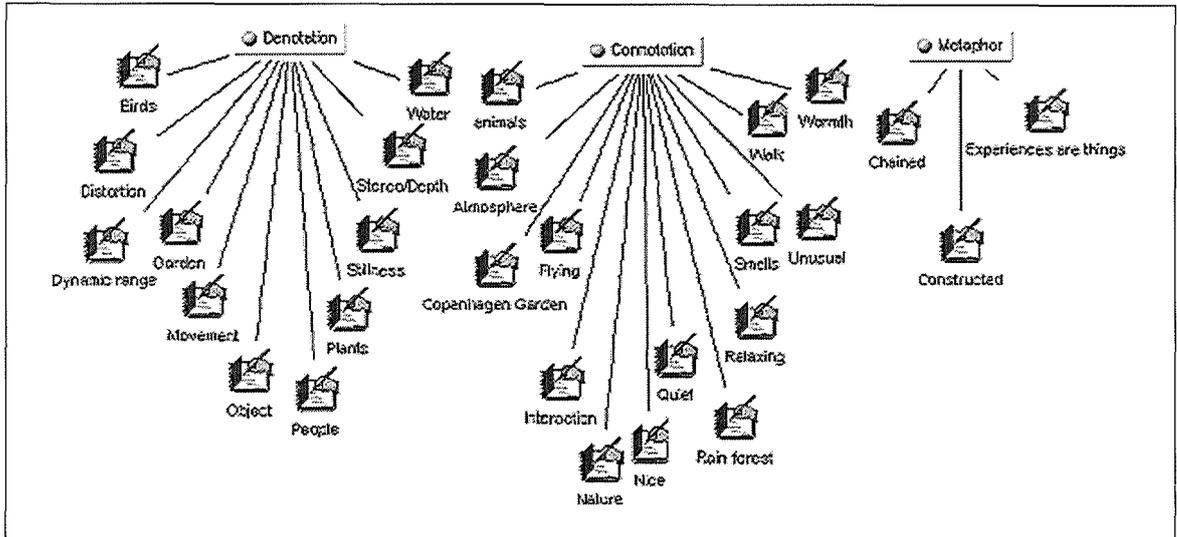


Figure 8.3 Coded responses from the significance and meaning probe

In this section a real variety of utterances appear. Again there is a range of denotative utterances that identify both aspects of the environment in terms of content and medium. However, the real thrust of the questioning uncovers a whole host of associations, memories and meanings that participants attribute to their immediate environment as connotations. Some examples of utterances are given below along with codes. The following table provides information on the type of channel that the phenomena occurred in. See Appendix D for a full list of utterances and codes.

Code	Example	Type	Freq
Animals	Well the first thing I think about is that I am trying to locate some kind of animals, If there are any I don't know. Because it's kind of weird I can hear this birds cry somewhere in the soundscape. So I for a while actually try to locate the bird It seems to be impossible for me.	C	2
Atmosphere	What do I associate with what I can see, well it's very exotic, it's almost like, well it's supposed to be hot and moisture and you can almost feel that it is, but not really.	C	2

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Birds	It's relaxing because of the water that is running and the birds.	D	4
Chained	The animals that are usually in botanical gardens, because that's what I mostly do, look around seeing if I can see the animals and small insects hiding, I'm not so much into plants. Its more the atmosphere and walking around enjoying the atmosphere. I'm kind of chained to this place. I would like to explore.	M	1
Constructed	Yes actually it's the constructed object. It's moving around and it keeps distracting me. Maybe its because its distorting this reality representation by not being part of it. It's going against the normal conditions of being in an environment like this, gravity doesn't work on it.	M	1
Copenhagen Garden	Yes, the water reminds me of a garden I know where there is a small vessel of water. And the botanical garden in Copenhagen I visited.	C	2
Distortion	Low dynamic range and some distortions when I move around, not so much when I stand still but when I start moving the corners move faster. When I move upwards its doing the thing skewed.	*DV	2
Dynamic Range	Low dynamic range and some distortions when I move around, not so much when I stand still but when I start moving the corners move faster. When I move upwards its doing the thing skewed.	*DV	1
Experiences are things	Actually the sounds of the water reminds me of a place, a museum in Copenhagen which has a kind of indoor garden like this. It's not the same actually but it sounds very much the same. So it kind of reminds me of that place and I am associating, trying to drag on my experiences of being in a place like that.	M	1
Flying	I am wondering if that rotating circle thingy is floating or flying? I think it might be water there, but it doesn't really look like water.	C	2
Garden	Yes being in a botanical garden.	D	8
Interaction	That I would like some action or something, I'd like to do something. I kind of miss interaction. I miss movement everything is still. I like the sounds though it's nice. I miss some action like I could pick some flowers or there were labels on the flowers then I could explore.	C	2

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Movement	I am wondering if that rotating circle thingy is floating or flying? I think it might be water there, but it doesn't really look like water.	DV	3
Nature	Calm, pleasant, nice, quiet, nature	C	3
Nice	Relaxing, taking a break from daily routines and looking at something very pleasant.	C	6
Object	Yes that graphics moving over there that is strange.	DAu	6
People	Yes there is no movement in the scene but there is a lot of people making noise I'm not in a rain forest because I'm actually present in a botanic garden, an indoor green house.	DA	1
Plants	I think it is a big Glasshouse. I think it's a place where people can come and study the plants and maybe some birds. It's a kind of nature machine or something.	DV	6
Quiet	Calm, pleasant, nice, quiet, nature	C	2
Rain forest	I think of being just in a tropic world.	C	4
Relaxing	It's relaxing because of the water that is running and the birds.	C	4
Smells	I miss the smells. The rings over there remind me that it's artificial, kind of irritating cos it's nothing to do with it. It's just there.	C	1
Stereo/Depth	In the model I think it is the green palm just in front of me, which is so close that I can see it in stereo, I'm quite fascinated by it.	*DV	1
Stillness	There's not much life in here, not much movement but sound of course.	DV	3
Unusual	And then there is this object, which is a bit unusual in this environment.	C	5
Walk	Not particularly but it's the kind of environment that inspires me to a nice walk, and the light of the sun is nice, warm its warm.	C	2
Warmth	Not particularly but it's the kind of environment that inspires me to a nice walk, and the light of the sun is nice, warm its warm.	C	1
Water	Well, like quietness, nice environment, relaxing environment, the noise of the water is very calming, that's relaxing.	DV/DA	7

**Table 8.2 Type and frequency of significance and meaning codes**

**Key:** D = Denotation, C = Connotation, M = Metaphor, V = Visual, A = Audio, Au = Augmented, \* = Medium/Form.

The connotative aspect of coding here is very wide-ranging yet low in recurrent frequency. This can generally be attributed to the individual differences of the 10 people who took part in the study. The connotative aspects of any sign encounter can only ever be considered in relation to each individual's Umwelt. In this respect, there may be some shared cultural heritage that might result in similar connotations occurring across a population. However, in relation to the questions here that explore personal significance and memory, the connotative potential of the environment becomes very specific to individual experiences.

Interestingly, in this section there is a considerable lack of active metaphors being used by the participants to describe their relationships with the environment. Unlike the first section where elements were considered in relation to spatial metaphors, here there are only three unrelated uses of metaphor with no recurrence.

### **8.10 Realness**

This section of the interview was designed to ask about what aspects of the environment participants considered to be real or artificial in the environment. It consists of two questions:

1. "Do the things you are seeing seem real to you?"
2. "Do you feel that you are in a real place?"

The first one asks about which aspects of the environment seem real/artificial. The second is an attempt to gauge how real the overall experience feels to the participant.

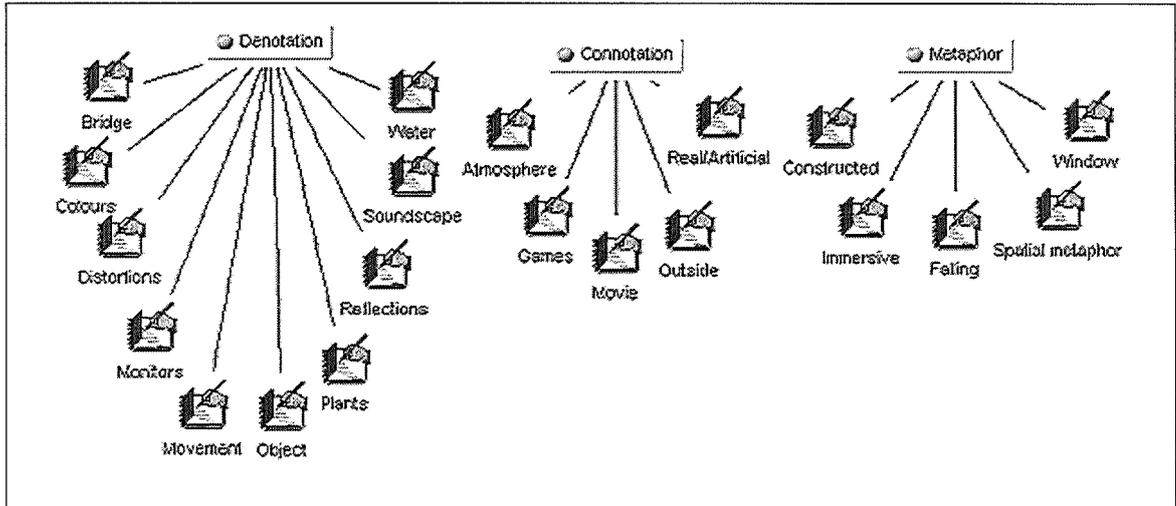


Figure 8.4 Coded responses from the realism probe

The utterances in this section cross all three main coding groups. Again there is evidence in the denotations of the split between form and content in the environment. This time however, some explanation is offered in the form of connotation and metaphor. Examples of utterances are given below along with codes. Further coding information is given in the table of type and frequency.

Code	Example	Type	Freq
Atmosphere	Ok with my ears I can hear the soundscape, actually there is so much water and water sound in here, but there is no moisture in the air, in my breathing or sensing on my skin.	C	1
Bridge	But on the other hand I get the feeling of being attracted to walking over the bridge or trying to step down on some other place maybe walk round, to explore it even more.	DV	1
Colours	No because they are strange colours and there are not many levels of colours, there is a lot of white and black and some green and some blue.	*DV	1
Constructed	On the other side I notice they are not real. Its not pure representation. They are not constructed as if they were a computer game. This is the thing I sense about it, I'm not sure, it could actually be constructed but I would label it as reality in some way.	M	1
Distortions	Because of the distortions in colours and when I move around	*DV	3
Falling	Yes. Its hard to see in areas where its really dark, but this area and over here where it is really light,	M	2

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	I think its really real to me and if I look down here its quite scary because I'm almost falling out of the platform.		
Games	On the other side I notice they are not real. Its not pure representation. They are not constructed as if they were a computer game. This is the thing I sense about it, I'm not sure, it could actually be constructed but I would label it as reality in some way.	C	1
Immersive	Sound, sound is very spatial it's location based. I also feel immersed in the stereo feeling that's why I was looking at that plant so intensely	M	2
Monitors	Yes they do, I think the way I see through the glass in here or whatever, is a bit blurry especially when I move quickly, but I think that it looks like a place that is here and I am looking through something.	*DV	2
Movement	Because I can move all the way around and look where ever I want and I can hear the sounds from the cars outside the house.	DV	5
Movie	In a way they seem real, it's a kind of double reality, in a way they look real. It could as well be a movie.	C	2
Object	They all seem real with one exception and that is the small things that are rotating in front of me that I find placed in the wrong environment. I don't associate anything with the figure.	DAu	1
Outside	Because I can move all the way around and look where ever I want and I can hear the sounds from the cars outside the house.	C	1
Plants	I think it's more if you look on the detail of the leaf it looks artificial. This plant looks much more real, and the pond and the plants on the lake	DV	3
Real/artificial	I think it's more if you look on the detail of the leaf it looks artificial. This plant looks much more real, and the pond and the plants on the lake	C	10
Reflections	Yes, at the beginning this leaf of this plant near by, with the sun reflecting on it, seems to be a bit artificial but now that I'm moving it around I'm used to it. The light and the reflection is very fine.	DV	1
Soundscape	Ok with my ears I can hear the soundscape, actually there is so much water and water sound in here,	DA	4

	but there is no moisture in the air, in my breathing or sensing on my skin.		
Spatial Metaphor	But on the other hand I get the feeling of being attracted to walking over the bridge or trying to step down on some other place maybe walk round, to explore it even more.	M	1
Water	Ok with my ears I can hear the soundscape, actually there is so much water and water sound in here, but there is no moisture in the air, in my breathing or sensing on my skin.	DV/DA	1
Window	It's a window to a kind of reality.	M	2

Table 8.3 Type and frequency of realness codes

Key: D = Denotation, C = Connotation, M = Metaphor, V = Visual, A = Audio, Au = Augmented, \* = Medium/Form.

Clearly the focus of these questions results in a number of responses that include reference to realness and artificiality. The frequency of these responses is rendered irrelevant because of the nature of the question. However, the information surrounding these questions is somewhat illuminating. In relation to the form/content split that has already been identified in the denotations there is a slight increase in the recurrence of utterances that mention things like ‘distortions’ and ‘monitors’. Along side this, there are connotations that identify the lack of atmosphere that would be present in a real botanical garden. As well as this there are utterances referring to ‘movies’ and ‘video games’ that are artificial experiences that this experience evokes for the participant. These are offered as ways of explaining the real/artificial qualities of the environment, which is evident in the form/content denotative experience of the immediate environment. Moreover, for the first time there are a number of active metaphors that appear with low frequency. Similar to the connotations these are offered as explanations of this form/content, real/artificial split. The ‘window’ metaphor, for example, attempts to explain how the experience of wearing an HMD offers the opportunity to look out onto another world. Similarly, the ‘immersive’ metaphor comes directly from the domain of VR research to explain the same phenomena.

### 8.11 Other Aspects of the Experience

This part of the interview is simply a general question that is designed to pick up on aspects of the study that participants may want to express about their experiences in the VE that have been missed in other questions:

“What else can you tell me about your experience?”

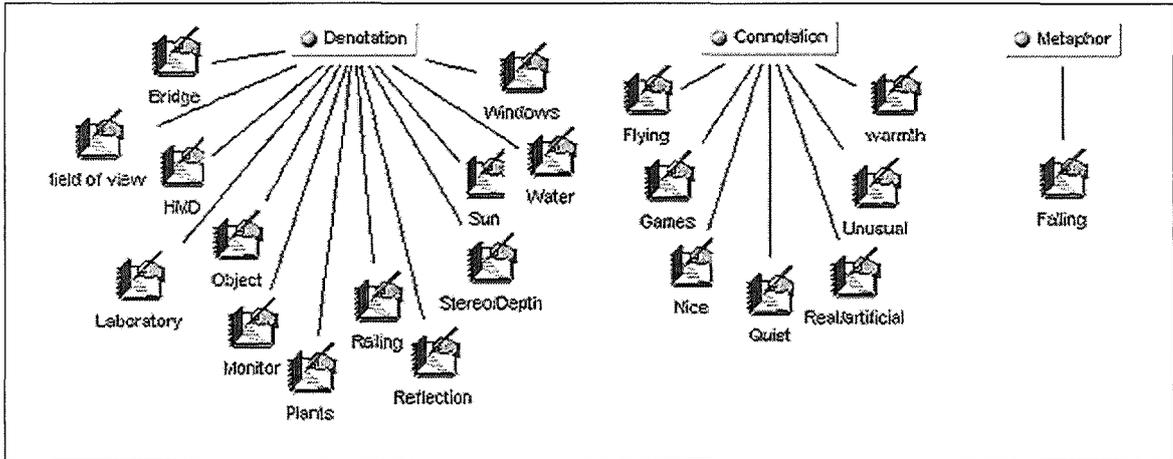


Figure 8.5 Coded responses from the experience probe

In general, the responses to this question were quite short and as such they represent a summing up of participants’ experiences within the VE. Examples of utterances and coding are given below (see Appendix D).

Code	Example	Type	Freq
Bridge	This bridge is very nice, I can appreciate this bridge very well, including these leaves in front of the bridge.	DV	1
Falling	There is something that is a bit unrealistic when I look down. Its like I’m leaning and the ground I am standing on is leaning with me too, this fence I was talking about is not entirely straight, it has an angle that’s not straight up.	M	1
Field of View	At the beginning I had a problem with the field of view, I mean I was seeing like the monitor, but now, I feel like I’m there, I got used to this field of view.	*DV	1
Flying	This object is finely placed, I mean I can tell that it is between me and the other bridge over there but its just a bit hanging in the air. It definitely looks artificial.	C	1

## Interacting with the Immediacy of Virtual Environments

Games	Well every time I have these kind of experiences I am missing where I need it elsewhere so where is my gun, where is the enemy.	C	2
HMD	Yes after a while I am beginning to be distracted from the view. I think it's because my brain has been adjusted to it, and then I start noticing the head mounted display, the physicality of the head mounted display. I notice that I have something different on my head	*DV	1
Laboratory	Well right now I am standing in the middle of a laboratory but I really completely forgot about that	*DV	1
Monitor	At the beginning I had a problem with the field of view, I mean I was seeing like the monitor, but now, I feel like I'm there, I got used to this field of view.	*DV	1
Nice	This bridge is very nice, I can appreciate this bridge very well, including these leaves in front of the bridge.	C	2
Object	I'm impressed with the depth perception, no reflection on the water from the rotating circles.	DAu	2
Plants	This bridge is very nice, I can appreciate this bridge very well, including these leaves in front of the bridge.	DV	2
Quiet	The reflection of the roof on the lake is very nice. And this warm reflection from these leaves and the light reflection from the sun, gives me a sense of quietness. I think it's the kind of light the illumination, the sun which gives me a nice feeling.	C	1
Railing	There is something that is a bit unrealistic when I look down. Its like I'm leaning and the ground I am standing on is leaning with me too, this fence I was talking about is not entirely straight, it has an angle that's not straight up.	DV	1
Real/artificial	This object is finely placed, I mean I can tell that it is between me and the other bridge over there but its just a bit hanging in the air. It definitely looks artificial.	C	2
Sun	The reflection of the roof on the lake is very nice. And this warm reflection from these leaves and the light reflection from the sun, gives me a sense of quietness. I think it's the kind of light the illumination, the sun which gives me a nice feeling.	DV	1
Unusual	Now that I get to think of it, it's a bit strange that I can't look out of the windows, but nothing else.	C	1

Warmth	The reflection of the roof on the lake is very nice. And this warm reflection from these leaves and the light reflection from the sun, gives me a sense of quietness. I think it's the kind of light the illumination, the sun which gives me a nice feeling.	C	1
Water	I'm impressed with the depth perception, no reflection on the water from the rotating circles.	DV/DA	2
Windows	Now that I get to think of it, it's a bit strange that I can't look out of the windows, but nothing else.	DV	1

**Table 8.4 Type and frequency of experience codes**

**Key:** D = Denotation, C = Connotation, M = Metaphor, V = Visual, A = Audio, Au = Augmented, \* = Medium/Form.

In general, this question resulted in the same patterns of denotation and connotation seen in other sections of the probe. There is the same split between form and content in the experience of the environment and again there is more explanation of this in relation to connotation. There is however, a distinct lack of metaphor again in relation to any of this.

## 8.12 Discussion

### 8.12.1 “What kind of signs do users encounter?”

The first significant thing to come out of this analysis is what is revealed by the denotative level of meaning that occurs in all sections of the probe. The evident split in two main types of denotation reveals the difference between the depicted world of the virtual environment and the medium that supports this environment. The depicted world is revealed in the denotations that refer to the pictorial elements such as the bridge, the plants, water etc. The technical world, or the supporting medium, is revealed in the denotations that refer to things like distortions stereo/depth, monitors etc. What is interesting about this is not only that the two worlds are revealed in the denotations but also that these two worlds occur at the same time. The technical elements are experienced as part of the environment as much as the pictorial elements of the world itself. In relation to presence research, this is a common problem that is known to interfere with a participants sense of being in the depicted world.

In relation to the proposed model, the pictures in the VE bear an iconic resemblance to the real things that they are representative of. In this way they are signs that represent

real things. Taken as a whole the VE is a group of concurrent iconic signs that represents a real place in a quite obvious semiotic way. Thus, the utterances of participants reveal the artefacts from the model as the elements denoted in the VE.

### **8.12.2 “What do users do with these signs?”**

The functional cycle is less evident in the data presented here, but is quite easily identified in the video footage itself. Simply put, as one watches the video footage one sees what the participants see. The functional cycle is revealed as the way in which the participant moves around, or more precisely, looks around the environment. In combination with listening to the utterances one can easily identify the elements that participants talk about as they look around.

Quite obviously, the limited interactive nature of media that promote immediacy, particularly in this environment, makes it impossible to identify any manipulated sequential chains of signs in the environment. While it is evident that the VE can be considered as one large group of concurrent signs rendered in the images, these signs in themselves cannot be manipulated in the same way that the symbols and indices of hypermedia can. They have no interactive component to them that allows them to be manipulated in any way (Andersen, 1990). As such this part of the model may not be appropriate in relation to media that promote immediacy, at least not to this environment.

### **8.12.3 “How do users interpret these signs during interaction?”**

More than anything it is the connotative aspects of the data that reveal how participants decode the signs/artefacts that make up the environment, revealing aspects of users Umwelts. While there is a range of different memories and associations that are evoked during immersion in the environment, many of them are related quite clearly to the depicted scene. These can generally be grouped into three main areas: references to Nature such as Rainforest, animals, birds, warmth atmosphere and smells; references to a pleasant, quiet experience; references to the desire to move around or engage with the environment in some way. The lack of metaphorical utterances used to describe the environment is also interesting. It seems to suggest that interaction with ‘immediacy’ type media, which is purely iconic, requires less metaphorical understanding. Perhaps this is because the iconic nature of this type of medium is naturally more denotative, supporting the illusion of non-mediation, whereas hypermediacy is largely symbolic in

construction, confronting you with the medium itself, as Bolter and Grusin suggest (Bolter and Grusin, 1999).

### **8.12.4 Discussion in Relation to Presence**

Two widely accepted definitions of presence are ‘the subjective experience of being in one place or environment, even when one is physically situated in another’ (Witmer and Singer, 1998) or ‘the perceptual illusion of non-mediation’ (Lombard and Ditton, 1997). In this study, what is revealed about presence, as defined here, is that presence is a continually shifting of attention to what is experienced while immersed in a VE. This cannot help but include elements of experiencing the medium itself, as the medium is the material that is formed to produce the illusory world. Without getting embroiled in a discussion of definitions of a sense of presence here, it is enough to say that the successful illusion of non-mediation (i.e. a perfect environment of immediacy) would be the removal of all of these denotative aspects of the technical environment that disturb the experience of being in the depicted pictorial space of the VE. The on going and problematic question that is at the heart of presence research is how to make this possible. To that question, there is no answer offered here. However, what this level of semiotic exploration reveals is the way that the phenomena encountered by participants is denoted and made sense of as part of their ‘immediate’ environment. This offers a potential method for measuring presence that is evident in the relationship between the levels of recurrence of elements in the VE and the elements of the technical world. In the denotative data here there is a high level of recurrence in elements of the VE and a low recurrence of elements intruding from the technical medium.

### **8.12.5 Immediacy and zones of interaction**

As mentioned at the beginning of this chapter, it was stated that it is not possible to immediately identify the same sort of zones that emerged from the data in Chapter 7. This then begs the question, why not? The answer to this lies in the differences between media that promote immediacy and hypermedia. Bolter and Grusin (1999) make quite clear that hypermedia confronts the user with the fractured and multiple aspects of the medium directly, whereas immediacy is about providing one holistic singular representation of reality. In this study, while the zones of interaction described in chapter 7 do not arise in the same manner, they can be identified as part of the mediating experience. The denotative split between the immediate world of the VE and the medium that supports it is particularly relevant here. As discussed already, the world

of the VE is the world of pictorial space represented by the photographs that make up the environment. The world of the medium, the monitors, the distortions, the HMD etc. is the world of the medium that allows the creation of the pictorial space. Here, unlike the pictures that Owen, Diarmid and Dave worked on, the participants of the study are asked to 'inhabit' the pictorial space in some way as if it were a real world. This is the basis of all virtual environments and it is at the core of issues of immediacy and presence identified earlier.

In the hypermedia study, organisational zone (zone 2) is identified as the; tools, brushes, paint, virtual or otherwise, that are manipulated throughout interaction. In this respect then the world of the medium that supports immediacy is the real world of the equipment that tries to erase itself during the process of mediation. The organizational zone cannot be identified easily because, unlike hypermedia systems, immediacy systems try to hide it. Denotative utterances that highlight distortions, dynamic range or the field of view reveal zone 2.

In considering the pictorial space of immediacy, it is important to consider how participants interacted with hypermedia in chapter 7. What needs to be remembered is the way that hypermedia allowed participants to step back from the pictorial space into a reflective zone (zone 1), or become engaged, via the organizational zone, in the production zone (zone 3). With the attempted suppression of the medium in immediacy systems, what happens is an immediate coming together of the pictorial space of production and the reflective space of zone 1. This then forces participants to inhabit the productive space of zone 3 as they inhabit zone 1, i.e. in a reflective manner. This is arguably supported to some degree by the masses of connotative data provided by the participants when they are asked about the associations they have with the environment. They are simply looking at it and thinking about it. They are reading it, not manipulating it or changing it. This position would be reversed if the medium was designed to support tele-presence, such as controlling a bomb disposal robot.

### **8.13 Summary**

The studies presented here focus on exploring the proposed model within the context of media that promote the experience of immediacy. The aim of these studies is to examine the relevance of the elements proposed in the model, in relation to

understanding interactions with immediacy type virtual environments from a semiotic perspective. The studies continue with the phenomenological approach to data gathering and semiotic analysis outlined in Chapter 5. The main difference from other studies in this thesis is that here live open ended interviews were used as the driving force for the talk aloud protocol. The subsequent analysis of the data reveals that indeed all of the aspects of the model seem appropriate to describing interactions with such media. The exception is in relation to the production of sequential syntagmatic structuring of signs during interaction. This is accounted for by the lack of interactive elements in the virtual environment and was predicted at the outset of the studies. With regard to the third research question, the studies presented here concur with those in Chapter 7 where an affirmative answer was offered. Indeed, the studies presented here do identify examples of some codes from Participants' Umwelts that are employed to make sense of their interactions.

