DESIGN MODELS FOR MULTIMEDIA LEARNING ENVIRONMENTS BASED ON INTERACTIVE DRAMA

by

THOMAS JOHN ROGERS

A thesis submitted to the University of Plymouth in partial fulfilment for the degree of

DOCTOR OF PHILOSOPHY

School of Computing
Faculty of Technology

September 2000
Abstract

Interactive multimedia offers a degree of richness that lies outside the scope of conventional design methods for computer based learning. This research seeks to develop an interdisciplinary approach to design, that recognises the ways in which the combination and integration of different media forms can be exploited to stimulate experiential, intuitive, perceptual, and social/communicative aspects of learning.

The goal of the project has been to develop a conceptual design model for the development of multimedia learning environments (MLEs), for humanistic learning applications, by using interactive drama. The models and methods developed though a practical design project have been founded upon theory from the realms of psychology, social sciences, learning and education, the arts and media, and software design. They address the cognitive and social aspects of learning, the use and interpretation of interactive media, the creation of learning environments, and the activities involved in design.

As a vehicle to test the theoretical perspective, a design project has been undertaken, that has involved:

- learning needs analysis and subject matter development;
- development of a structural model for the MLE;
- information structure, navigation and interface design;
- scripting, design and development of media materials for the development of interactive drama;
- formative evaluation.

The subject area chosen for the design project is that of pregnancy and childbirth. The primary reasons for this choice was a desire to address the issues of design for informal learning experiences (that do not fit in the remit of institutional curricula) and an interest in finding ways to represent the social and interpersonal dimension to learning. Such learning processes have been described as 'humanistic learning' for the purposes of this research project.
To help fulfil these goals, it was decided to work with playwright Simon Turley to develop a number of interactive drama scenes. Not only did this enable some of the more sensitive and personal issues of pregnancy to be addressed, but it also gave an opportunity to explore the world of drama, film and theatre as a means to create interactive learning experiences.

The research has shown the benefits of interdisciplinary design practice, produced a framework of the theoretical issues that inform designers, and developed an approach to the design of MLEs for humanistic learning applications. These elements have been brought together to form the conceptual design model.
Contents

ACKNOWLEDGEMENTS ................................................................................................. 1

AUTHOR'S DECLARATION ............................................................................................. 3

1. INTRODUCTION TO THE PROJECT ........................................................................ 5
1.1 AIMS OF THE RESEARCH ...................................................................................... 5
1.2 RESEARCH QUESTION, ORIGINALITY AND CONTRIBUTION TO KNOWLEDGE .... 7
1.3 RATIONALE FOR THE RESEARCH ........................................................................ 8
1.3.1 Design issues for a new medium ......................................................................... 8
1.3.2 Technological convergence .................................................................................. 10
1.3.3 Humanistic learning: pregnancy and childbirth ....................................................... 14
1.3.4 Drama as a medium for experiential learning ......................................................... 17
1.4 RESEARCH ACTIVITIES ......................................................................................... 18
1.5 PRESENTATION OF THE THESIS ........................................................................... 18
1.5.1 Part 1 - introduction and research methods ......................................................... 18
1.5.2 Part 2 - literature review ....................................................................................... 19
1.5.3 Part 3 - exploration of MLE and interactive drama design ....................................... 19

2. RESEARCH METHODS ............................................................................................ 21
2.1 INTRODUCTION ..................................................................................................... 21
2.2 RESEARCH METHODOLOGY ................................................................................. 22
2.3 RESEARCH METHODS .......................................................................................... 28
2.4 KNOWLEDGE FRAMEWORK ............................................................................... 30
2.4.1 Psychological factors ............................................................................................ 31
2.4.2 Learning issues ..................................................................................................... 32
2.4.3 Social dimension .................................................................................................. 32
2.4.4 Production issues .................................................................................................. 32
2.4.5 Multimedia design ............................................................................................... 33
2.5 SUMMARY .............................................................................................................. 33
3. PSYCHOLOGICAL PROCESSES ................................................................. 34

3.1 SYMBOLICISM .................................................................................. 34
3.2 CONNECTIONISM ............................................................................. 36
3.3 CONNECTIONISM AND HIGHER ORDER COGNITION ...................... 36
3.4 PERCEPTION .................................................................................... 39
3.5 VISUALISATION AND IMAGINATION ................................................. 42
3.6 THE ROLE OF SYMBOLIC THOUGHT ................................................ 43
3.7 BEHAVIOUR AND PHYSICAL RESPONSES ....................................... 45
3.8 SOCIAL PSYCHOLOGY ..................................................................... 47
3.9 PSYCHOLOGY AND ITS CONTRIBUTION TO LEARNING AND MLE DESIGN ... 49

4. LEARNING, INSTRUCTION AND LEARNING TECHNOLOGY ............... 51

4.1 UNDERLYING PARADIGMS, OBJECTIVISM VS. CONSTRUCTIVISM .......... 52
4.2 LEARNING MODELS ....................................................................... 55
   4.2.1 Laurillard’s conversational framework ........................................... 55
   4.2.2 Rich Environments for Active Learning (REALS) .............................. 57
4.3 LEARNING PROCESSES ................................................................. 58
4.4 INSTRUCTION AND LEARNING ......................................................... 62
4.5 LEARNING STYLE ............................................................................ 62
4.6 SOCIAL AND INSTITUTIONAL FACTORS OF LEARNING .................... 63
4.7 THE LEARNING ENVIRONMENT ...................................................... 64
4.8 ORGANISATIONAL LEARNING ....................................................... 65
4.9 LEARNING WITH MEDIA ............................................................... 66
4.10 LEARNING WITH INTERACTIVE MULTIMEDIA ............................... 67
4.11 INTERACTIVE MULTIMEDIA FOR HUMANISTIC LEARNING ............. 67
13. EVALUATION AND DISCUSSION OF THE DESIGN PROCESS .......... 210

13.1 INTRODUCTION ........................................................................................................ 213
13.2 REFLECTION BY THE SCRIPTWRITER .................................................................. 214
13.3 EVALUATION OF DESIGN MODELS AND METHODS ............................................. 220
   13.3.1 Evaluation of the Knowledge Framework ............................................................... 220
   13.3.2 Evaluation of the design process ........................................................................... 225
13.4 EVALUATION FROM THE USER’S PERSPECTIVE .................................................. 227
   13.4.1 Discussion of humanistic learning ........................................................................ 229
   13.4.2 Evaluation of the prototype learning materials ....................................................... 231
   13.4.3 Future directions and improvements .................................................................... 234
13.5 SUMMARY AND DISCUSSION .............................................................................. 237

14. CONCLUSIONS: INCORPORATING A RICH KNOWLEDGE MODEL INTO THE DESIGN PROCESS .............................................................. 240

14.1 INTRODUCTION .................................................................................................... 240
14.2 ISSUES FOR DESIGN PRACTICE ........................................................................... 242
14.3 APPLYING THE CONCEPTUAL DESIGN MODEL .................................................... 244
   14.3.1 Requirements analysis phase ................................................................................ 245
   14.3.2 Prototype and interface design phase .................................................................... 248
   14.3.3 Creation of interactive drama materials ................................................................. 252
   14.3.4 Media implementation phase ............................................................................... 256
   14.3.5 Formative evaluation phase ................................................................................. 259
14.4 MLES FOR HUMANISTIC LEARNING .................................................................... 263
14.5 INTERACTIVE DRAMA ........................................................................................... 264
14.6 REFLECTION AND THE DIRECTIONS OF FUTURE WORK .................................. 265
   14.6.1 Review of the project: a medical practitioner’s view ................................................. 266
   14.6.2 Interface Technologies ........................................................................................ 268
   14.6.3 Computer mediated communication (CMC)........................................................... 269
   14.6.4 Virtual reality (VR) ........................................................................................... 271
14.7 CLOSING DISCUSSION: FUTURE RESEARCH QUESTIONS ................................ 271

REFERENCES ............................................................................... 274
List of Figures

Figure 1.1 Basic structure of the Knowledge Framework: Psychological Factors described in Chapter 3; Learning issues, described in Chapter 4; the Social Dimension described in Chapters 5, 6 and 7; Production Issues described in Chapter 8; and Multimedia Design described in Chapter 9 ....................................... 6

Figure 2.1 An early version of the Knowledge Framework ................................................... 31

Figure 3.1 Levels of control hierarchy (Harré et al, 1985, p27) ............................................. 46

Figure 4.1 Essential aspects of the teaching-learning process (Laurillard, 1995, p180) ............... 55
Figure 4.2 REAL definition: Framework (Grabinger & Dunlap; 1995; p13) ............................ 58

Figure 6.1 Audience Activity Phases and Sequences (Lin, 1993, p229) ................................. 85
Figure 6.2 Gratification-Seeking Process Model (Lin, 1993, p232) ....................................... 86
Figure 6.3 Value Network and Communication Circuit of the Entertainment-Education Soap Opera "Acompañame" (Nariman, 1993, p60) .............................................. 89

Figure 7.1 Illustration of drama elements used in the creation of a 'simulated virtual workplace', reported by Blackwell et al 1995.......................................................... 106
Figure 7.2 Illustration of drama elements used in Midnight Stranger™. © Jeff Green; Animatics Interactive. All rights reserved. ................................................................. 107
Figure 7.3 Illustration of drama elements used in Mode™. © i. Hoffmann + associates Inc. And its licensors. All rights reserved. ......................................................... 108
Figure 7.4 Relationship between Laurel’s Aristotelian HCI paradigm and the dramatic paradigms used in this research project ............................................................. 110
Figure 7.5 The Oz System Architecture (Kelso et al, 1992, p2) ................................................ 112
Figure 7.6 The story framework, the story representation and the story agent work together to form an authoring and presentation system with multiple feedback loops (Brooks, 1997, p384). ............................................................... 115
Figure 7.7 Classical story structure, derived from Garrand (1997) and Laurel (1993) ................ 116
Figure 7.8 Narrative models for interactive multimedia: (a) Linear structure with scene branching; (b) Hierarchical branching explosion; (c) Parallel structure; (d) String-of-pearls structure. Drawn from Garrand, 1997, pp72-75 ............................... 117
Figure 8.1 Interface models. (a) The pre-cognitive–science view of the interface. (b) The mental-models view. The thought bubbles and their contents are considered part of the interface. (c) The “horrible recursion” version of the mental-models view of the interface. More bubbles could be added ad infinitum. (d) A simple model if the interface, circa 1989. In this view the interface is that which joins human and computer, confirming to the needs of each. (Laurel, 1993, pp12-14) ..................................................................... 128

Figure 8.2 Theatrical models (a) Plan view of a typical proscenium theatre. (b) For the audience, what’s happening on the stage is all there is. Triangles represent the actors. (c) Putting the audience on the stage creates confusion. (d) An alternative view of human computer interaction, in which the representation is all there is. The triangles represent agents of either human or computer-generated types, and the other shapes are other objects in the virtual environment. The shape of “the stage” is oval, like the beam of a spotlight, to suggest that all the matters is that which is illuminated. (Laurel, 1993, pp14-18) .................................................................................................... 129

Figure 8.3 The classic life cycle or waterfall model (Pressman, 1992, p25) ......................................................... 130

Figure 8.4 Iterative prototyping (Boyle, 1997, p186) .................................................................................. 131

Figure 8.5 The spiral model (Pressman, 1992, p29) .................................................................................. 132

Figure 8.6 Major activities of formative evaluation (Kearsley, 1983, p146) ..................................................... 135

Figure 9.1 Knowledge Framework including contributions from design literature ........................................ 138

Figure 9.2 Knowledge Framework showing the environmental influences upon the designer ........................................ 145

Figure 10.1 Stages in product development .................................................................................. 155

Figure 10.2 Scenes and quotes from interviews with recent parents .................................................................................. 160

Figure 10.3 Scenes from simulated first antenatal interview .................................................................................. 161

Figure 10.4 An example of a parent’s home page, showing the progress and significant events of pregnancy and birth. ©Copyright Doug & Tracia Barbieri, used with permission .................................................................................. 162

Figure 10.5 Schematic suggesting the primary concerns and interests from the viewpoints of designer and user .................................................................................. 165
Figure 11.1  Structural model of the MLE ................................................................. 169

Figure 11.2  Design of user interactions ................................................................. 172

Figure 11.3  The architectural structure of an MLE showing distinction between primary active learning resources and supporting passive reference materials (Smith, 1996, p166) ................................................................. 173

Figure 11.4  Illustration of the office experiments and interface designs (button & cursor based) ........................................................................................................ 175

Figure 11.5  Illustration of the office experiments and interface designs (naturalistic style) ........................................................................................................ 176

Figure 11.6  Structural relationships of the four functional prototypes: (a) parental interview segments, (b) the waiting room environment, (c) an ultrasound test, (d) a home birth .......................................................................... 177

Figure 11.7  Interviews, comments chosen by simple click of the mouse .................. 178

Figure 11.8  Spatial representation and simple interaction with characters .................. 179

Figure 11.9  Simple ultrasound simulation and related digital movies ....................... 181

Figure 11.10  Illustration of the home-birth demo, related graphics and information representations ................................................................. 182
Figure 12.1  Diagram showing the sequence of the interactive drama design activities..................188

Figure 12.2.  Examples of script and design document pages: (a) character profiles; (b) original linear scripts; (c) scripts segmented and adapted into individual events and episodes; (d) compilation of scripts showing narrative routes; (e) final image based scripts used in production of prototype materials and evaluation of drama materials.........................................................................192

Figure 12.3.  A selection of materials used to support design and scripting used in Experiment A: (a) sketches of physical space, (b) storyboard of character interaction, (c) development of character interaction through rehearsal video, (d) annotated script showing possible interactions. Materials used to support design and scripting used in Experiment B: (e) storyboard sketches, (f) annotated video storyboards taken from rehearsals, (g) schematic diagrams representing spatial, chronological and interpersonal relationships....................193

Figure 12.4.  Illustration of the rehearsal activities and description of the influence they had on the later design of drama materials...............................................................................................196

Figure 12.5  Structural framework of interactive drama materials............................................199

Figure 12.6  The structure of the drama, guidance points and special topic materials in Experiment A..........................................................................................................................201

Figure 12.7  Panoramic views of the locations used in Experiment B.........................................204

Figure 12.8  The spatial-time relationships between different scenes and episodes in Experiment B........................................................................205

Figure 12.9  The structure of the drama showing multiple routes and switch of viewpoint to follow different characters..........................................................206

Figure 12.10 Representation different character viewpoints within the interactive drama........207

Figure 12.11 Experiment C: example images from professional casting and video production.................................................................................................209

Figure 12.12 Illustration of the stages completed in the development and research of interactive drama.................................................................212
Figure 14.1 Conceptual design model comprising the Knowledge Framework and Design Process...........................................................................................................242

Figure 14.2 Representation of areas of knowledge drawn upon during requirements analysis phase........................................................................................................245

Figure 14.3 Representation of areas of knowledge drawn upon during Prototype and interface design phase ........................................................................................................249

Figure 14.4 Representation of areas of knowledge drawn upon during creation of interactive drama materials........................................................................................................252

Figure 14.5 Representation of areas of knowledge drawn upon during media implementation phase........................................................................................................257

Figure 14.6 Representation of areas of knowledge drawn upon during formative evaluation phase........................................................................................................260
List of Tables

Table 4.1 Assumptions inherent in objectivism and constructivism. (Jonassen, 1991, p9) .................. 53
Table 4.2 Student and teacher roles in the learning process (Laurillard, 1993, p86) ........................ 56

Table 6.1 Function of Theories in Entertainment-Education Soap Operas. (Nariman, 1993, p29) ......................................................................................................................... 88

Table 7.1 Comparison between drama and narrative using the characteristics of Laurel’s Aristotelian paradigm. (Paraphrased from Laurel, 1993, pp94-95) ......................... 111
Table 7.2 Summary of Smith and Bates’ proposed adoption of cinematic editing techniques in IF environments (Smith & Bates, 1989, pp6-9) ........................................ 114

Table 11.1 The relationship between the content of the structural model and the antenatal interview .......................................................................................................................... 170

Table 14.1 Summary of relationship between the Knowledge Framework and the first phase of the Design Process indicating relevance and general order priority given to the knowledge areas .................................................................................. 248
Table 14.2 Summary of relationship between the Knowledge Framework and the second phase of the Design Process indicating relevance and general order priority given to the knowledge areas ................................................................. 251
Table 14.3 Summary of relationship between the Knowledge Framework and the third phase of the Design Process indicating relevance and general order priority given to the knowledge areas ............................................................................... 255
Table 14.4 Summary of relationship between the Knowledge Framework and the fourth phase of the Design Process indicating relevance and general order priority given to the knowledge areas ............................................................................... 259
Table 14.5 Summary of relationship between the Knowledge Framework and the fifth phase of the Design Process indicating relevance and general order priority given to the knowledge areas ............................................................................... 263
Acknowledgements

This research has grown from the belief that there is much to be achieved in improving the design methods, and learning strategies, employed in the creation of interactive media. It is also based on a desire to understand more about the growing opportunities to use information and media technologies for learning about the complexities and experiences of life. The success of this work has been made possible by the help and guidance of many people from many areas of experience and expertise. In particular the following people were essential to the completion of the project.