## 9 Conclusions

Having now looked at three separate groups of studies from chapters 4, 7 and 8, some conclusions can now be drawn regarding the suitability of the presented model, the approach used and the findings in each of the studies. In this way, the contribution to knowledge within this thesis is explicated and directions for future work are identified.

### 9.1 The Contribution to Understanding New Media

This thesis directly addresses the problem of understanding new media that faces traditional HCI enquiry. Specifically, it identifies the lack of adequate theories in HCI that are grounded in a critical media perspective as a source of difficulty in understanding new media. Thus, the problem is tackled by elucidating the characteristics of new media from an historical media perspective and by providing a critical approach to new media derived from semiotic theory. The research presented in this thesis explores a semiotic model of interaction that places the user at the centre of activity engaged in the interpretation of sign systems whatever domain they might be in. The main studies in this thesis explore examples of both hypermedia and immediacy, which are broad categories of new media identified at the outset. Throughout the presentation of this thesis, the research questions are continually addressed at the appropriate juncture in the development of the theory. Explanations and answers are continually sought and offered as the development of a semiotics of new media is explored. In this way, answers to each question are offered as the thesis develops and each answer contributes to the development of the theory. The key findings in relation to understanding new media and HCI are thus:

- The identification of semiotic concepts relevant to new media
- The development of a semiotic model of interaction
- The development of a semiotically informed method of analysis
- The identification of codes

Each one is considered in detail under its own heading below.

### 9.1.1 The identification of semiotic concepts relevant to new media

The initial question that was posed at the beginning of this thesis, is based on an understanding of semiotics, in relation to theories about older media that have been proposed by a number of critical theoreticians over the last hundred years or so.

#### Question 1

**“Given the characteristics of new media, what aspects of existing semiotic theory in relation to older media are relevant to the development of a semiotic theory of new media?”**

The notion that the development of new media has very much been predicated on the computerisation of much older media, leads to the idea that various semiotic theories of older media might be relevant in the development of a semiotic theory of new media. Chapters 2 and 3 of this thesis directly address this question, by providing a very broad and detailed review of the basics of semiotic theory and its application in a number of relevant domains. A critical examination of these older theories identifies a number of important and recurring semiotic themes and problems that, it is argued, are worth taking into consideration in relation to the development of a semiotics of new media. Thus, the answer to the first research question is presented at the end of chapter 3, as a list of semiotic themes that are relevant to the development of a semiotics of new media:

- **Codes:** the underlying constructs that shape the meanings that people make as they interpret sign systems.
- **Denotation, Connotation and Metaphor:** the mechanisms by which signification occur.
- **Rhetoric:** the forms of signifying structures that have become specific to a certain domain.
- **Syntagmatic Structuring:** the concurrent and sequential structuring of sign units into complex structures called texts.
- **Sign Types:** the units of sign systems e.g. icons, indices and symbols, or Andersen’s interactive signs.

This list acts as a guide towards the development of the proposed semiotic model of interaction with new media.

### 9.1.2 The development of a semiotic model of interaction

The answer to the second research question is directly dependent on the answer to the first. Having identified the semiotic concepts that might be relevant to the development of a semiotics of new media, the focus of this question, is on developing a semiotic model of interaction with new media.

#### Question 2

**“How might the concepts identified as relevant to the development of a semiotic theory of new media be combined to produce a model of interaction with new media systems?”**

This question then places the semiotics of new media in direct relation to the concept of interaction that is so central to the concerns of HCI. In doing so, it becomes apparent that the application of semiotic theory, in relation to new media and interaction in particular, is fraught with problems. In Chapter 4, traditional semiotic analyses are attempted in relation to the interactive interfaces of mobile phones. This initial set of studies highlights the strengths and weaknesses of existing semiotic approaches. In particular, it identifies that a semiotics of new media requires it’s own understanding of the interactive process, in relation to the concept of user as author/reader of an interactive experience.

Essentially, a solution to this problem is achieved in chapter 5, by focusing on the notion of embodiment in relation to semiotic theory. The focus then moves to exploring the interpretations of embodied users that are acting within a medium, which is embedded with signs. In this way, semiotics moves away from the concerns of expert semioticians analysing static texts, towards the concerns of studying individuals interacting with dynamic convergent media.

The resultant model relies upon semiotic theory to articulate the mechanisms by which an embodied author/reader makes sense of the phenomena encountered during interpretive interactions with new media systems. The central concept proposed in this model, is fundamentally based on von Uexkull’s theories in relation to notions of the functional cycle and the Umwelt. This in turn, provides an answer to the second research question.

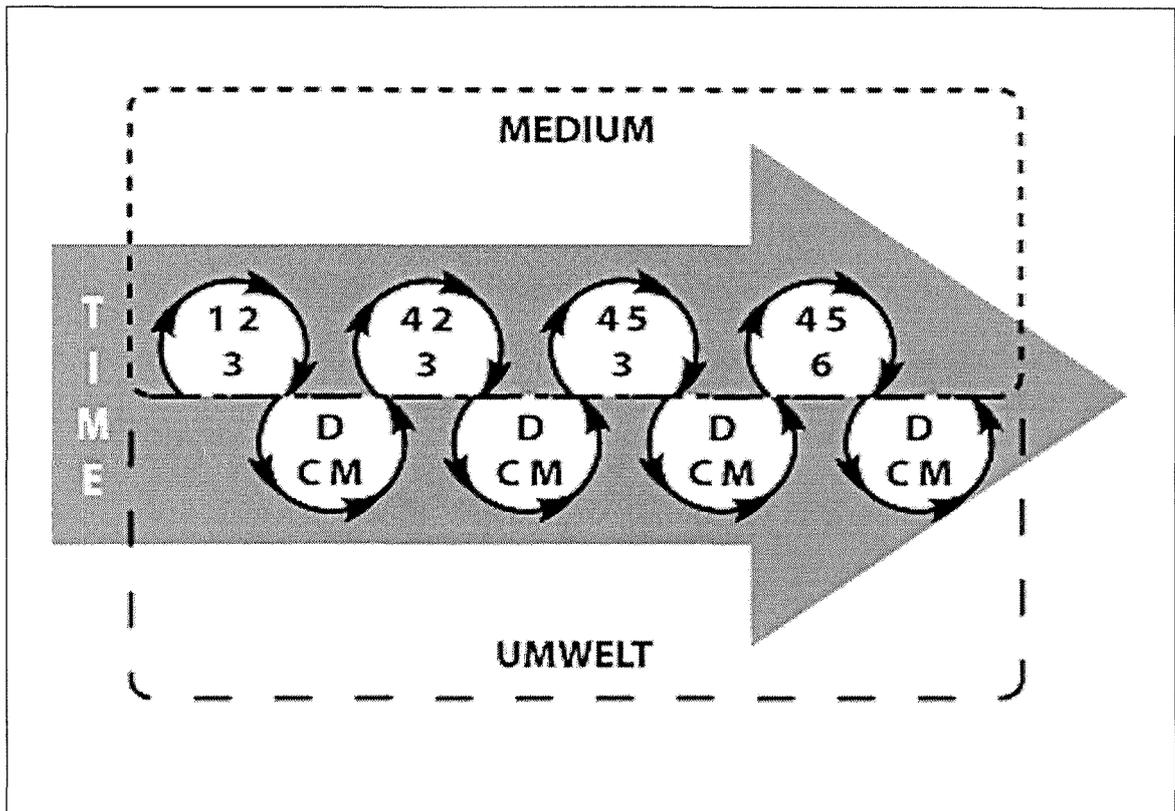


Figure 9.1 A semiotic model of interaction with new media

### 9.1.3 The development of a semiotically informed method of analysis

In considering the third and final research question, it is firstly important to establish that the theoretical model, derived from the semiotics of old media, is in actual fact appropriate for describing interactions with new media.

#### Question 3

**“Can the proposed semiotic theory of new media be applied to the study of interactions with media that promote both hypermedia and immediacy, in order to identify the codes that users employ in understanding new media?”**

With this in mind, the methods employed in Chapters 7 and 8 attempt show that the elements of the proposed model really do occur in relation to the two types of new media identified in chapter 1, i.e. hypermedia and immediacy.

Secondly, these methods also attempt to identify aspects of the codes that users employ to make sense of their interactions. To this end, three separate sub-questions are addressed, which direct the research towards an answer to the final research question, these are:

- **“What kind of signs do users encounter?”**
- **“What do users do with these signs?”**
- **“How do users interpret these signs during interaction?”**

Chapter 7 is a very detailed analysis of video data gathered from real workspace environments in relation to the concept of hypermedia. It focuses on the process of interaction and attempts, from a semiotic point of view, to uncover the kinds of meanings that users make from the artefacts they encounter while interacting. Evidence was found, which shows the types of phenomena that users encounter as artefacts or sign vehicles in the environment, that range from physical objects in the painters studio to the tool pallets and graphical representations of Photoshop. The study also shows how the participants interact with these signs, manipulating them and transforming them in combinations to form concurrent and sequential syntagms that result in the creation of further signs and further transformations throughout the working process. Furthermore, through the use of the semiotic method, the meanings that users make while they are interacting are also captured. Particular evidence is found for both connotative and metaphorical types of meaning, where users offer interpretations of signs and activities that are clearly derived from their own personal experience or Umwelt.

In Chapter 8 the method focuses on the detailed analysis of video footage of semi-structured, talk-aloud interviews, conducted while participants are actually inside a virtual environment. The subsequent analysis reveals how the proposed model can be used to explain interactions with media that promote immediacy. For example, the photo realistic pictures used in the VE are essentially iconic signs, that when taken as a whole, become a group of concurrent iconic signs that represents a real place. Also, the connotative aspects of the data reveal how participants decode the signs/artefacts that make up the environment, revealing aspects of users sense making. Interestingly, this type of media, which focuses on the immediacy of photographic realism, shows very little evidence of the sequential structuring of syntagms that is made obvious. This is a particular feature of this type of media, where the illusion of non-mediation is paramount. Therefore, it is expected that this should be the case. Making sequential

syntagmatic structuring obvious would result in a shift towards hypermedia rather than immediacy.

#### **9.1.4 The identification of codes**

The methods employed in all of these studies are based around the semiotic concepts discussed in the early chapters of the thesis. As such, they constitute a semiotically informed method of analysis that integrates semiotic coding and phenomenologically driven data gathering techniques as discussed in chapters 5 and 6 of this thesis. The findings of each study supports the development of the semiotic model as a way of understanding the interaction process from a semiotic perspective. They also establish that this semiotically driven approach can be used to identify the underlying codes that users employ while interacting. The problem with this approach is that, inevitably, individual differences play a huge part in people's interpretation of signs. Also, while the semiotic categories of denotation, connotation and metaphor prove to be useful in analysing participants utterances, it is not always easy to identify where the boundaries between the categories lie. This is particularly difficult because participants' utterances are naturally loaded with many layers of meaning, so denotation, connotations and metaphors are often combined.

The studies presented in this thesis make no attempt to find an incontrovertible truth about how many categories of codes there are that people use to make sense of their interactions with new media. This would be a huge task, involving much more quantitative data gathering techniques and statistical analysis. What this thesis does attempt to show, is that the proposed model of semiotics can be verified by uncovering different types of codes that are evident in the users utterances about their interactions.

In doing so, the studies identify some of the aspects of participants Umwelts that are brought to the interaction as a means of sense making. This in turn, points towards the irreducible nature of human interpretation described by the concept of infinite semiosis. Further work might establish a category of source image schemas, for example, that can be directly related to interactions with different types of new media, perhaps in the form of a rhetoric. However, the codes uncovered here can only be considered as indicators of this.

In relation to hypermedia, codes that point towards possible categorisation of users meaning making were those of spatial metaphors, container metaphors, getting and giving metaphors, with many others offering the potential of further investigation. The immediacy studies also showed reference to the use of spatial metaphors and container metaphors. Both sets of studies provided unique connotative references that were related to the specific instances of the signs they encountered in each domain. For example, the 'Roman nose' on the face that Dave worked on, also the connotations of 'rain forest' or 'movies' that were derived from the exploration of the virtual botanic garden.

## 9.2 The Contribution to Semiotics

As well as contributing to an understanding of new media, this thesis also offers a contribution to the semiotic community, in that it addresses the on-going problem within semiotics of user interpretation of sign systems and dynamic texts. A fundamental problem with semiotic theory, is that while it is very capable of theorizing about meaning, it provides very little empirical support for its claims in terms of user or reader interpretations. Every aspect of semiotics is from the theoretical standpoint of the semiotic expert. As a result, semiotics has long been berated in other disciplines for its lack of empirical support for its assertions. In this thesis, this problem is tackled by developing a semiotic approach that borrows a great deal from phenomenological approaches. In this way, empirical data gathering is built into a semiotic understanding of interaction. This in itself can be considered as a contribution to semiotic theory, simply because there is such a lack of research that attempts to bridge this theoretical/empirical gap (Chandler, 2001) (Mick & Buhl, 1992).

Furthermore, the nature of the proposed model and the semiotic method of analysis brings something more to the semiotic community, in that they begin to address the problem in semiotics of interpreting dynamic texts or sign systems. In short, the contribution to HCI, in relation to interacting with new media, is also a contribution to the semiotic community because dynamic sign systems are becoming more and more prevalent in the world today. Inevitably, as narratives and texts become more and more interactive, a semiotics like the one presented here becomes more and more necessary for semiotic analysis.

### 9.3 Reflections on the Application of the Method

Clearly, there are limitations associated with all talk-aloud procedures (Nielsen, Clemmensen & Yssing, 2002). It is accepted that there is always some element of cognitive processing that remains unknowable in this type of study. It is also accepted that the very nature of talking about something as you do it interferes with the processes of doing it. Further to this, is the idea that getting people to talk-aloud as they do things inherently makes them more reflective upon what they are doing, while they are doing it. In these studies, this is both useful and a hindrance.

Firstly, it is useful because all of the studies employed in this method are aimed at uncovering what people are thinking about as they interact. Probing the sense making activities of participants is essential to gaining some insight into how meaning is attributed to signs in an environment. The talk-aloud procedure allows the gathering of qualitative data while interaction is happening, which is invaluable in exploring the semiotic processes in individuals during interaction.

Contrary to this though, is the problem that self-reflection is not necessarily what people are doing when they are interacting. In Chapter 7 this is problematic because one of the zones (zone 1) that has been identified in the interaction process of the participants is particularly reflective, while the other two zones, (zones 2 & 3) are more active. It is difficult to be sure how reflective zone 1 is compared to the others when the whole study is coloured by the talk-aloud procedure. However, it is interesting to think of interaction as having a necessary part of it that is naturally reflective.

Another problem with this approach is the sheer amount of time that the analysis requires at this level of detail. The first part of the analysis, watching the tapes and logging the data is relatively straightforward. It is the analysis of the utterances at ground level that really takes the time. Using the Barthes style semiotic framework to identify denotations, connotations and metaphors provides what seems like a fairly clean-cut categorisation system. In actual fact, this is not the case, as many utterances can have multiple meanings, which makes categorisation all the more difficult and time consuming. For example, some complex utterances exhibit all three characteristics, which is the nature of language. The key to disentangling this is to concentrate on the emergent codes themselves. The semiotic codes provide a useful structure for analysis

in the first instance, while it is the actual meanings of the denotations, connotations and metaphors, as used by the participants, that give the insight into participants Umwelts. Further use of this method may require a tightening up of this categorisation or it may simply be a case of becoming more experienced in using this method of analysis, essentially getting a 'feel' for the types of meanings that participants are using.

## **9.4 Future work**

Of course, further validation of the model presented in this thesis would be a most appropriate starting point for any further work. In particular, it would be interesting to conduct further studies into the types of codes that users employ to understand different media, such as work place environments and online gaming communities. Further studies of this nature would provide more support for the model proposed in this thesis, as well as helping to establish a rhetoric of interactive meaning. Indeed, the research presented here focuses only on the single user perspective. It would be interesting to see how a semiotic model of interaction, based on this research, could be developed to encompass multiple networked users in collaborative environments. Here the notions of user and reader become particularly important as they are challenged by collaborative activity within the flux of sign based media. Also the emergence of the zones of interaction requires some further work to understand their relationship with the semiotic model proposed here.

### **9.4.1 A three zone model of interaction**

There are two particularly unique findings that emerge from the studies in Chapter 7. The first is the uncovering of the three zones of interaction that emerge from the video data. The second, is the apparent link between the zones of interaction and the types of meanings derived from the semiotic analysis of the data. These zones only emerged in relation to the hypermedia study and no real evidence was found in either of the other two studies to support them. Nevertheless, these findings suggest the possibility of a revision, or at least an alternative view of a semiotic model of interaction with hypermedia that might be conducted as part of some further study into a semiotics of new media.

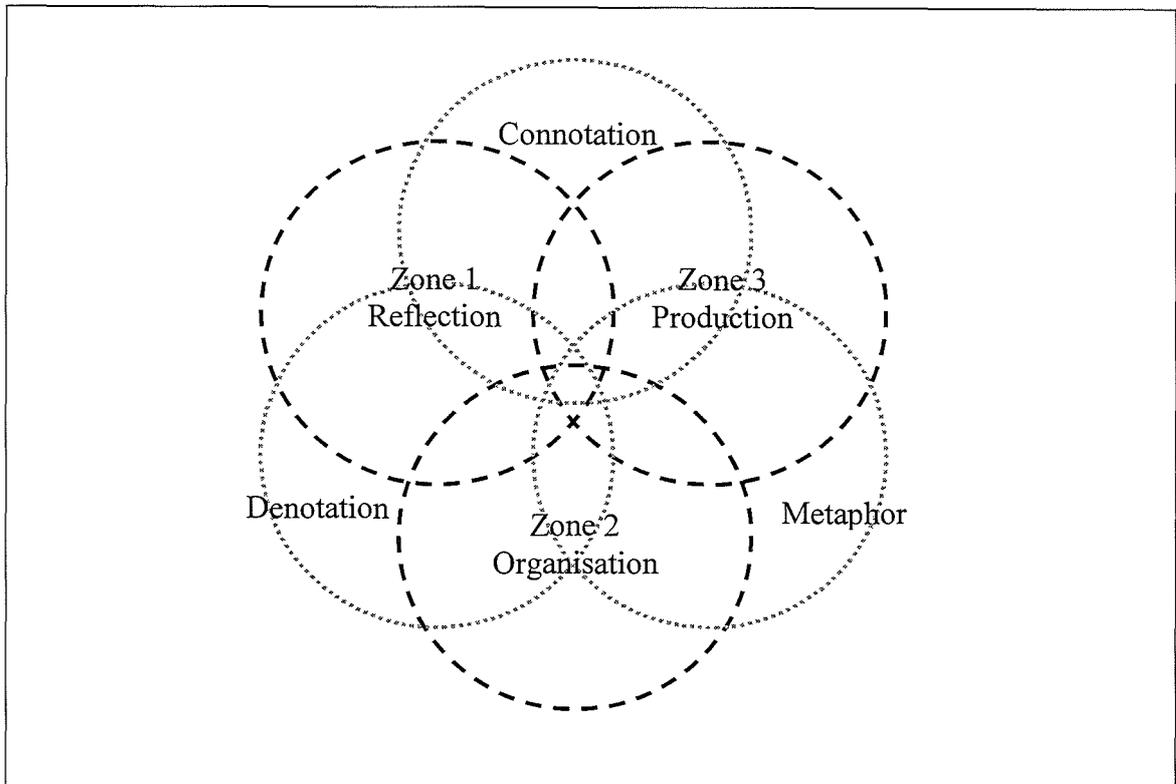


Figure 9.2 A proposed model of zones and meaning

For instance, it is not impossible to think of the proposed model, explored in this thesis, as a sequential view of interaction and the emergent zones-model as a spatial view of interaction. This is not unlike considering these semiotic models in relation to Passini's (1992, 1999) sequential and spatial models of places. Indeed, the emergent model of the three zones of interaction, might also be considered in relation to models of place, such as (Relph, 1976) or (Gustavson, 2001) in some future study. A clearer understanding of interaction with new media might emerge from a semiotic perspective, if both sequential and spatial views are taken in tandem. The first model providing some insight into sequential aspects of interactions over time and the spatial model helping to understand what constitutes the place of interaction.

It is also entirely possible that the three-zone model is an appropriate way to conceptualise about interactions in virtual environments where all three zones are stacked on top of one another. From this perspective, the user is primarily in the reflective zone observing the images displayed in the HMD. Secondly, the user is

engaged in organising and manipulating the technology by wearing the HMD and tracking devices. Thirdly, the user is engaged in producing the virtual environment as a kind of performance or self created narrative, through moving around in the environment. Alternatively, it is perhaps possible that the studies presented here, confirm, that it is only through the inclusion of interactive possibilities with artefacts in the virtual environment, that a real sense of presence can be created in virtual environments. Further work would help to answer these questions.

#### **9.4.2 Designer/User relationship**

A semiotic model of interaction with new media describes an interface/information space as a number of sign elements brought together to form a text. This text, unlike other texts, is experienced through the dynamic interpretation and manipulation of the concurrent and sequential syntagms of the system. This results in the production of meaning by the user. In short, the messages placed in the system by the designers have become the medium through which the user works. This thesis has concentrated on understanding user interactions with new media from a semiotic perspective. In this context, the relationship with the designer has been excluded. However, much of the theory presented here points towards the inclusion of the designer in a further development of the model. This is important because the user is characterised as the author/reader of her own interactive experiences. Thus, a designer can also be conceived of in the same way, essentially there is little difference between the two in terms of how they interact with new media. The model presented in this thesis is a model of the process of interaction with new media systems. Such systems are home to many designers, software engineers etc., who use them to create further systems or interactive artefacts for other people to use. The process of interaction for designer and user is very much the same, whether it is creating a flight booking system, or booking a flight over the Internet. The interaction and manipulation of signs is inevitable. The question is, if designer and user are considered together, how does this affect a semiotic model of understanding new media? Similarly, what are the power relationships between the two, who is responsible for what exactly? Further work might explore more fully this relationship between designer and user from a semiotic perspective.

#### **9.4.3 Design Practice**

The model and the semiotically informed method of analysis provide an alternative approach to new media design practice that offers solutions to problems that traditional

HCI approaches do not successfully articulate. By grounding the approach to new media in a critical semiotic approach, new media designers will be able to tackle design problems in relation to the history of remediation, convergence and the user as author/reader of their interactive experience. These particular aspects of the semiotic perspective presented here go beyond traditional considerations of user interface design, task analysis and heuristic evaluation.

The model in itself offers a useful way of thinking about interaction with new media in semiotic terms. Thus, when designers are developing convergent new media systems, they might consider how an author/reader will effectively engage her functional cycle to interpret the material they are producing. Moreover, they may see how the convergent paradigmatic structures they create impact on one another as they are interpreted and manipulated concurrently and sequentially. They might also consider more readily, the problems of clarity and ambiguity that impact on interpretative interaction as levels of meaning are added or reduced. As for the semiotically informed method of evaluation, this can be used in the design process as a way to identify whether or not users fully understand important aspects of new media systems. In a similar way to the SERG approach, they can use it to evaluate whether or not the messages are getting across. The difference here is that this method takes into account levels of meaning where SERG does not. Designers might also use it to identify underlying interaction codes and patterns that users might bring to a specific system, which might provide insight as to where to make improvements.

## **9.5 Conclusion**

New technology is transforming the world around us by providing new mediating and communicating opportunities. These transformations in media result in transformations of the signifying systems that we use to interact with them. Thus, a semiotics that can provide an understanding of the dynamic interactions with new media sign systems is clearly required. In proposing a semiotics of new media, this thesis has re-evaluated the semiotics of numerous older media domains in relation to their relevance to new media concepts. The result of this is a list of relevant criteria that should be included in a semiotic theory of new media. More importantly, the thesis also develops these criteria into a semiotic model of interaction with new media and successfully explores its suitability and robustness in relation to real world new media interactions through

empirical study. Therefore, this thesis contributes to an understanding of how users make sense of their interactive encounters with new media sign systems from a semiotic perspective. The semiotic model and the embodied/semiotic method of analysis presented here are therefore the result of a wide-ranging exploration of semiotic theory in relation to HCI and new media. It is expected that this thesis will be used as the basis for further exploration and future work in this field.

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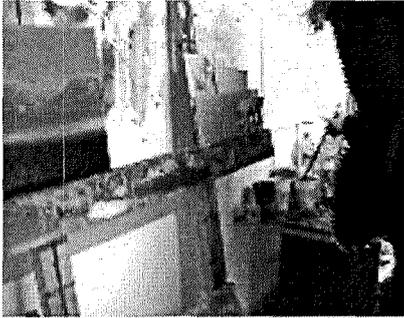
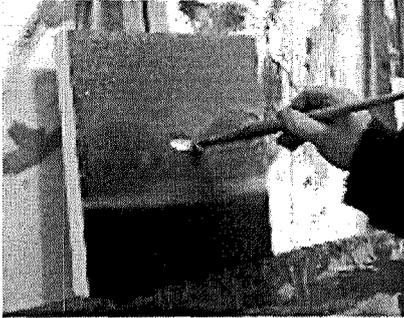
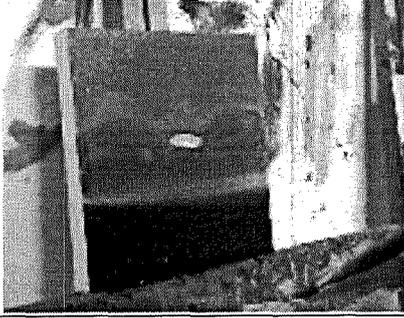
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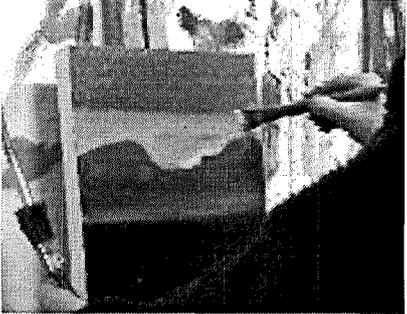
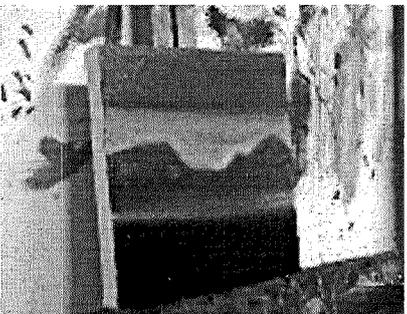
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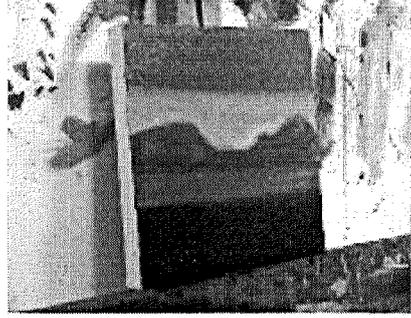
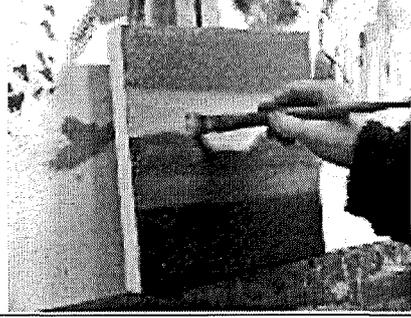
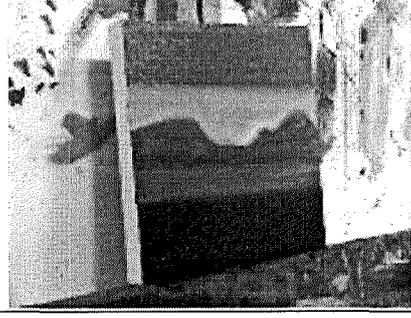
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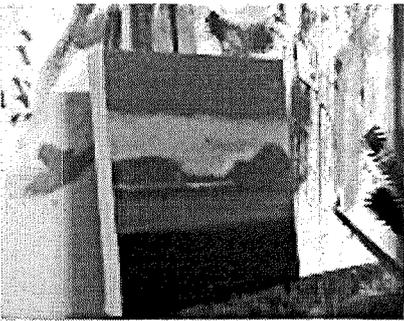
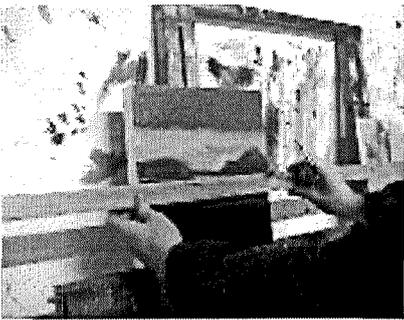
# Appendix A

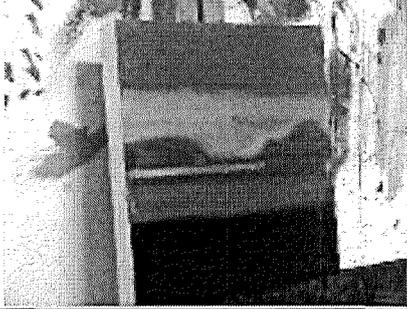
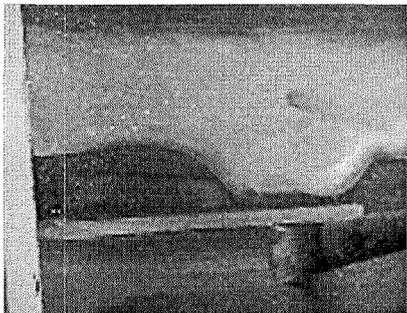
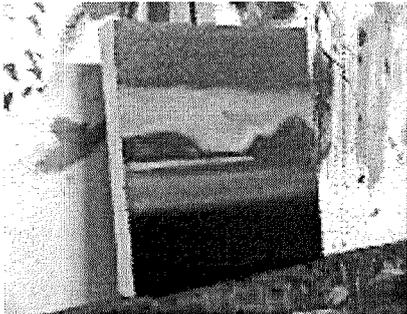
## Owen's Transcript

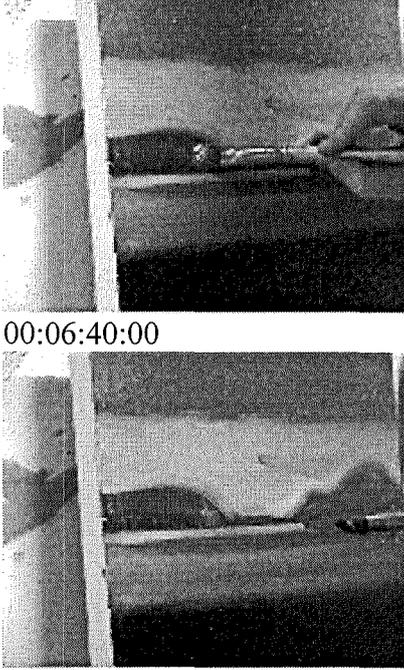
Screen	Description	Speech	Zone	Code
00 	Canvas blocked in, Owen has brush in hand	-Why are you using this brush? erm well, I want to use this to get some purer, lighter pigments, and this brush just gives me a straighter edge, a straighter line.	2	D
00:00:15:45 	Owen mixes paint off camera	Just going to use some pure... some white with a little bit of yellow mixed in with it.	2	D
00:00:25:13  00:00:32:22 	Owen starts painting directly in the middle of the canvas. He stops and steps back and then starts painting above the middle to the left (the sky).	And eh?... Yeh  I was initially going to use it to paint the sea but I'm actually going to use it instead to paint the sky.	3  1 3	C

<p>00:00:34:22</p> 				
	<p>Owen uses broad strokes to apply the white paint</p>	<p>-So what are you actually doing here? I'm just blocking in, just giving some definition to the... I'm actually painting some islands again, so I'm just giving some definition to the islands.</p>	<p>3</p>	<p>M C M</p>
<p>00: 01:20:06</p>  <p>00:01:32:14</p> 	<p>Paints Steps back Paints again Steps back looks at canvas Changes brush</p>	<p>I'm trying to decide weather I'm happy with this composition or not. I'm happy enough with it just now so I'm just going to keep on, I may change it but...I want a different colour for ...I'm not happy with this green. I want a different colour for the sea.</p>	<p>1 2 1</p>	<p>M?  D &amp;C</p>
<p>00:01:43:08</p>	<p>Owen turns to palette and mixes colour</p>	<p>So I'm gonna mix some ultra marine with some white.</p>	<p>2</p>	<p>D</p>

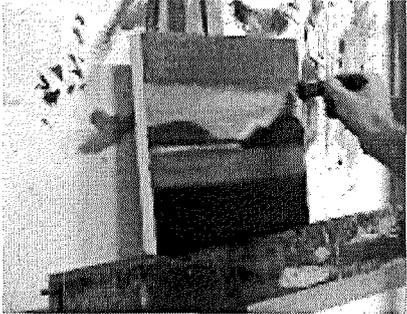
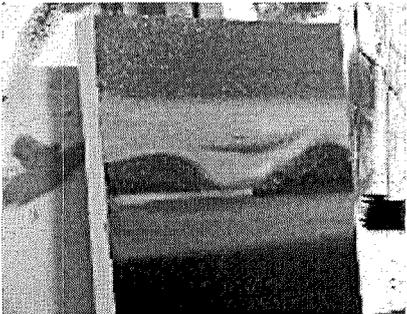
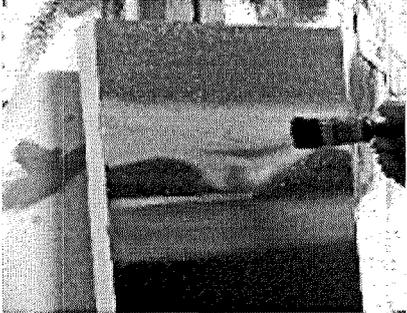
					
<p>00:01:53:00</p> 		<p>Returns to canvas and applies the paint</p>	<p>Try that... It's kind of mixing with the green, it's almost kind of a grey colour. It's still quite... Its difficult to tell what it is. It's starting to take some kind of shape.</p>	<p>3</p>	<p>D</p>
<p>00:02:17:11</p> 			<p>Just painting bands of colour at the moment, probably break up the horizontal composition with some verticals but I dunno, I quite like that.</p>	<p>1</p>	<p>M</p>
				<p>3</p>	<p>M</p>
<p>00:02:35:03</p> 		<p>Refers to working sketch Changes brush again, back to sky brush.</p>	<p>Right... I'm just referring to the sketch there and I'm going to change this a bit. Try and alter the composition a wee bit.</p>	<p>1</p>	<p>D</p>
<p>00:02:57:</p>		<p>Catches drip with finger and uses finger to paint directly</p>	<p>The paint is all gathering round the side there; I don't</p>	<p>3</p>	<p>M</p>

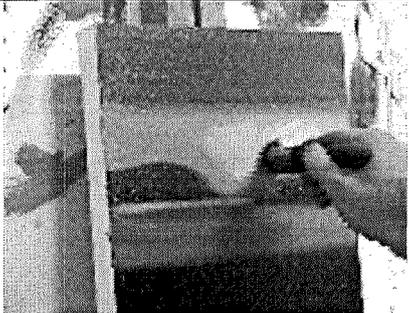
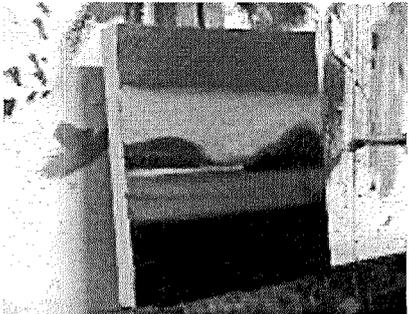
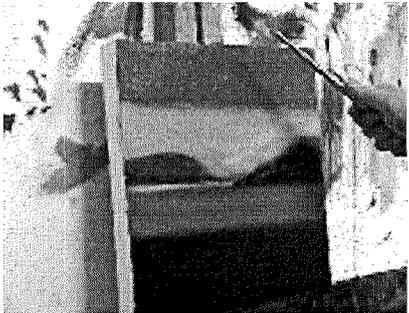
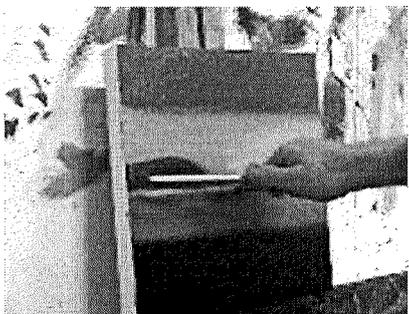
	<p>on the canvas</p>	<p>particularly want that to happen. I'll use my fingers to put a bit of paint on it. Just trying to use something other than a brush at the moment. -Why is that? Just you get a different effect almost less controllable in a way. You know what effect you are going to get with a brush, you start introducing your fingers and cloths etc and you get a less predictable effect.</p>		<p>D  M</p>
<p>00:03:39:14</p> 	<p>Steps back Changes brushes Loads brush with paint from palette. Paints on a thin line of white.</p>	<p>I'm gonna bring some lighter colours into it. I'm going to use a small brush now. Bring some bright white into the sea.</p>	<p>1 2 3</p>	<p>D D C</p>
<p>00:04:29:03</p>  <p>00:04:47:01</p>	<p>Cleans and puts down brushes, picks up a piece of wood. Places straight edge on Canvas and paints in the white line</p>	<p>I'm not getting the effect that I need here so I'm going to use a straight edge to do it. Oh... eh, that's a bit better.</p>	<p>2 3</p>	<p>M D</p>

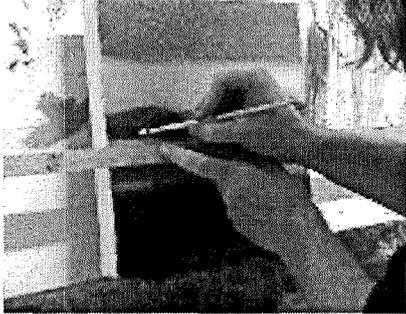
				
<p>00:05:01:19</p>  <p>00:05:13:10</p> 	<p>Steps back Changes to a broader brush again. Blends in surrounding paint with blobs</p>	<p>Now there are blobs of paint there that I don't really like, so I'm going to try and get rid of them. -How are you going to get rid of them? Just by using a bigger brush and blending them in with the rest of the colours. Try and do it as straight as possible.</p>	<p>1 2 3</p>	<p>D D D</p>
<p>00:05:48:22</p> 	<p>Stands back. Washes brushes</p> <p>Owen selects a flat brush and mixes some orange paint on the palette.</p>	<p>I'm going to... It's all getting a bit monotone so I'm going to bring some colour into the islands. Just deciding what colour I want now... Orange, I quite fancy orange. -Why orange there's no orange in the painting and I feel like I need a bit of contrast.</p>	<p>1 2</p>	<p>M C D</p>
<p>00:06:25:14</p>	<p>Paints on canvas with orange paint</p>	<p>It's mixing in with the blue to give a muddy</p>	<p>3</p>	<p>D</p>

 <p>00:06:40:00</p> <p>00:06:40:00</p>	<p>Stands back</p> <p>Points to right island then the left</p>	<p>brown but I don't mind that... It's not what I was expecting but I quite like it. I'm not dead certain about this composition but I'm going to carry on with it for the time being. I think I want to give the idea that this island is in front of this one, so I'm going to introduce some colour into that as well. Maybe a darker colour.</p>	<p>1</p> <p>M</p> <p>M</p> <p>C</p> <p>D</p>	
 <p>00:07:16:17</p> <p>00:07:28:01</p>	<p>Uses the same brush but loads it with darker colour. Paints into the island, over the boundary shape</p>	<p>Using the same brush again but it's a bit more red to make it darker.</p>	<p>2</p> <p>3</p>	<p>D</p>
<p>00:07:44:03</p>	<p>Changes brush (to sea colour)</p>	<p>I'm going to try and straighten up this line a bit. I'm starting to mix my brushes a bit</p>	<p>1</p> <p>2</p> <p>3</p>	<p>D</p> <p>M</p>

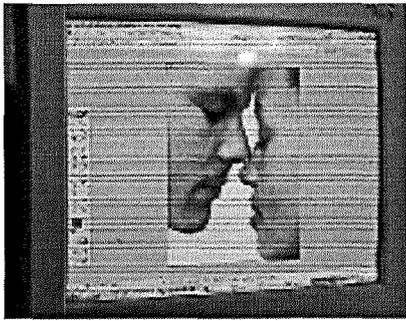
		<p>now and the colours are starting to get a bit muddy. I'll probably clean them in a minute.</p>		<p>D</p>
<p>00:07:50:00</p> 				
	<p>00:08:14:01</p> <p>Stands back to contemplate the picture. Cleans brushes. Loads brush with Yellow from palette</p>	<p>I'm going to start working on the sky. I'm just cleaning this brush, looking around to see, I've kind of run out of clean brushes I'm wanting to bring some lighter colour into the sky.</p>	<p>1 2</p>	<p>C D M C</p>
<p>00:08:26:01</p> 	<p>00:08:53:17</p> <p>Paints on the yellow</p>	<p>I'm still keeping this fairly loose; I'm not putting</p>	<p>3 1</p>	<p>M M</p>

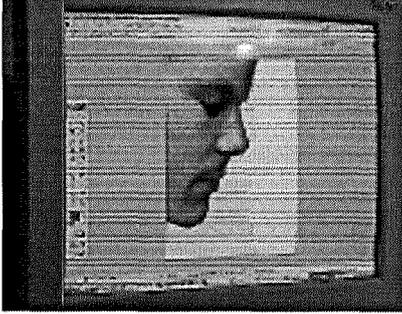
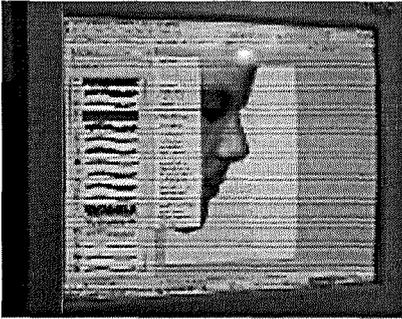
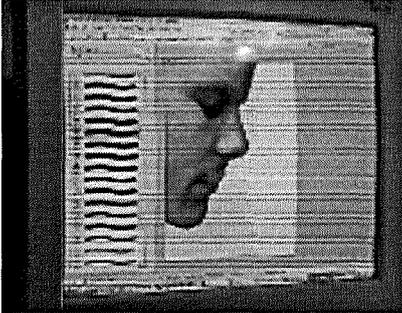
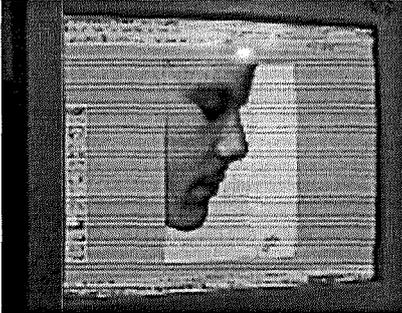
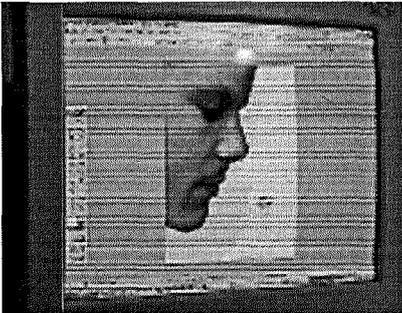
 <p>00:09:17:08</p> 		<p>any definition into islands or any of it really. I'm quite happy for it to be almost abstract...</p>	<p>3</p>	
<p>00:09:36:08</p>  <p>00:09:37:00</p> 	<p>Owen paints on some red in the sky by accident. Stands back Cleans brush</p>	<p>Just kind of get... oh shuffle! That wasn't intentional. There was some of that red left on the brush from blurring in that horizon line. I didn't really want that to happen, although it's not that bad.</p>	<p>3 1 2</p>	<p>D D C?</p>
<p>00:09:55:06</p>  <p>00:09:57:00</p>	<p>Uses dry brush to try and remove red. Adds some white to cover it over.</p>	<p>Just going to put a bit more white on the brush now. It's kind of, not necessarily intentionally, the colours that I'm using and the way that I'm painting it is making it seem like it's a certain time of</p>	<p>3 2 3 1?</p>	<p>D C</p>

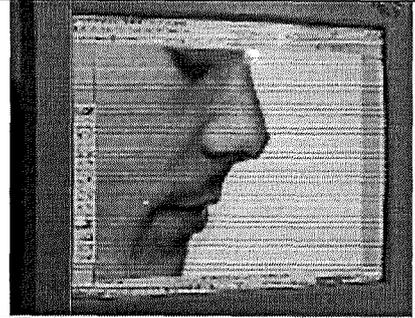
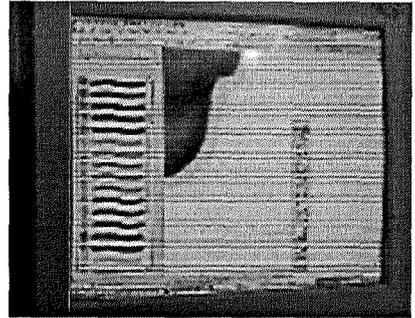
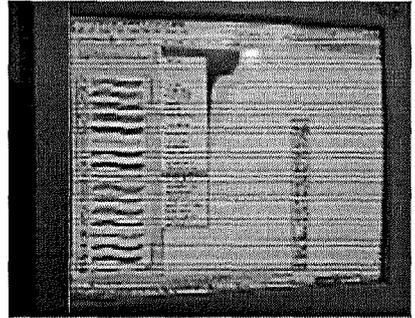
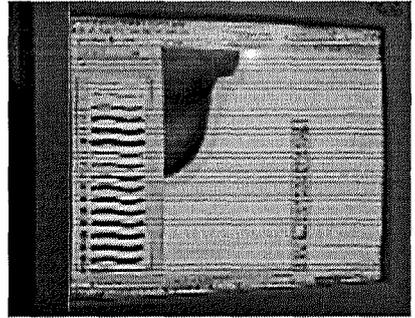
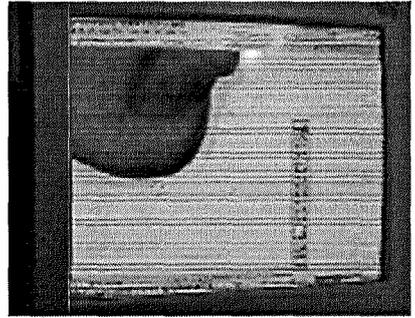
		<p>day... early morning or just as its about to get dark. It wasn't necessarily an intentional decision. It's the colours, and the way I'm painting that is dictating that.</p>		M?
<p>00:10:52:00</p> 	<p>Changes brush again to paint the island</p>	<p>-What are you doing there? Just trying to put some different tone on that island there. Trying to darken it a wee bit. Just defining the point where the island finishes.</p>	<p>2  3</p>	<p>C  C</p>
<p>00:11:38:00</p>  	<p>Stands back</p>	<p>I think its dark enough. I want to bring a bit more light colour into it. In the form of, although it doesn't make perfect sense, but I want there to be a bright line here of like some kind of light whether its moonlight or sun or whatever.</p>	<p>1</p>	<p>D  C</p>
<p>00:12:06:00</p>	<p>Washes brush. Selects small brush. Loads brush from palette</p>	<p>I'm going to use this wee brush again because its just going to be a thin line, need a bit of control.</p>	<p>2</p>	<p>D</p>

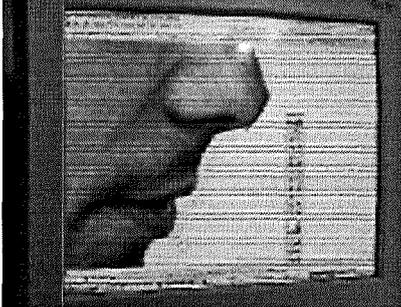
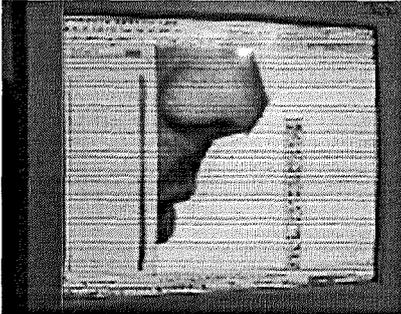
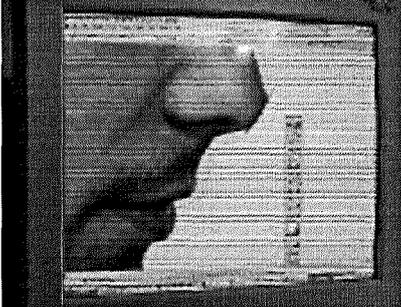
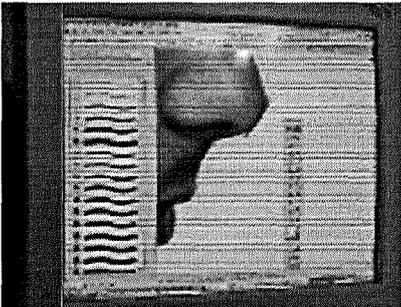
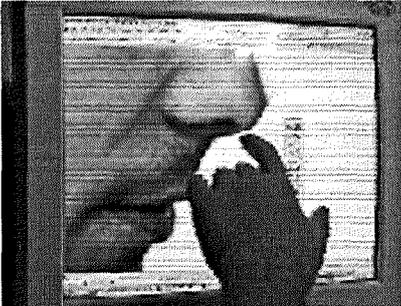
		<p>I'm actually going to use the straight edge again. Have to find a bit that's not already painted.</p>		
<p>00:12:43:13</p> 	<p>Lines up the straight edge. Paints in the line</p>	<p>Hopefully this will stay still. Right it's getting there.</p>	<p>3</p>	<p>M</p>
<p>00:13:06:19</p> 				

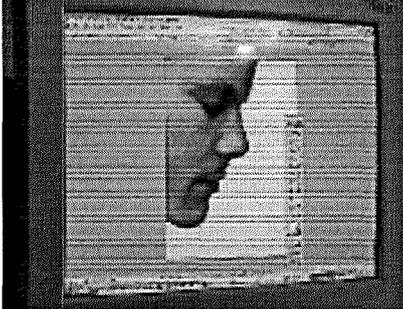
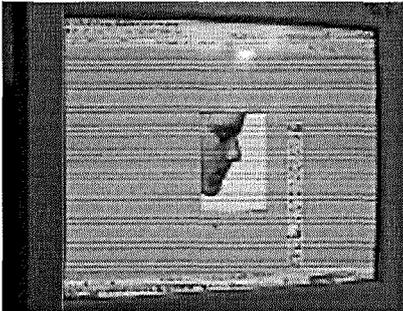
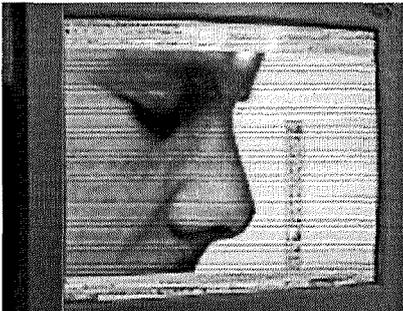
**Dave's transcript**