I would first like to thank Peter Jagodzinski, my Director of Studies, for giving me help and advice in the development of my ideas, the progress of the research and the writing of this thesis. I would also like to thank Mike Phillips, my second supervisor, for the contribution and guidance he gave to the research project.

I would like to thank Simon Turley for his work on the creation of scripts, direction of actors and guidance on dramatic theory. Matthew Barrand, Roberta Russell, Rachel Cheney, James Allwood, Ellie Cheney and Sue Cheney also gave their time, production and acting skills. They were kind enough to let me observe their rehearsals and patient enough to work with me on the video shoot. A special thanks must also go to the Cheney family for the use of their house to shoot some of the video sequences.

Jane Roberts’ final year project work, provided supporting work and additional media resources for this research. Chris Brown and Neil Dare-Williams spent many hours building the structure and links for the project Internet pages.

Members of the Perinatal Research Unit, Post Graduate Medical School Derriford Hospital, have provided useful advice on the selection of a topic and focus for the MLE. They also gave insight to the viewpoints, interests, and needs of the medical professions.

A number of people in Canada were kind enough to give me help from a distance by allowing me to reproduce their copyright materials. The interactive drama products Mode™ and Midnight Stranger™ are used with permission of the writer and director Jeff Green of Maximedia and product producers Animatics Interactive Corporation. I would also like to thank Jeff Green for his advice and encouragement during the project. The publishers of Mode™, Hoffman & Associates Inc, have also been kind enough to allow me to reproduce screen shots and promotional materials in my PhD thesis. I would like to thank Mary Cascone, Licensing Manager at Hoffman & Associates, for her work in arranging copyright permission.
I would also like to acknowledge all of the people who have told me of their experiences, opinions, and ideas on pregnancy and childbirth for the design project. In particular, the Wilson and Bell families were very helpful in giving their time and answering all my questions. A number of families have kindly allowed me to link to their home pages about their pregnancies and children. In particular I would like to thank Tracia and Doug Barbieri for allowing me to use images from their family Internet site about the birth of their daughter Ashlyn Marie.

Within the University of Plymouth, I have received valuable insight and ideas from members of the MediaLab Arts team. My appreciation goes to Dan Livingstone, Chris Speed, James Norwood, Mic Cady, Geoff Cox and Debbie Garcia-Tobin. My colleagues in the Manufacturing and Business Systems Group have also been very supportive to my research work.

My friends Chris Smith and Richard Parsons, both past members of the Human Centred Systems Design research group, have been very helpful with their comments and ideas. They have always been thought provoking and informative.

The most important people in my life have been extremely supportive and tolerant of me during the completion of this project. My love and thanks go to Rachael, for her care, constructive criticisms, proof-reading and personal insights. The long conversations and hours of work have been a huge help to the developments of my ideas and to the progress of this work. I would also like to thank her daughter, Becci Hards, for being understanding of my work commitments, and always appreciative and helpful when it mattered.

As ever, my Dad has been a great friend and given no end of practical and moral support during my time at the University of Plymouth. Finally, my Mum (Eileen Rogers, 29/5/1920 to 13/12/95) gave me an incredible amount of time and care in her life. Her interest and pride in my work, education and achievements actively continued to her last moments. I am therefore dedicating this work to her.
Author's Declaration

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award.

The Study was financed with the aid of a research grant from the Higher Education Funding Council For England.

Relevant scientific seminars and conferences were regularly attended at which work was presented; external institutions and individuals were visited for consultation purposes, and a number of papers prepared for publication.

Publications:


Presentations and Conferences Attended:


AETT ’95 Association of Educational Technology and Training Conference. University of Plymouth; April 1995


External Contacts:

Perinatal Research Group, Post-Graduate Medical School, Derriford Hospital Group.

Simon Turley, Theatrical Playwright and Dramatist.

Signed T. J. Rogers

Dated 22 September 2000
1. Introduction to the project

The purpose of this chapter is to describe:

- the aims and rationale for the research;
- intended outcomes of the research;
- the research question;
- rationale for the research in relation to learning issues and the convergence of computing and media technologies;
- the approach taken in completing the research activities;
- the structure and presentation of the thesis.

1.1 Aims of the research

This research seeks to develop methods and models of design that recognise the ways in which the combination and integration of different media forms can be exploited to provide users with new capabilities through experiential, intuitive, perceptual, and social-communicative aspects of learning (Jagodzinski et al, 1995). In this research, this type of learning is termed 'humanistic learning'.

The main aim for this research is to develop a conceptual design model. The conceptual model is formed from two parts. The first part is a representation of the knowledge and expertise that supports designers in the creation of multimedia learning environments (MLEs) for humanistic learning applications. This part of the model is referred to as the 'Knowledge Framework' and has the basic structure shown in Figure 1.1. It concentrates upon the most salient theoretical and applied knowledge that informs the design of humanistic learning applications through the exploitation of interactive drama. Thus it has drawn upon work from the fields of psychology, social sciences, learning and education, arts and media, and computing (described in Chapters 3 to 9).
Figure 1.1 Basic structure of the Knowledge Framework: Psychological Factors described in Chapter 3; Learning issues, described in Chapter 4; the Social Dimension described in Chapters 5, 6 and 7; Production Issues described in Chapter 8; and Multimedia Design described in Chapter 9.

The second part of the model is a description of the ‘Design Process’ involved in a practical design project. It provides an instantiation of the use of the Knowledge Framework and illustrates the way in which a range of diverse and sometimes conflicting theoretical perspectives can be reconciled and integrated within creative practice. The design work has been limited to the development of prototype materials and has involved the following:

- learning needs analysis and subject matter development;
- development of a structural model for the MLE;
- information structure, navigation and interface design;
- scripting, design and production of media materials for the development of interactive drama;
- formative evaluation.

The purpose of this two-level conceptual design model is to communicate to other designers and researchers a way of harnessing the power and potential of MLEs that exploit interactive drama for humanistic learning applications. As explained in Chapter 2, an explorative approach has been taken to the research. That is to say, that it explores a new technological opportunity by examining a range of theoretical and
practical domains to identify those aspects that can be integrated to provide a conceptual platform for future work. However it recognises that the wide diversity of interpretation, which is inevitable and indeed necessary in a creative medium, precludes the possibility of prescriptive "guidlines" or "methodologies" for designers. The research identifies a design space and gives an example of how that might be interpreted but does not set out to constrain that space for others.

The subject area chosen as a vehicle for the design project is that of pregnancy and childbirth. It was chosen because it is one of life's most significant experiences, involves many kinds of learning, demands the assimilation of much information and advice, and demands the making of many important decisions and choices. It is also recognised that parents are often excluded from important decisions and choices because of the failure of conventional learning methods, and information sources, to make clear the options and implications of their decision making.

The use of interactive drama offered a number of potential benefits. First, it enabled some of the more sensitive and personal issues of pregnancy to be addressed. These are issues that are inaccessible through conventional learning materials in the domain. Secondly, it provides a clear example of the kind of new media form and features that are enabled by the convergence of media technologies. Finally, it enabled the observation of, and participation in, a variety of creative design activities that produced a detailed understanding of humanistic learning from a designer's perspective. These drama materials were developed in co-operation with playwright, Simon Turley.

1.2 Research question, originality and contribution to knowledge

This research seeks to answer the question:

*What framework of knowledge and design processes are needed to develop MLEs using interactive drama for humanistic learning?*

Little has been published which explores the design of MLEs that deliver this type of learning experience. Such experiences not only involve the building of formal knowledge, but also involve interpersonal, social and cultural, moral, and emotional issues that are essential to the understanding of important life episodes.

The originality of this project comes from the identification and description of interactions, between the different disciplines and bodies of knowledge, that contribute to and emerge from the design process. It has also come from the co-operation and input of different creative and technical design expertise. This research has sought ways to articulate the design process involved in creating such an MLE.

The contribution to knowledge arises from the identification of the potential for digital technologies to enable new forms of user interaction with media and thus new
possibilities for delivering humanistic learning experiences. Secondly, it arises from an analysis of the theoretical foundations, environmental considerations, production needs, skill and knowledge contributions, creative processes, and resources involved in the design of process of MLEs using interactive drama for humanistic learning.

1.3 Rationale for the research

The motivation for this research grew out of the identification of a number of developments in computer and media technology, and the recognition of the importance of social and experiential aspects of learning. Through the period of the research project, the evolution of technology has widened the possibilities for exploiting the design methods described in the following chapters. Equally, changing political and social concerns for health, welfare and education have made the types of learning issues discussed much more prominent in the public domain.

The original motivations, and subsequent developments, for the project can be described under four headings:

- Design issues for a new medium;
- Technological convergence;
- Humanistic learning: pregnancy and childbirth;
- Drama as a medium for experiential learning.

1.3.1 Design issues for a new medium

Conventional approaches to the design and development of computer based learning systems have largely followed an objectivist model of learning (Jonassen, 1994, p11). That is to say, a model that is based upon the symbolic paradigm of cognitive science derived from cognitive psychology, computer programming, systems analysis, and instructional design. These products often resemble programmed instructional texts. More recent technology has enabled the development of hypermedia, which enables a more exploratory constructivist approach. As a result many multimedia learning products tend to resemble hyperlinked books in their structure and content, for example Encarta (Microsoft, 1995). Users interact by selecting from hot-words, menu items, icons and areas of pictures. Factual knowledge is delivered in various forms in the style of a multimedia textbook, and audio-visual enhancements are added to established forms of learning.

In this project the interactive book metaphor has been replaced by an environment with spatial and chronological dimensions in a form more akin to interactive film or video. The primary interface design for prototype materials has been developed around the
concept of interactive drama. In this style of MLE, users learn through interaction with characters, or objects of interest, to follow events with a strong interpersonal and social interest. Vicarious learning experiences are supported by integrated learning and information resources.

The premise of this research is that multimedia can be used to develop forms of learning resource that can be applied to previously neglected learning domains and situations. The objective of this approach is to facilitate learning in domains which are not purely factual, but which have elements of understanding that normally arise from social interaction and life experiences. That is to say based on a social-communicative model of learning (Jagodzinski et al, 1995).

Innovations in technology are now making possible a release of creative potential inherent within the medium, however it can be said that techniques for design and development have yet to mature.

"Therefore in many cases, interactive multimedia has come to be characterised by confusion arising from a muddle of images, video and type; disorientation from a multiplicity of overlaid boxes, windows and menus; and frustration with a rash of icons and buttons, combined with crude uses of colour and texture and liberal usage of computerised effects."

(Flint, 1994)

Whilst the design of MLEs has been chosen as the focus for this research, much of what has been discovered is applicable to the design of other multimedia applications, such as entertainment and information systems. There are an increasing number of multimedia producers and multimedia titles (educational and commercial) available, however it is interesting to note the comments of the Gistics (1995) report on multimedia.

"Our research of interactive title buyers reveals a generally low level of satisfaction. They find titles, with few exceptions, uniformly bland, boring and just "brain dead".

(Gistics, p17,1995)

They also suggest that "authoring practice" fails to deliver the full range of its creative potential (Gistics, p17, 1995), with all titles having similar visual style and functional characteristics. This would suggest that there is an opportunity to develop a better understanding of the creative and technical requirements of designing good products. This demands the growth of a theoretical perspective on communicating with multimedia, whether it be to enable learning, tell a story or play a game.

"Tight linking between visual, kinaesthetic, and auditory modalities is the key to the sense of immersion that is created by many computer games, simulations, and virtual reality systems."

(Laurel, 1993, p161)
Brenda Laurel's statement sums up a primary reason for the success of the best interactive multimedia, and the lure that draws a growing body of enthusiasts, especially for the playing of computer games. The adoption of such ideas are less well defined in other areas, including other forms of interactive entertainment and learning. However, a number of emerging design and research issues have been described in the literature:

“We are now entering a novel place in history of human-computer relationships, a phase in which once dominant issues will become quite obsolete, while previously unasked questions will arise. [...] Now emphasis is shifting towards areas like computer-mediated communication (CMC), computer-supported cooperative work (CSCW), and virtual reality (VR) as media. We can still worry about users and consider their ways of interacting with computers as matters worthy of our interest, but priorities in both practice and research are changing fast. We no longer have to face and model system users but social actors, who are participating in electronic environments in order to reach their particular goals, to assert their principles and values, and to develop their projects and self-identities.”

(Mantovani, 1996, p1)

Mantovani's work considers the socio-cognitive perspective of communication environments, the social and cultural frameworks that influence the use of computer and communication systems, and the impact of communication technologies upon individuals, organisations and social groupings.

This research project seeks to encompass the socio-cognitive perspective described by Mantovani, and identify a set of elements that form a convergence for the design of MLEs. A literature review has identified a range of approaches to the design of multimedia, learning technology, and other interactive media forms. The review has also discussed the contribution, of research and design practice, that may be drawn from the conventional media (e.g. film, TV) and applied to MLE design. This literature is usually written from a single disciplinary perspective. As described in the later chapters of this work, it has been found that there is much to be gained by bringing together knowledge from these different disciplines. This approach enables the development of common design models and methods for design practitioners, technologists, and educationalists to draw upon and use. Indeed it can be argued that such developments are essential to exploit the opportunities offered by convergences of computing, media and communications technologies.

1.3.2 Technological convergence

Falling costs of computing power are driving the opportunities for exploiting interactive technologies in new ways. A report published in McKinsey Quarterly (Butler et al, 1999) has identified a number of trends, and made a number of predictions, on the economic opportunities of interconnectivity. They suggest that there will be huge advances in network communications, “enabling new applications and
new connectivity" (Butler et al, 1997, p11), that the trends in "faster, cheaper, and more abundant" (Butler et al, 1997, p11) computing power will continue for at least the next decade. They estimate a 98% fall in price from 0.31 cents per kilobit in 1997 to 0.004 cents per kilobit by 2005. They suggest that all industries will see deep transformations in their form and activities, and that one of the sectors to be fundamentally transformed are the media industries.

""Digitizable" industries, such as entertainment and software, in which the conversion of products from atoms to bits will create unlimited possibilities for interaction."
(Butler et al, 1997, p22)

At present the common concept of multimedia is contained within the technology of the desktop computer. This is changing as digital technology and interactive services encroach on the domestic world. Currently, the obvious application of computers in the home is through game consoles, controlled through a mouse or joystick of some description. This is changing, and will continue to change, as technology and lower prices combine to enable new services (Gistics, 1995, p27) creating new possibilities for interactive information and entertainment services. Preferences for technology platform, and the requirements of interface design, have been considered in more detail in this research.

As already said, the duration of this project has coincided with technological developments that have markedly changed the possibilities for interactive media. At the beginning the most obvious route for development of MLE was a CD-ROM based product. Subsequently, the Internet as a medium for information, communication and transaction has grown enormously. More recently cable networks, digital TV and DVD technologies have been introduced to the market, although their adoption have yet to mature. The work completed in this project has been limited to the design of interactive media, excluding interactive communication between networks of people. One of the findings of the research (discussed in Chapter 13 and 14) suggests that the TV screen will retain preference, over the personal computer, for domestic users of interactive technology. As Marzano says:

---

1 DVD = Digital Versatile Disc or Digital Video Disc
"On the one hand, it [TV] exerts a tremendous influence in the social, spatial and temporal organisation of our lives, both in relation to others and to the television set itself. On the other hand, it reflects those changes as they happen. Its increasing mobility and independence mirrors our own; its impending integration with other technologies reflects our global integration; and, as we look more closely into this looking glass (everybit as strange as the one Alice stepped in through in Lewis Carroll's story), we begin to see an object which is more and more like ourselves; not an alien piece of hardware but an ever-present friend who reacts in familiar ways and with whom we feel at home."

(Marzano, 1995, pp9-10)

The concept of 'convergence' is increasingly being used in relation to media, information technology and communications industries. This can be seen at the levels of business and market, technological, development, and in terms of the expertise that are coming together to produce new media products. Examples can be found in a number of industries and markets, in broadcasting, IT and consumer electronics. For example, in the United Kingdom, a number of leading terrestrial, cable and satellite broadcasters began to introduce digital TV services in 1998 and 1999. At present the advantages offered are limited to improvements in image and sound quality, and the availability of new channels. However, the future promises to develop interactive TV and information services. In the 1996 report, "The BBC's Digital Service Proposition: A consultation document", a strategy and vision for the development of digital broadcasting is described.

"Last Summer the BBC published its vision of the digital future. Extending Choice in the Digital Age described the transformation which digital technology would bring to broadcasting over the next ten years, making possible hundreds of television channels and entirely new types of services. Audiences would have much greater choice and more opportunity to control - and respond to - the material they received. Within the decade, it predicted, over half of all households might be receiving multi-channel, digital television, delivered by a variety of means - digital terrestrial, satellite, cable or telecoms."

(BBC, 1996)

"Transmitting programmes by digital signal will dramatically increase the number of services which can be delivered to audiences: as many as ten digital services will be able to occupy the frequency previously occupied by one conventional analogue service. In addition, digital broadcasters will allow viewers greater choice over how and when they watch, eventually allowing them to interact with programmes and select their own programme content."