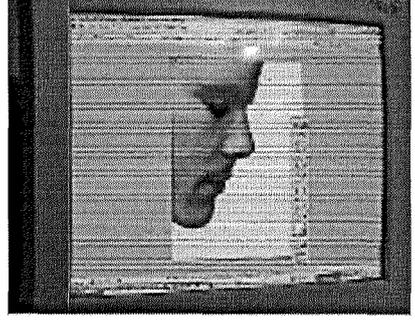
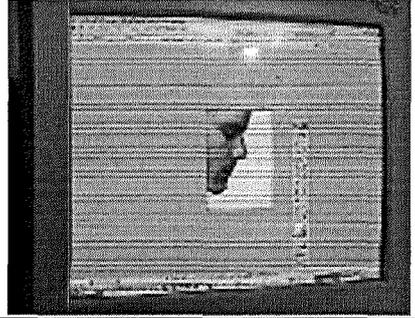
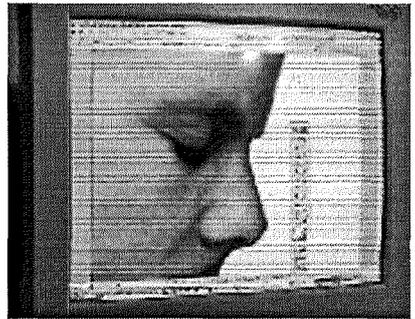
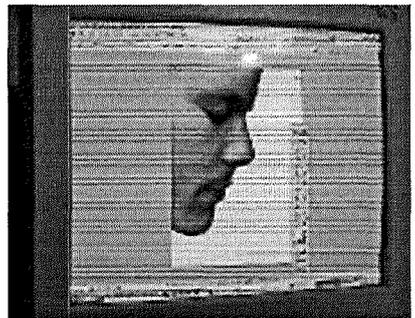
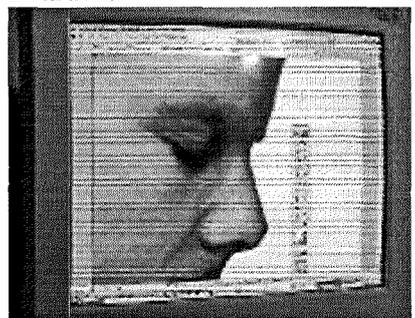
Screen/Time	Description	Speech	Z	C
<p>22:16:00</p> 	<p>Two faces on screen, female selected. Swaps background colour on tool palette. Deletes face. Points at head with cursor.</p>	<p>I've changed this over so the background colour is white, so when I cut her out white is all we're left with. So the good thing about that is, what we can now do, is a couple of things, is that he's pretty much isolated quite quickly</p>	<p>2</p>	<p>D</p>
<p>22:16:06</p>		<p>now...there's a little bit on his forehead that you'd probably</p>	<p>1</p>	<p>M</p>

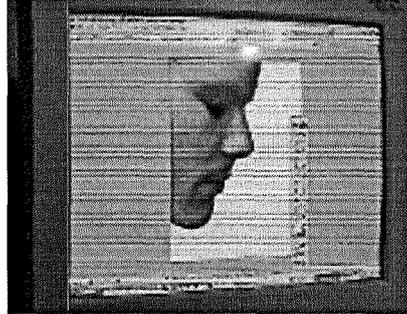
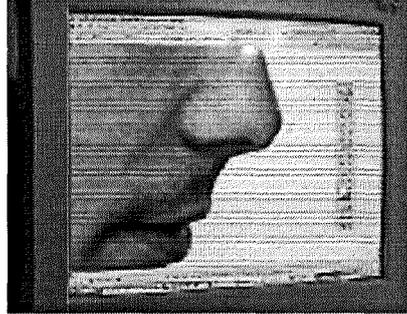
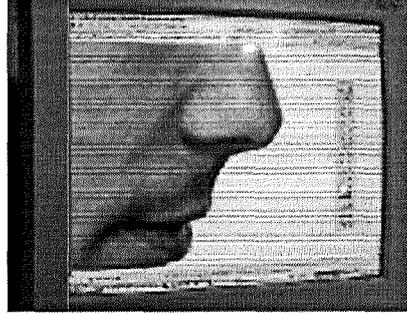
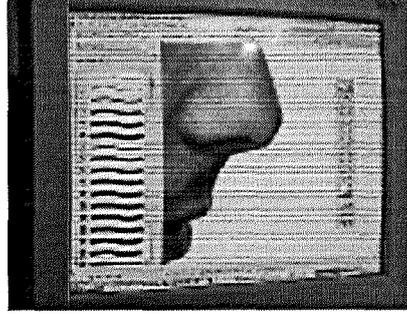
	<p>Points at grey background with cursor.</p>	<p>actually never know. You might have to do a wee bit of tweeking but there's not much. So what I'm going to do know is take out the majority of all this junk away.</p>		M
<p>22:16:27</p> 	<p>Opens brush menu and scrolls up and down</p>	<p>What I'll do is select quite a big brush I need quite a natural brush for this to work, it doesn't have to be but it helps. I want something that is fairly solid so this will do.</p>	2	D
<p>22:16:43</p> 	<p>Picks a brush, cursor changes on screen. Closes brush palette, checks colour. Tries to paint over grey background. Nothing happens. Goes to brush parameters changes opacity to 100%.</p>	<p>What I'm going to do now is um, its already white so I'm just going to... First of all pump the opacity up, pump the flow up to a hundred percent. Just get rid of all this stuff really quickly, just helping to isolate it a bit easier. Try to get as close as I dare without messing up. I released my mouse there so that I've got a save that went into the history panel.</p>	3	M
<p>22:16:46</p> 	<p>Uses cursor to paint over background (erase grey).</p>		2	M
<p>22:16:51</p> 			3	M
<p>22:17:17</p> 	<p>Zooms in close up on face.</p>	<p>So I'll probably just start working on him now. He's quite easy to work on right</p>	1	C

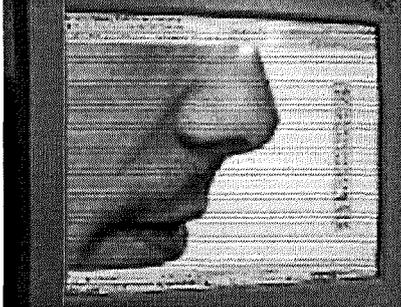
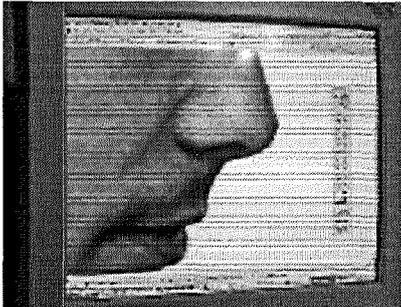
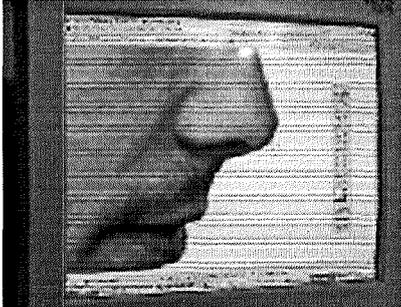
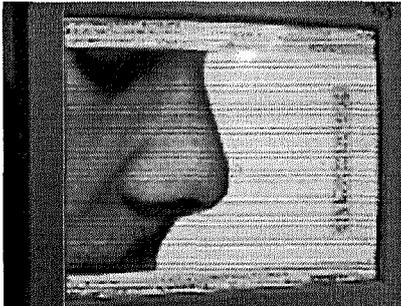
		<p>now.</p>		
<p>22:17:24</p>   	<p>Opens brush panel Scrolls up and down through menu.</p> <p>Searches through different brush menus.</p> <p>Selects a brush from the menu. Cursor changes to a perfect circle.</p> <p>Uses slide on palette to reduce the brush size.</p>	<p>What I'll do is probably select a nicer brush than this. Looking for a natural. I want one that's just really round doesn't have much...see these have got pixels in there texture, I don't want that I want something that is just a little bit more flat.</p> <p>-So here you are just searching through the different palettes Yes, this is a really clean edge, its got a slight blur to the edge. What this means is that when I'm working I can get quite close to it like this.</p>	<p>2</p>	<p>D</p> <p>D</p> <p>M</p>
<p>22:18:17</p> 	<p>Uses cursor to remove grey colour close to face.</p> <p>Scrolls up face</p>	<p>It just leaves some of the pixels in there, so this is a really nice wee tool to use to take the edge off. I've not gone onto the edge but the blurring takes that edge away that I'm looking for. So you can see that I'm getting quite close but not touching it. It's</p>	<p>3</p>	<p>D</p> <p>M</p>

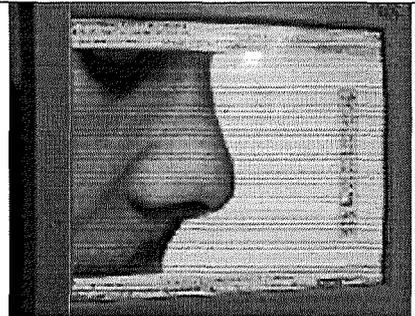
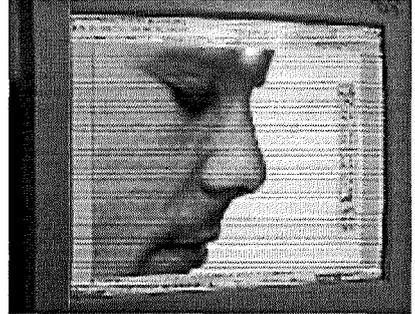
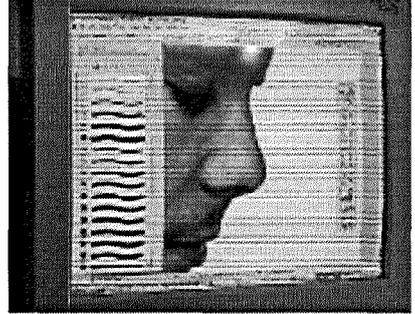
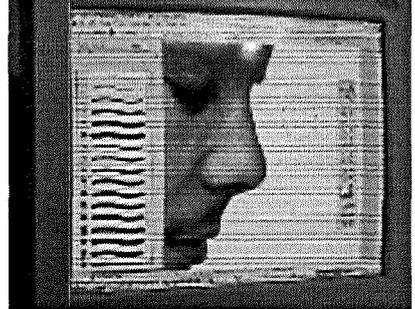
		<p>cleaning it quite nicely. -So you are really using it like an eraser? Yes that's right.</p>		
<p>22:18:40</p> 	<p>Opens brush palette and uses slider to reduce brush size. Working close in around a difficult area.</p>	<p>I'm going to have to dump the size a bit here. Not as much as one, just to get this area here.</p>	<p>2 3</p>	<p>M</p>
<p>22:18:50</p> 	<p>Opens brush palette and uses slide to increase the brush size</p>	<p>You can see now that it becomes very unproductive, I've got to move the mouse a lot to clean, so I'll bump it back up. To be productive and still be accurate I'll change the size fairly regularly.</p>	<p>2</p>	<p>M D</p>
<p>22:18:56</p> 				
<p>22:19:17</p> 	<p>Starts working around the nose to remove some residue of the previously deleted face.</p>	<p>This will be quite tricky now, because I have to match the blurring that is already here. What I'll need to do is see what that looks like when I get back out.</p>	<p>3</p>	<p>M</p>
<p>22:19:29</p>	<p>Zooms out</p>	<p>See its got a bit of a flat nose at the moment. What I may do is... I've got</p>	<p>1</p>	<p>C? C</p>

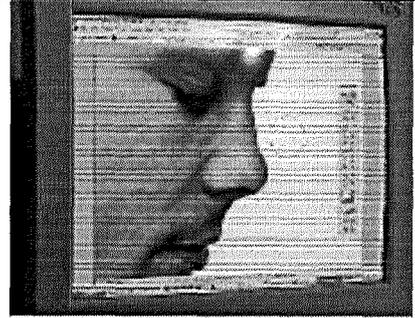
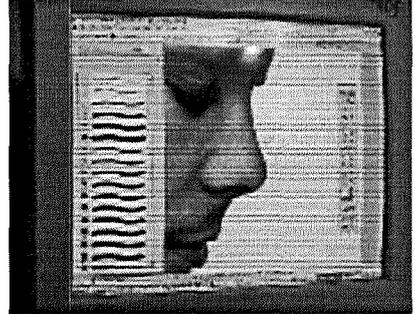
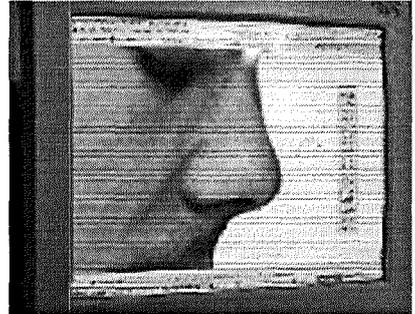
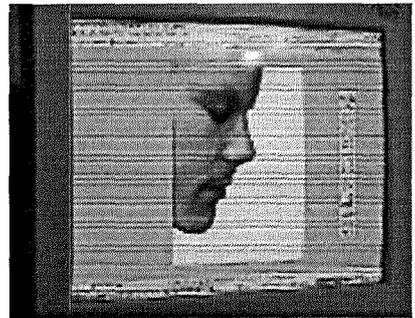
	<p>Points at problem areas with cursor.</p>	<p>options here, I could trim away some of his nose, which might actually be the option because the darkness that we have here is not that hot. There's not much shadow there, she was creating shadow so we want to trim that away, it saves us having to retouch it.</p>		<p>M D</p>
	<p>Zooms right out</p>	<p>There's a wee bit of patchiness down here as well. When you come out it's not particularly apparent.</p>		<p>D</p>
	<p>Zooms in Close</p>	<p>Might have to go back in there and adjust that.</p>		<p>M</p>
<p>22:20:12</p> 	<p>Moves face around Uses cursor to remove remaining grey around face. Trims away some of Nose. Undo nose trim. Moves to remove more grey from eyebrow. Point at eyebrow with cursor.</p>	<p>What I'll do is trim off all this excess and then go back in and make amends.  Not happy with that.  I was half closing my eyes there to get a feel what this actually was. When I half close my eyes I realised that it was his eyebrow. Gives you an idea of what to drop and what not to</p>	<p>3</p>	<p>M  M C M</p>
<p>22:20:45</p>	<p>Point close up to forehead Zooms out to look at whole face.</p>	<p>I can tell you straight away that there is a little thing here. The pixels are a little bit dark and</p>	<p>1</p>	<p>D  M</p>

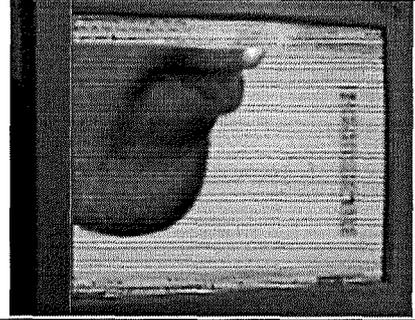
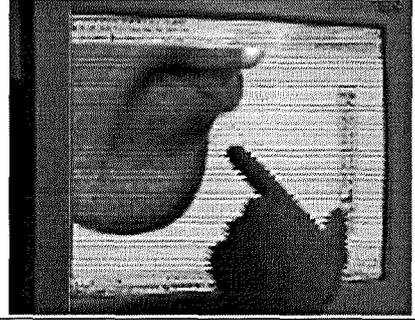
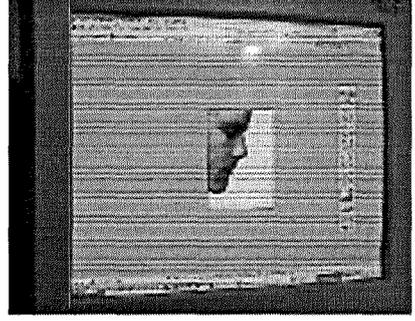
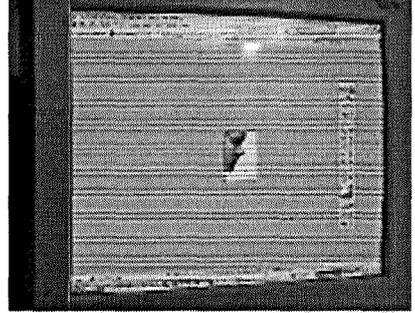
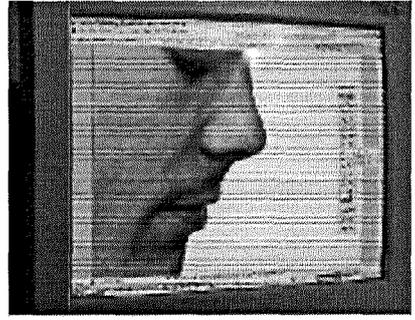
	<p>Zooms right out</p>	<p>that's causing a little bit of chunking. When you come out you can see that it's a bit bitty there. Gives a slight granularity to the surface.</p>		
				
<p>22:21:01</p>	<p>Zooms back in. Works on face with cursor.</p>	<p>The last edge if I just curved it back to give a hint that its going back up over his head, might need a bit more looks like is head goes in and then up again.</p>	<p>3</p>	<p>C</p>
	<p>Zooms out</p>	<p>He's a bit of a TEFAL guy at the moment.</p>	<p>1</p>	<p>C</p>
<p>22:21:12</p>	<p>Zooms in</p>	<p>He's a bit of a TEFAL guy at the moment.</p>	<p>3</p>	<p>M</p>
	<p>Uses cursor to remove some forehead.</p>	<p>I'll just shave a little bit off.</p>		
<p>22:21:23</p>				
				
<p>22:21:36</p>	<p>Points to brush parameter panel. Waves cursor around across head.</p>	<p>What we can do here is that we can change the flow or the opacity so that I</p>	<p>2</p>	<p>D</p>

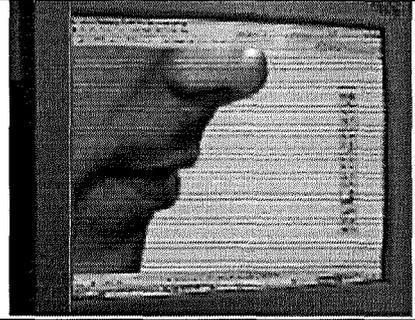
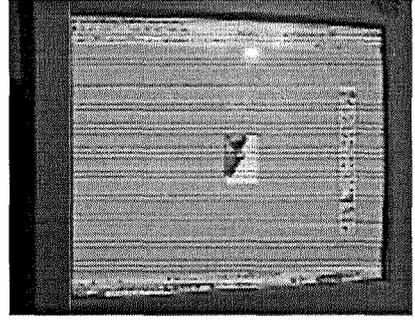
		can be a bit more aggressive in my painting but it will be slower.	1	M
22:21:47 	Zooms out  Zooms in	Now that looks a bit more realistic for his head there now.	1	C
22:21:53 	Points at nose	Now I'm going to start working on his nose. There is some natural red here about 3 pixels back. So what I'm going to do is try and sculpt his nose a bit.	1	C?  D  M
22:22:04 	Clicks on Smudge icon on tool palette. Cursor changes shape.	This is when I use smudge in a different way.	2	D
22:22:10 	Opens brush palette. Selects brush Works on the nose adding more colour pixels to the nose, Smudging the colours.	-so you are changing brush again? I've changed tool, it's a different tool this is a smudge tool, I'm now going to select a very similar brush. What I'm going to do is try and rebuild his nose a bit but I want to keep the same colours so I'll bring this shading	2          3	D          M
22:22:23				M

		<p>down there. Give it a little bit more shape</p>		
<p>22:22:42</p> 	<p>Clicks on Paint icon on tool panel. Uses cursor to erase the built up nose.</p>	<p>Now what I can do is flip back to my paint brush and maybe try and pull some of this stuff off. -So are building that up to... Take it away again, that's right. So that I've got room to play with so that I can shape the nose the way I want it. I'll be relatively aggressive to start with.</p>	<p>2 3</p>	<p>M M</p>
<p>22:22:50</p> 				<p>M</p>
<p>22:23:13</p>  	<p>Zooms out  Zooms out more  Zooms in</p>	<p>Noses generally have a bit of a... At the moment he's got a bit of a Roman nose, so I may want to consider.. I mean that's fine people would never probably think twice about having a Roman nose but we could give him any nose he wants. (laugh) -You sound like a plastic surgeon. Yeh.</p>	<p>1</p>	<p>C  C</p>
<p>22:23:37</p>	<p>Uses Cursor to take away some of the pixels on the nose. Undoes some work.</p>	<p>I'm not particularly happy with that, so I'm going to take abit of that...build</p>	<p>3</p>	<p>M</p>

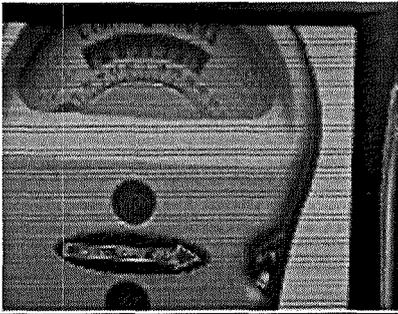
	<p>Tries again</p>	<p>from the back up so it looks more natural</p>		
<p>22:23:45</p> 	<p>Zooms out.</p>	<p>Moving my head to see how it looks.</p>	<p>1</p>	
<p>22:23:50</p>  	<p>Opens brush palette. Uses slider to increase brush size. Checks size of cursor on screen. Goes back to slider and reduces size.</p>	<p>A wee trick that I'll sometimes use here is to use a much larger brush than I would actually need. What that will do is give a shallower curve.</p>	<p>2</p>	<p>M  M</p>
<p>22:23:58</p> 	<p>Uses cursor on nose.  Goes too far Undoes mistake Works back in again</p>	<p>So I've actually zoomed out now and I'm using a bigger brush so I get a less aggressive curve. It my look as if nothing is happening... ooops! Just rolling the mouse a bit , helps me hopefully to not put too much on</p>	<p>3</p>	<p>M  D</p>

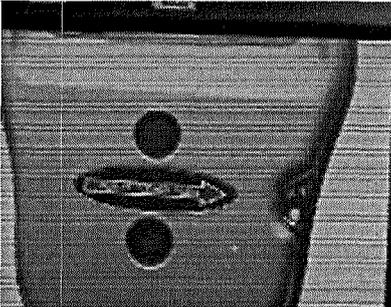
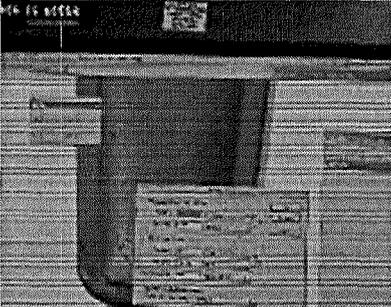
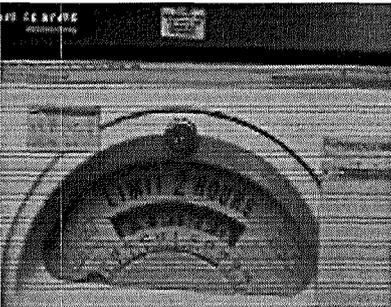
				
				
<p>22:24:38</p> 	<p>Opens brush palette Reduces brush size with slider. Zooms in Works on nose again Zooms out</p> <p>Zooms in Moves to chin</p>	<p>Ok I'm a wee bit out of control there so I'm going to move down a little bit. It comes back to that, It's not too bad. One of the things I'm not too happy with is that it's still a bit too sharp. I want to work on his chin a bit more as well.</p>	<p>2</p> <p>1</p>	<p>M</p> <p>M</p> <p>C</p>
<p>22:25:00</p> 				
				

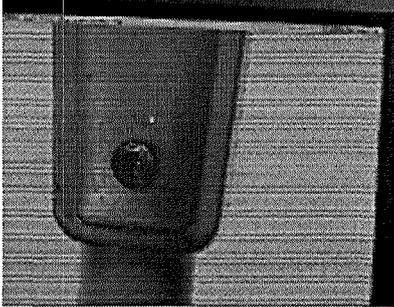
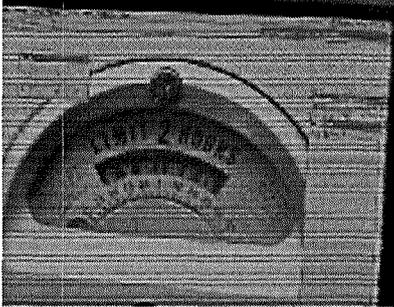
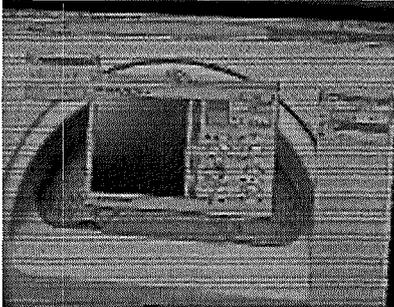
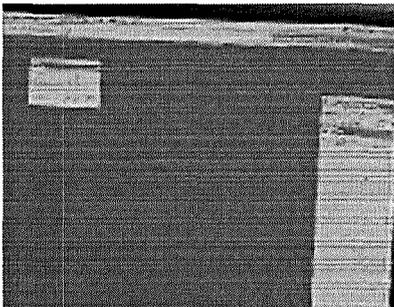
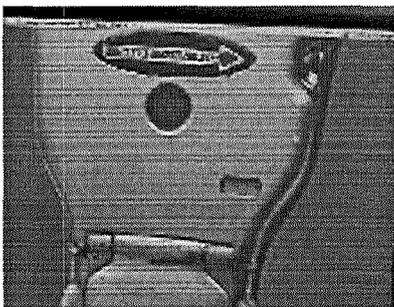
				
<p>22:25:16</p> 	<p>Point at screen with hand. Uses cursor to remove some of chin. Goes too far. Undoes</p>	<p>A lot of this chunkiness is caused by anti-aliasing. So I need to try and trim that back a little bit, oops.</p>	<p>3</p>	<p>M D M</p>
<p>22:25:50</p>  	<p>Zooms out looks at full face. Zooms right so image is small.</p>	<p>That will hopefully be a bit better. One thing I know is that I'm probably going to have the image at about that size. So I know for a fact that that's ok.</p>	<p>1</p>	<p>D</p>
<p>22:26:00</p>  <p>22:26:10</p>	<p>Zooms back in Selects blur tool from tool palette. User parameters to adjust the strength of the blur tool Tests it. Undoes it. Changes the strength again. Zooms in. Uses tool around edge of face. Moves face with</p>	<p>What I will do is put a slight blur on it. So I'll move to a blur tool now and I'll probably pump it down to about 20%. Actually that's a bit too strong. It just bangs the anti-aliasing up a bit gives it a lot more of an edge makes it a little bit less surreal. When</p>	<p>2  3 2 3</p>	<p>D  M M M</p>