(BBC, 1996)

"The BBC will use digital technology to meet the demand for information and data services. The aim is to offer an interactive information source available to viewers using a digital set-top box. At the click of a remote control button, they will be able to receive data related to the programme they are watching on BBC 1, BBC 2 or the 24-hour news channel."

(BBC, 1996)

Evidence of how these developments in broadcasting are beginning to evolve may be seen in the introduction of thematic programming, such as the transmission of 24 hour
news channel and the BBC’s Internet news service. Extended scheduling and linking of TV programmes to other media, for example the series animal documentaries, news and information bursts transmitted under the title of “The Animal Zone” and linked to a large Internet site, and the BBC “Wildlife” magazine.

“Education will be one of the key areas to benefit from digital technology. Already the BBC is the world’s largest producer of educational broadcasting, delivering a wealth of material to schools and colleges and to adults at home and work. The new technology will enable us to expand and extend this service. Increasingly, it will allow audiences more opportunity to interact with the material they are receiving.

An important offering will be a new service designed to provide a stream of information and educational software 24 hours a day. This will be available once the necessary set-top box technology is ready, probably by mid-1998. It will provide text in support of programmes or educational software which can be used either at the same time as a BBC programme is being watched, or “off-line” and therefore not tied to the simultaneous viewing of the programme.”

(BBC, 1996)

The thematic presentation of information, education and public service broadcasting may also be found with other TV companies. For example, between 2nd and 5th November 1997, Channel 4 broadcast a number of films, documentaries and ‘vox-pop’ programmes (personal opinions) on the pros and cons of abortion. Screened under the collective title of “Whose Choice”, it was supported by an Internet site and confidential telephone support lines.

In the consumer electronics and computing industries convergence is also becoming an important part of corporate strategy development. For example, Sony, are embracing these new opportunities in various initiatives, through the blend of technology and creativity, on a global scale.

“Idei’s quest is for Sony to combine Japan’s technical wizardry with America’s creative panache and thus become the global multimedia entertainment company. “Something,” says Idei, “like a Disney or Time Warner with our manufacturing base in Japan.” That means bridging technology and entertainment, not to mention the cultural chasm between Japan and America. Ultimately, Idei aspires to create a global wireless network, a world in which satellite communications bring interactive entertainment to every living room and den. Says he: “Convergence is happening not only between audio and video but between computers and communication. There is a fundamental change in society, and this is our opportunity.”

(Gibney, 1997)

These examples are indicative of the structural changes that are happening in a number of industries and markets. They are characteristic of the developments in the way that consumer electronics, media resources and computer technology are perceived and used by people. Sony is finding ways to respond to these opportunities.

---

2 Idei = Nobuyuki Idei, Sony Corporation President.
“Although Sony still makes a ton of money on Walkmans, its competitive edge in such standalone products is fading in a world where music and video are increasingly being rendered in the digital language of computers. So Sony is making personal computers with Intel, Net-surfing hardware for Microsoft's WebTV and cell phones and pagers with San-Diego-based Qualcomm Inc. Sony factories are churning out a wave of digital-based products, from high-resolution videodiscs and video-game machines to passport-size video and still cameras that plug into a PC.”

(Gibney, 1997)

Changes in people's expectations for the way that learning issues are communicated, and learning resources are presented, are likely when technology creates new possibilities for information delivery and vicarious experience. From the perspective of this research, these convergences make conditions ripe for investigating the design requirements of MLEs and interactive drama.

1.3.3 Humanistic learning: pregnancy and childbirth

The decision to research the design of MLEs based around interactive drama scenarios evolved out of early literature research into psychological processes and learning paradigms, in particular the concept of humanistic learning (described in Chapter 4). The adoption of 'pregnancy and childbirth' as a topic for the prototype materials came from contact with members of the Perinatal Research Group3.

Medical professionals have identified the need to increase the awareness and knowledge about antenatal care and childbirth options amongst potential parents (described in Chapter 10). It is believed that in the future parents will be able to choose from a wider range of care options, which will place more responsibilities upon parents to make informed choices for care. Such experiences also involve interpretation of complex information and advice. One of the problems highlighted is the difficulty of preparing advisory literature. It was said by the clinicians from the Perinatal Research Group who provided advice, that such literature has to be written for an average reading age of 11 years. It is recognised that there are significant difficulties for people that have less than average literacy skills in comprehending and employing advice in complex technical, personal or social domains.

A number of studies have shown the existence of wide ranging literacy difficulties amongst the adult population. For example, (Basic Skills Agency, 1994; Ekinsmyth & Bynner, 1994) have confirmed the literacy problems of a significant minority of adults. Others, for example the Office for National Statistics (1998a), have highlighted the low participation in post-compulsory education and training. The survey by Ekinsmyth and Bynner (1994, p25) looked at literacy and numeracy levels amongst 1650 adults drawn

3 Part of the Graduate Medical School, in Derriford Hospital, Plymouth
from the 1970 British Cohort Study4. They report that 12% of the adults in the survey report some literacy or numeracy skills. Further assessment of the participants produced some interesting findings. Ekinsmyth & Bynner’s (1994, p41) conclusions included the following points:

- The participant’s self-reported reading difficulties concentrated upon poor ability to read letters and deal with forms.
- The participant’s writing and spelling difficulties were mainly about an inability to express themselves.
- Some of the most significant skill problems for participants (over 50% failure) involved the interpretation of graphs, the understanding of instructions and arguments, and the comprehension of a piece of literary text.
- People with poor literacy skills tend to have poor numeracy skills.
- People who report difficulties with numeracy and literacy tend to perform poorly when assessed, however “quite large proportions who perform badly do not acknowledge any problems” (Ekinsmyth & Bynner, 1994, p41).
- Their study also shows that the people with poor levels of literacy and numeracy tend to come from lower social classes, have parents with low educational attainments, and are more likely to experience unemployment. Women with these difficulties also tend to drop out of the labour market early. (Ekinsmyth & Bynner, 1994, pp42-55).

Research has shown similar interconnections between poverty, educational achievements and employment, amongst teenage parents (Social Exclusion Unit, 1999; Zabin & Hayward, 1993). There is an implicit difficulty in helping such people to make informed choices based upon the information and advice delivered to them. As such, there is potential for people to become alienated, or disenfranchised, from the system that is intended to serve them.

The possibilities for different approaches to obstetric care and informed consent have been described in the literature (for example Rising, 1998; Spindel & Suarez, 1995; Proctor, 1998) and echo the concerns and issues raised by the medical staff talked to during this project. The way in which women and midwives perceive the care given

---

4 A longitudinal study of all children born in the UK between 5th and 11th of April 1970.
them (Proctor, 1998) and the worries that they have during pregnancy have also been considered (Statham et al, 1997). One of Proctor’s findings confirms the discussions with medical practitioners, in the Perinatal Research Group, and the views expressed by parents during subject matter research (described in Chapter 10).

"Antenatal care was characterized primarily by a need for information, understanding and reassurance. Information was clearly important to women, but numerous differences occurred between midwives’ and women’s beliefs. The importance of being offered information was mentioned frequently by women, particularly concerning their anxiety in not knowing what to ask about antenatal procedures or tests. Many did not feel confident asking for advice because they perceived the staff to be too busy to spend time with them. This issue was raised in groups of both pregnant and postnatal women, regardless of whether they were having their first or a subsequent pregnancy. Women said staff sometimes asked them if they had questions about their care, but often they did not know what they should ask. Making more guided offers of information in relation to specific aspects of care may be more helpful from staff, in addition to paying attention to nonverbal communication that may deter women from asking questions.

Midwives overestimated the importance women attached to discussing information leaflets during pregnancy. At first this seems surprising, but midwives’ and women’s perceptions of “discussion of information” may be different. During the focus groups, women spoke of feeling let down when information leaflets were proffered. Staff did not discuss leaflets with women, who were advised to go home and discuss them with their partner before reaching a decision. This sometimes made women feel unsure about decisions and unwilling to ask for further information for fear as being perceived as overdemanding. In such cases they relied on the offer of further information."

(Proctor, 1998, p92)

Proctor found that women felt that it was important to involve partners in decision making, particularly during labour and birth, yet in her study midwives did not mention this as an issue. Women also felt that there was a need to develop knowledge and confidence during the postnatal period to help them adjust to their new role, whilst midwives primary concern was with support for breast-feeding.

Statham et al (1997, pp229-232) have identified the main factors that create worry amongst pregnant women. The study showed that past experience (e.g. failed or successful first pregnancies) and other “attitudinal, personality, and mood factors were found to be related to baby worry” (Statham et al, 1997, p231). It also showed that worry was at its highest during early and the later stages of pregnancy, and that for a number of interrelated reasons older women were most likely to be concerned of risks, whilst younger women had the highest anxiety ratings and were most likely to say “don’t know” in their questionnaire responses.

The view presented here is that there is a significant need to find a way of presenting important, and sometimes complex, information and decisions. It is also suggested that some of the people who find the greatest difficulty in assimilating such information and advice, and find it difficult to make decisions, are the most vulnerable to poor experiences of pregnancy and childbirth. The difficulty found by many parents in interpreting and using printed materials, even with support from medical professionals,
would seem to demand a different approach. It is from such concerns that the need for creating accessible MLEs, aimed at helping prospective parents, has been identified.

This subject area, the issues surrounding pregnancy, has some features arising from low standards of educational achievement, disenfranchisement and alienation. It is typical of a wide range of problems faced by the caring services. The present research is thus generalisable almost directly to a large number of similar subject areas in health care and social work. More broadly, many of the issues and solutions explored here will generalise to any aspect of humanistic learning and beyond.

1.3.4 Drama as a medium for experiential learning

The decision to use drama as an educational medium was based upon two reasons. The first is in terms of the emotional content, intellectual reflection, sense of involvement and cathartic rewards it offers to those who watch it. The value of soap opera, in addressing important social and personal issues, is considered to be particularly relevant. This is discussed in greater detail in Chapter 6. The second reason developed during the project. The involvement of scriptwriter Simon Turley, introduced a number of theoretical models used in the development of drama techniques for educational purposes. Other examples of theatre and drama, used for the production of experiential learning by an adult audience, would seem to suggest that there is value in the approach taken in this research.

In formal education, there have been a number of examples where theatre and drama have been used to provide new perspectives on professional practice. One example is provided by Kerr (1995, 1997) who reports her work on “Project 2000”. This project successfully uses drama as an educational technique to encourage experiential learning and behavioural changes amongst participants. The project, run by student nurses, involved secondary school students in the processes and decisions of health promotion. In particular the 14-18 year olds considered issues of sexual health. The results of the experiment suggest a sense of empowerment and deep learning. The student nurses who facilitated the learning experience reported that they felt more confident, less inhibited, more able to communicate and more assertive in delivering their educational message.

A second, more recent, example is found at the University of Bradford Management Centre. They have developed a short course as part of its Executive Development Programme (University of Bradford, 1999, p7) titled “Mythodrama” and run by a theatre director. The course, to be run at the Globe Theatre in London, is promoted as “a new form of arts based experiential learning developed from the fields of theatre, personal and professional development”. The course uses the works of Shakespeare to
consider issues such as “the art of motivational leadership and inspiring people through speech” and “the process of creative change” (University of Bradford, 1999, p7).

1.4 Research activities

The research methods and activities undertaken in the research are described, in more detail, in Chapter 2. Experts from a number of disciplines have given advice and input to the project. A full list is included in Appendix I. They have included contributions from the fields of human centred systems design, multimedia and cyber-theory, interactive media design, drama and theatre, actors, and subject matter specialists. The author provided an interdisciplinary approach to the development of the research. This included knowledge and experience of learning, learning technology, multimedia design, and the application of systems theory to the analysis and design of human and technological systems.

The research activities have sought to explore a set of theoretical domains and practical concerns that need to be assimilated within creative design practice and the thought processes that this involves. The conceptual design model is intended to offer a designer a set of relevant areas that identify the design space for the development of MLEs for humanistic learning applications employing interactive drama. It also furnishes the designer with a rationale and examples for design decisions and choices through the Design Process, described in Chapters 10 to 13 of this work.

1.5 Presentation of the thesis

The activities involved in, and the theory that underpins, the design process involved in the development of the MLE and interactive drama prototypes are described in the following chapters. The thesis is presented in three parts, describing the context, purpose and the research methods employed, a review of the theoretical and practical elements that constitute the Knowledge Framework and a description of the Design Process through the creation of prototype MLE and interactive drama materials. The concluding Chapter draws together Knowledge Framework and the Design Process to form the conceptual design model.

1.5.1 Part 1 - introduction and research methods

Chapter 1 has introduced the project, by describing the goals, context and approach taken in the research.

Chapter 2 describes the research methodology adopted and the methods used to complete the study.
1.5.2 Part 2 - Knowledge Framework

Chapter 3 reviews the literature of human psychological processes and discusses the importance of experience, real or simulated, with regard to humanistic learning.

Chapter 4 discusses current literature on learning processes, models and the use of media, that can be applied to humanistic learning topics.

Chapter 5 considers the social context through which people develop experience, and considers the role of media in this process.

Chapter 6 develops the issues raised in Chapter 5, by discussing how people find engagement with and gratification from mass media, and the use of drama to represent relationships and social values.

Chapter 7 describes how the dramatic art can be exploited to offer a degree of interactivity, enabling a degree of audience control or participation, within a multimedia environment.

Chapter 8 discusses the main areas of production of which designers need to have knowledge for successful MLE creation.

Chapter 9 looks specifically at the theoretical concepts and paradigms of design, to describe the processes and practice of design in relation to MLEs and interactive drama.

1.5.3 Part 3 - Application of the Knowledge Framework in the Design Process

Chapter 10 introduces the practical exemplar of the research project, identifying the purpose of the MLE and user needs, and describes the development, and findings, of the subject matter research phase.

Chapter 11 describes the design process, and builds a structural model of the product, describes the development of interface designs and prototype MLEs.

Chapter 12 considers the possibilities for using interactive drama through the development of three ‘experiments’ that look at a number of techniques for creating interactivity and engagement for learners.
Chapter 13 reviews the evaluation of the design process, and the features of the prototype materials, and discusses the feedback received.

Chapter 14 presents a conceptual design model which integrates the Knowledge Framework with the Design Process, discusses the findings of the research and looks at directions for further research.
2. Research Methods

This chapter has three aims. The first is to review the research methodology pertinent to this field, and justify the choices made. The second is to identify the methods used to conduct the research. The third is to introduce the initial content of the Knowledge Framework used to support the practical activities of the work and capture the reflections on the theory that have emerged.

2.1 Introduction

In conducting the research process, the emphasis has been on the description of what designers 'do'. The work has sought to understand the expertise, skills and creative influences with which they may concern themselves as creators of multimedia learning environments (MLE) and interactive drama.

The investigation began from the (almost naive) view that multimedia has the facility to simulate human experience directly, without rendering it into an abstract symbolic form. The goal of the research has been to facilitate the learning of ideas and concepts, which cannot easily be captured in symbols or words, in the most realistic way possible, through the use of multimedia. As the project developed the realisation of the constraints and opportunities that are placed upon the design process have been identified and described. They have been described in terms of the medium, technology, cultural conventions of communication, and the psychological processes involved in perception and the construction of meaning.

As described in Chapter 1, the theoretical foundations of the research project have been developed into the Knowledge Framework. The framework began as a tentative model of the issues and disciplines involved in MLE design, and has evolved through the course of the project. The research work, undertaken during the completion of the design project, have involved a series of analytical and creative activities. This has been undertaken to explore and describe the practical and creative considerations involved in this type of MLE design. These exercises have related to the description of learning need, knowledge representation and structures, interface design, navigation methods, interactive drama development and scripting, and media presentation. Much of this work has been described in a number of publications, conference presentations and internal reports (Jagodzinski et al, 1994; Rogers et al, 1995; Rogers, 1995; Rogers et al, 1997a; Rogers et al, 1997b; Jagodzinski et al, 1997; Jagodzinski et al, 1998; Turley et al, 1998; Rogers et al, 1999). The work is described in more detail in the following chapters.
In this chapter, the research methodology and research methods chosen for this research are described and the reasons for their use explained. Finally the Knowledge Framework, that forms the basis to the research, is introduced.

2.2 Research Methodology

Research in this project is conducted from a number of viewpoints. From one viewpoint, the development of the Knowledge Framework began in order to identify the areas of knowledge and learn more about existing theory. It has evolved with other research activities, the suggestions of participants in the design process, and from criticisms and questions raised during evaluation. From a second viewpoint the creation of the prototype MLE and interactive drama materials involved reflection and participation in the design process. It also involved observation of, and co-operation with, other practitioners. This produced a description of the design process and the methods employed in design practice. The final viewpoint, is that of subject matter research. This research involved identification and description of the learning experiences of parents, the learning needs of new parents, and the guidance provided in literature and other media resources. It contributed to the design process by helping to form decisions about the content, structure and media forms used in the prototype MLE materials. It also produced an understanding of the nature of humanistic learning experiences that needed to be built into the MLE design.