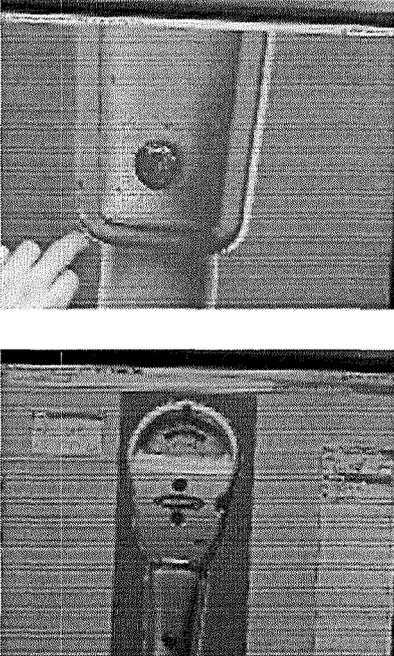
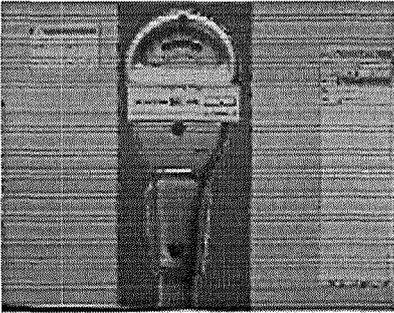
	<p>hand tool. Uses cursor on edge again</p>	<p>you have that hard edge with the step pixels it looks very fake.</p>		
<p>22:27:09</p>  <p>22:27:20</p>	<p>Zooms out to assess the final image.</p>	<p>The thing about working professionally on things like this is that you don't have time to make it perfect so I would be quite happy to pump that in like that.</p>	<p>1</p>	<p>M</p>

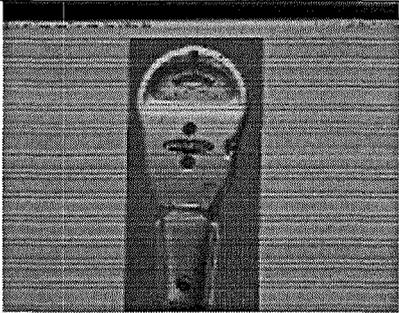
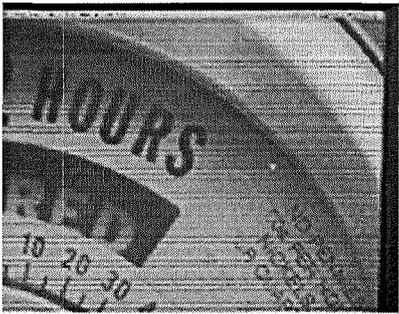
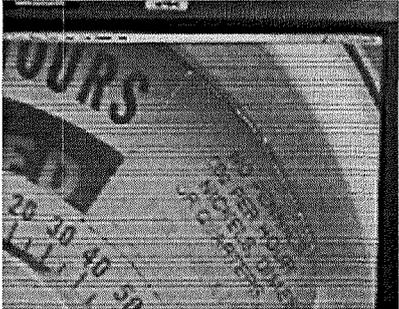
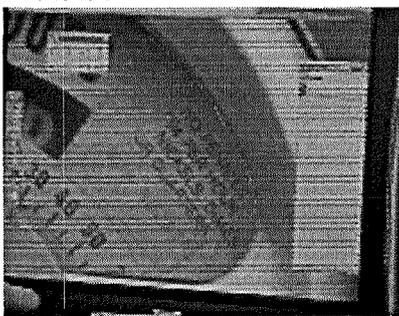
Diarmid's transcript

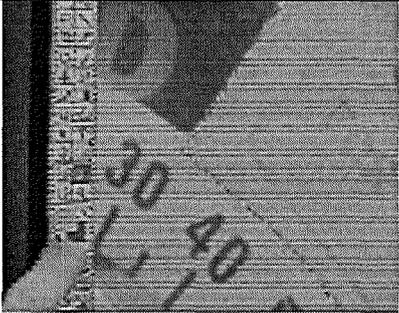
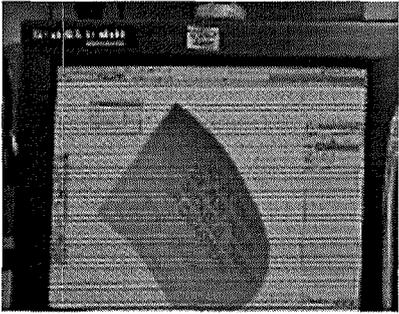
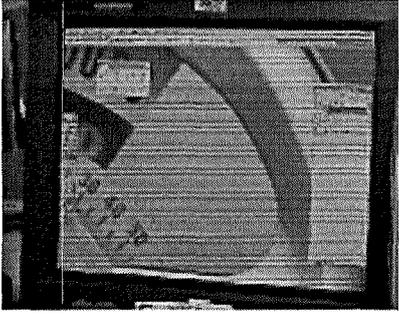
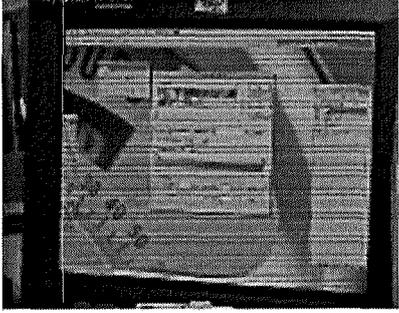
Time Screen	Actions	Speech	Zone	Code
<p>20:41:19</p> 	<p>Opens Parking Meter File.</p>	<p>This is an image you would get off a photo disc.</p>	<p>2</p>	<p>D</p>
<p>20:41:21</p> 	<p>Goes Close up. Opens a directory window to Save file in.</p>		<p>2</p>	
<p>20:41:30</p>	<p>Moves Image around with hand tool.</p>	<p>-So what are you actually doing here? I Need to ...Make it British effectively.</p>	<p>3 1</p>	<p>C? M</p>

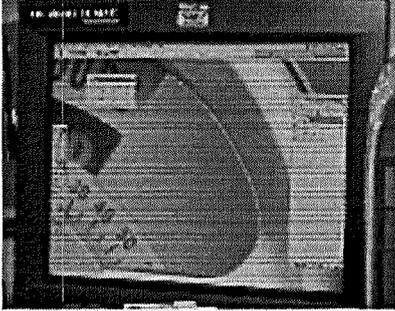
	<p>Points at screen with hand and cursor.</p>	<p>So I'm going to loose all that type around here. Change expired to penalty, leave the limit 2 hours and then just make it as realistic as possible.</p>		<p>D C?</p>
<p>20:41:44</p> 	<p>Moves Image with hand tool. Opens Save folder again. Closes it. Opens Image size window, looks at image size. Closes it.</p>	<p>The file format comes with quite a high Res. Its quite a high Res Image</p>	<p>3 2</p>	<p>D</p>
<p>20:41:56</p> 				
<p>20:42:00</p>  	<p>Moves Image back to top Opens Path window, Selects Background, Delete option pops up, Clicks Yes.  Selects Path  Sets tolerance  Makes an inverse selection  Removes background layer  Moves Image up and down</p>	<p>This is how they come off a photo disc. It comes with a Path. First thing we are going to do is delete the background. Because its going on to a coloured background I delete the actual background. I'm selecting it from the actual path. Set tolerance. Invert it, Go back to layer palette, remove background layer to layer zero so I can delete the</p>	<p>2</p>	<p>M D M M D D M D</p>

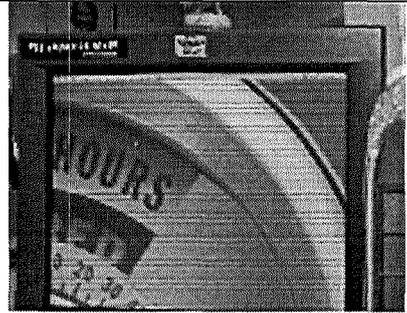
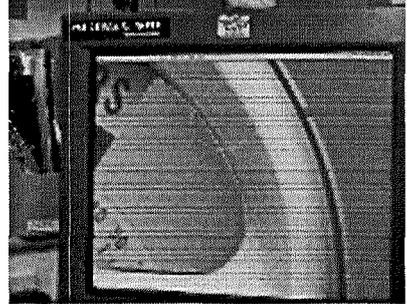
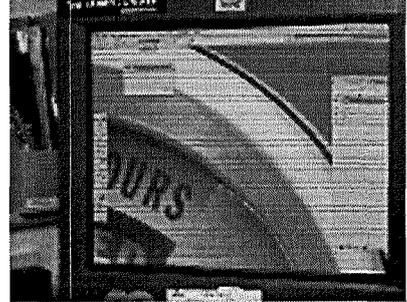
		<p>actual background. So we've got the chequered squares.</p>		
<p>20:42:39</p>    	<p>Opens layer palette and creates a new layer. Opens colour palette and selects red. Selects All. Opens Fill window. Fills layer. Zooms out to see full image. Moves meter image in front of colour. Zooms in</p>	<p>Put a new background with a new colour, just using any colour just now. Select All Fill the foreground colour. So that's the full background image, I'm just going to swap the actual order.</p>	<p>2</p>	<p>D</p>
<p>20:43:00</p>	<p>Moves Image down Looks at image closely.</p>	<p>Right I do this so I can actually see you sometimes get wee areas of white, and if I deleted it to</p>	<p>1</p>	<p>D</p>

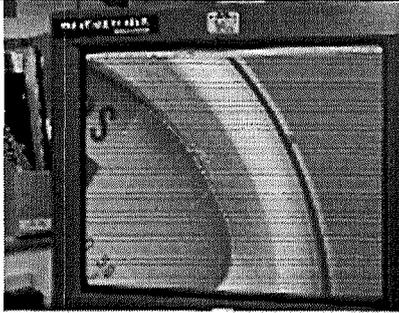
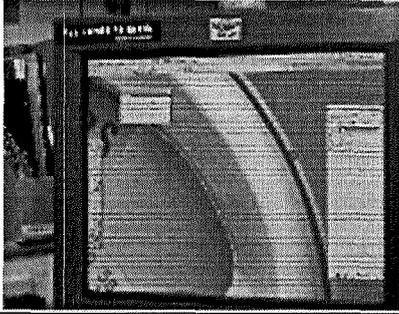
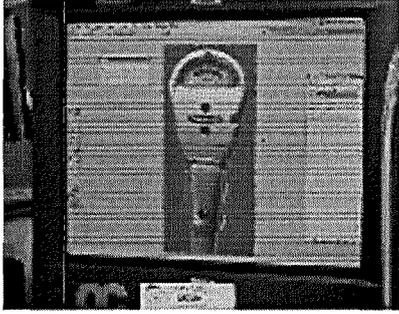
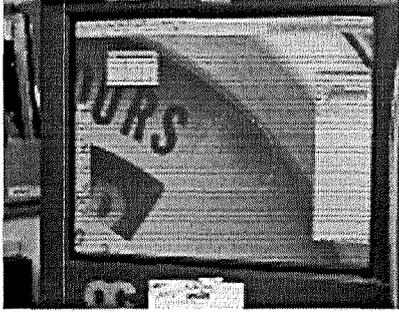
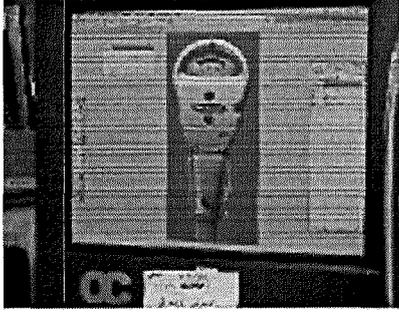
	<p>Points at screen to show white areas</p>	<p>white they wouldn't come up. I can also see if there is a need for a cast round there. I saw there's probably a need for a cast round here, it's a wee bit edgy.</p>		
<p>20:43:15</p>	<p>Zoom out. Selects Layer. Copies Layer and drags it below the background.</p>	<p>So I'm going to, soften that edge up by deleting it away with a feather on the actual outline. I'm just going to duplicate it so I've always got a copy of the original, how it was underneath.</p>	<p>2</p>	<p>M  M</p>
<p>20:43:35</p>  <p>20:43:56</p>  <p>20:44:16</p>	<p>Selects layer 1 (Image). Selects the inverse of the image. Opens feather palette, sets feather radius. Zooms in.</p> <p>Path line disappears. Zooms in Close. Moves Image. Uses Cursor on image edges.</p> <p>Zoom out Zoom In Close. Move image around checking top edge. Zoom out Zoom In Move image around</p>	<p>Make the selection of the actual background. Selection there. Because I've got a selection I'm just going to hide it, Its got an actual feather on the selection. I'm just going to delete the edge, like burn it away, you can see that its just softening up that halo, just giving it a soft edge to make it more realistic.</p> <p>Ok so he's cool as a top layer edge wise</p>	<p>2  3  1</p>	<p>D  M  M  M</p>

				
<p>20:44:34</p> 	<p>Points at side sections. Zooms in Close. Selects Pen tool Clicks on Points around the section he is working on with the cursor. This connects up the points and makes a selection line Path, around the section he wants to work on.</p> <p>Adjusts the curve with the 'handles' on the curve.</p>	<p>I'm now going look at these two bits here. Going to use the pen tool. Take that out. Just roughly make a loose selection Based on the pen again. Because it's quite curvaceous, good word, using the pen tool because you get a lot more control than going straight in with say a lasso tool. Just tweaking that one</p>	<p>1 2 3</p>	<p>D D M</p>
<p>20:44:49</p> 	<p>Opens Layer palette, selects paths, renames new path. Selects the path</p>	<p>So he's cool, I've got the paths there, work path.. call him 'left'. I've got the path there, I can make a selection on him and I can work into that.</p>	<p>2</p>	<p>M M</p>
<p>20:45:55</p> 	<p>Clicks on eyedropper tool. Clicks on light part of image. Then clicks on dark part.</p> <p>Uses the CMYK palette to compare the numbers of is selection of colour</p>	<p>I'm going to use... this half I'm just going to take it all out. Its got quite a lot of grain about it , so I'm going to take a selection of the front colour using the eye dropper and the back as well. So I've got a really dark brown to beige. That's</p>	<p>2 3 2</p>	<p>M D C? D</p>
<p>20:46:05</p>				

	<p>till it is right.</p>	<p>probably too dark on the background, I want it to look quire realistic so.</p>	<p>2</p>	
<p>20:46:25</p>	<p>Selects the gradient tool from the tools palette. Then attempts to use it, but decides not to. Goes to Layer Palette and copies the selection to a new layer.</p>	<p>Again using the CMYK make up I'm just picking appropriate colours. Put a selection of 1.5 give it a soft feather on that.</p>	<p>3</p>	<p>M</p>
	<p>Attempts to apply gradient on the selection with cursor drag, gets nothing.</p>	<p>I'm going to go to the gradient tool and I'm just going to fill... No I'm not.</p>	<p>2</p>	<p>D</p>
<p>20:46:40</p>	<p>Changes the parameters of the gradient tool opacity, transparency etc.</p>	<p>I'm going to layer him up onto a different layer. So I've got a selection there and I'm just going to float him above so that's just that selection there</p>	<p>3</p>	<p>C?</p>
	<p>Applies the gradient fill but gets no gradient. Tries 3 times.</p>	<p>So I'm purely working on a separate layer. Oh its not working ...what have I got... 20%, don't want transparency, I want normal. So that's a foreground to background colour, like that.</p>	<p>2</p>	<p>M</p>
<p>20:47:19</p>	<p>Opens the Gradient Editor selects the gradient.</p>	<p>So it actually looks a bit fakey just now.</p>	<p>3</p>	<p>?</p>
	<p>Reapplies the gradient with cursor. Is back to front.</p>	<p>So that's a foreground to background... that's the other way round.</p>		
<p>20:47:27</p>	<p>Reapplies the gradient correctly.</p>			
				
<p>20:47:33</p>				

				
<p>20:47:35</p> 	<p>Zooms out to have a look. Zooms back in. Move Image back to selection. Points at screen.</p>	<p>Now that's a bit more realistic in tone. Colour looks shit so I'm going to apply a filter to it, a noise filter, and then add a shadow to it with the airbrush or one of the other painting tools. And then I can sort of numb it down a bit.</p>	<p>1</p>	<p>C? C M</p>
<p>20:47:58</p> 	<p>Selects noise filter from menus. Uses slider on the window to reduce the level of noise applied.</p>	<p>Add noise. Too much.</p>	<p>2</p>	<p>D</p>
<p>20:48:20</p>  <p>20:48:40</p> 	<p>Unhides path selection, inverts the selection. Deletes the edge. Zooms out to look. Zooms back in moves image, then zooms in to work area</p> <p>Point at screen</p>	<p>That's about right. Just tidy that selection, I've got a halo from filling it previously. Still got selection hidden, going to invert that and just delete that edge off that. So he's still there but he's not got that sort of natural light shadow coming round here so I want to recreate that and just take him right back. Shadow him the fuck out.</p>	<p>2 1</p>	<p>M M C? M</p>

				
<p>20:48:55</p>	<p>Selects the path, then selects the airbrush, Opens brush palette, selects a big brush, sets exposure parameter. Uses the big cursor on the image, in broad strokes across the selected area.</p>	<p>So make my selection, shadows 65, take a 100, he's quite big. Exposure... I'll start at 10 and I'll work back.</p>	<p>2 3</p>	<p>D M M</p>
<p>20:49:09</p>	<p>Uses the big cursor on the image, in broad strokes across the selected area.</p>	<p>That's slowly but surely burning him in.</p>	<p>2</p>	<p>D</p>
	<p>Clicks on wrong thing Opens an unwanted window, closes it. Uses cursor again. Jumps back to parameters and selects mid-tones, alters the exposure.</p>	<p>Didn't want that. Ok so that starting on the shadows now I go on to mid tones and I take him to 20.</p>	<p>3 2 3</p>	
<p>20:49:29</p>	<p>Changes parameters again selecting highlights and changing exposure with a slider. Uses Cursor again.</p>	<p>Work in the mid tone a bit subtle differences. Highlights, which is the lightest section of them all.</p>	<p>3</p>	
<p>20:49:36</p>				
<p>20:49:45</p>				

				
<p>20:49:52</p>				
				
<p>20:50:00</p>	<p>Selects path Zooms out Zooms in Deletes the selection Zooms out Zooms in</p>	<p>Just hiding the selection there, that's looking a bit more realistic. There's still a bit of a feather there but I'll go back in and fix that. Make selection, just checking I've got that there. Just deleting that away. Ok so that's one process there finished.</p>	<p>2</p>	
			<p>1</p>	
<p>20:50:10</p>				
			<p>3</p>	
<p>20:50:34</p>				
			<p>2</p>	
<p>20:50:50</p>			<p>1</p>	<p>M</p>

# Appendix B

Owen  
Zone 1

-----  
12 quotation(s) for code: ZONE 1  
Quotation-Filter: All

-----  
P 1: Owen.txt - 1:14 (49:49) (Super)  
Codes: [Connotation] [Denotation] [Zone 1]  
Memos: [Colours] [Time of day]

It's kind of, not necessarily intentionally, the colours that I'm using and the way that I'm painting it is making it seem like it's a certain time of day... early morning or just as its about to get dark.

P 1: Owen.txt - 1:21 (14:14) (Super)  
Codes: [Zone 1]

I'm trying to decide weather I'm happy with this composition or not.

P 1: Owen.txt - 1:23 (14:14) (Super)  
Codes: [Connotation] [Denotation] [Zone 1]  
Memos: [Colours] [Sea]

I want a different colour for the sea.

P 1: Owen.txt - 1:28 (20:20) (Super)  
Codes: [Zone 1]  
Memos: [Sketch]

Right... I'm just referring to the sketch there and I'm going to change this a bit. Try and alter the composition a wee bit.

P 1: Owen.txt - 1:32 (26:26) (Super)  
Codes: [A painting is a container] [Denotation] [Metaphor] [Zone 1]  
Memos: [A painting is a container] [Colours] [Tone]

I'm gonna bring some lighter colours into it.

P 1: Owen.txt - 1:38 (34:34) (Super)  
Codes: [A painting is a container] [Connotation] [Denotation] [Metaphor]  
[Zone 1]  
Memos: [A painting is a container] [Colours] [Islands] [Tone]

I'm going to... It's all getting a bit monotone so I'm going to bring some colour into the islands.

P 1: Owen.txt - 1:41 (36:36) (Super)  
Codes: [certainty is dead] [Metaphor] [Painting is a journey] [Painting  
is unpredictable] [Zone 1]

Memos: [Certainty is death] [Painting is a journey] [Painting is unpredictable]

It's not what I was expecting but I quite like it. I'm not dead certain about this composition but I'm going to carry on with it for the time being.

P 1: Owen.txt - 1:42 (36:36) (Super)  
Codes: [Connotation] [Denotation] [Zone 1]  
Memos: [Colours] [Islands]

I think I want to give the idea that this island is in front of this one, so I'm going to introduce some colour into that as well.

P 1: Owen.txt - 1:46 (41:42) (Super)  
Codes: [Connotation] [Zone 1]  
Memos: [Sky]

I'm going to start working on the sky.

P 1: Owen.txt - 1:50 (47:47) (Super)  
Codes: [Zone 1]

Just kind of get... oh shuffle! That wasn't intentional.

P 1: Owen.txt - 1:55 (54:54) (Super)  
Codes: [Connotation] [Denotation] [Metaphor] [Zone 1]  
Memos: [Moonlight/sunlight] [Tone]

I think its dark enough. I want to bring a bit more light colour into it. In the form of, although it doesn't make perfect sense, but I want there to be a bright line here of like some kind of light whether its moonlight or sun or whatever.

P 1: Owen.txt - 1:58 (59:59) (Super)  
Codes: [Metaphor] [Painting is a journey] [Zone 1]  
Memos: [Painting is a journey]

Right it's getting there.

Zone 2

-----  
13 quotation(s) for code: ZONE 2  
Quotation-Filter: All  
-----

P 1: Owen.txt - 1:15 (4:4) (Super)  
Codes: [Denotation] [Metaphor] [Painting is getting] [Painting is giving] [Zone 2]  
Memos: [giving and getting] [Lines] [Paint] [Tone]

erm well, I want to use this to get some purer, lighter pigments, and this brush just gives me a straighter edge, a straighter line.

P 1: Owen.txt - 1:16 (5:6) (Super)



I'm wanting to bring some lighter colour into the sky.

P 1: Owen.txt - 1:51 (47:47) (Super)  
 Codes: [Connotation] [Denotation] [Zone 2]  
 Memos: [Brushes] [Colours] [Horizon]

There was some of that red left on the brush from blurring in that horizon line.

P 1: Owen.txt - 1:52 (49:49) (Super)  
 Codes: [Denotation] [Zone 2]  
 Memos: [Brushes] [Colours]

Just going to put a bit more white on the brush now.

P 1: Owen.txt - 1:59 (56:56) (Super)  
 Codes: [Denotation] [Metaphor] [Painting is control] [Zone 2]  
 Memos: [Brushes] [Lines] [Painting is control] [Straight edge]

I'm going to use this wee brush again because its just going to be a thin line, need a bit of control. I'm actually going to use the straight edge again. Have to find a bit that's not already painted.

Zone 3

-----  
 20 quotation(s) for code: ZONE 3  
 Quotation-Filter: All

-----  
 P 1: Owen.txt - 1:17 (8:8) (Super)  
 Codes: [Zone 3]

And eh?... Yeh. \_\_\_\_

P 1: Owen.txt - 1:18 (9:9) (Super)  
 Codes: [Connotation] [Denotation] [Zone 3]  
 Memos: [Paint] [Sea] [Sky]

I was initially going to use it to paint the sea but I'm actually going to use it instead to paint the sky.

P 1: Owen.txt - 1:19 (12:12) (Super)  
 Codes: [A painting is a container] [Metaphor] [Painting is giving] [Zone 3]  
 Memos: [A painting is a container] [giving and getting]

I'm just blocking in, just giving some definition to the

P 1: Owen.txt - 1:20 (12:12) (Super)  
 Codes: [Connotation] [Metaphor] [Painting is giving] [Zone 3]  
 Memos: [giving and getting] [Islands]

I'm actually painting some islands again, so I'm just giving some definition to the islands.

P 1: Owen.txt - 1:25 (18:18) (Super)  
 Codes: [Denotation] [Zone 3]

Memos: [Colours]

Try that... It's kind of mixing with the green, it's almost kind of a grey colour.

P 1: Owen.txt - 1:26 (18:18) (Super)  
Codes: [A painting is a living thing] [Metaphor] [Zone 3]  
Memos: [A Painting is a living thing]

It's still quite...Its difficult to tell what it is. It's starting to take some kind of shape

P 1: Owen.txt - 1:27 (18:18) (Super)  
Codes: [Metaphor] [Zone 3]  
Memos: [Colours] [Composing is touching]

Just painting bands of colour at the moment, probably break up the horizontal composition with some verticals but I dunno, I quite like that.

P 1: Owen.txt - 1:29 (22:22) (Super)  
Codes: [A painting is a container] [A painting is a living thing]  
[Denotation] [Metaphor] [Zone 3]  
Memos: [A painting is a container] [A Painting is a living thing]  
[Paint]

The paint is all gathering round the side there; I don't particularly want that to happen.

P 1: Owen.txt - 1:30 (22:22) (Super)  
Codes: [Denotation] [Zone 3]  
Memos: [Brushes] [Fingers] [Paint]

I'll use my fingers to put a bit of paint on it. Just trying to use something other than a brush at the moment.

P 1: Owen.txt - 1:31 (24:24) (Super)  
Codes: [Denotation] [Metaphor] [Painting is control] [Painting is getting] [Painting is unpredictable] [Zone 3]  
Memos: [Brushes] [Fingers] [giving and getting] [Painting is control]  
[Painting is unpredictable]

Just you get a different effect almost less controllable in a way. You know what effect you are going to get with a brush, you start introducing your fingers and cloths etc and you get a less predictable effect.

P 1: Owen.txt - 1:34 (26:26) (Super)  
Codes: [A painting is a container] [Connotation] [Denotation]  
[Metaphor]  
[Zone 3]  
Memos: [A painting is a container] [Colours] [Sea] [Tone]

Bring some bright white into the sea.

P 1: Owen.txt - 1:36 (30:30) (Super)  
Codes: [Denotation] [Zone 3]  
Memos: [Paint]



Codes: [Zone 3]

Hopefully this will stay still.  
Davey

Zone 1

-----  
17 quotation(s) for code: ZONE 1  
Quotation-Filter: All  
-----

P 1: Davey.txt - 1:2 (3:3) (Super)  
Codes: [Connotation] [Zone 1]  
Memos: [Person]

So the good thing about that is, what we can now do, is a couple of things, is that he's pretty much isolated quite quickly now...there's a little bit on his forehead that you'd probably actually never know.

P 1: Davey.txt - 1:3 (3:3) (Super)  
Codes: [Metaphor] [Zone 1]  
Memos: [Image is a container] [Unwanted pixels are junk]

You might have to do a wee bit of tweeking but there's not much. So what I'm going to do know is take out the majority of all this junk away.

P 1: Davey.txt - 1:10 (7:7) (Super)  
Codes: [Connotation] [Zone 1]  
Memos: [Person]

So I'll probably just start working on him now. He's quite easy to work on right now.

P 1: Davey.txt - 1:20 (20:20) (Super)  
Codes: [Connotation] [Metaphor] [Zone 1]  
Memos: [Good is hot] [Person] [Photoshop is cutting shapes]

See its got a bit of a flat nose at the moment. What I may do is... I've got options here, I could trim away some of his nose, which might actually be the option because the darkness that we have here is not that hot.

P 1: Davey.txt - 1:21 (20:20) (Super)  
Codes: [Connotation] [Metaphor] [Zone 1]  
Memos: [Photoshop is cutting shapes] [Shadow]

Theres not much shadow there, she was creating shadow so we want to trim that away, it saves us having to retouch it.

P 1: Davey.txt - 1:22 (21:21) (Super)  
Codes: [Metaphor] [Zone 1]  
Memos: [Image is a container] [Pixels are grain]

There's a wee bit of patchiness down here as well. When you come out it's not particularly apparent. Might have to go back in there and adjust that.

P 1: Davey.txt - 1:25 (28:28) (Super)

Codes: [Denotation] [Zone 1]  
 Memos: [Pixels] [Pixels are grain]

I can tell you straight away that there is a little thing here. The pixels are a little bit dark and that's causing a little bit of chunking.

P 1: Davey.txt - 1:26 (28:28) (Super)  
 Codes: [Metaphor] [Zone 1]  
 Memos: [Image is a container] [Pixels are grain]

When you come out you can see that it's a bit bitty there.

P 1: Davey.txt - 1:27 (29:29) (Super)  
 Codes: [Metaphor] [Zone 1]  
 Memos: [Pixels are grain]

Gives a slight granularity to the surface.

P 1: Davey.txt - 1:29 (31:31) (Super)  
 Codes: [Connotation] [Zone 1]  
 Memos: [TEFAL guy]

He's a bit of a TEFAL guy at the moment.

P 1: Davey.txt - 1:32 (35:35) (Super)  
 Codes: [Connotation] [Zone 1]  
 Memos: [Person] [Realism]

Now that looks a bit more realistic for his head there now.

P 1: Davey.txt - 1:33 (37:37) (Super)  
 Codes: [Connotation] [Denotation] [Metaphor] [Zone 1]  
 Memos: [Colour] [Person] [Photoshop is building shapes] [Pixels]

Now I'm going to start working on his nose. There is some natural red here about 3 pixels back. So what I'm going to do is try and sculpt his nose a bit.

P 1: Davey.txt - 1:40 (49:49) (Super)  
 Codes: [Connotation] [Zone 1]  
 Memos: [Person] [Roman Nose]

Noses generally have a bit of a... At the moment he's got a bit of a Roman nose, so I may want to consider.. I mean that's fine people would never probably think twice about having a Roman nose but we could give him any nose he wants. (laugh)

P 1: Davey.txt - 1:42 (54:55) (Super)  
 Codes: [Denotation] [Zone 1]

Moving my head to see how it looks.

P 1: Davey.txt - 1:47 (62:62) (Super)  
 Codes: [Connotation] [Metaphor] [Zone 1]  
 Memos: [Person] [Sharpness]

It comes back to that, It's not too bad. One of the things

I'm not too happy with is that it's still a bit too sharp.  
I want to work on his chin a bit more as well.

P 1: Davey.txt - 1:49 (66:66) (Super)  
Codes: [Denotation] [Zone 1]  
Memos: [Image]

That will hopefully be a bit better. One thing I know is  
that I'm probably going to have the image at about that  
size. So I know for a fact that that's ok.

P 1: Davey.txt - 1:54 (70:70) (Super)  
Codes: [Metaphor] [Zone 1]

The thing about working professionally on things like this  
is that you don't have time to make it perfect so I would  
be quite happy to pump that in like that.

Zone 2

-----  
17 quotation(s) for code: ZONE 2  
Quotation-Filter: All  
-----

P 1: Davey.txt - 1:1 (3:3) (Super)  
Codes: [Denotation] [Metaphor] [Zone 2]  
Memos: [Colour] [Photoshop is cutting shapes] [Spatial metaphor]

I've changed this over so the background colour is white,  
so when I cut her out white is all we're left with.

P 1: Davey.txt - 1:4 (5:5) (Super)  
Codes: [Denotation] [Zone 2]  
Memos: [Painting tools]

What I'll do is select quite a big brush I need quite a  
natural brush for this to work, it doesn't have to but it  
helps.

P 1: Davey.txt - 1:5 (5:5) (Super)  
Codes: [Metaphor] [Zone 2]  
Memos: [Physical action metaphor]

I want something that is fairly solid so this will do.

P 1: Davey.txt - 1:7 (5:5) (Super)  
Codes: [Denotation] [Metaphor] [Zone 2]  
Memos: [Percentages] [Physical action metaphor] [Spatial metaphor]

First of all pump the opacity up, pump the flow up to a  
hundred percent.

P 1: Davey.txt - 1:11 (9:9) (Super)  
Codes: [Denotation] [Zone 2]  
Memos: [Painting tools]

What I'll do is probably select a nicer brush than this.

P 1: Davey.txt - 1:12 (10:10) (Super)

Codes: [Denotation] [Zone 2]  
 Memos: [Pixels]

Looking for a natural. I want one that's just really round doesn't have much...see these have got pixels in there texture, I don't want that I want something that is just a little bit more flat

P 1: Davey.txt - 1:13 (10:10) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 2]  
 Memos: [Edges] [Spatial metaphor]

Yes, this is a really clean edge, its got a slight blur to the edge. What this means is that when I'm working I can get quite close to it like this.

P 1: Davey.txt - 1:16 (16:16) (Super)  
 Codes: [Metaphor] [Zone 2]  
 Memos: [Giving & getting] [Physical action metaphor] [Spatial metaphor]

I'm going to have to dump the size a bit here. Not as much as one, just to get this area here.

P 1: Davey.txt - 1:18 (16:16) (Super)  
 Codes: [Denotation] [Zone 2]  
 Memos: [Percentages]

To be productive and still be accurate I'll change the size fairly regularly.

P 1: Davey.txt - 1:31 (33:33) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 2]  
 Memos: [Painting is aggressive] [Percentages]

What we can do here is that we can change the flow or the opacity so that I can be a bit more aggressive in my painting but it will be slower.

P 1: Davey.txt - 1:34 (39:39) (Super)  
 Codes: [Denotation] [Zone 2]  
 Memos: [Painting tools]

This is when I use smudge in a different way.

P 1: Davey.txt - 1:35 (42:42) (Super)  
 Codes: [Denotation] [Zone 2]  
 Memos: [Painting tools]

I've changed tool, it's a different tool this is a smudge tool, I'm now going to select a very similar brush.

P 1: Davey.txt - 1:37 (44:44) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 2]  
 Memos: [Photoshop is cutting shapes] [Spatial metaphor]

Now what I can do is flip back to my paint brush and maybe try and pull some of this stuff off.

P 1: Davey.txt - 1:43 (57:57) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 2]  
 Memos: [Giving & getting] [Painting tools]

A wee trick that I'll sometimes use here is to use a much larger brush than I would actually need. What that will do is give a shallower curve.

P 1: Davey.txt - 1:46 (62:62) (Super)  
 Codes: [Metaphor] [Zone 2]  
 Memos: [Spatial metaphor]

Ok I'm a wee bit out of control there so I'm going to move down a little bit

P 1: Davey.txt - 1:50 (68:68) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 2]  
 Memos: [Giving & getting] [Painting tools] [Percentages] [Spatial metaphor]

What I will do is put a slight blur on it. So I'll move to a blur tool now and I'll probably pump it down to about 20%.

P 1: Davey.txt - 1:52 (68:68) (Super)  
 Codes: [Metaphor] [Zone 2]  
 Memos: [Physical action metaphor] [Spatial metaphor]

It just bangs the anti-aliasing up a bit

Zone 3

-----  
 20 quotation(s) for code: ZONE 3  
 Quotation-Filter: All  
 -----

P 1: Davey.txt - 1:6 (5:5) (Super)  
 Codes: [Denotation] [Zone 3]  
 Memos: [Colour]

What I'm going to do now is um, its already white so I'm just going to...

P 1: Davey.txt - 1:8 (5:5) (Super)  
 Codes: [Metaphor] [Zone 3]  
 Memos: [Painting is cleaning] [Spatial metaphor]

Just get rid of all this stuff really quickly, just helping to isolate it a bit easier. Try to get as close as I dare without messing up.

P 1: Davey.txt - 1:9 (5:5) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 3]  
 Memos: [History panel]

I released my mouse there so that I've got a save that went into the history panel.

P 1: Davey.txt - 1:14 (12:12) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 3]

Memos: [Edges] [Painting tools] [Pixels]

It just leaves some of the pixels in there, so this is a really nice wee tool to use to take the edge off. I've not gone onto the edge but the blurring takes that edge away that I'm looking for.

P 1: Davey.txt - 1:15 (12:12) (Super)  
Codes: [Metaphor] [Zone 3]  
Memos: [Painting is cleaning] [Spatial metaphor]

So you can see that I'm getting quite close but not touching it. It's cleaning it quite nicely.

P 1: Davey.txt - 1:17 (16:16) (Super)  
Codes: [Denotation] [Metaphor] [Zone 3]  
Memos: [Colour] [Painting is cleaning] [Physical action metaphor]

You can see now that it becomes very unproductive, I've got to move the mouse a lot to clean, so I'll bump it back up.

P 1: Davey.txt - 1:19 (18:18) (Super)  
Codes: [Metaphor] [Zone 3]  
Memos: [Image is a container]

This will be quite tricky now, because I have to match the blurring that is already here. What I'll need to do is see what that looks like when I get back out.

P 1: Davey.txt - 1:23 (23:23) (Super)  
Codes: [Metaphor] [Zone 3]  
Memos: [Image is a container] [Photoshop is cutting shapes]

What I'll do is trim off all this excess and then go back in and make amends.

P 1: Davey.txt - 1:24 (26:26) (Super)  
Codes: [Connotation] [Metaphor] [Zone 3]  
Memos: [Person] [Spatial metaphor]

I was half closing my eyes there to get a feel what this actually was. When I half close my eyes I realised that it was his eyebrow. Gives you an idea of what to drop and what not to.

P 1: Davey.txt - 1:28 (31:31) (Super)  
Codes: [Connotation] [Denotation] [Metaphor] [Zone 3]  
Memos: [Edges] [Giving & getting] [Person]

The last edge if just curved it back to give a hint that its going back up over his head, might need a bit more looks like is head goes in and then up again.

P 1: Davey.txt - 1:30 (31:31) (Super)  
Codes: [Metaphor] [Zone 3]  
Memos: [Photoshop is cutting shapes]

I'll just shave a little bit off.

P 1: Davey.txt - 1:36 (42:42) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 3]  
 Memos: [Colour] [Photoshop is building shapes] [Spatial metaphor]

What I'm going to do is try and rebuild his nose a bit but I want to keep the same colours so I'll bring this shading down there. Give it a little bit more shape.

P 1: Davey.txt - 1:38 (46:46) (Super)  
 Codes: [Metaphor] [Zone 3]  
 Memos: [Photoshop is building shapes] [Spatial metaphor]

So that I've got room to play with so that I can shape the nose the way I want it.

P 1: Davey.txt - 1:39 (47:47) (Super)  
 Codes: [Metaphor] [Zone 3]  
 Memos: [Painting is aggressive]

I'll be relatively aggressive to start with.

P 1: Davey.txt - 1:41 (53:53) (Super)  
 Codes: [Metaphor] [Zone 3]  
 Memos: [Photoshop is building shapes] [Spatial metaphor]

I'm not particularly happy with that, so I'm going to take a bit of that...build from the back up so it looks more natural.

P 1: Davey.txt - 1:44 (59:59) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 3]  
 Memos: [Image is a container] [Painting is aggressive] [Painting tools]

So I've actually zoomed out now and I'm using a bigger brush so I get a less aggressive curve. It my look as if nothing is happening... oops!

P 1: Davey.txt - 1:45 (60:60) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 3]  
 Memos: [Mouse] [Photoshop is building shapes]

Just rolling the mouse a bit , helps me hopefully to not put too much on.

P 1: Davey.txt - 1:48 (64:64) (Super)  
 Codes: [Denotation] [Metaphor] [Zone 3]  
 Memos: [Photoshop is cutting shapes] [Pixels] [Pixels are grain]

A lot of this chunkiness is caused by anti-aliasing. So I need to try and trim that back a little bit, oops.

P 1: Davey.txt - 1:51 (68:68) (Super)  
 Codes: [Metaphor] [Zone 3]

Actually that's a bit too strong.

P 1: Davey.txt - 1:53 (68:68) (Super)  
 Codes: [Connotation] [Denotation] [Metaphor] [Zone 3]

Memos: [Edges] [Giving & getting] [Pixels] [Realism]

gives it a lot more of an edge makes it a little bit less surreal. When you have that hard edge with the step pixels it looks very fake.

Derm

Zone 1

-----  
8 quotation(s) for code: ZONE 1

Quotation-Filter: All  
-----

P 1: Derm.txt - 1:2 (6:6) (Super)

Codes: [Connotation] [Denotation] [lost and found?] [Metaphor] [Zone 1]  
[Britishness] [Realism] [Type]

I Need to ..Make it British effectively. So I'm going to loose all that type around here. Change expired to penalty, leave the limit 2 hours and then just make it as realistic as possible.

P 1: Derm.txt - 1:9 (14:14) (Super)

Codes: [Denotation] [Zone 1] [Edges]

Right I do this so I can actually see you sometimes get wee areas of white, and if I deleted it to white they wouldn't come up. I can also see if there is a need for a cast round there. I saw there's probably a need for a cast round here, it's a wee bit edgy.

P 1: Derm.txt - 1:15 (20:20) (Super)

Codes: [Metaphor] [Personification] [Zone 1] [Spatial metaphor]

Ok so he's cool as a top layer edge wise

P 1: Derm.txt - 1:16 (22:22) (Super)

Codes: [Zone 1]

I'm now going look at these two bits here.

P 1: Derm.txt - 1:30 (31:31) (Super)

Codes: [Connotation] [Denotation] [Zone 1] [Colour] [Filter]  
[Painting tools] [Realism] [Shadow] [Shit]

Now that's a bit more realistic in tone. Colour looks shit so I'm going to apply a filter to it, a noise filter, and then add a shadow to it with the airbrush or one of the other painting tools.

P 1: Derm.txt - 1:31 (31:31) (Super)

Codes: [less feeling is down] [Metaphor] [Personification] [Zone 1]  
[Spatial metaphor]

And then I can sort of numb it down a bit.

P 1: Derm.txt - 1:35 (35:35) (Super)  
 Codes: [Connotation] [Metaphor] [Personification] [Zone 1] [Shadow]

So he's still there but he's not got that sort of natural light shadow coming round here so I want to recreate that and just take him right back.

P 1: Derm.txt - 1:42 (45:45) (Super)  
 Codes: [Image is a container] [Metaphor] [Zone 1]

There's still a bit of a feather there but I'll go back in and fix that.

Zone 2

-----  
 24 quotation(s) for code: ZONE 2  
 Quotation-Filter: All  
 -----

P 1: Derm.txt - 1:1 (3:3) (Super)  
 Codes: [Denotation] [Zone 2] [Image] [Photo disc]

This is an image you would get off a photo disc.

P 1: Derm.txt - 1:6 (10:10) (Super)  
 Codes: [Denotation] [Zone 2] [Path] [Photo disc]

This is how they come off a photo disc. It comes with a Path.

P 1: Derm.txt - 1:7 (10:10) (Super)  
 Codes: [Denotation] [Zone 2] [Background] [Chequered squares] [Colour] [Layer palette] [Path]

First thing we are going to do is delete the background. Because its going on to a coloured background I delete the actual background. I'm selecting it from the actual path. Set tolerance.Invert it, Go back to layer palette, remove background layer to layer zero so I can delete the actual background. So we've got the chequered squares.

P 1: Derm.txt - 1:8 (12:12) (Super)  
 Codes: [Denotation] [Image is a container] [Metaphor] [Zone 2] [Background] [Colour]

Put a new background with a new colour, just using any colour just now.Select AllFill the foreground colour. So that's the full background image, I'm just going to swap the actual order.

P 1: Derm.txt - 1:10 (16:16) (Super)  
 Codes: [Denotation] [Metaphor] [Soft & hard] [Zone 2] [Edges]

So I'm going to, soften that edge up by deleting it away with a feather on the actual outline.

P 1: Derm.txt - 1:11 (16:16) (Super)  
 Codes: [Denotation] [Hiding metaphor] [Metaphor] [Zone 2] [Copy]  
 [Spatial metaphor]

I'm just going to duplicate it so I've always got a copy of the original, how it was underneath.

P 1: Derm.txt - 1:12 (18:18) (Super)  
 Codes: [Denotation] [Zone 2] [Background]

Make the selection of the actual background. Selection there.

P 1: Derm.txt - 1:13 (18:18) (Super)  
 Codes: [Denotation] [Hiding metaphor] [Metaphor] [Zone 2] [Selection]

Because I've got a selection I'm just going to hide it, Its got an actual feather on the selection.

P 1: Derm.txt - 1:17 (22:22) (Super)  
 Codes: [Denotation] [Image is a container] [Metaphor] [Zone 2]  
 [Painting tools]

Going to use the pen tool. Take that out.

P 1: Derm.txt - 1:19 (24:24) (Super)  
 Codes: [Denotation] [Metaphor] [Personification] [Zone 2] [Path]  
 [Selection]

So he's cool, I've got the paths there, work path.. call him 'left'. I've got the path there, I can make a selection on him and I can work into that.

P 1: Derm.txt - 1:20 (26:26) (Super)  
 Codes: [Denotation] [Image is a container] [Metaphor] [Zone 2]  
 [Image]

I'm going to use... this half I'm just going to take it all out.

P 1: Derm.txt - 1:22 (26:26) (Super)  
 Codes: [Connotation] [Denotation] [Zone 2] [CMYK palette] [Colour]  
 [Percentages] [Realism]

That's probably too dark on the background, I want it to look quire realistic so. Again using the CMYK make up I'm just picking appropriate colours. Put a selection of 1.5 give it a soft feather on that.

P 1: Derm.txt - 1:23 (26:26) (Super)  
 Codes: [A tool is a place] [Denotation] [Image is a container] [Zone 2]  
 [Painting tools]

I'm going to go to the gradient tool and I'm just going to fill... No I'm not.

P 1: Derm.txt - 1:24 (26:26) (Super)  
 Codes: [Metaphor] [Personification] [Zone 2] [Spatial metaphor]

I'm going to layer him up onto a different layer.

P 1: Derm.txt - 1:25 (26:26) (Super)  
Codes: [Denotation]  
[Metaphor] [Spatial Metaphor] [Zone 2] [Selection]

So I've got a selection there and I'm just going to float him above so that's just that selection there So I'm purely working on a separate layer.

P 1: Derm.txt - 1:27 (26:26) (Super)  
Codes: [Denotation] [Zone 2] [Background] [Colour] [Percentages]

what have I got... 20%, don't want transparency, I want normal. So that's a foreground to background colour, like that.

P 1: Derm.txt - 1:29 (27:27) (Super)  
Codes: [Connotation] [Zone 2] [Realism]

So it actually looks a bit fakey just now.

P 1: Derm.txt - 1:32 (33:33) (Super)  
Codes: [Grain is noise] [Image is a container] [Zone 2]

Add noise. Too much.

P 1: Derm.txt - 1:33 (35:35) (Super)  
Codes: [Connotation] [Image is a container] [Metaphor] [Zone 2]  
[Halo]

That's about right. Just tidy that selection, I've got a halo from filling it previously.

P 1: Derm.txt - 1:34 (35:35) (Super)  
Codes: [Denotation] [Hiding metaphor] [Metaphor] [Zone 2] [Edges]  
[Selection]

Still got selection hidden, going to invert that and just delete that edge off that.

P 1: Derm.txt - 1:36 (37:37) (Super)  
Codes: [Denotation] [Metaphor] [Personification] [Zone 2]  
[Percentages]

So make my selection, shadows 65, take a 100, he's quite big.

P 1: Derm.txt - 1:37 (38:38) (Super)  
Codes: [Denotation] [Metaphor] [Work is a space] [Zone 2]  
[Percentages] [Spatial metaphor]

Exposure... I'll start at 10 and I'll work back.

P 1: Derm.txt - 1:39 (42:42) (Super)  
Codes: [Connotation] [Denotation] [Metaphor] [Personification] [Zone 2]  
[Percentages] [Shadow]

Ok so that starting on the shadows now I go on to mid tones and I take him to 20.

P 1: Derm.txt - 1:41 (45:45) (Super)  
Codes: [Connotation] [Denotation] [Hiding metaphor] [Metaphor] [Zone 2] [Realism] [Selection]

Just hiding the selection there, that's looking a bit more realistic.

Zone 3

-----  
8 quotation(s) for code: ZONE 3  
Quotation-Filter: All  
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P 1: Derm.txt - 1:3 (8:8) (Super)  
Codes: [Denotation] [Zone 3] [Image]

The file format comes with quite a high Res. Its quite a high Res Image

P 1: Derm.txt - 1:14 (18:18) (Super)  
Codes: [A tool is fire] [Connotation] [Denotation] [Metaphor] [Soft & hard] [Zone 3] [Edges] [Halo] [Image is a container]

I'm just going to delete the edge, like burn it away, you can see that its just softening up that halo, just giving it a soft edge to make it more realistic.

P 1: Derm.txt - 1:18 (22:22) (Super)  
Codes: [Denotation] [Image is a container] [Metaphor] [Selecting is touching] [Zone 3] [Painting tools] [Selection]

Just roughly make a loose selection Based on the pen again. Because it's quite curvaceous, good word, using the pen tool because you get a lot more control than going straight in with say a lasso tool. Just tweaking that one.

P 1: Derm.txt - 1:21 (26:26) (Super)  
Codes: [Denotation] [Metaphor] [Zone 3] [Background] [Colour] [Painting tools] [Selection] [Spatial metaphor]

Its got quite a lot of grain about it , so I'm going to take a selection of the front colour using the eye dropper and the back as well. So I've got a really dark brown to beige.

P 1: Derm.txt - 1:26 (26:26) (Super)  
Codes: [Zone 3]

Oh its not working ...

P 1: Derm.txt - 1:28 (29:29) (Super)  
Codes: [Denotation] [Zone 3] [Background]

So that's a foreground to back ground... that's the other way round.

P 1: Derm.txt - 1:38 (40:40) (Super)  
Codes: [A tool is fire] [Metaphor] [Personification] [Zone 3]

That's slowly but surely burning him in.

P 1: Derm.txt - 1:40 (43:43) (Super)  
Codes: [Connotation] [Zone 3]

Work in the mid tone a bit subtle differences. Highlights,  
which is the lightest section of them all.

## Appendix C

Name & No: Salvatore 2
<p>Description</p> <p>OK take your time and have a good look around and describe to me what you can see. I see a garden, with a bridge and an object, looks like coming from a leaf, staying in the middle, then I see the sun on the leaves. I hear some water. I see the roof. Is there anything else you can see?</p> <p>Ok, the lake, the pond, with some plants on the water. I told you this object. Trees all around.</p>
<p>Associations &amp; Significance</p> <p>As you look around do you have any associations with what you can see?</p> <p>Association? You mean the bridge is the bridge? Association which kind of association?</p> <p>Are there other things that you think about?</p> <p>No, I mean I feel like I am in a garden, a botanic garden and I have no other association right now</p> <p>What sorts of things do you think about as you look around?</p> <p>Well, like quietness, nice environment, relaxing environment, the noise of the water is very calming, that's relaxing.</p> <p>Is there anything that has a particular significance for you?</p> <p>You mean emotionally?</p> <p>Yes</p> <p>No</p> <p>Is there anything here that reminds you of anything else?</p> <p>Not particularly but it's the kind of environment that inspires me to a nice walk, and the light of the sun is nice, warm its warm. And then there is this object, which is a bit unusual in this environment.</p>
<p>Realness</p> <p>Ok so do the things you can see, do they seem real to you?</p> <p>Yes</p> <p>Do you feel that you are in a real place?</p> <p>Yes, at the beginning this leaf of this plant near by, with the sun reflecting on it, seems to be a bit artificial but now that I'm moving it around I'm used to it. The light and the reflection is very fine. I think it's more if you look on the detail of the leaf it looks artificial. This plant looks much more real, and the pond and the plants on the lake</p>
<p>Anything else</p> <p>Ok this is the last question. What else can you tell me about your experience?</p> <p>At the beginning I had a problem with the field of view, I mean I was seeing like the monitor, but now, I feel like I'm there, I got used to this field of view. I can look all around. If I move very quickly its sometime a bit disturbing. This bridge is very nice, I can appreciate this bridge very well, including these leaves in front of the bridge. This object is finely placed, I mean I can tell that it is between me and the other bridge over there but its just a bit hanging in the air. It defiantly looks artificial. The reflection of the roof on the lake is very nice. And this warm reflection from these</p>

leaves and the light reflection from the sun, gives me a sense of quietness. I think it's the kind of light the illumination, the sun which gives me a nice feeling.