Each of these research viewpoints contributed to an interpretation of design expertise and design process for MLEs that serve humanistic learning applications. The chosen research strategy for the project is qualitative. The reasons for this choice have been described by Creswell (1998, p18). In terms of this research, these reasons are related to the questions being asked, such as ‘what’ knowledge and expertise is involved in the design project, and ‘how’ is the design process completed. Secondly, it is a topic that demands an explorative approach, as theory explicitly related to the specifics of the research, is still evolving. Thirdly, as stated above, it is a topic that demands a detailed description from a number of perspectives, that requires investigation over an extended period within the context of its practical setting, and where emergent features can be identified and considered.

The researcher’s role in the project, it was decided, should be one of active learner who can describe the research from the participants’ view rather than as an “expert” who passes judgement on participants (Creswell, 1998, p18). This also enabled the researcher to consider the interrelationships between the contributions of the different participants in the project, and the different research activities. As Janesick puts it:
"In addition, the qualitative researcher is very much like an artist at various stages in the design process, in terms of situating and recontextualizing the research project within the shared experience of the researcher and the participants in the study. [...] In other words, art forces us to think about how human beings are related to each other in their respective worlds."

(Janesick, 1998, p37)

Janesick (1998, pp48-49) cautions against over-reliance upon, or too much of a preoccupation with, a particular research method. She warns that it may divert attention towards defence of method, and result in the substance and richness of the actual story being weakened. To avoid such difficulties and develop a deeper explanation, this research has taken the multi-viewpoint approach described above. Conducting research within each viewpoint involved the use of different research strategies to support the investigative activity most effectively.

A number of writers support this view. For example Creswell (1998, pp l 6-17) argues that qualitative research involves the development of extensive data resources that have been gathered by gaining access to the insiders' perspective. He suggests that these data resources, made up of complex interrelated texts, images and other media resources, should be reduced into a number of themes and categories that represent the perspectives found within the study. Most importantly he argues that such research is unlikely to have firm guidelines, or specific procedures, and will evolve and change constantly. Denzin and Lincoln take a similar stance:

"Qualitative research is multimethod in focus, involving an interpretative, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials—case study, personal experience, introspective, life story, interview, observational, historical, interactional, and visual texts—that describe routine and problematic moments and meaning in individuals' lives."

(Denzin & Lincoln, 1994, p2)

Marshall and Rossman (1989, p28) also explain the process of qualitative research as wide ranging enquiries that are developed through real-world observations, dilemmas and questions. For them qualitative research draws together personal or tacit theory with formal theory. Such a viewpoint is particularly appropriate to the research described in this thesis, because it involves the development of personal methods applied to design practice and their augmentation through the input of other specialists and theory drawn from the literature.

In order to develop a sound explanation for the design of the project, Marshall and Rossman (1989, pp12-13) suggest that it should have the following characteristics:
• A substantive focus that explains the rationale for the research and how it relates to a larger phenomenon or "illuminate larger issues" (Marshall & Rossman, 1989, p12). The rationale for this research has been explained in Chapter 1. It is argued that the completion of the design project identifies a conceptual design model that may be applied to other MLE design projects with a similar purpose.

• The sound design of the research project. This should follow logically from the research question and "the conceptual framework surrounding those questions" (Marshall & Rossman, 1989, p13). In this research project, design of the research is founded upon the Knowledge Framework, and the decision to investigate the research process as a participant. The subject matter for the MLE was chosen because of its appropriateness to the research question and because resources and subjects were accessible. The development of three research viewpoints emerged through interaction with the subject matter and a need to understand the richness of the design process.

• Researcher competence should be demonstrated. This is the ability of researchers to deal with the conceptual framework and the research design, and show the necessary abilities to engage with the research activities. In this project, this was developed from prior knowledge and expertise of the author in the development of learning technology resources, through initial development of the Knowledge Framework and participation in the design process.

So far discussion of qualitative research has been drawn from the human sciences literature. It follows a conventional approach, with a number of general research steps. Creswell (1998, p18) has described these as:

• presenting a problem;
• asking a question;
• collecting data to answer the question;
• analysing the data;
• answering the question.
Whilst such an approach is appropriate, in general terms, for this project, it has been developed for analysis and description of social groupings and interactions. In essence it relates to the observation of, co-operation and communication with, other people. This is highly relevant to many of the activities described in later chapters of this work, such as interviews with parents, co-operative design activities with a scriptwriter, observation of actors during rehearsals, and evaluation of the design process. However there is a significant element of this research that relates to the personal creative practice of the author.

To open up these issues of personal creativity to scrutiny, and describe the reflective processes of complex design tasks, the work of Schön (1983, pp307-325) has been used as a theoretical basis for the research method. The integration of reflective practice as research is an important part of this work, where the role of the researcher and practitioner are symbiotic with each type of activity informing the other.

Schön (1983, pp308-9) describes two types of research. The first that could be called practice based is where “practitioners may become reflective researchers in situations of uncertainty, instability, uniqueness, and conflict”. Here the relationship between practice and research is intimate, and the subtle interchanges between doing and thinking are inseparable. The second type of research Schön calls reflective research. This is research that is not directly involved in practice but may enable practitioners to improve their capacity for reflective practice. Reflective research is subdivided into four types:

- **Frame analysis** which considers how problems and solutions are conceived (or framed) and strategies for completing designs are generated. This type of analysis can be seen in the development of a conceptual model described in Chapter 10.

- **Repertoire-building research** involves research into the cases, models and archetypes that designers (may) employ in the successive iterations of their design activities. This can be found in the literature review in Chapters 3 to 9.

- **Research on fundamental methods of inquiry and overarching theories** involves identification and analysis of the fundamental principles that designers use to make sense of, and solve a design problem. For example the understanding of theories of perception, imagination described in Chapter 3, and the generation of mental models and external artefacts first described in Chapter 3, and used in the design process described in Chapters 10 to 13.
Research on the process of reflection-in-action seeks to describe the intuitive thoughts, critical judgements and insights that underscore design activities. This aspect of work links in to the reflection derived from the design activities, implicit within this thesis, and the reflection of scriptwriter Simon Turley in Chapter 13.

Referring to the work of Schön as an influence, Wood and Taylor (1996, p37-38) note the divide between academic research methods and “those evolved by practice-oriented professionals such as doctors, architects and designers”. As they go on to say, the opportunities and challenges of new technology have changed this gulf, and theory is gradually developing a much stronger influence over practice.

"The continuing changes to studio practice mean that a modern counterpart of the "master craftsman" may no longer be the recipient of the essential wealth of oral knowledge. Rapidly changing technologies have brought hitherto unforeseen problems (and possibilities). Environmental and ethical problems, in particular, have made theory an increasingly vital component of design. Obviously, this type of knowledge is available only in critical, analytical and logical modes, usually presented in long strings of textual argumentation. It is tempting to suggest that a more relevant form of knowledge would be polysemic rather than monosemic, and intuitive rather than rule-based."

(Wood & Taylor, 1996, p38)

Pylyshyn, however, takes a stance that argues it is impossible to develop a theory of practice.

"Once again we find that the most rational analysis can be rendered irrelevant in the real practical world, which is messy enough to be governed not only by human reasoning, but also by the vagaries of fashion.

[...] You cannot have a theory of practice, and what practical fields need are perceptive people with some sensitivity to the tasks at hand, the potential for new technologies to help or bypass them, an ability to ask the right questions, and some training on how to answer such questions empirically in particular cases. In other words, there is no substitute for wisdom in dealing with real life."

(Pylyshyn, 1991, p48)

The description of the intuitive approaches to design, described by Wood and Taylor, and the sensitivity and wisdom, that Pylyshyn writes about, are essential elements to the development of this research. However, it can also be argued that the development of the qualities necessary to deal with, interpret and represent "real life" involves both experience and the assimilation of theory, and that practitioners develop their own theoretical perspectives by drawing on the accepted viewpoint of others (Wood & Taylor, 1996, pp38 & 43-44). By taking an interdisciplinary approach, this research seeks to identify theoretical perspectives that influence designers in their work, as well as the more pragmatic tasks and creative aspects of MLE design.
The final methodological element considered in this research relates to the way in which the research findings are confirmed through triangulation of the research data. Janesick (1998, pp47-48) identifies five types of triangulation:

- **data triangulation** through the use of different data sources to consider a single situation or phenomenon;
- **investigator triangulation** through the use of more than one researcher in the generation or evaluation of data;
- **theory triangulation** through the application of multiple theoretical knowledge on a single set of data;
- **methodological triangulation** through the use of multiple research methods to study a single problem;
- **interdisciplinary triangulation** using frameworks of expertise and methods drawn from other spheres of practice that "will help to lift us up out of the dominant trench" of a single discipline (Janesick, 1998, p48).

It is interdisciplinary triangulation that is most apparent in this research. For example design practice has involved creative input from people with expertise in drama and theatre, learning technology and interactive media design (amongst others). It has also been evaluated and reviewed from the perspective of HCI and multimedia specialists, the expertise of parents and medical practitioners. Each having their own perspective on the design requirements for, and use of, MLEs and the potential of interactive drama for humanistic learning applications. As described above, the research strategies for this work have been drawn from the worlds of human sciences and those more applicable to practice based and creative arts. As Janesick has argued:

"The prevailing myths about aggregating numbers and, more tragically, aggregating individuals into sets of numbers have moved us away from our understanding of lived experience. By using other disciplines, such as art, sociology, history, dance, architecture, and anthropology to inform our research processes, we may broaden our understanding of method and substance."

(Janesick, 1998, p47)

A designers' ability to compromise the tensions of conveying the complexities of reality, and the subtleties of individual human experience, with the symbolic constructs of the medium comes through the realisation of the creative process. In order to understand the creative processes of designing a complex visual medium (in this case multimedia) involves a sophisticated blend of interdisciplinary knowledge. To answer the research question, an interdisciplinary approach to researching the design process is a necessity. The methods employed to complete this research project are described in the next section.
2.3 Research Methods

This project's concerns include the technological and production issues of design, the psychological and social issues for users, the learning theory and methods for MLEs, the communication techniques, and the artistic contributions that make designs effective. As described above, and in Chapter 1, emphasis is on the creation of practical design models that encompass the range of human characteristics relevant to humanistic learning. They illustrate different learning situations, show the possibilities for using different media forms in knowledge representation, and reveal how media can be used, in new ways, to apply multimedia techniques to complex learning scenarios.

The research has been documented through a series of analytical activities and creative exercises to build practical and creative understanding of MLE and interactive drama design. This has included the description of learning need, production of knowledge and information requirements, interface designs, navigation methods, interactive drama development and scripting, and media presentation. The design project is described under the following topic areas:

- subject matter research and requirements analysis
  (described in Chapter 10);

- MLE prototype and interface design
  (described in Chapter 11);

- creation of interactive drama materials
  (described in Chapter 12);

- formative evaluation
  (described in Chapter 13).

The methods employed have involved reflection upon creative practice by the researcher, as well as a range of other activities to analyse and describe the models and theory that are included in the thesis. Formative evaluation of the research came from the critical review of practitioners and academics. The academic research included use of the following methods to generate findings:

- literature search and review to develop the Knowledge Framework
  (introduced in the next section);

- identification of learning needs and subject matter research through
  literature search, review of media materials and semi-structured interviews;
• reflection upon the design of prototype MLE and interactive drama materials;
• observation of and participation in the creation of character and dramatic scenarios in rehearsals and media production;
• evaluation of the design process and design characteristics of prototype materials through the use of focus groups and workshops, web based presentation of the research, and ‘walkthrough’ evaluation of prototype materials.

The use of dramatic techniques has made it possible to explore and develop an approach to the design of interactive drama for delivering humanistic learning experiences. This work has included the development of case study characters and scenarios derived from subject matter research. It has progressed to a collaboration with dramatist Simon Turley to script the drama scenarios in a form suitable to an interactive drama and humanistic learning needs. The result has been the creation of several dramatic episodes that illustrate a number of experiences which could feasibly be encountered by the case study characters. Of particular importance from a research perspective, has been the observation of rehearsals (directed by Simon Turley) to derive understanding of the direction process and character development by actors. This enabled analysis of ways in which social interactions, emotions and communications are portrayed. It fed into the location video shoot to develop first hand experience of the process, requirements and possibilities of shooting interactive drama.

A number of additional activities have been undertaken to identify and explore the more functional aspects of MLE design. These have included completion of:

• a structural model to define the form that a complete MLE product would have;
• a learning needs analysis;
• storyboarding and graphic design;
• structural and navigation design;
• experiments in the use of naturalistic interface designs through development of prototype MLEs.

Reflective criticism upon the design process, in collaboration with others, has made it possible to consider how different types of media and representational forms may be structured to form a coherent whole. This has resulted in the conception and refinement of several MLE designs that illustrate how the design models, media and learning
techniques and models relate to a practical design problem. The benefits of the participatory and reflective features of the design have been commented upon by Stratfold:

"The design of materials can be a revealing process in itself. The conversion of video programme to multimedia was particularly useful. [...] The process forces the person performing the conversion to examine the way the media and the narrative works and is structured. Some experience in video production perhaps allowed me to recognise some of the issues that were uncovered, but since we are all experienced readers of video narrative I suspect that other people would come across similar discoveries during this type of concession, if not always being able to identify their nature."

(Stratfold, 1994, p209)

This comment emphasises the necessity of reflective practice in understanding the design process. This work has brought about a number of results, that have emerged from this reflective practice approach. It has provided a deeper understanding of the theory and practicalities of creating everyday learning experiences. In particular it has enabled the development of models and methods that contribute to the conceptual design model for design of MLEs serving humanistic learning needs and employing interactive drama.

As already said, the Knowledge Framework forms a significant part of this conceptual design model. Its development provided the starting point for the unfolding of the research study, and initially identified the development of possible areas of concern for design practice. This chapter continues with an introduction to the Knowledge Framework.

2.4 Knowledge Framework

During the initial literature search, a number of themes were followed to establish a better understanding of the characteristics and needs that multimedia must respond to, or exploit, to facilitate and support learning. These themes can be summarised as the way in which people:

- make decisions and interact with the world;
- learn both formally and intuitively;
- recognise and give meaning to symbols, objects, situations and events;
- are affected by different forms of communication and media.

Interactive multimedia has yet to evolve into a form which encompasses the breadth of subject content and design methods encountered in established, more mature, media forms. The literature search identified a number of topics that constitute four areas of concern (illustrated in Figure 1.1) for the design of this type of multimedia. The four
areas of concern for multimedia design provided the basis to the Knowledge Framework shown in Figure 2.1. It has been developed during the course of this research, and may be seen in its final form in Chapter 9. The four areas, plus the central element of 'Multimedia Design', are described in Sections 2.4.1 to 2.4.5.

![Knowledge Framework Diagram]

**Figure 2.1** An early version of the Knowledge Framework.

### 2.4.1 Psychological factors

The literature search to develop an understanding of human thought processes is founded upon two fundamental paradigms. These are the symbolic paradigm underlying logic and rule based reasoning, and the connectionist paradigm based upon more recent evidence of neurological brain function. The connectionist paradigm provides a more effective explanation of the interplay between our perceptual, imaginative, and memory functions in learning and problem solving. The symbolic paradigm is specific to a more limited range of activities related to specific types of problem solving, and the articulation of knowledge.

The connectionist paradigm, as explained by Rumelhart et al (1986) has been adopted to explain the fundamental acts of perception and learning, while higher level acts involved in the organisation and articulation of knowledge have been interpreted in terms of the theory of schemata and mental models (Johnson-Laird, 1983; Norman, 1983; O'Malley
& Draper, 1992). This view recognises the important contribution of perceptual and imaginative processes to learning, problem solving, and design in real world situations.

2.4.2 Learning issues

The second area relates to the way in which learning materials are delivered and their instructional design content. Whilst this draws upon general learning theory and instructional design paradigms from computer based learning, due regard for the learning processes of everyday life is an essential part of exploiting multimedia.

In the context of this research, a greater focus is place upon learning theory that supports the concepts, and creation of resources for, humanistic learning. As such, a MLE is considered to be a resource used for learning rather than as a system that provides a teaching solution. A constructivist perspective is favoured over an objectivist one that draws on the approach of formal teaching.

2.4.3 Social dimension

This area relates to the social and cultural context of human interaction and communication, and links to the expectations people have of a learning situation, their need for contact with others, and their way of interpreting different media forms. It also affects the way we think and the nature of our thoughts.

Four elements are included within this subject area. Social Interaction and Perspective relates to the social roles and cultural norms and interactions observed within a social grouping; this may be at different levels of focus, for example relating to an ethnic identity, profession, or personal relationship (Harre et al, 1985). Language can be thought of in a similar way, and concerns the linguistic conventions that we adopt to communicate to different people and for different purposes. It also relates to the processes of linguistic development interrelated to thought, memory, imagination and consciousness (Vygotsky, 1978; Habermas, 1991). Visual Culture refers to our perceptions of images and other visual forms, and the way in which these socially accepted conventions of myth and reality may be exploited in the representation of information (John-Steiner, 1985; Olsen, 1991). Media Theory provides the academic perspective on specific codes of communication that are used in the various media forms (Andrew, 1984), and which may be brought in to the realm of multimedia to improve design strategies, techniques and output.

2.4.4 Production issues

These are the practical aspects of multimedia production, that a designer must understand to successfully create a design and its acceptance by users. They relate to the technical, aesthetic, and economic issues of translating subject knowledge into different
forms of media and information structure in a MLE. The personnel and resource needs of a project must be an implicit part of any design brief, and an explicit part of every production plan.

2.4.5 Multimedia design

This central element of the model relates to design theory that describes the practical implementation of the contributing knowledge areas.

One area of research that has been drawn upon in this work is that of design science. Most literature in this field is concerned with engineering design practice (for example electronic, mechanical, architectural). It is often motivated by the wish to improve understanding of industrial or commercial design in order to increase efficiency and/or effectiveness. Early research in this field was guided a positivist perspective, assuming that human problem solving is an inherently rational activity.

Of interest to this research is more recent work that has recognised design as a social process, that cannot be described effectively by reductionist research methods. These, more holistic methods have been applied to the understanding of multimedia design, and more specifically, the creative activity involved in the design of the MLE and interactive drama prototypes. MLE design is therefore presented as a constructive, social and emergent process rather than one that is purely rational, and has been developed through an approach closer to the design of views of Winograd and Flores (1986) and Pugh (1996).

In addition to theory from design science, the fields of film and television have been looked at to review literature and examples on the creative practice involved in the design and production of visual media and multimedia. These processes are embodied into practical designs through the development of a range of design methods and models (for example, Florin 1990; Davenport, 1996b). The work is described in detail in the third part of this thesis (Chapters 10 to 13).

2.5 Summary

In this chapter the strategy, viewpoints and methodology behind the research have been explained. The importance of interdisciplinary research has been identified, and the methods employed in completing the research have been described. In the following chapters the research project is explained to ultimately produce a conceptual model for people who wish to design humanistic learning and interactive drama materials.
3. Psychological Processes

This chapter builds an account of the psychological processes involved in learning. In particular it discusses the importance of experience, real or simulated, with regard to intuitive, social and communicative aspects of learning. This style of informal learning that is accumulated through the events, episodes and problems of life is termed "humanistic learning".

This chapter also considers the value of understanding psychological processes from the designer's viewpoint. In designing what is effectively a new media form, it is important to have such a theoretical understanding to meet the psychological needs and personal motivations of users, understand how such processes may be exploited, and to provide enriching and relevant learning experiences within MLEs and interactive drama.

An understanding of the way people think and act upon the world is an important element in the understanding of the learning processes that they engage in, both in the real world and within a MLE environment. It is also important part of understanding the creative practice and expertise of designers. Central to this discussion are the assumptions made about the way the world is perceived and made sense of.

In the following sections two main paradigms of human mental processes are described. The first, symbolicism, is based on processing of rules and symbols. The second, connectionism is based on models of neural processes in the brain. In terms of this thesis, explanation of psychological processes are founded mainly upon the connectionist paradigm. However there are undeniably key elements in human psychological processes that involve the use and interpretation of symbols. In this chapter the explanation of how these paradigms interrelate is developed around current literature and then builds into a broader discussion relevant to psychological factors of learning and MLE design. The theory described in this chapter feeds into Chapter 4 on learning, Chapters 5, 6 and 7 in relation to social aspects of psychology and interpretation of human drama and use of media, and Chapters 8 and 9 in terms of creative design processes and activities.

3.1 Symbolicism

Until recently the prevailing belief has been that human cognition is founded upon rule-based thought, in which memories and knowledge are stored and manipulated as discrete symbols. These ideas are encapsulated in the symbolic paradigm, which Dinsmore (1992, p2) summarises as follows:
there are such things as *symbols*, which can be combined into larger *symbolic structures (or expressions)*,

- these symbolic structures have a *combinatorial semantics* whereby what a symbolic structure represents is a function of what its parts represent, and

- at the same time all cognitive *processes* (reasoning) are manipulations of symbolic structures.

Language and mathematics, for example, are intrinsically symbolic so that the articulation of knowledge in written forms is necessarily also confined to a symbolic style. The symbolic paradigm can be found in a number of different manifestations to explain different thought processes, including logic and rule-based systems, semantic (or associative) networks and schemata, scripts, prototypes etc. (Norman, 1982, pp54-59).

However, there are a number of problems with an explanation of human cognition that relies solely upon the symbolic paradigm. Bereiter (1991) and Dinsmore (1992) have argued that human cognition is not completely governed by rules, and that, therefore, the symbolic paradigm by itself is not enough to explain the whole learning process. Symbol systems explain the acquisition of information in a propositional form (i.e. they must rely upon conventions of combination and manipulation to work) but do not explain knowledge gain through sensory experience. Thought which relies upon such conventions (for example language, mathematics and logic) have a limited robustness when using incomplete, ill-defined or erroneous information.

Dinsmore (1992, pp4-6) identifies a number of "mysterious processes" which do not seem to involve symbol manipulation, for example holistic processes like face recognition, and the recognition of noisy or unexpected input. Bereiter (1991, p11) also puts forward a number of examples to suggest that people are disinclined to use rules of logic or formal laws, and that they tend to base analysis and decision making on heuristics developed from experience or intuition. For example he quotes: Johnson-Laird (1983) who explains how people build and run mental models to understand and test different situations; Bobrow (1985) who found that scientists "will employ informal rules when considering actual cases" from their own specialisms, despite their theoretical knowledge of the subject; and, the work of Nisbett and Rosch (1980) who found that people were unable to explain accurately the rules they were using to perform a task.
These examples all point to an explanation of cognitive processes other than the symbolic, to account for some aspects of human thought. This explanation would need to account for the best fit, experience-based heuristics that seem to underlie many aspects of the human thought process.

3.2 Connectionism

The connectionist paradigm (also called parallel distributed processing or PDP) is based on the neural structure of the brain, and the parallel processing of information that occurs across these complex networks of neurones and synapses.

"The PDP approach emphasises that cognitive processes operate in parallel, that neural activity is distributed across broad regions of the brain, that cognitive processes can be executed even when the information is incomplete or faulty, and that some clues are more effective than others in locating information in memory.”

(Matlin, 1994, p17)

Connectionist networks seek to match perceptions and experience with combinations of neural activation, formed by the tens of thousands of interconnections linking each network node. The networks are both robust and flexible, as they enable erroneous or incomplete information to be processed and acted upon. They are more responsive to certain patterns of sensory or psychological stimuli in prompting memory retrieval and prompting appropriate thought processes. Where a good match is made, i.e. where there is close comparison between perceptual patterns and stored concepts, the system is stable. If there is a poor match, or incomplete recognition, the network will tune itself to improve correlation. This tuning process means that learning is “continuous, natural and fundamental” to the connectionist paradigm (Norman, 1986, p545).

3.3 Connectionism and higher order cognition

Although connectionist networks imply a continual learning process, it still has to be explained how this affects higher level cognitive processes, and what place conventional models have. Rumelhart et al (1986) have put forward a reinterpretation of Schema Theory, that takes into account the characteristics of the connectionist paradigm.

Conventionally, schemata are described as structures of linked “packets of knowledge” (Norman, 1982, pp51-53) which involve high level concepts such as ‘dog’ and ‘cat’ being held in memory. Most significantly, all schemata are retained as discrete entities, and take up a large part of memory. This means that sophisticated search and retrieval processes are needed to enable correct structures to be found and used.
In more recent explanations (Rumelhart et al, 1986, p20), schemata are no longer seen as entities retained in memory, but as ephemeral forms generated from connectionist networks to suit the prevailing circumstances. They combine “past experiences with the biases and activation levels resulting from the current experience and the context in which it occurs” (Norman, 1986, p356). Rather than comprising high-level concepts, networks are made up from “microfeatures” (Rumelhart et al, 1986, p8), these relate to the activation levels in the network responding to characteristic features of the situation or phenomenon perceived (e.g. size, form, texture, loudness). Schemata can then be formed and altered using connectionist tuning processes.

Schema theory has been closely linked to the concept of mental models, and it can be said that schemata provide the organisation and knowledge needed to construct them (Rogers and Rutherford, 1992, pp291-292). The general concept of mental models is that thought involves generation of representations that simulate or model the world (Johnson-Laird, 1983, pp53-54). Johnson-Laird (1983, pp422-438) describes a typology in which mental models are divided into two kinds, physical models (representations of sensory stimuli) and conceptual models (abstract representations). Physical and conceptual models can be combined and used together to create complex model forms, giving the necessary sophistication to build any body of knowledge.

A mental model is more than an internal display of events, it is a rich representation of a user’s understanding of what a situation or phenomenon consists of, how it will act, and why it should act in that way (O’Malley and Draper, 1992, p74). The key feature is that it can be ‘run’, to enable exploration and evaluation of behaviour, before a decision is made or action is taken.

Rumelhart et al (1986, p40-41) propose that mental models should be seen as a parallel mechanism to connectionist schemata, such that the schema “takes inputs from the world and produces actions” and the model “takes actions and predicts how the input would change in response”. They also argue that stimuli from the world can be replaced by internally generated inputs, to allow models to be run within the mind and conclusions to be drawn. Thus it becomes possible to interact with the world and make decisions about what to do next, and it is also possible to contemplate without interaction to imagine what could happen.

Since mental models are a construct based upon an individual’s understanding, it does not necessarily follow that models will be complete or wholly accurate. Norman (1983, p8) argues that mental models are always incomplete (but functional) and that people have “severely limited” abilities to run their models. O’Malley and Draper (1992, p85) suggest that knowledge may not be coherent, but “distributed across several internal representations”, and that these representations may also involve
interaction with external artefacts (e.g. pen and paper, or computer) to form a complete model. Further, the process of interaction "creates possibilities for learning and cognitive change as the user gains experience" (O'Malley and Draper 1992, p88). For example, the development of diagnostic skills in medicine involves students in an interactive process with patients rather than 'artefacts', but the principles remain the same. Bordage and Lemieux (1991, pp570-572) have described the way in which medical students form visual prototypes of conditions to become effective at diagnosis. Quick and accurate diagnosis is dependent on the acquisition of "broad" prototypes that cover even atypical symptoms. These prototypes need to avoid reliance upon "the enumeration of symptoms and signs contained in various diseases", and must include "the adequate recognition of the substance, form, and effect of the symptoms and signs" (Lemieux and Bordage, 1992, p203). This seems to equate to understanding in terms of the 'rich representation' that occurs with the development of a mental model.

The connectionist paradigm offers an alternative approach to our comprehension of human thought processes. It realigns our understanding of cognition (Norman, 1986, pp351-546) to emphasise the importance of perception, visualisation, imagination, and 'doing' in learning.

It is important that mental models are not seen as simple representations of abstract symbols nor inanimate objects. Mental models can equally be rich representations of people or social situations, and include all the cognitive, behavioural, affective, communicative, and cultural sophistication that implies. It is in the coherent representation of these many different information forms and cultural messages that the adoption of suitable media techniques becomes so important. As is developed in the following chapters, the design and implementation of the infrastructure of a MLE provides the continuity and linking of topics to make the experience seem natural. This is a process analogous to the careful scripting and editing of a film score to create a stimulating plot and narrative for a story. It involves links psychological factors of use and design with the other areas described in the Knowledge framework (Chapters 4 to 9) as applied in the Design Process (Chapters 10 to 13).

For this research, we have adopted a broad view of mental models and their use, that draws upon the connectionist perspective of psychology and the learning theory explained in Chapter 4. The concept of mental models is important to MLE and interactive drama design in a number of ways, including:

- as an analytical tool to interpret users' understanding, including the way they would interact with the real world environment being studied;
- in the development of stereotypes and scenarios to represent social situations and learning activities;
• as a means to structure the designers' models of the subject matter, the users, interactions and interface;

• as a means of establishing the appropriate media forms, theory and production techniques to create a satisfying learning experience.

3.4 Perception

A description of perception is important to this thesis from two perspectives. From a learner's perspective, perceptions are the basic stimuli for the interpretation of the world. These stimuli provide signals for the formation and reinforcement of connectionist networks and mental models (discussed in previous sections). They are closely linked to generation of imagination (discussed in the next section). All of these elements contribute to intuitive and experiential learning processes that are fundamental to the concept of humanistic learning (as described in Section 1.1 and explored further in Chapter 4). From the designer's perspective, perceptions provide the basic stimuli to inform design practice. Perception and visualisation supports the realisation of designs, media products through comparison with their own experience of the world and existing examples of media. Perception also supports interpretation of others' experiences through observation of, and interaction with, people and social situations. Again, for a designer intuitive processes and experiential learning are an important part of creative practice and development of design expertise, as described in Chapter 9 and explored further through the design project described in Chapters 10 to 13.

In this section an explanation of perception is presented to show how it influences people's learning processes and interpretation of media. Secondly to describe those aspects of perception that help designers, to create a sense of reality for users of a media product (as described in Chapter 6). This has relevance for the design of MLEs and for interactive drama (Section 7.2), where disruption of perception can inhibit engagement with the media and the vicarious experience of the user.

Reference has already been made to the statement by Norman that learning is a "continuous, natural and fundamental" characteristic of the connectionist paradigm (1986, p545). In this context, 'learning' is intended to mean the continual adjustment of a person's thoughts and actions to the sensory stimuli of their environments. In short, it is a process of pattern matching.

---

1 See Section 10.2.4 and Figure 10.5 for further comment on this.
"Basically, here we have an adaptive system, continually trying to configure itself so as to match the arriving data. It works automatically, prewired if you will, to adjust its own parameters so as to accommodate the input presented to it. It is a system that is flexible, yet rigid. That is, although it is always trying to mirror the arriving data, it does so by means of existing knowledge, existing configurations. It never expects to make a perfect match, but instead simply tries to get the best match possible at any time: The better the match, the more stable the system."

(Norman, 1986, pp535-536)

Perceptions provide the basic patterns of stimuli against which general patterns – held in memory – are matched and adjusted, and upon which decisions and action are based. Put simply, new or adjusted patterns are then added to memory. Incomplete or erroneous patterns will then be adapted or built upon in subsequent activations.


The process of seeing is reliant upon stimuli from the environment, but these are signals used to create an internal representation of the world, rather than complete pictures screened for examination. The eye does not receive equally detailed information from all parts of the retina. Our view of the world is mediated by the constructs of our mind based upon memory, visualisation and imagination. This is a representation that relies "more on stored knowledge and experience" than on direct response to external stimuli (von der Marlsburg, 1990, p304); it is as much a part of experience and memory as it is translation of sensation (O’Sullivan et al 1983, p168).

"Interpretation is an inextricable part of sensation. To obtain its knowledge of what is visible, the brain cannot therefore merely analyse the images presented to the retina; it must actively construct a visual world".

(Zeki, 1992, p43)

This involves many parallel operations on the information (Frisby, 1980, p35), making it possible to produce a description of the objects and scenes being viewed, and at a rate that enables us to function adequately within the world.

Although very significant advances in psychology and neuroscience have been made, there are many questions regarding higher levels of perception yet to be answered. Dretske (1990, pp129-148) considers these issues, and raises a number of philosophical questions related to the knowledge, sensory content, and truth of what is perceived and remembered.
"Much of our knowledge (some would say all of our knowledge) is acquired by perceptual means: we come to know where the cat is by seeing it in the sofa. We might also hear, smell, and feel the cat. These are some of the ways we have of finding out, ways of coming to know, the content and character of our world. The general term for such ways of finding out, ways of coming to know is perception. Memory is the name we give to the ways we have for retaining (through time) the acquired knowledge. Powerful mechanisms for acquiring knowledge (keen eyesight, for example) are of little value to animals that cannot remember, if even for a few seconds, anything they learn. A large storage capacity, on the other hand, is wasted on systems with no way of getting information to be stored."

(Dretske, 1990, pp 129-130)

Dretske distinguishes—that is not to say separates—between sensory perception and cognitive perception. Sensory perception relates to vision (say) without knowledge of what is seen, so the impression of form, shape, movement, colour, etc. without identification of what is seen. All we can say is that there is impression of a coherent entity, with certain characteristics. Cognitive perception involves knowledge of an object, so that a viewer can say they have seen 'a cat' or 'a dog' or 'a house', etc. For Dretske, sensory and cognitive elements combine to form a particular mode of perception.

This perspective raises a number of issues, such as how perception and memory interact, the role of language and meaning in perception and the role of perception in learning. Of course, most of the situations we encounter are complex and dynamic, with many different objects, moving in relation to the viewer and each other. So we don't simply see objects, but also events, properties and characteristics, and situations.

Take as an example the way in which images are perceived in a communication medium.

"Even when we speak of perceiving one object by, through or in perceiving another—in the way we speak, for instance, of seeing the game on TV or seeing someone in a movie (or photograph)—our knowledge of the game or person will be secondary relative to our knowledge of the electronic or photographic image. Insofar as we regard the image appearing on our television or movie screen as the primary, or real, object of perception, we regard facts about these images as being cognitively primary. Facts about the people and events being represented are secondary. For instance, we learn (see) that a player kicked a field goal by observing the behaviour of the electronically produced images of the player, the ball, and the goalposts appearing on our television screen."