Name & No: Michael 3
Description
<p>Take your time have good look around and describe to me what you can see.          I see a very strange movement up in the air as if I am turning at the same time. I see some plants that are very close. Some plants just below me. A railing just where I'm standing, a bridge, a blinding window, there are some strange colours on some of the plants. There is a strange thing rotating over the water, looks like its flying, like its hanging from the plants, there is a bridge behind it. Some more plants. Some plants and trees in the background, which seem to be very shadowy.          Is there anything else that you can see?          A big pole, there is a very low dynamic range</p>
Associations & Significance
<p>As you are looking around do you have any associations with what you can see?          Association?          Yes, do you associate what you can see with anything else?          I'm not sure what you mean?          Ok what sort of things do you think about as you look around?          Low dynamic range and some distortions when I move around, not so much when I stand still but when I start moving the corners move faster. When I move upwards its doing the thing skewed.          Is there anything that you can see that has a particular significance for you?          I am wondering if that rotating circle thingy is floating or flying?          I think it might be water there, but it doesn't really look like water.          Is there anything here that reminds you of anything else?          No</p>
Realness
<p>Do you think that the things that you can see seem real to you?          No because they are strange colours and there are not many levels of colours, there is a lot of white and black and some green and some blue.          Do you feel that you are in a real place?          No          Why not?          Because of the distortions in colours and when I move around</p>
Anything else
<p>What else can you tell me about your experience?          I'm impressed with the depth perception, no reflection on the water from the rotating circles.</p>

Name & No: Lars 8
Description
<p>Ok as you are looking around can you describe to me what you can see?          Well I'm in a botanical garden. It's a glasshouse. Trees. In front of me now it's a sort of statue or thing that is turning around slowly. There is also water, I can see some flowers on the water. When I turn to the right I can see a bridge, a white bridge. Some palms. On the left there is a fence, white fence, some plants. I can look down the garden. Looks like there is another platform down there. I see stereo, I feel depth in</p>

the plants I can see what's behind them in the back. Over me there is a kind of strange construction, Now things are moving without me moving, I'm standing still and the picture is moving.
Associations & Significance
As you are looking around then what do you associate with what you see? Associate? You mean I just name something that comes to my mind? Yes Calm, pleasant, nice, quiet, nature What sorts of thing do you think about when you look around? Relaxing, taking a break from daily routines and looking at something very pleasant. Is there anything in particular that has significance for you? In the model I think it is the green palm just in front of me, which is so close that I can see it in stereo, I'm quite fascinated by it. Is there anything here that reminds you of anything else? Yes, the water reminds me of a garden I know where there is a small vessel of water. And the botanical garden in Copenhagen I visited.
Realness
So do the things that you are seeing seem real to you? They all seem real with one exception and that is the small things that are rotating in front of me that I find placed in the wrong environment. I don't associate anything with the figure. Do you feel that you are in a real place then? Well yes and no, I do see that the quality of the pictures tells me that I am not looking at the plants in real because I know my eyes can get more details than in these monitors. So in that sense I don't feel that I am there but in another sense I feel that the environment is very immersive in other ways. What kind of ways? Sound, sound is very spatial it's location based. I also feel immersed in the stereo feeling that's why I was looking at that plant so intensely
Anything else
Can you tell me anything else about your experience? Yes after a while I am beginning to be distracted from the view. I think it's because my brain has been adjusted to it, and then I start noticing the head mounted display, the physicality of the head mounted display. I notice that I have something different on my head

Name & No: Ole 10
Description
As you are looking around can you describe to me what you can see? Well it's a kind of indoor botanical garden right, I can see the roof, plants a small bridge, some water. There is a kind of constructed object its not part of the other reality. Is there anything else you can see? I notice a difference in lights, It's bright to the right, I think there's sun up there, supposed to be. So you have these different sorts of light. There is something down there, a kind of a path. Another bridge to the left. And we have the sounds too, the water
Associations & Significance
What do you associate with what you can see?

<p>Actually the sounds of the water reminds me of a place, a museum in Copenhagen which has a kind of indoor garden like this. It's not the same actually but it sounds very much the same. So it kind of reminds me of that place and I am associating, trying to drag on my experiences of being in a place like that.</p> <p>What sorts of things do you think about, as you look a round?</p> <p>Well the first thing I think about is that I am trying to locate some kind of animals, If there are any I don't know. Because its kind of weird I can hear this birds cry somewhere in the soundscape. So I for a while actually try to locate the bird It seems to be impossible for me. I think I got off the track of the question.</p> <p>Is there anything that you see that has a particular significance for you?</p> <p>Yes actually it's the constructed object. Its moving around and it keeps distracting me. Maybe its because its distorting this reality representation by not being part of it. It's going against the normal conditions of being in an environment like this, gravity doesn't work on it.</p> <p>Is there anything you can see that reminds you of anything else?</p> <p>Well actually the kind of plants we have here, it's a botanical garden so its plants and trees that I'm not used to seeing in my normal environment but it reminds me of being on a holiday in a different place. Actually it doesn't remind me of a rain forest although it could be but there's too much light in here.</p>
<p>Realness</p> <p>Do the things you are seeing seem real to you?</p> <p>In a way they seem real, it's a kind of double reality, in a way they look real. It could as well be a movie. It's a window to a kind of reality. On the other side I notice they are not real. Its not pure representation. They are not constructed as if they were a computer game. This is the thing I sense about it, I'm not sure, it could actually be constructed but I would label it as reality in some way.</p> <p>Do you feel that you are in a real place?</p> <p>Its hard for me to say that I'm in this new place, actually I'm looking at the new place, but actually being there is not an appropriate description of it. I have a freedom of looking but it doesn't determinate my sense of being there.</p> <p>Why not?</p> <p>I could get scientific here and try and explain it with some sense modalities but, I'm looking but I'm not sensing. Ok with my ears I can hear the soundscape, actually there is so much water and water sound in here, but there is no moisture in the air, in my breathing or sensing on my skin. That's one of the things I'm missing. But on the other hand I get the feeling of being attracted to walking over the bridge or trying to step down on some other place maybe walk round, to explore it even more. This possibility of being able to move around this place would enhance the feeling of being there. If I could feel that I could make a difference to the place , the place would accept me and I would accept it better</p>
<p>Anything else</p> <p>What else can you tell me about your experience?</p> <p>Well every time I have these kind of experiences I am missing where I need it elsewhere so where is my gun, where is the enemy.</p>

Name & No: Katrine 14
Description
<p>As you are looking around can you describe to me what you can see?</p> <p>I'm in a kind of big house made of metal and glass; there are lots of plants. I can hear some cars or something outside, and right in front of me I can see a white fence and</p>

<p>there's a big step down on the other side of the fence to some more plants and I think some water. I don't know what else is down there, something I can't see. I can see some of the construction Can you see anything else? A bridge, and I can go that way and walk onto the bridge I think, if I can walk.</p>
<p>Associations &amp; Significance</p> <p>What do you associate with what you can see? ?? I don't understand?? What things do you think about when you look around? I think it is a big Glasshouse. I think it's a place where people can come and study the plants and maybe some birds. It's a kind of nature machine or something. Is there anything here that has a particular significance for you? Maybe this is a part of a lake, I didn't realise this before. I can see something that is made with the computer, Is that what you meant? At first I thought it was something that was not supposed to be in the house. Is there anything that reminds you of anything else? Other plants, no not that I can think of.</p>
<p>Realness</p> <p>Do the things that you can see seem real to you? Yes they do, I think the way I see through the glass in here or whatever, is a bit blurry especially when I move quickly, but I think that it looks like a place that is here and I am looking through something. OK so do you feel that you are in a real place? Yes I do Why do you feel you are in a real place? Because I can move all the way around and look where ever I want and I can hear the sounds from the cars outside the house.</p>
<p>Anything else</p> <p>Can you tell me anything else about your experience? There is something that is a bit unrealistic when I look down. Its like I'm leaning and the ground I am standing on is leaning with me too, this fence I was talking about is not entirely straight, it has an angle that's not straight up. Anything else? Now that I get to think of it, it's a bit strange that I can't look out of the windows, but nothing else.</p>

<p>Name &amp; No: Tea 16</p>
<p>Description</p> <p>Ok as you look around can you describe to me what you can see? I think there's some water down here, and there might be a person over there, and there's, its really dark around here but there are some trees. Over here there is more water running round. There's a sculpture or something here. More trees and plants. What else can you see, anything else? Is there water all round me? What can you see? I see trees and water and I'm standing in some kind of fence around me Do you notice anything else at all? Not for certain because its really dark</p>
<p>Associations &amp; Significance</p> <p>As you look around what do you associate with what you see? Do you have any</p>

<p>associations?          About where I am or?          Yes          I must be in some kind of park.          Do you have any other kinds of associations with it?          It's relaxing because of the water that is running and the birds.          What sorts of things do you think about as you look around?          That's where I look because back here it's really dark so it's not so pleasurable. But over here its really nice because it's more light and I can see the water.          Is there anything that has particular significance for you?          In which way?          Many different ways, whatever significance means to you.          I don't know          Is there anything that you can see that reminds you of anything else?          It reminds me of being in some garden. Oh maybe I'm starting to something else?          What else?          Are there only flowers or is there something else in the tree? I mean is there some other pictures that I should be able to see?          Generally what you can see is what you can see.          Ok. There's a bird over here I think</p>
<p>Realness</p> <p>Do the things that you can see do they seem real to you?          Yes. Its hard to see in areas where its really dark, but this area and over here where it is really light, I think its really real to me and if I look down here its quite scary because I'm almost falling out of the platform.          So do you feel that you are in a real place?          Kind of yeh.          What makes it feel real?          The space, and the sound          Is there anything that doesn't make it feel real?          That I can't move around</p>
<p>Anything else</p> <p>What else can you tell me about your experience?          It actually reminds me of computer games</p>

<p>Name &amp; No: Jens 19</p>
<p>Description</p> <p>As you are looking around can you describe to me what you can see?          Generally of course it's a botanical garden. I'm standing in the middle of a place where people can stand, and I am seeing some computer graphics in the middle of the scene also, it's not as natural as the rest.          Just describe the things that you can see.          In front of me I can see a plant. I first realise now that I am standing in front of water, a small lake with plants floating on the top, I thought it was the floor underneath but of course its water that s very obvious now. I'm also standing in a green house, with trees and palms. Above me is it some kind of bridge , maybe it's just the roof I don't know, maybe a platform.</p>

Associations & Significance
<p>As you look around what do you associate with what you can see?          What do I associate with what I can see, well it's very exotic, it's almost like, well it's supposed to be hot and moisture and you can almost feel that it is, but not really.          Anything else, anything maybe more general?          There's not much life in here, not much movement but sound of course.          What things do you think about as you look around?          I think of being just in a tropic world.          Any other thoughts that come to mind?          Yes there is no movement in the scene but there is a lot of people making noise          I'm not in a rain forest because I'm actually present in a botanic garden, an indoor green house. I associate heat and humidity.          As you look around is there anything that is particularly significant for you.          Yes that graphics moving over there that is strange.          Why is that strange?          Because I don't expect it in here.          Is there anything else here that reminds you of anything else?          The rest seems natural and reminds me of being present</p>
Realness
<p>Do the things that you are seeing seem real to you?          Yes of course its relative but it seems pretty real. I really haven't had the feeling of being more present in an artificial world before.          So do you feel that you are in a real place?          Yes well my senses eye and ears tell me that I am present except for the tracking but it's like being there. The sound is also quite realistic. I seem unbalanced in a kind of way; if I were to turn I would fall. So its pretty real</p>
Anything else
<p>What else can you tell me about your experience?          Well right now I am standing in the middle of a laboratory but I really completely forgot about that</p>

Name & No: Stine
Description
<p>As you look around can you describe to me what you can see?          Well I can see a kind of garden inside a dome made of glass. A bridge, a small bridge, its kind of like a botanical garden. Now I see something odd, three rings, they balance on each other and they twist I'm standing on a kind of pavement or something, and there is a fence, kind of under me. I can see water lilies and I can hear the water, something is dripping on the right side.          Any other things?          There is another bridge by the three rings. There is a path over me. I think that's it.</p>
Associations & Significance
<p>What association do you have with the things you can see?          Botanical garden I think, something set up.          Anything else at all?          I miss the smells. The rings over there remind me that it's artificial, kind of irritating cos it's nothing to do with it. It's just there.          What things do you think about when you are looking around?          That I would like some action or something, I'd like to do something. I kind of miss interaction. I miss movement everything is still. I like the sounds though its nice. I</p>

<p>miss some action like I could pick some flowers or there were labels on the flowers then I could explore.</p> <p>Is there anything in particular that has significance for you?</p> <p>Well the rings attract attention because they are the only thing moveing.</p> <p>Are you reminded of anything else while you are here? Do you have any memories of anything?</p> <p>Yes being in a botanical garden</p> <p>Is there anything else that you can see that reminds you of anything else?</p> <p>The animals that are usually in botanical gardens, because that's what I mostly do, look around seeing if I can see the animals and small insects hiding, I'm not so much into plants. Its more the atmosphere and walking around enjoying the atmosphere. I'm kind of chained to this place. I would like to explore.</p>
<p>Realness</p> <p>The things that you are seeing do they seem real to you?</p> <p>Well yes I can recognize them, they seem real it's more realistic than VR.</p> <p>Do you feel that you are in a real place?</p> <p>Yeh I do, its like someone did some video tapings and then rendered them. It looks like some place where that pictures are from.</p>
<p>Anything else</p> <p>Is there anything else you can tell me about your experience?</p> <p>I get curious. I like experiencing new stuff. I get curious what's this all about.</p>

# Appendix D

HU: Descriptions

File: [H:\Benogo\DEMO1~1\ATLASA~1\Descriptions]

Edited by: Super

Date/Time: 09/08/04 12:15:34 PM

-----  
Codes-quotations list

Code-Filter: All  
-----

Code: Connotation {1-0}

P 1: Descriptions.txt - 1:31 (68:68) (Super)

Codes: [Connotation] [Denotation] [Metaphor]

Memos: [Cars] [Outside] [Spatial Metaphor]

I can hear some cars or something outside,  
-----

Code: Denotation {47-0}

P 1: Descriptions.txt - 1:1 (4:4) (Super)

Codes: [Denotation]

Memos: [Bridge] [Garden] [Object] [Plants]

I see a garden, with a bridge and an object, looks like  
coming from a leaf, staying in the middle, then I see the  
sun on the leaves.

P 1: Descriptions.txt - 1:2 (5:5) (Super)

Codes: [Denotation]

Memos: [Water]

I hear some water.

P 1: Descriptions.txt - 1:3 (6:6) (Super)

Codes: [Denotation]

Memos: [Roof/buildings]

I see the roof.

P 1: Descriptions.txt - 1:4 (8:10) (Super)

Codes: [Denotation]

Memos: [Object] [Plants] [Water]

Ok, the lake, the pond, with some plants on the water. I  
told you this object. Trees all around.

P 1: Descriptions.txt - 1:5 (18:18) (Super)

Codes: [Denotation]

Memos: [Movement]

I see a very strange movement up in the air as if I am turning at the same time.

P 1: Descriptions.txt - 1:6 (19:19) (Super)

Codes: [Denotation] [Metaphor]

Memos: [Plants] [Spatial Metaphor]

I see some plants that are very close.

P 1: Descriptions.txt - 1:7 (20:20) (Super)

Codes: [Denotation] [Metaphor]

Memos: [Plants] [Spatial Metaphor]

Some plants just below me.

P 1: Descriptions.txt - 1:8 (21:21) (Super)

Codes: [Denotation]

Memos: [Bridge] [Colours] [Railing] [Roof/buildings]

A railing just where I'm standing, a bridge, a blinding window, there are some strange colours on some of the plants.

P 1: Descriptions.txt - 1:9 (22:22) (Super)

Codes: [Denotation]

Memos: [Bridge] [Object] [Plants]

There is a strange thing rotating over the water, looks like its flying, like its hanging from the plants, there is a bridge behind it.

P 1: Descriptions.txt - 1:10 (23:23) (Super)

Codes: [Denotation]

Memos: [Plants]

Some more plants.

P 1: Descriptions.txt - 1:11 (24:24) (Super)

Codes: [Denotation]

Memos: [Plants]

Some plants and trees in the background, which seem to be very shadowy.

P 1: Descriptions.txt - 1:12 (26:26) (Super)

Codes: [Denotation]

Memos: [Dynamic range] [Roof/buildings]

A big pole, there is a very low dynamic range

P 1: Descriptions.txt - 1:13 (33:33) (Super)

Codes: [Denotation] [Metaphor]

Memos: [Garden] [Spatial Metaphor]

Well I'm in a botanical garden.

P 1: Descriptions.txt - 1:14 (34:34) (Super)

Codes: [Denotation]

Memos: [Roof/buildings]

Itís a glasshouse.

P 1: Descriptions.txt - 1:15 (35:35) (Super)  
Codes: [Denotation]  
Memos: [Plants]

Trees.

P 1: Descriptions.txt - 1:16 (36:36) (Super)  
Codes: [Denotation] [Metaphor]  
Memos: [Object] [Spatial Metaphor]

In front of me now itís a sort of statue or thing that is turning around slowly.

P 1: Descriptions.txt - 1:17 (37:37) (Super)  
Codes: [Denotation]  
Memos: [Plants] [Water]

There is also water, I can see some flowers on the water.

P 1: Descriptions.txt - 1:18 (38:39) (Super)  
Codes: [Denotation]  
Memos: [Bridge] [Plants]

When I turn to the right I can see a bridge, a white bridge. Some palms.

P 1: Descriptions.txt - 1:19 (40:40) (Super)  
Codes: [Denotation] [Metaphor]  
Memos: [Plants] [Railing] [Spatial Metaphor]

On the left there is a fence, white fence, some plants.

P 1: Descriptions.txt - 1:20 (41:41) (Super)  
Codes: [Denotation] [Metaphor]  
Memos: [Garden] [Spatial Metaphor]

I can look down the garden.

P 1: Descriptions.txt - 1:21 (42:42) (Super)  
Codes: [Denotation] [Metaphor]  
Memos: [Bridge] [Spatial Metaphor]

Looks like there is another platform down there.

P 1: Descriptions.txt - 1:22 (43:43) (Super)  
Codes: [Denotation] [Metaphor]  
Memos: [Spatial Metaphor] [Stereo/Depth]

I see stereo, I feel depth in the plants I can see whatís behind them in the back.

P 1: Descriptions.txt - 1:23 (44:44) (Super)  
Codes: [Denotation]  
Memos: [Roof/buildings]

Over me there is a kind of strange construction, Now things

are moving without me moving, I'm standing still and the picture is moving.

P 1: Descriptions.txt - 1:24 (52:52) (Super)  
 Codes: [Denotation]  
 Memos: [Bridge] [Garden] [Plants] [Roof/buildings] [Water]

Well it's a kind of indoor botanical garden right, I can see the roof, plants a small bridge, some water.

P 1: Descriptions.txt - 1:25 (53:53) (Super)  
 Codes: [Denotation]  
 Memos: [Object]

There is a kind of constructed object its not part of the other reality.

P 1: Descriptions.txt - 1:26 (55:56) (Super)  
 Codes: [Denotation]

I notice a difference in lights, It's bright to the right, I think there's sun up there, supposed to be. So you have these different sorts of light.

P 1: Descriptions.txt - 1:27 (57:57) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Path] [Spatial Metaphor]

There is something down there, a kind of a path.

P 1: Descriptions.txt - 1:28 (58:58) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Bridge] [Spatial Metaphor]

Another bridge to the left.

P 1: Descriptions.txt - 1:29 (59:59) (Super)  
 Codes: [Denotation]  
 Memos: [Water]

And we have the sounds too, the water

P 1: Descriptions.txt - 1:30 (67:67) (Super)  
 Codes: [Denotation]  
 Memos: [Plants] [Roof/buildings]

I'm in a kind of big house made of metal and glass; there are lots of plants.

P 1: Descriptions.txt - 1:31 (68:68) (Super)  
 Codes: [Connotation] [Denotation] [Metaphor]  
 Memos: [Cars] [Outside] [Spatial Metaphor]

I can hear some cars or something outside,

P 1: Descriptions.txt - 1:32 (68:68) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Plants] [Railing] [Spatial Metaphor] [Water]

and right in front of me I can see a white fence and thereís a big step down on the other side of the fence to some more plants and I think some water.

P 1: Descriptions.txt - 1:34 (70:70) (Super)  
Codes: [Denotation]  
Memos: [Roof/buildings]

I can see some of the construction

P 1: Descriptions.txt - 1:35 (71:71) (Super)  
Codes: [Denotation]  
Memos: [Bridge]

A bridge, and I can go that way and walk onto the bridge I think, if I can walk.

P 1: Descriptions.txt - 1:36 (79:79) (Super)  
Codes: [Denotation] [Metaphor]  
Memos: [People] [Plants] [Spatial Metaphor] [Water]

I think thereís some water down here, and there might be a person over there, and thereís, its really dark around here but there are some trees

P 1: Descriptions.txt - 1:37 (80:80) (Super)  
Codes: [Denotation] [Metaphor]  
Memos: [Spatial Metaphor] [Water]

Over here there is more water running round.

P 1: Descriptions.txt - 1:38 (81:81) (Super)  
Codes: [Denotation]  
Memos: [Object]

Thereís a sculpture or something here.

P 1: Descriptions.txt - 1:39 (84:84) (Super)  
Codes: [Denotation]  
Memos: [Plants] [Railing] [Water]

I see trees and water and Iím standing in some kind of fence around me.

P 1: Descriptions.txt - 1:40 (94:94) (Super)  
Codes: [Denotation]  
Memos: [Garden]

Generally of course itís a botanical garden.

P 1: Descriptions.txt - 1:41 (95:95) (Super)  
Codes: [Denotation]  
Memos: [Object]

Iím standing in the middle of a place where people can stand, and I am seeing some computer graphics in the middle of the scene also, itís not as natural as the rest.

P 1: Descriptions.txt - 1:42 (97:97) (Super)

Codes: [Denotation] [Metaphor]  
 Memos: [Plants] [Spatial Metaphor] [Water]

In front of me I can see a plant. I first realise now that I am standing in front of water, a small lake with plants floating on the top, I thought it was the floor underneath but of course its water that s very obvious now.

P 1: Descriptions.txt - 1:43 (98:99) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Bridge] [Plants] [Roof/buildings] [Spatial Metaphor]

Iím also standing in a green house, with trees and palms. Above me is it some kind of bridge , maybe itís just the roof I donít know, maybe a platform.

P 1: Descriptions.txt - 1:44 (107:107) (Super)  
 Codes: [Denotation]  
 Memos: [Garden] [Roof/buildings]

Well I can see a kind of garden inside a dome made of glass.

P 1: Descriptions.txt - 1:45 (108:108) (Super)  
 Codes: [Denotation]  
 Memos: [Bridge] [Garden]

A bridge, a small bridge, its kind of like a botanical garden.

P 1: Descriptions.txt - 1:46 (109:109) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Object] [Path] [Railing] [Spatial Metaphor]

Now I see something odd, three rings, they balance on each other and they twist Iím standing on a kind of pavement or something, and there is a fence, kind of under me.

P 1: Descriptions.txt - 1:47 (110:110) (Super)  
 Codes: [Denotation]  
 Memos: [Plants] [Water]

I can see water lilies and I can hear the water, something is dripping on the right side.

P 1: Descriptions.txt - 1:48 (112:113) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Bridge] [Object] [Path] [Spatial Metaphor]

There is another bridge by the three rings. There is a path over me. I think thatís it.

-----  
 Code: Metaphor {19-0}

P 1: Descriptions.txt - 1:6 (19:19) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Plants] [Spatial Metaphor]

I see some plants that are very close.

P 1: Descriptions.txt - 1:7 (20:20) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Plants] [Spatial Metaphor]

Some plants just below me.

P 1: Descriptions.txt - 1:13 (33:33) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Garden] [Spatial Metaphor]

Well Iím in a botanical garden.

P 1: Descriptions.txt - 1:16 (36:36) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Object] [Spatial Metaphor]

In front of me now itís a sort of statue or thing that is turning around slowly.

P 1: Descriptions.txt - 1:19 (40:40) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Plants] [Railing] [Spatial Metaphor]

On the left there is a fence, white fence, some plants.

P 1: Descriptions.txt - 1:20 (41:41) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Garden] [Spatial Metaphor]

I can look down the garden.

P 1: Descriptions.txt - 1:21 (42:42) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Bridge] [Spatial Metaphor]

Looks like there is another platform down there.

P 1: Descriptions.txt - 1:22 (43:43) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Spatial Metaphor] [Stereo/Depth]

I see stereo, I feel depth in the plants I can see whatís behind them in the back.

P 1: Descriptions.txt - 1:27 (57:57) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Path] [Spatial Metaphor]

There is something down there, a kind of a path.

P 1: Descriptions.txt - 1:28 (58:58) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Bridge] [Spatial Metaphor]

Another bridge to the left.