(Dretske, 1990, p135)

So, despite the fact that we are seeing an electronic image on a TV screen, what is apparent to the viewer is the American football game. The viewer's ability to follow events will depend on a cognitive perception of the game, a representation of the field of play and an ability to see individual players (e.g. halfback, quarterback, etc.) and the tactical moves they use. However, this is experience mediated by knowledge of TV presentation, so that cuts between cameras can be interpreted, and the viewer understands the relative positions of the player, the flying ball, and the goal posts in...
the context of the game, even though they are all framed within a single two-dimensional TV screen. Issues related to the way in which people engage with and derive reward from media is discussed more fully in Chapter 6.

This example begins to present a view of how perception, cognition and memory interplay to build an experience of an occasion or set of events. In order to stimulate the perceptual processes of learners, the MILE designer has the task understanding and exploiting perception. This involves the creation sensory hooks to attract attention, the creation of engaging environments and dynamic flow to sustain interest and curiosity, and the coherence to avoid disruption of thought.

Over half a century ago the Gestalt psychologists noted that there is strong agreement among observers concerning the organization of a given pattern. Their observations led to the development of several principles of perception, such as the principle of good continuation, which holds that points that are aligned in a straight line or a smooth curve are interpreted as belonging together, and the law of [...] good figure, which holds that patterns are seen in such a way that the resulting structure is as simple as possible.”

(Biederman, 1990, p42)

Such perceptual processes, described in this section, are only part of the story. As already described perception is innately related to memory and imagination. If perceptual processes engender interest, imagination and memory need to be used to promote comparison, reflection and integration of experience and knowledge.

3.5 Visualisation and imagination

Visualisation is the representation of conscious thought in visual form, whereas the terms imagination and imagery may also be used to refer to other sensory modes. So that we may, for example, think in terms of “Auditory Imagery” (Reisberg et al, 1991, pp) or tactile imagery. However, it is in the visual mode of perception that most research has been conducted.

There is evidence to show that imagined objects “mimic the properties of real objects” (Kosslyn, 1983, p189), and that there are common psychological and neurological mechanisms used in both perception and imagery (Kosslyn, 1990, p74-75). But further to this there is evidence in the works of Perky in 1910, and Segal in 1972 (cited in Kaufmann, 1979, pp35-36) to suggest that:

“[...] imaging is not a passive revivification of past experiences, but rather a constructive process where the image is constructed in part from past experiences, but where present sensory input is also an important determining factor.”

(Kaufmann, 1979, p36)

According to Kosslyn (1990, p74) people will tend to use (in his work visual) imagery when their ideas or problems have a “subtle visual property”, the information is not part of a well established internal classification system, or where the required information cannot easily be deduced from other stored information. A study by
Kosslyn (1990, p75), in which subjects kept diaries of their thoughts, has identified some typical uses of imagery. These have been found to include planning of events, scenarios of conversations and confrontations, the creation and comprehension of verbal descriptions, in problem solving, and to "induce emotional or motivational states". Such processes have relevancy to the use and enjoyment of drama materials (as described in Chapter 6 and 7), learning in real world experiential environments (Chapter 4) and the creativity and the design activities involved in producing learning environments (Chapter 10) and interactive drama (Chapter 9 and Chapter 12).

The extent to which images can be created and adapted will be dependent upon the complexity of that image, and the underlying knowledge held about the objects and events imagined (Kosslyn, 1983, pp183-186). That is to say, there are parallel philosophical issues between imagination and perception. In the same way that what we see is dependent upon the knowledge and belief that underlie perception, the ability to create and adapt imagery is "a reflection of our underlying knowledge and beliefs about what would happen if we were dealing with real objects" (Kosslyn, 1983, p189). In terms reminiscent of Bereiter's description of the difficulties with the symbolic paradigm, and Dinsmore's Mysterious processes (discussed in Section 3.1), Antonietti (1991, p212) offers some advantages to the use of visualisation in problem solving:

- the use of mental images “allow subjects to avoid the mechanical use of algorithms” required by verbalisation, or logic based reasoning;
- mental images can be freely transformed and adapted in novel ways;
- mental images are “holistic representations” that allow the elements within to be considered concurrently
- visualisation enables dynamic processes to be considered and elements to be restructured in innovative ways.

3.6 The role of symbolic thought

The discussion so far has concentrated on mental representations, both perceived and imagined, which involve retention or retrieval and use of sensory information. Despite this, it takes only a little thought to realise that rule-based thought and symbolic forms of representation are a very important part of human cognition and communication (Bereiter, 1991, p14). Examples of this include, language, mathematics, music and graphic representations. These themes of language and visual representation are picked up again in Sections 5.1.3 and 5.1.4 respectively.
"If not having a word for X or a theory for X means I cannot come to have certain beliefs about X, then not having a word (or a theory) for X will prevent me from cognitively perceiving X. Without an appropriate language for talking about oxygen, without some knowledge (however crude) of chemical theory, I can hardly be expected to see when oxidation is occurring (see that it is occurring) even when it happens under my nose. I just will not recognise it—certainly not as oxidation. So the cognitive perception of oxidation is relative to those factors—factors like possession of the right concepts and knowledge of the appropriate scientific theories—that are essential to a knowledge that oxidation is occurring.”

(Dretske, 1990, p145)

Kosslyn (1984, p92) suggests that mental representations can be considered in relation to four broad areas:

- **language**, the storage, retrieval, interpretation and use of information in the form of words and sentences;
- **reason**, the storage, retrieval, interpretation and use of information in the form of logic and rational statements;
- **perception**, the retention, retrieval, interpretation and use of information based upon sensory stimuli;
- **motor control**, the storage, retrieval and planning of physical movement.

Dinsmore (1992, p16) identifies a number of “high level reasoning tasks” that are more compatible with symbolism, and difficult to explain using connections as an underlying model.

Among these are the need to match different short-term information structures, the need to deal with anomalous combinations of concepts, and the need to perform embedded reasoning, for instance to reason about a particular person’s beliefs.

(Dinsmore, 1992, p16)

These examples are related to the areas of **language** and **reason**, where information has a coded or abstract meaning and is articulated using rules of syntax and semantics. Therefore, the idea that symbolism underlies human thought and runs from “lines of mental program code” (Bereiter, 1991, p15) is challenged, but not the idea that it underlies human rationality. Also, it needs to be recognised that within most human activities a combination and interrelation between psychological mechanisms may be expected. For example, a mechanical building problem may involve a combination of memory, perception, mental imagery, rule-based reason, language, and motor-skills to achieve the intended goal. Further, the task may involve the production of (internal and external) representations that use sensory, codified and abstract descriptions of the various elements involved.
Any form of symbolic representation can be described in functional terms by reference to its format, content, and organisation (Kosslyn, 1984, p102).

- The *format* is the set of symbols that are used to impart information and the rules that construct meaning (i.e. syntax and semantics).
- The *content* is the specific information to be conveyed or considered.
- The *organisation* is the overall structure of the information (e.g. hierarchical, spatial, chronological, etc.).

It can be argued that these rules and symbolic forms are social constructs, culturally moderated and bestowed on society through a combination of influences (Bereiter 1991, p14). This is true for representations which take a propositional format using rules of logic, and for depictive forms using pictorial symbols. They are a central part of social and cultural activities, extending through everyday life, literature, linguistics, science and mathematics, and in contemporary film and media theory. They, and the rules and knowledge they represent, in all their guises, communicate information and guide behaviour and are an important part of the design of MLEs. In this project the interactions between the subtleties of human experience and action have a complex relationship with the symbolic codes (e.g. language, written scripts, programming codes, actors performances) that make the creation, use and interpretation of MLE and interactive drama possible. This is discussed further in Chapters 6 and 7, and explored during the Design Process in Chapters 11 and 12.

### 3.7 Behaviour and physical responses

Goldman (1990, pp317-340) identifies two ways of describing human actors. The first is at the neuro-physiological level, in which actions occur in response to perceived stimuli. This results in deterministic viewpoint on the behaviour of people. The second is where people are viewed as free individuals. He identifies four main determinants, that combine to produce different forms of action:

- preferences;
- beliefs;
- ability;
- opportunity.

The methods by which they interact are highly complex, and demand "an integrated theory of behaviour production" (Goldman, 1990, p328). This would link actions such as gestures, expression and verbalisation with the social constructs of behaviour.
In their book "Motives and Mechanisms", Harré et al (1985) provides a coherent overview linking a number of psychological models. They suggest that 'human conduct' needs to be explained in terms of a 'control hierarchy' that spans three levels. This is a model that relates to processes of mind, and highlights the interdependence between individual and social environment rather than explaining brain function.

![Control Hierarchy Diagram](image)

- **Level 1**, represents the low-level processing of sensory-information and other unconscious controls that automatically regulate the behavioural mechanisms of mind and body.

- **Level 2**, conscious awareness, relates to the processes through which lower order sensory information is synthesised into more "complex representations". At this level, thought is given meaning and can be articulated, perceptions are interpreted, mental representations are created, and planning and deliberation takes place.

- **Level 3**, is a level that "largely remains to be discovered" (Harré et al, 1985, p24), it relates to the interpersonal and intrapersonal dimensions of social interaction between people and institutions, and influences the way people orient themselves to everyday activity and interaction with the world.

This third level, 'social order', is not part of conscious thought, but relates to the processes and factors within a social or cultural grouping that influence thought and behaviour. It is concerned with the longer-term effects of society upon the individual, and is a "powerful system of regulation lying 'adjacent' to the domain of conscious reasoning (Harré et al, 1985, p26). Influences may be exerted within social groups at
the micro level, such as the family, peer groups, or work mates. They may also come from influences at the macro level such as from political or religious bodies, cultural role models, and media figures. This will manifest in a variety of ways, with positive or negative results. These issues are also addressed by discussion of organisational learning in Section 4.8.

In a similar way to the explicit use of rules in education forming a framework for learning, the social order level provides a guiding structure for conscious thought, communication and action. It is not generally apparent to those who are subject to it (Harre et al, 1985, p40). Harre et al use the term “patterns in the lifecourse” to refer to these higher-order regulatory social influences, and suggest that they are a part of the pattern matching processes which people employ in perception and cognition.

"To take a simple case: biological imperatives demand that we eat; but cultural imperatives determine the cuisine, our table manners, and the ritual significance with which many meals are taken."

(Harré et al, 1985, p31)

This stratified scheme of human thought and action provides a useful model for the designer to use in framing the goals and structures of MLE and interactive drama design. It emphasises the interrelationships between individual perception, behaviour and motivation with the social and cultural needs that sustain common values and beliefs.

3.8 Social psychology

"What we call logical reasoning, and attribute to the workings of the individual mind, is actually a public reconstruction meant to legitimate a conclusion by showing that it can be derived by procedures recognised as valid."

(Bereiter, 1991, p14)

In making this statement, Bereiter is identifying logical reasoning as a mechanism for individuals to articulate their thoughts to others. Rationality is seen as a process of continually tuning a set of personal rules to fit what is publicly justifiable (e.g. through "common sense", social convention, or formal research and experimentation). The use of rules can be said to become a “part of public discourse” (Bereiter, 1991, p15) where definitions, concepts, principles and conclusions are drawn out and examined against theoretical or practical situations and problems. Thus, the generation, communication and use of implicit and explicit rules can provide a framework through which common understanding occurs and support for social and moral trends develop.

One area in which these issues can be examined is in formal education, where the presentation and use of rules and procedures forms a keystone of instruction. Even in the classroom, there is evidence to suggest that rules are not learnt the same way as they are delivered (Bereiter, 1991, p14). Whilst rules may be memorised and recited,
their use is less clearly defined, forming into a much more diverse process of rational thought, imagery, memory retrieval and communication. An example of this, is in the way a child learns language. The teaching of grammatical rules by a tutor has very limited effect in comparison with the natural assimilation of language through its use. Rather than using rules of instruction to generate new verbs, "children's increasing competence involves spontaneous internal redescriptions" (Boden, 1992, p128) of language skills held in a connectionist framework. Different tenses of verbs are learnt over time through practice without an ability to explain the grammatical rules that they follow (Boden, 1992, p125).

Recognition of the social dimension to human psychology is important in two ways: as already described it highlights the influence of society and culture on cognitive processes; and explains the way in which people interact with complex physical and social environments, making decisions, taking action, and learning in the process. In her book, "The Principles of Social Psychology", Hayes (1993) sets out the scope of social psychology, to include:

- the contexts of interaction, including the characteristics of the physical environment, social and cultural identity;
- conversation and communication, including verbal and non-verbal language features, expected purpose and interpretation;
- interaction with others, involving the use of preconceived models for interactions and regulatory influences;
- person perception, relating to physical and personality traits, actions and behaviour, attraction or repulsion, and the expectations that result from them;
- personal attitudes and beliefs, affecting people's responses to particular objects or situations;
- theories on conflict and co-operation, relating to tendencies towards aggression and altruism.

Social psychology seeks to move psychology from the domain of the controlled laboratory experiment and into the complexities of real world situations (Hayes, 1993, p12). Hayes does not attempt to cover the full range of human social experience, but she does give some idea of the complexity and variety of information that people store.

---

2 See also the discussion on learning processes, learning style and instruction in Section 4.3 to 4.5.
She also sets out the social cues and stimuli that people use and interpret during the course of particular episodes.

3.9 Psychology and its contribution to learning and MLE design

In this chapter we have reviewed the theory which underlies the components of human thought processes and behaviour. In designing, what is effectively a new media form, it is important to have such a theoretical understanding to:

- ensure as rich a view as possible of the characteristics of the end user can be developed;
- consider the characteristics and processes of perception, imagination and interpretation that a designer employs in their creative design activities;
- develop MLE and interactive drama designs that provide enriching and relevant learning experiences for users.

Clarke and Crossland (1985) takes a step closer to the real world application of psychological theory in their theory of Action Systems.

Think of politics, medicine, the law, the way one brings up a family or pursues a career, how one makes a logical decision or comes to achieve a sense of self-understanding. These are all matters of action, and it is our ability to understand and organize our part in them that is of real significance to us as individuals. We shall only become more adept at dealing with these aspects of our existence as we extend our awareness of the patterns and processes that make up such phenomena.

(Clarke & Crossland, 1985, p14)

Clarke and Crossland’s statement offers a concise description of why this research is concerned with psychological processes and the theory that explains them. In addition to explaining how people act within their environments and learn to do things more effectively, there is the need to understand how such actions and learning may be designed into a MLE.

In the course of the day an individual will, depending on their culture and social situation, go through a number of customs and conventions as part of the general intercourse with their social and physical environment. These may be simple episodes,

---

3 A term first coined by Harré in his book “Social being” (1979) to denote the basic unit of human interaction, rather than the individual act or action, it refers to significant sequences encountered in life that have their own ritual, actors, settings etc. (Hayes, 1993, p12).
4 As shown practically in Chapter 10
5 Discussed further in Chapter 9 and explored practically in Chapter 10 to 13
6 See also Chapter 4.
such as a greeting or answering a phone, more formal such as buying a train ticket or a job interview, or perhaps the ritual involved in religious worship. Such actions can be thought of as the structural frameworks through which people make sense and engender meaning in the episodes, events and interactions that happen in their lives.

Equally, during one's life, there are a number of significant events that are experienced and which have an important affect on self perception and the values placed by others. Examples include: material concerns such as job promotion or loss, and house purchase; physical concerns such as major illness or frailty; and, cultural status ascribed through age, marriage status, parenthood, education, or social value, etc.

In all of these episodes there are a multiplicity of sensory, cognitive, social and cultural signals to be interpreted and acted upon. The extent to which they are successfully negotiated will rely upon the cognitive processes of the individual, the relevant procedural and social knowledge that is held, and the ability to adapt existing knowledge to new situations. Also, a significant part of any situation will be the emotional, attitudinal, motivational and past (remembered) influences that underpin any chain of events. These psychological processes are fundamental to the development of necessary knowledge and abilities needed to exist in, survive and contribute to, our physical and social worlds. The (non-curricular) learning involved in assimilating the everyday tasks, and significant milestones, of life has been termed 'humanistic learning' in this project. For an MLE to offer a successful humanistic learning experience, it would seem that its design must be able to represent appropriate features of the psychological processes described in this chapter. In the next chapter, humanistic learning is discussed in relation to current literature on learning and learning technology.
This chapter contrasts two views of learning: constructivism and objectivism. It discusses their characteristics in relation to humanistic learning and the subject chosen for the design project described in Chapters 10 to 13 of this work.

A number of learning models have been developed to explain the complex processes involved in learning from 'real world' or authentic problems. These are described and considered in relation to individual and social aspects of learning.

The chapter concludes by considering the role and uses of different media forms in learning, and the broader use of media to stimulate ideas, reflection and communication.

The way in which learning materials are delivered and their pedagogic content are very much dependent upon the designers' viewpoints on learning, instruction and the possibilities of educational technology. This research has drawn upon the literature to describe learning theory and instructional design paradigms. In particular it is interested in the theory that can support the exploitation of interactive media technology to enable humanistic learning experiences. In this context, a MLE is considered to be a resource used for learning rather than as a system that provides a teaching solution.

Before considering specific learning theories, or the use of MLEs, it is useful to contrast the learning experiences in formal classroom settings and real world (informal) situations. For example, teenagers considering the issues of unplanned pregnancy.

A conventional classroom setting may involve delivery of verbal and written factual information, supporting case study material, and tutor led debate. The tutor would probably set the structure and delivery of the learning materials and may predetermine the most important issues and learning points for the students. It is probable that students would be able to bring with them some level of (probably second hand) knowledge and the imagination to cover unknown ground. The tutor would fulfil the students' expectations, by ensuring that salient questions are raised and key learning points are delivered. However, the classroom is an artificial environment to consider the issues and choices involved in such a scenario. The large group environment may result in an atmosphere of embarrassment or bravado. It would inevitably be limited by time, and the knowledge held by people in the room. This would be a perfectly acceptable situation for a formal class, and would probably add to the students' knowledge. However, contrast the classroom with a real world situation.
In the real world, the circumstances related to an unplanned pregnancy would be very different. It is possible that the issues and implications of teenage parenthood would not have been discussed in any great depth, nor even considered, until too late. Not only would there be a need to speculate about choices, there is an imperative to make decisions that will have long-term effects and uncertain outcome. As described in Chapter 3, this would involve many different kinds of perceptions, social influences and kinds of information to consider and act upon. Parenthood, whatever the circumstances, requires many practical, social, cultural, and emotional factors to be taken into account. It involves the learning of many new things, whilst testing attitudes and beliefs of all those affected.

4.1 Underlying Paradigms, Objectivism vs. Constructivism

Although the above examples relate to the same concerns and dilemmas the two learning experiences are fundamentally different, and they would surely create different schemata and mental models of pregnancy and parenthood. In a similar vein, multimedia learning products can be designed to produce understanding by using different pedagogical strategies that have different underlying assumptions. Jonassen (1991) contrasts two philosophical paradigms that reflect different perspectives on the processes of learning. These are called objectivism and constructivism, and are summarised in Table 4.1.

Objectivism can be seen to be influenced by behaviourism and symbolicism. It assumes that the world is made up of objects, with inherent properties and knowledge which have to be discovered and encoded into memory using abstract symbols. Learning is “the process of mapping those entities or concepts onto learners” (Jonassen, 1991, p9). The role of teachers is to impart information about the real world in the form of language, mathematical expression, or other symbolic representation. Using this paradigm and its underlying assumptions, the emphasis would be on *instructional* design and sequences of programmed learning.

Constructivism is founded on the assumption that an individual's knowledge of the world is founded upon the constructs of their past experience.

> "What someone knows is grounded in perception of physical and social experiences which are comprehended by the mind. What the mind produces are mental models that represent what the knower has perceived. These models are then used to explain, predict, or infer phenomena in the real world."

(Jonassen 1994, p35)
<table>
<thead>
<tr>
<th>Reality (real world)</th>
<th>Objectivism</th>
<th>Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>External to the knower</td>
<td>Determined by the knower</td>
<td>Dependent upon human mental activity</td>
</tr>
<tr>
<td>Structure determined by entities, properties, and relations</td>
<td>Product of mind</td>
<td>Symbolic procedures construct reality</td>
</tr>
<tr>
<td>Structure can be modelled</td>
<td>Structure relies on experiences/interpretations</td>
<td></td>
</tr>
<tr>
<td>Mind</td>
<td>Processor of symbols</td>
<td>Builder of symbols</td>
</tr>
<tr>
<td>Mirror of nature</td>
<td>Perceiver/interpreter of nature</td>
<td></td>
</tr>
<tr>
<td>Abstract machine for manipulating symbols</td>
<td>Conceptual system for constructing reality</td>
<td></td>
</tr>
<tr>
<td>Thought</td>
<td>Disembodied: independent of human experience</td>
<td>Embodied: grows out of bodily experience</td>
</tr>
<tr>
<td>Governed by external reality</td>
<td>Grounded in perception/construction</td>
<td></td>
</tr>
<tr>
<td>Reflects external reality</td>
<td>Grows out of physical and social experience</td>
<td></td>
</tr>
<tr>
<td>Manipulates abstract symbols</td>
<td>Imaginative: enables abstract thought</td>
<td></td>
</tr>
<tr>
<td>Represents (mirrors) reality</td>
<td>More than representation (mirrors) of reality</td>
<td></td>
</tr>
<tr>
<td>Atomistic: decomposable into “building blocks”</td>
<td>Gestalt properties</td>
<td></td>
</tr>
<tr>
<td>Algorithmic</td>
<td>Relies on ecological structure of conceptual system</td>
<td></td>
</tr>
<tr>
<td>Classification</td>
<td>Building cognitive models</td>
<td></td>
</tr>
<tr>
<td>What machines do</td>
<td>More than machines are capable of</td>
<td></td>
</tr>
<tr>
<td>Meaning</td>
<td>Corresponds to entities and categories in the world</td>
<td>Does not rely on correspondence to world</td>
</tr>
<tr>
<td>Independent of the understanding of any organism</td>
<td>Dependent upon understanding</td>
<td></td>
</tr>
<tr>
<td>External to the understander</td>
<td>Determined by understander</td>
<td></td>
</tr>
<tr>
<td>Symbols</td>
<td>Represent reality</td>
<td>Tools for constructing reality</td>
</tr>
<tr>
<td>Internal representations of external reality (“building blocks”)</td>
<td>Representations of internal reality</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1 Assumptions inherent in objectivism and constructivism. (Jonassen, 1991, p9).

Rather than the passing of pre-organised knowledge from tutor to student, constructivist strategies facilitate learning as a process of knowledge building and skill practice. The general ethos is to provide the motivation and cues through which prior knowledge, beliefs and experiences are built upon, reinterpreted and given meaning.
A number of approaches to the design of learning materials have been proposed to support constructivist principles, these include the cognitive apprenticeship model (Collins et al., 1989 and Collins, 1991), anchored instruction (Bransford et al., 1990), rich environments for active learning or REALs (Grabinger & Dunlap, 1995), and other forms of simulation, microworlds and modelling programs (Laurillard, 1993, pp131-178). These principles can also be embedded into the use and production of hypertexts and hypermedia (Laurillard, 1993, p125). One of the principal elements of such models is the desire to put learning into a context of real world phenomena and problems, refuting objectivist advocacy of the simplification and deconstruction of knowledge, to enable effective learning through the accumulation of experience based knowledge.

“So rather than decontextualizing in isolated school environments, we should create real world environments that employ the context in which learning is relevant.”

( Jonassen, 1991, p11)

From a constructivist perspective learning results in the development or refinement of mental models that represent the experience of the individual (Jonassen, 1991, p10, & 1994, p35; Lebow, 1993, pp10-11). A holistic view, drawing upon knowledge discussed in Chapter 3, that recognises the cognitive, social, emotional and situated aspects of learning is fundamental to the paradigm.

It is unlikely that any learning resource or learning scenario will be ‘purely’ objectivist or constructivist. Few classrooms run purely on the tutor delivering knowledge to students and few learning resources or practical learning situations are totally devoid of instruction or guidance to assist the cognitive and co-operative efforts of students. The purpose of this research is not to devalue either perspective on learning, as both are useful in particular contexts (Jonassen, 1994, p37).

With respect to the creation of learning resources, and in particular interactive multimedia, most of the experience in design using constructivist principles has tended to result in “smaller simplified scale” (Grabinger & Dunlap, 1995, p9), focusing on tasks which can be programmed in a mechanistic form; for example microworld laboratory experiments to learn the concepts of kinetic and potential energy derived from Newtonian Mechanics (Lindström et al., 1993) and a simulation that represents “a set of condition–action rules [...] for operating a nuclear power plant” (Laurillard, 1993, p131). Alternative systems have been hyper-linked for the delivery of information in an encyclopaedic style, independent of any inherent learning objective. It is unlikely that either of these approaches would impart the emotions, motivations and context of the issues involved in the example which started this chapter (teenage pregnancy) or for any other situation with a strong interpersonal or emotional element.
4.2 Learning models

A number of models have been developed to represent the way that people learn and use learning resources—including teachers. Of these, Laurillard’s conversational framework clearly identifies the contrasts between human-based and media-based learning experiences.

Another useful model is offered by Grabinger and Dunlap (1995). They have built the REAL concept to characterise the features of environments that support constructivist learning. Their model draws substantially upon earlier work accommodating practical needs and integrating a number of earlier constructivist learning models. This model offers a substantial body of knowledge upon which the learning technology dimension of a MLE design can be founded.

4.2.1 Laurillard’s conversational framework

Laurillard (1993, p103) has presented a ‘conversational framework’ that describes the interactions between a teacher and student needed to complete a learning activity. This relationship is illustrated in Figure 4.1 and summarised in Table 4.2. She says that an understanding of the different roles for teacher and student is crucial in creating effective learning activities. For her, teaching is “essentially a rhetorical activity, seeking to persuade students to change the way that they experience the world” (Laurillard, 1993, p28). As such, the student must be a willing participant in the learning process, seeking to interpret the mediated vision of the subject matter, embedding it in their understanding of the learning domain and their general world view. The teacher has the role of mediating the experience of the learning domain so that it provides, academic knowledge of the underlying principles and, appropriate context of the real world experiences or activities that are involved.
<table>
<thead>
<tr>
<th>Aspects of the learning process</th>
<th>Student's role</th>
<th>Teacher's role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprehending structure</td>
<td>Look for structure</td>
<td>Explain phenomena</td>
</tr>
<tr>
<td></td>
<td>Discern topic goal</td>
<td>Clarify structure</td>
</tr>
<tr>
<td>Integrating parts</td>
<td>Translate and interpret forms of representation</td>
<td>Offer mappings</td>
</tr>
<tr>
<td></td>
<td>Relate goal to structure of discourse</td>
<td>Ask about internal relations</td>
</tr>
<tr>
<td>Acting on descriptions</td>
<td>Derive implications, solve problems, test hypotheses, etc. to produce descriptions</td>
<td>Elicit descriptions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compare descriptions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Highlight inconsistencies</td>
</tr>
<tr>
<td>Using feedback</td>
<td>Link teacher's redescription to relation between action and goal to produce new description</td>
<td>Provide redescription</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elicit new description</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Support linking process</td>
</tr>
<tr>
<td>Reflecting on goal-action-feedback</td>
<td>Engage with goal</td>
<td>Prompt reflection</td>
</tr>
<tr>
<td></td>
<td>Relate to actions and feedback</td>
<td>Support reflection on goal-action-feedback</td>
</tr>
</tbody>
</table>

Table 4.2 Student and teacher roles in the learning process (Laurillard, 1993, p86)

Obviously, a humanistic learning product designed for use in a domestic or open-learning setting cannot offer the prolonged contact between teacher and student that is encountered in an intensive classroom setting. A MLE will have to provide substitutional support in place of the 'teacher' to engender curiosity, sustain interest, support interaction and contain appropriate and accessible information resources. These issues are expanded upon in Section 4.9 and explored from a media dimension and design perspective in Chapters 6, 7 and 9.
4.2.2 Rich Environments for Active Learning (REALS)

A REAL is a generic, media independent, paradigm for a learning environment that is founded on constructivist principles. In other words a REAL could just as easily be found in a classroom as it could in a computer based learning environment. A REAL is made up of an “assortment of methods and ideas that help create an environment that promotes and encourages active learning” (Grabinger & Dunlap, 1995, p12). They offer a set of attributes for REALs (Grabinger & Dunlap, 1995, pp15-27),:

- **Student responsibility and initiative.** A student centred approach to learning is a necessity for *knowledge construction*. The student is then required to question their thoughts and actions, and reflect upon the implications and consequences that result. This process of self reflection, enables the student to develop an understanding of their own learning behaviour and therefore take control of it.

- **Generative learning activities**, originate knowledge through interaction with authentic problems. They “require students to take static information and generate fluid, flexible, usable knowledge” (Grabinger & Dunlap 1995, p19). The role of the teacher or learning resource is then as a facilitator to the students’ investigations, analysis, experiments and solutions.

- **Authentic learning contexts** may be defined in terms of complexity, demands placed upon cognition, engagement and interactivity, and the tools available for problem solution. There may also need to be some adaptation for “the age maturation level of the students and environmental constraints such as safety and resource availability” (Grabinger & Dunlap 1995, p20).

- **Authentic assessment strategies** are the companion of authentic learning contexts. Authentic assessment must have an appropriate degree of complexity, depth and context to measure the skills and knowledge in the learning task. It must also recognise the different aspects of intelligence employed by the students.

- **Co-operative support** is an important aspect of the other four attributes. It recognises the effects of communication activities on the learning process and how the social context of learning affects self-esteem and attitudes towards others.
This research endorses the ideals included in the REAL concept, but stops short of the view that “the learning that occurs within the environment is founded on the activities and processes that encourage thinking and reasoning, and not the media that deliver information.” (Grabinger & Dunlap, 1995, p12). As discussed in Section 4.9, and argued by Kozma (1991) and Simpson (1994) different media forms can be used to cue different sensory perceptions, mental representations and modes of thought. They can also be used to exploit attitudes, beliefs and knowledge in different ways and make possible different types of learning activity not normally available to a classroom environment.

4.3 Learning Processes

In work undertaken by the Multimedia Research Group, University of Plymouth, a body of knowledge has been drawn together that reflects the different types of information and learning activity that may be encountered within a MLE. Jagodzinski et al (1994) make a distinction between the acquisition of information in propositional

---

1 Section 3.4.
2 Sections 3.3 & 3.5.
3 Section 3.1 to 3.3.
or symbolic form (*symbolic knowledge*), and knowledge gained through sensory experience that comes from the pattern matching processes of connectionism. Smith and Jagodzinski (1995, pp30-31) made a similar distinction by dividing knowledge acquired through experience into two kinds:

- **Experiential knowledge** is that which relates to "complex real world physical phenomena which can most easily be understood through some physical sensory process", and that which comes from "intuitive understanding of values, relationships and abstract theoretical constructs" (Smith & Jagodzinski 1995, pp30-31).

- **Metacognitive knowledge**, is the strategic knowledge of how and when knowledge may be used in order to complete a task. It may be learnt and articulated in symbolic form, but is generated from "the patterns of procedures and approaches which best suit particular real-world problems" (Smith & Jagodzinski 1995, p31). This relies upon the appropriate stimuli in the brain setting off a chain of events to ensure the necessary intellectual and motor-sensory activities are carried through. As Norman points out this is not infallible:

> "Airplane pilots sometimes attempt to land without lowering their landing gear [...] the failure of performance resulted from a failure to retrieve, not from a lack of knowledge."

(1982, p68)

Jagodzinski et al (1995) have identified six types of learning that relate to learning through experience. These different types of learning are not mutually exclusive, neither do they have clear-cut boundaries. They are included to provide a means of focus, to emphasise particular aspects of the learning that could be exploited within a MLE.

- intuitive learning;
- experiential learning;
- situated learning;
- social-communicative learning;
- emancipatory and self reflective learning;
- meta-learning.

---

4 Sections 3.1 to 3.3 and 3.6.
The process of learning, when related to the connectionist paradigm, is not so much one that involves construction but one of formation. Knowledge is formed by patterns of connectivity across distributed networks of neural activity. Given the description of microfeatures by Rumelhart et al (1986, p8)\textsuperscript{5}, and the tuning process involved in pattern matching, it becomes easier to understand how the impressions left by sensory stimuli, imagery and emotional response can influence the acquirement of knowledge and skill, and the retention of memory. Intuitive learning is based upon sensory and emotional responses that result from physical and social experiences, in combination with other indistinct motivations. Lindström et al define intuition as the “sudden illumination based on a global perception of a phenomenon” (1993, p265). They argue that understanding comes from the “immediate sense that a situation has for a student and the way she discerns, delimits and relates” (1993, p263) to the elements within a phenomenon, based upon pre-existing knowledge of the physical and social world. Laurillard (1991) argues that “intuitive understanding” is qualitatively different from “analytical understanding”.

"Students make use of a variety of aspects of their experience as they struggle to make sense of the language of an academic discipline: physical experiences, social experiences, emotions, intentional goals, irrelevant experiences - and these are important because they enrich the concepts they develop, and not always in beneficial ways. Against those powerful sensual experiences, academics put up rather less compelling experiences of language, symbolism and analytical reasoning to develop students’ conceptions of such concepts as ‘velocity’, ‘power’, ‘structuralism’, etc. Small wonder that for many students the sensual or emotional experiences hold sway, and the concept remains known “intuitively” rather than analytically” as the academic would prefer."

(Laurillard, 1991, p2)

This is not a suggestion that intuitive learning should be given precedence over more formal academic styles, but that an appropriate balance be sought in the design of learning materials. In the design of MLEs, balance may be sought by using media and communication techniques to intuitively guide a user through a learning experience, supported by access to more structured learning and information resources.

For the purposes of this research, the term experiential learning, is used specifically to mean knowledge that can only be acquired by direct sensory experience. Many real life engineering problems cannot adequately be modelled using mathematical formulae, because they would be too approximate or too complex once implemented (Jagodzinski et al, 1995). An example is found in civil engineering, where the behaviour of a riverbed subject to erosion can only be physically modelled using sand, clay, and water in an engineering laboratory (Smith & Jagodzinski, 1995, pp30-31). Similarly many personal dilemmas and problems involve complex social, cultural and personal

\textsuperscript{5} Section 2.4.1 and 3.3.
influences that are difficult to resolve. Such problems, are perhaps, even more difficult to design and communicate with sufficient texture and subtlety to make believable. This has lead to the emphasis placed on the Social Dimension of the Knowledge Framework in Chapters 5 to 7 of this work, and the desire to draw upon research and creative techniques into conventional and interactive drama forms.