P 1: Descriptions.txt - 1:31 (68:68) (Super)

Codes: [Connotation] [Denotation] [Metaphor]  
 Memos: [Cars] [Outside] [Spatial Metaphor]

I can hear some cars or something outside,

P 1: Descriptions.txt - 1:32 (68:68) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Plants] [Railing] [Spatial Metaphor] [Water]

and right in front of me I can see a white fence and thereís a big step down on the other side of the fence to some more plants and I think some water.

P 1: Descriptions.txt - 1:33 (69:69) (Super)  
 Codes: [Metaphor]  
 Memos: [Spatial Metaphor]

I donít know what else is down there, something I canít see.

P 1: Descriptions.txt - 1:36 (79:79) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [People] [Plants] [Spatial Metaphor] [Water]

I think thereís some water down here, and there might be a person over there, and thereís, its really dark around here but there are some trees

P 1: Descriptions.txt - 1:37 (80:80) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Spatial Metaphor] [Water]

Over here there is more water running round.

P 1: Descriptions.txt - 1:42 (97:97) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Plants] [Spatial Metaphor] [Water]

In front of me I can see a plant. I first realise now that I am standing in front of water, a small lake with plants floating on the top, I thought it was the floor underneath but of course its water that s very obvious now.

P 1: Descriptions.txt - 1:43 (98:99) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Bridge] [Plants] [Roof/buildings] [Spatial Metaphor]

Iím also standing in a green house, with trees and palms. Above me is it some kind of bridge , maybe itís just the roof I donít know, maybe a platform.

P 1: Descriptions.txt - 1:46 (109:109) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Object] [Path] [Railing] [Spatial Metaphor]

Now I see something odd, three rings, they balance on each other and they twist Iím standing on a kind of pavement or something, and there is a fence, kind of under me.

P 1: Descriptions.txt - 1:48 (112:113) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Bridge] [Object] [Path] [Spatial Metaphor]

There is another bridge by the three rings. There is a path over me. I think thatís it.

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 Code: Zone 1 {0-0}

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 Code: Zone 2 {0-0}

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 Code: Zone 3 {0-0}

HU: Associations  
 File: [H:\Benego\DEMO1~1\ATLASA~1\Associations]  
 Edited by: Super  
 Date/Time: 09/08/04 12:13:25 PM

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 Codes-quotations list  
 Code-Filter: All

-----  
 Code: Connotation {25-0}

P 1: Associations.txt - 1:1 (7:7) (Super)  
 Codes: [Connotation]  
 Memos: [Nice] [Quiet] [Relaxing] [Water]

Well, like quietness, nice environment, relaxing environment, the noise of the water is very calming, thatís relaxing.

P 1: Associations.txt - 1:3 (14:14) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Object] [Unusual]

And then there is this object, which is a bit unusual in this environment.

P 1: Associations.txt - 1:4 (13:13) (Super)  
 Codes: [Connotation]  
 Memos: [Nice] [Walk] [Warmth]

Not particularly but itís the kind of environment that inspires me to a nice walk, and the light of the sun is nice, warm its warm.

P 1: Associations.txt - 1:6 (29:29) (Super)  
 Codes: [Connotation]

Memos: [Flying] [Movement] [Water]

I am wondering if that rotating circle thingy is floating or flying? I think it might be water there, but it doesn't really look like water.

P 1: Associations.txt - 1:7 (40:40) (Super)

Codes: [Connotation]

Memos: [Nature] [Nice] [Quiet] [Relaxing]

Calm, pleasant, nice, quiet, nature

P 1: Associations.txt - 1:8 (42:42) (Super)

Codes: [Connotation]

Memos: [Nice] [Relaxing]

Relaxing, taking a break from daily routines and looking at something very pleasant.

P 1: Associations.txt - 1:10 (46:47) (Super)

Codes: [Connotation]

Memos: [Copenhagen Garden] [Garden] [Water]

Yes, the water reminds me of a garden I know where there is a small vessel of water. And the botanical garden in Copenhagen I visited.

P 1: Associations.txt - 1:11 (54:56) (Super)

Codes: [Connotation] [Metaphor]

Memos: [Copenhagen Garden] [Experiences are things] [Garden] [Water]

Actually the sounds of the water reminds me of a place, a museum in Copenhagen which has a kind of indoor garden like this. It's not the same actually but it sounds very much the same. So it kind of reminds me of that place and I am associating, trying to drag on my experiences of being in a place like that.

P 1: Associations.txt - 1:12 (58:58) (Super)

Codes: [Connotation] [Denotation]

Memos: [animals] [Birds]

Well the first thing I think about is that I am trying to locate some kind of animals, if there are any I don't know. Because it's kind of weird I can hear this birds cry somewhere in the soundscape. So I for a while actually try to locate the bird it seems to be impossible for me.

P 1: Associations.txt - 1:13 (60:61) (Super)

Codes: [Connotation] [Denotation] [Metaphor]

Memos: [Constructed] [Distortion] [Flying] [Movement] [Object] [Unusual]

Yes actually it's the constructed object. Its moving around and it keeps distracting me. Maybe it's because it's distorting this reality representation by not being part of it. It's going against the normal conditions of being in an environment like this, gravity doesn't work on it.

P 1: Associations.txt - 1:14 (63:63) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Plants] [Rain forest] [Unusual]

Well actually the kind of plants we have here, it's a botanical garden so its plants and trees that I'm not used to seeing in my normal environment but it reminds me of being on a holiday in a different place. Actually it doesn't remind me of a rain forest although it could be but there's too much light in here.

P 1: Associations.txt - 1:15 (72:74) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Birds] [Garden] [Nature] [Plants]

I think it is a big Glasshouse. I think it's a place where people can come and study the plants and maybe some birds. It's a kind of nature machine or something.

P 1: Associations.txt - 1:19 (93:93) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Birds] [Relaxing] [Water]

It's relaxing because of the water that is running and the birds.

P 1: Associations.txt - 1:20 (95:95) (Super)  
 Codes: [Connotation]  
 Memos: [Nice] [Water]

That's where I look because back here it's really dark so it's not so pleasurable. But over here it's really nice because it's more light and I can see the water.

P 1: Associations.txt - 1:22 (105:105) (Super)  
 Codes: [Connotation]  
 Memos: [animals] [Birds]

Ok. There's a bird over here I think.

P 1: Associations.txt - 1:23 (112:112) (Super)  
 Codes: [Connotation]  
 Memos: [Atmosphere] [Rain forest]

What do I associate with what I can see, well it's very exotic, it's almost like, well it's supposed to be hot and moisture and you can almost feel that it is, but not really.

P 1: Associations.txt - 1:24 (114:114) (Super)  
 Codes: [Connotation]  
 Memos: [Stillness]

There's not much life in here, not much movement but sound of course.

P 1: Associations.txt - 1:25 (116:116) (Super)  
 Codes: [Connotation]  
 Memos: [Rain forest]

I think of being just in a tropic world.

P 1: Associations.txt - 1:26 (118:118) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [People] [Rain forest] [Stillness]

Yes there is no movement in the scene but there is a lot of people making noise I'm not in a rain forest because I'm actually present in a botanic garden, an indoor green house.

P 1: Associations.txt - 1:27 (119:119) (Super)  
 Codes: [Connotation]  
 Memos: [Atmosphere]

I associate heat and humidity.

P 1: Associations.txt - 1:28 (121:121) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Movement] [Object] [Unusual]

Yes that graphics moving over there that is strange.

P 1: Associations.txt - 1:29 (125:125) (Super)  
 Codes: [Connotation]  
 Memos: [Nature]

The rest seems natural and reminds me of being present.

P 1: Associations.txt - 1:31 (134:134) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Object] [Smells]

I miss the smells. The rings over there remind me that it's artificial, kind of irritating cos it's nothing to do with it. It's just there.

P 1: Associations.txt - 1:32 (136:140) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Interaction] [Nice] [Plants] [Stillness]

That I would like some action or something, I'd like to do something. I kind of miss interaction. I miss movement everything is still. I like the sounds though it's nice. I miss some action like I could pick some flowers or there were labels on the flowers then I could explore.

P 1: Associations.txt - 1:35 (147:147) (Super)  
 Codes: [Connotation] [Metaphor]  
 Memos: [Chained] [Interaction] [Plants] [Walk]

The animals that are usually in botanical gardens, because that's what I mostly do, look around seeing if I can see the animals and small insects hiding, I'm not so much into plants. It's more the atmosphere and walking around enjoying the atmosphere. I'm kind of chained to this place. I would like to explore.

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Code: Denotation {20-0}

P 1: Associations.txt - 1:2 (5:5) (Super)  
Codes: [Denotation]

Memos: [Garden]

No, I mean I feel like I am in a garden, a botanic garden and I have no other association right now

P 1: Associations.txt - 1:3 (14:14) (Super)  
Codes: [Connotation] [Denotation]  
Memos: [Object] [Unusual]

And then there is this object, which is a bit unusual in this environment.

P 1: Associations.txt - 1:5 (26:27) (Super)  
Codes: [Denotation]  
Memos: [Distortion] [Dynamic range]

Low dynamic range and some distortions when I move around, not so much when I stand still but when I start moving the corners move faster. When I move upwards its doing the thing skewed.

P 1: Associations.txt - 1:9 (44:44) (Super)  
Codes: [Denotation]  
Memos: [Plants] [Stereo/Depth]

In the model I think it is the green palm just in front of me, which is so close that I can see it in stereo, I'm quite fascinated by it.

P 1: Associations.txt - 1:12 (58:58) (Super)  
Codes: [Connotation] [Denotation]  
Memos: [animals] [Birds]

Well the first thing I think about is that I am trying to locate some kind of animals, If there are any I don't know. Because its kind of weird I can hear this birds cry somewhere in the soundscape. So I for a while actually try to locate the bird It seems to be impossible for me.

P 1: Associations.txt - 1:13 (60:61) (Super)  
Codes: [Connotation] [Denotation] [Metaphor]  
Memos: [Constructed] [Distortion] [Flying] [Movement] [Object] [Unusual]

Yes actually it's the constructed object. Its moving around and it keeps distracting me. Maybe its because its distorting this reality representation by not being part of it. It's going against the normal conditions of being in an environment like this, gravity doesn't work on it.

P 1: Associations.txt - 1:14 (63:63) (Super)  
Codes: [Connotation] [Denotation]  
Memos: [Plants] [Rain forest] [Unusual]

Well actually the kind of plants we have here, itís a botanical garden so its plants and trees that Iím not used to seeing in my normal environment but it reminds me of being on a holiday in a different place. Actually it doesnít remind me of a rain forest although it could be but thereís too much light in here.

P 1: Associations.txt - 1:15 (72:74) (Super)  
Codes: [Connotation] [Denotation]  
Memos: [Birds] [Garden] [Nature] [Plants]

I think it is a big Glasshouse. I think itís a place where people can come and study the plants and maybe some birds. Itís a kind of nature machine or something.

P 1: Associations.txt - 1:16 (76:78) (Super)  
Codes: [Denotation]  
Memos: [Object] [Unusual] [Water]

Maybe this is a part of a lake, I didnít realise this before. I can see something that is made with the computer, Is that what you meant? At first I thought it was something that was not supposed to be in the house.

P 1: Associations.txt - 1:17 (80:80) (Super)  
Codes: [Denotation]  
Memos: [Plants]

Other plants, no not that I can think of.

P 1: Associations.txt - 1:18 (91:91) (Super)  
Codes: [Denotation]  
Memos: [Garden]

I must be in some kind of park.

P 1: Associations.txt - 1:19 (93:93) (Super)  
Codes: [Connotation] [Denotation]  
Memos: [Birds] [Relaxing] [Water]

Itís relaxing because of the water that is running and the birds.

P 1: Associations.txt - 1:21 (101:101) (Super)  
Codes: [Denotation]  
Memos: [Garden]

It reminds me of being in some garden. Oh maybe Iím starting to something else?

P 1: Associations.txt - 1:26 (118:118) (Super)  
Codes: [Connotation] [Denotation]  
Memos: [People] [Rain forest] [Stillness]

Yes there is no movement in the scene but there is a lot of people making noise Iím not in a rain forest because Iím actually present in a botanic garden, an indoor green house.

P 1: Associations.txt - 1:28 (121:121) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Movement] [Object] [Unusual]

Yes that graphics moving over there that is strange.

P 1: Associations.txt - 1:30 (132:132) (Super)  
 Codes: [Denotation]  
 Memos: [Garden]

Botanical garden I think, something set up.

P 1: Associations.txt - 1:31 (134:134) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Object] [Smells]

I miss the smells. The rings over there remind me that itís artificial, kind of irritating cos itís nothing to do with it. Itís just there.

P 1: Associations.txt - 1:32 (136:140) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Interaction] [Nice] [Plants] [Stillness]

That I would like some action or something, Iíd like to do something. I kind of miss interaction. I miss movement everything is still. I like the sounds though its nice. I miss some action like I could pick some flowers or there were labels on the flowers then I could explore.

P 1: Associations.txt - 1:33 (142:142) (Super)  
 Codes: [Denotation]  
 Memos: [Object]

Well the rings attract attention because they are the only thing moveing.

P 1: Associations.txt - 1:34 (145:145) (Super)  
 Codes: [Denotation]  
 Memos: [Garden]

Yes being in a botanical garden.

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 Code: Metaphor {3-0}

P 1: Associations.txt - 1:11 (54:56) (Super)  
 Codes: [Connotation] [Metaphor]  
 Memos: [Copenhagen Garden] [Experiences are things] [Garden] [Water]

Actually the sounds of the water reminds me of a place, a museum in Copenhagen which has a kind of indoor garden like this. Itís not the same actually but it sounds very much the same. So it kind of reminds me of that place and I am associating, trying to drag on my experiences of being in a place like that.

P 1: Associations.txt - 1:13 (60:61) (Super)

Codes: [Connotation] [Denotation] [Metaphor]  
 Memos: [Constructed] [Distortion] [Flying] [Movement] [Object]  
 [Unusual]

Yes actually itís the constructed object. Its moving around and it keeps distracting me. Maybe its because its distorting this reality representation by not being part of it. Itís going against the normal conditions of being in an environment like this, gravity doesnít work on it.

P 1: Associations.txt - 1:35 (147:147) (Super)  
 Codes: [Connotation] [Metaphor]  
 Memos: [Chained] [Interaction] [Plants] [Walk]

The animals that are usually in botanical gardens, because thatís what I mostly do, look around seeing if I can see the animals and small insects hiding, Iím not so much into plants. Its more the atmosphere and walking around enjoying the atmosphere. Iím kind of chained to this place. I would like to explore.

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 HU: Realness  
 File: [H:\Benogo\DEMO1~1\ATLASA~1\Realness]  
 Edited by: Super  
 Date/Time: 09/08/04 12:16:27 PM

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 Codes-quotations list  
 Code-Filter: All  
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Code: Connotation {12-0}

P 1: Realness.txt - 1:1 (6:7) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Movement] [Plants] [Real/Artificial] [Reflections]

Yes, at the beginning this leaf of this plant near by, with the sun reflecting on it, seems to be a bit artificial but now that Iím moving it around Iím used to it. The light and the reflection is very fine.

P 1: Realness.txt - 1:2 (8:9) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Plants] [Real/Artificial]

I think itís more if you look on the detail of the leaf it looks artificial. This plant looks much more real, and the pond and the plants on the lake

P 1: Realness.txt - 1:3 (17:17) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Colours] [Real/Artificial]

No because they are strange colours and there are not many levels of colours, there is a lot of white and black and some green and some blue.

P 1: Realness.txt - 1:9 (41:41) (Super)

Codes: [Connotation]  
 Memos: [Movie] [Real/Artificial]

In a way they seem real, it's a kind of double reality, in a way they look real. It could as well be a movie.

P 1: Realness.txt - 1:11 (42:43) (Super)  
 Codes: [Connotation] [Metaphor]  
 Memos: [Constructed] [Games] [Real/Artificial]

On the other side I notice they are not real. It's not pure representation. They are not constructed as if they were a computer game. This is the thing I sense about it, I'm not sure, it could actually be constructed but I would label it as reality in some way.

P 1: Realness.txt - 1:12 (49:49) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Atmosphere] [Soundscape] [Water]

Ok with my ears I can hear the soundscape, actually there is so much water and water sound in here, but there is no moisture in the air, in my breathing or sensing on my skin.

P 1: Realness.txt - 1:13 (51:51) (Super)  
 Codes: [Connotation]  
 Memos: [Bridge] [Spatial metaphor]

But on the other hand I get the feeling of being attracted to walking over the bridge or trying to step down on some other place maybe walk round, to explore it even more.

P 1: Realness.txt - 1:15 (63:63) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Movement] [Outside] [Soundscape]

Because I can move all the way around and look where ever I want and I can hear the sounds from the cars outside the house.

P 1: Realness.txt - 1:16 (69:69) (Super)  
 Codes: [Connotation]  
 Memos: [Falling] [Real/Artificial]

Yes. It's hard to see in areas where it's really dark, but this area and over here where it is really light, I think it's really real to me and if I look down here it's quite scary because I'm almost falling out of the platform.

P 1: Realness.txt - 1:17 (83:83) (Super)  
 Codes: [Connotation]  
 Memos: [Distortions] [Falling] [Real/Artificial] [Soundscape]

Yes well my senses eye and ears tell me that I am present except for the tracking but it's like being there. The sound is also quite realistic. I seem unbalanced in a kind of way; if I were to turn I would fall. So it's pretty real

P 1: Realness.txt - 1:18 (81:81) (Super)

Codes: [Connotation]  
 Memos: [Real/Artificial]

Yes of course its relative but it seems pretty real. I really haven't had the feeling of being more present in an artificial world before.

P 1: Realness.txt - 1:19 (91:91) (Super)  
 Codes: [Connotation]  
 Memos: [Movie]

Yeh I do, its like someone did some video tapings and then rendered them. It looks like some place where that pictures are from.

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 Code: Denotation {10-0}

P 1: Realness.txt - 1:1 (6:7) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Movement] [Plants] [Real/Artificial] [Reflections]

Yes, at the beginning this leaf of this plant near by, with the sun reflecting on it, seems to be a bit artificial but now that I'm moving it around I'm used to it. The light and the reflection is very fine.

P 1: Realness.txt - 1:2 (8:9) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Plants] [Real/Artificial]

I think it's more if you look on the detail of the leaf it looks artificial. This plant looks much more real, and the pond and the plants on the lake

P 1: Realness.txt - 1:3 (17:17) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Colours] [Real/Artificial]

No because they are strange colours and there are not many levels of colours, there is a lot of white and black and some green and some blue.

P 1: Realness.txt - 1:4 (21:21) (Super)  
 Codes: [Denotation]  
 Memos: [Distortions] [Real/Artificial]

Because of the distortions in colours and when I move around

P 1: Realness.txt - 1:5 (27:28) (Super)  
 Codes: [Denotation]  
 Memos: [Movement] [Object]

They all seem real with one exception and that is the small things that are rotating in front of me that I find placed in the wrong environment. I don't associate anything with the figure.

P 1: Realness.txt - 1:6 (30:30) (Super)  
 Codes: [Denotation]  
 Memos: [Monitors] [Plants] [Real/Artificial]

Well yes and no, I do see that the quality of the pictures tells me that I am not looking at the plants in real because I know my eyes can get more details than in these monitors.

P 1: Realness.txt - 1:7 (33:34) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Immersive] [Movement] [Soundscape]

Sound, sound is very spatial it's location based. I also feel immersed in the stereo feeling that's why I was looking at that plant so intensely

P 1: Realness.txt - 1:12 (49:49) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Atmosphere] [Soundscape] [Water]

Ok with my ears I can hear the soundscape, actually there is so much water and water sound in here, but there is no moisture in the air, in my breathing or sensing on my skin.

P 1: Realness.txt - 1:14 (59:59) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Distortions] [Monitors] [Movement] [Window]

Yes they do, I think the way I see through the glass in here or whatever, is a bit blurry especially when I move quickly, but I think that it looks like a place that is here and I am looking through something.

P 1: Realness.txt - 1:15 (63:63) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Movement] [Outside] [Soundscape]

Because I can move all the way around and look where ever I want and I can hear the sounds from the cars outside the house.

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 Code: Metaphor {5-0}

P 1: Realness.txt - 1:7 (33:34) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Immersive] [Movement] [Soundscape]

Sound, sound is very spatial it's location based. I also feel immersed in the stereo feeling that's why I was looking at that plant so intensely

P 1: Realness.txt - 1:8 (31:31) (Super)  
 Codes: [Metaphor]  
 Memos: [Immersive]

So in that sense I don't feel that I am there but in another sense I feel that the environment is very immersive

in other ways.

P 1: Realness.txt - 1:10 (42:42) (Super)  
 Codes: [Metaphor]  
 Memos: [Window]

Itís a window to a kind of reality.

P 1: Realness.txt - 1:11 (42:43) (Super)  
 Codes: [Connotation] [Metaphor]  
 Memos: [Constructed] [Games] [Real/Artificial]

On the other side I notice they are not real. Its not pure representation. They are not constructed as if they were a computer game. This is the thing I sense about it, Iím not sure, it could actually be constructed but I would label it as reality in some way.

P 1: Realness.txt - 1:14 (59:59) (Super)  
 Codes: [Denotation] [Metaphor]  
 Memos: [Distortions] [Monitors] [Movement] [Window]

Yes they do, I think the way I see through the glass in here or whatever, is a bit blurry especially when I move quickly, but I think that it looks like a place that is here and I am looking through something.

HU: Other experiences  
 File: [H:\Benogo\DEMO1~1\ATLASA~1\Other experiences]  
 Edited by: Super  
 Date/Time: 09/08/04 12:17:10 PM

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 Codes-quotations list  
 Code-Filter: All

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 Code: Connotation {6-0}

P 1: Experience.txt - 1:3 (7:8) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Flying] [Object] [Real/artificial]

This object is finely placed, I mean I can tell that it is between me and the other bridge over there but its just a bit hanging in the air. It definatly looks artificial.

P 1: Experience.txt - 1:4 (8:9) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Nice] [Plants] [Quiet] [Reflection] [Sun] [warmth] [Water]

The reflection of the roof on the lake is very nice. And this warm reflection from these leaves and the light reflection from the sun, gives me a sense of quietness. I think itís the kind of light the illumination, the sun which gives me a nice feeling.

P 1: Experience.txt - 1:7 (29:29) (Super)  
 Codes: [Connotation]  
 Memos: [Games]

Well every time I have these kind of experiences I am missing where I need it elsewhere so where is my gun, where is the enemy.

P 1: Experience.txt - 1:8 (34:35) (Super)  
 Codes: [Connotation] [Denotation] [Metaphor]  
 Memos: [Falling] [Railing] [Real/artificial]

There is something that is a bit unrealistic when I look down. Its like Iím leaning and the ground I am standing on is leaning with me too, this fence I was talking about is not entirely straight, it has an angle thatís not straight up.

P 1: Experience.txt - 1:9 (37:37) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Unusual] [Windows]

Now that I get to think of it, itís a bit strange that I canít look out of the windows, but nothing else.

P 1: Experience.txt - 1:10 (42:42) (Super)  
 Codes: [Connotation]  
 Memos: [Games]

It actually reminds me of computer games  
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Code: Denotation {9-0}

P 1: Experience.txt - 1:1 (4:4) (Super)  
 Codes: [Denotation]  
 Memos: [field of view] [Monitor]

At the beginning I had a problem with the field of view, I mean I was seeing like the monitor, but now, I feel like Iím there, I got used to this field of view.

P 1: Experience.txt - 1:2 (6:6) (Super)  
 Codes: [Denotation]  
 Memos: [Bridge] [Nice] [Plants]

This bridge is very nice, I can appreciate this bridge very well, including these leaves in front of the bridge.

P 1: Experience.txt - 1:3 (7:8) (Super)  
 Codes: [Connotation] [Denotation]  
 Memos: [Flying] [Object] [Real/artificial]

This object is finely placed, I mean I can tell that it is between me and the other bridge over there but its just a bit hanging in the air. It definatly looks artificial.

P 1: Experience.txt - 1:4 (8:9) (Super)  
 Codes: [Connotation] [Denotation]

Memos: [Nice] [Plants] [Quiet] [Reflection] [Sun] [warmth] [Water]

The reflection of the roof on the lake is very nice. And this warm reflection from these leaves and the light reflection from the sun, gives me a sense of quietness. I think it's the kind of light the illumination, the sun which gives me a nice feeling.

P 1: Experience.txt - 1:5 (16:16) (Super)

Codes: [Denotation]

Memos: [Object] [Reflection] [Stereo/Depth] [Water]

I'm impressed with the depth perception, no reflection on the water from the rotating circles.

P 1: Experience.txt - 1:6 (21:23) (Super)

Codes: [Denotation]

Memos: [HMD]

Yes after a while I am beginning to be distracted from the view. I think it's because my brain has been adjusted to it, and then I start noticing the head mounted display, the physicality of the head mounted display. I notice that I have something different on my head

P 1: Experience.txt - 1:8 (34:35) (Super)

Codes: [Connotation] [Denotation] [Metaphor]

Memos: [Falling] [Railing] [Real/artificial]

There is something that is a bit unrealistic when I look down. It's like I'm leaning and the ground I am standing on is leaning with me too, this fence I was talking about is not entirely straight, it has an angle that's not straight up.

P 1: Experience.txt - 1:9 (37:37) (Super)

Codes: [Connotation] [Denotation]

Memos: [Unusual] [Windows]

Now that I get to think of it, it's a bit strange that I can't look out of the windows, but nothing else.

P 1: Experience.txt - 1:11 (47:47) (Super)

Codes: [Denotation]

Memos: [Laboratory]

Well right now I am standing in the middle of a laboratory but I really completely forgot about that

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Code: Metaphor {1-0}

P 1: Experience.txt - 1:8 (34:35) (Super)

Codes: [Connotation] [Denotation] [Metaphor]

Memos: [Falling] [Railing] [Real/artificial]

There is something that is a bit unrealistic when I look down. It's like I'm leaning and the ground I am standing on is leaning with me too, this fence I was talking about is

not entirely straight, it has an angle that's not straight  
up.

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