Learning which takes place in the context of a particular location, or social setting, to absorb features of the prevailing value system and subculture, is called situated learning. Examples can be found in the traditional craft apprenticeship systems, where skills, work practices, and standards of workmanship are carefully maintained and passed on from craftsman to apprentice. Similar learning and socialisation processes can also occur in less formal situations.

"Before schools appeared, apprenticeship was the most common means of learning and was used to transmit the knowledge required for expert practice in fields from painting and sculpting to medicine and law. Even today, many complex and important skills such as those required for language use and social interaction, are learned informally through apprenticeship like methods—that is, methods not involving didactic teaching, but observation, coaching, and successive approximation."

(Collins et al, 1989, p453)

That there is a social-communicative dimension to learning and functioning in the world has already been mentioned. Its contribution to the development of developing interactive drama materials is described in Chapters 5, 6 and 7. Knowledge is retained to enable the creation of schemata and models appropriate to the social and cultural norms of society. Hayes (1993, pp4-6) suggests that the schemata built by learners are related to self image, role within a particular group, the personality and traits of others, and the norms of action and response within given social and cultural settings. These are the mechanisms that people use in the generation of imagery to rehearse or review social interaction (mentioned in Section 3.7 and 3.8), and through which meaning is ascribed to behaviour and communication in its various forms.

Learning cannot simply be a process of acquiring and packing away knowledge. People reflect on their experiences, so that they may assimilate it into a form that they can understand and give meaning to. This enables the framing and re-framing of knowledge in new associations and contexts, to facilitate further learning, skilled performance, and problem solving. This process of reflection leading to a perspective transformation is the essence of self-reflective and emancipatory learning. Harré et al offers an interesting metaphor for this process:

"There is a general conversation which takes place in universities, and to which academic staff contribute. It is from this conversation that students extract what they can. Education, according to personal psychology, is like breathing in the surrounding air; it is not like being pumped up like the tyre of a bicycle."

(1985, p72)
Meta-learning is the accumulation of knowledge and intellectual skills related to the process of learning itself. This includes development of the strategies used to add and transform existing knowledge, to identify particular kinds of situation or problem, and complete problem solving activities. Meta-learning is closely allied to meta-cognitive knowledge. Its development is “an organic, not a mechanistic, process” (Claxton, 1990, p150), and it does not form an abstract body of knowledge, separated from its origins. Learning strategies evolve as an integral part of a domain or task, that in time “may become relatively disembedded and therefore more widely available” (Claxton, 1990, p150) for use in situations with similar patterns of events or features. Clearly this aspect of learning is crucial, without these processes the retention, transformation and utilisation of knowledge in any meaningful sense is not possible. Neither would it be possible to generate original thought and knowledge.

4.4 Instruction and Learning

As stated in Section 4.2.1, the role of a teacher is to impart information about the real world, and interpret information in the form of language, mathematical expression, or other symbolic representation. Using this paradigm and its underlying assumptions, the emphasis would be on instructional design and sequences of programmed learning: “essentially an application of operant conditioning wherein the learner's behaviour was shaped by reinforcement of desired learning behaviours” (Jonassen, 1991, p9). Instruction tends to be based upon the deconstruction of topics to look at individual principles and concepts. When taking such a stance, the process of presenting information, testing skills and/or knowledge, along with remedial correction of error become a mechanistic process in which subject matter is explained as being "unproblematic" (Somekh, 1994, p3) and presented at a level below the complexities of the real world.

Rather than this passing of knowledge from tutor to student, constructivist strategies facilitate learning. The general ethos is to provide the motivation and cues through which prior knowledge, beliefs and experiences are built upon, interpreted and given meaning.

4.5 Learning style

The classic texts on learning style are those of Kolb (1984) and Honey and Mumford (1992). Here learning styles of people are characterised as being predominantly activists, reflectors, theorists or pragmatists.

Sadler-Smith (1996, p186) has argued that the concept of learning style is not adequately defined, and that it is applied too generally to learning preferences and
cognitive style. He suggests that the term ‘learning style’ may be better defined by use of a number of characteristics:

- **learning preference**: that defines an inclination towards one style of educational provision;
- **learning strategy**: that describes the approach adopted in the construction of knowledge, attainment of skill and accumulation of experience;
- **learning style**: the habitual methods employed in acquiring knowledge, skills and experience;
- **cognitive strategy**: the approach adopted in the mental processing of information;
- **cognitive style**: the learnt methods and habits for structuring and retrieving information.

At the core of this model (below cognitive style) is the “central personality dimension” of the individual learner (Sadler-Smith 1996, p186).

Salmon considers learning style in the context of personal learning stance. Personal stance “refers to the positions which each of us takes up in life” (Salmon, 1989, p231). This concept stresses the strong social, cultural and interpersonal dimension to human experience. This relates to the, implicit and explicit, ways in which people engage with learning and produce their own particular interpretation of an experience. Learning is viewed as an inherent part of human experience, and enables the potential of learning as a process for social change.

### 4.6 Social and institutional factors of learning

A number of writers, for example Dillenbourg (1996, p165) and Somekh (1996, p9), have noted the opportunity to use social interaction as a part of the learning experience provided by learning technology. Arguing that it can help the development of social skills, co-operative problem solving and achievement of goals.

However, Laurillard (1993, p172) cautions against automatically equating the communication activity with the learning activity. Whilst discussion can provide a point of view, present descriptions and explanations, and confront people with the limits of their knowledge, it also has the potential to move away from the learning goal and side track important issues.
“Discussion between students is an excellent partial method of learning that needs to be complemented by something offering the other characteristics [of her ‘conversational framework’], if students are not to flounder in mutually progressive ignorance.”

(Laurillard, 1993, p172)

There must be a participative or ‘doing’ element that leads from a question to a problem solution, decision or other constructive learning activity. These activities will ideally seek to engender a sense of curiosity or motivate the user to learn more or take further steps towards personal or collective goals. Communication and social interaction provide an opportunity to support, guide and correct problem analysis and decision making.

4.7 The learning environment

A learning environment can be viewed as simply a physical setting in which learning takes place. Perkins (1992, p46) suggests that a learning environment may be described in terms of “five facets” which if used in different combinations will provide a certain experience of learning. Within a particular situation the facets will exist in different forms and exert different degrees of influence upon the learning process. The five facets are:

- **information banks** (e.g. people, libraries, computer systems, film archives etc.);
- **symbol pads** (e.g. paper, blackboards, computer screens, calculators etc.);
- **construction kits** use components or building blocks to create a solution or articulate an idea (e.g. Lego, laboratory equipment, commands in computer languages);
- **‘phenomenonaria’**, a specific area that makes available a phenomenon for experimentation and scrutiny (e.g. aquariums, terrariums, computer simulations and microworlds etc.);
- **task managers**, are the people and controls in an environment that set learning aims, direct activity, support progress and provide feedback.

A learning environment does not have to have all five constituents within its boundaries. For example the lecture hall would possibly be limited to lecturer and notes (information banks), notebooks and overhead projector (symbol boards), and instructions from lecturer and written handouts (task managers). Other types of learning environment take a more proactive ‘constructivist’ approach. A sports training session would involve the score cards and performance measurement (information
banks), training equipment (construction kits and phenomenonaria), and coaches, teammates and competitors (task managers).

A more complete description of a learning environment will also acknowledge the social and cultural setting of learning as an important enabler of learning. Salomon (1996, p365) identifies “set of agreed behaviours, consensually held expectations and understandings” as being essential parts of an environment that relate to its physical setting, people within and the activities involved. To understand these issues requires an understanding of the social psychological issues raised in Section 3.8, to create them within an MLE demands that the issues described in Chapter 5 are addressed.

4.8 Organisational learning

Argyris and Schön (1996, p8) have considered the nature of organisations, and put forward the idea that organisations can be viewed both in terms of the individuals that make it up, and as an entity in its own right. This theory may also be seen to be relevant to the constructs and functioning of the family. This is essentially a systems approach, in which the action, culture and values of the organisation are greater than the sum of its individual members. It also has similar considerations to the interrelationships of the control hierarchy described by Harré et al (Section 3.7) and the social psychological processes described in Section 3.8.

An organisation demands a number of characteristics to differentiate it from a group or a crowd. This includes (Argyris & Schön, 1996, pp8-9) the ability to:

- agree the way in which decisions are to be made within, and on behalf of, the organisation;
- give tasks and responsibilities to people who will act as representatives or agents of the organisation;
- identify the confines of the organisation and the environments it inhabits.

These regulatory characteristics need not be explicit, and may only become apparent during times of crisis or significant structural change to the organisation. Although the concept of organisation tends to be associated to a business or other social institution (e.g. school, church, government body), these characteristics could just as easily be applied to a family. This would possibly be more apparent in circumstances that demand co-operative planning, decision making, or action and where unexpected challenges to family cohesion or desired changes involve new experiences.

Changes in the desires, needs or motivations of the membership may demand renegotiation of the organisations existence. The extent to which the organisation is
able to sustain commitment to these characteristics defines the extent to which organisational learning occurs. The flexibility and robustness of an organisation is its ability to respond to and whether changing circumstances. Drew and Smith (1995, p5-6) offer a model to diagnose the extent of an “organization’s change proofing”, based on its Focus (strategic foresight and orientation towards its goals), Will (resolve to carry through its plans), and Capability (competencies held that make change possible).

Organisational learning occurs when changes are recognised and accommodated. So a family with rigid roles, behaviours, demarcation of rights and responsibilities, and set lifestyles is less likely to learn and adapt to new circumstances. In some situations the rigidity of the organisation (or family) may become intolerable and result in major catastrophe when major changes or choices (say in response to an unexpected pregnancy) need to be made.

4.9 Learning with media

Laurillard (1993, p94 & p100) has concluded that there are four characteristics to the learning dialogue between student and teacher, and that different forms of media can be classified according to these characteristics. She says that the success of any particular media can be evaluated by the extent that it is:

- **discursive**, the extent to which the conceptions, understandings and learning goals of student and teacher are accessible, negotiable and open to debate;

- **adaptive**, the extent to which the teacher can adapt learning goals to improve relative understanding and continue dialogue;

- **interactive**, that students receive “meaningful intrinsic feedback” (Laurillard, 1993, p100) to their actions that are in keeping with the learning task;

- **reflective**, that teachers can support the student to relate the feedback they receive to the outcomes of the learning experience and that students can pace their progress to facilitate deliberation and thought on their learning.

As Laurillard (1993, pp109-112) describes, printed materials are far from ideal when assessed against the four characteristics. Print simply offers a description of the subject experts’ view of the topic being learnt, with prescribed goals that cannot be negotiated. There is no way to adapt content or direction of the learning activities in response to the
students decisions, choices or progress. Students cannot be supported in their reflection.

Text on a page is inherently passive and cannot inform of misinterpretation and, as described in Chapter 1, many adults have not developed the abilities necessary to follow instructions or fill in official forms. It is reliant upon the readers ability to construct meaning and comprehension from it.

4.10 Learning with interactive multimedia

The literature described in the preceding sections and in Chapter 3 emphasises the complexity of experience based learning in the real world. Together they offer a perspective on the sophistication of human learning, and the extent to which perception, experience and imagination contribute to understanding about the objects, animals, people, events and situations encountered in life.

Although the enormous potential for the use of multimedia learning resources has been argued here (and by others), the lack of any distinct learning advantage in many applications is also recognised. The failure to deliver may occur for a variety of reasons. For example, a reliance on novelty over effectiveness, incorrect assumptions of the innate value of technology, or inappropriate replication of learning resources designed for other media. Underlying these reasons is the lack of a clear design rationale that has been derived from an understanding of human learning and psychological needs and that recognise the possibilities for and advantages of MLEs. This research seeks to overcome this problem by linking the theory described in Chapters 3 to 8 to support the multimedia design issues described in Chapter 9.

4.11 Interactive multimedia for humanistic learning

It is argued that multimedia has the potential to represent the subtleties of human experience, for sophisticated representation of information and situations, interaction with objects, people, and environments. To do this, requires a re-evaluation of the limits placed upon communication through interactive multimedia, and the way in which perception, imagination and cognition are interrelated in the learning process.

"In some eras, mental imagery has been heralded as the keystone of thinking; in others—including much of our own century—its very existence has been denied. The reasons for such fluctuations will shape the future theory of the mind.”

(Kosslyn, 1983, p4)

The use of abstract symbols (for example text, algebraic expressions) is an effective way communicating information concisely, however it also decontextualises and reduces the impact of the message. In some instances it can also oversimplify the information content. Knowledge or experience that is related to things such as human
consciousness: interpersonal relationships, emotion, moral values, beliefs and sensory perception are better communicated through audio-visual modes of representation. This research has sought to deliver such learning through the use of interactive drama.

To represent reality and serve humanistic learning needs requires a new approach to MLE design, one in which the creative arts of media specialists⁶ are given a far greater weighting in the design team. However, that does not mean that a MLE should be less reliant on the technical skills to exploit hardware and software, nor the systematic elicitation of knowledge, nor the rational approach needed to create information structures. With ever increasing demands on computer memory because of technical and artistic innovation, there will be a greater need to use technology more efficiently and to handle more complexity in order to produce an acceptable representation of the real world to critical users. Equally, it is not being argued that text and other symbol based systems can be eliminated, but that they need to be used appropriately according to the purpose and function of the MLE. It is knowledge of these issues from which the theory of multimedia will evolve, and the ability to represent real world events for the vicarious experience of learners will improve. Some of these issues are discussed further in Chapters 8 and 9, and their practical implications are demonstrated in the development of prototype learning materials in Chapter 11 and interactive drama materials in Chapter 12.

It is clear from the psychological and learning theory so far described, and evidence on the power of conventional media forms (see for example Kozma (1991), Laurillard (1991 and 1993) and Simpson (1994)) that social-communicative, and self-reflective and emancipatory learning, are key elements in the success of many media based learning resources. This is because these kinds of learning confront beliefs, values and emotions to put into context the message delivered.

A fundamental question of this research is how multimedia can be designed to exploit its inherent potential in order to create a MLE that has clear learning advantages for the users with a humanistic learning interest. Such a goal demands that a situation, say the teenage pregnancy scenario described earlier, is represented realistically whilst sustaining coherent models of presentation and comprehension. How media issues need to be addressed are described in Chapters 5 to 7.

---

⁶ For example script writers, directors, camera and sound personnel, visual designers.
5. Social Dimension: Dramatic Arts, Mass Media & Culture

This chapter presents the Social Dimension of the Knowledge Framework. It introduces the social context through which people gain experience, develop social values, and the influence that visual culture and media play in this process. The discussion expands upon the previous two chapters, on psychological processes and learning, and introduces a number of issues that are important to the next two chapters.

5.1 Social dimension

This chapter is concerned with the social and cultural context of human interaction and communication. The "Social Dimension" of the Knowledge Framework links to the expectations people have of a social situation or learning problem, their need for contact and interaction with others, modes of communication, their cultural identities, and their way of interpreting different media forms. It influences the way we think and the nature of our thoughts by forming understanding and values interrelated to our perceptions, imagination, behaviour and other mental processes.

The close interrelationship between social identity, culture and cognitive processes occur both in the creation of media and in their consumption by audiences. The process of communicating through any media form involves far more than the direct reconstruction of personal thoughts, or the reconstruction of perceived or imagined objects and environments. It requires the originator of the message to produce an acceptable representation of what he or she has perceived or imagined, and then communicate it in a form that a recipient can comprehend. The recipients will in turn interpret the message and contextualise it in terms of their own perceptions, emotional responses, experience and values. In describing film theory, Andrew comments.

"Every man-made representation derives its power not from its relation to real perception but from its deployment of a system of marks which, through use, has become "readable as" an image of the real. The artist works to make the marks of the system equivalent to the distinguishing marks of the perceptual field he or she hopes to represent. The viewer works to decipher the marks using his experience with the system and interpreting the strategy of the artist to interpolate a complete scene."

(Andrew, 1984, p30)

This process occurs in the portrayal of an event in a radio documentary or drama, the textual description of a landscape in a book, or the portrayal of a character's life through a film. Any media form, for example theatre, film or newspapers and magazines has characteristics that form its style, structure, and presentation methods. For this research, these interrelated characteristics are described within five areas of interest (described in Section 5.1.1 to 5.1.5 below):
5.1.1 Social interaction and cultural perspective

Social roles and cultural norms regulate the interactions that occur within a social grouping; this may be at different levels of focus, say relating to an ethnic identity, profession, or personal relationship. In Chapter 3 these phenomenon have been explained in terms of the Harré et al. three level model (Section 3.7) and social psychological theory (Section 3.8). In Chapter 4 the relevant learning processes are described in terms of the social issues of learning (Section 4.6) and organisational learning (Section 4.8).

An important part of social and cultural identity is the representation and exploration of its values, membership and circumstances through art and the media. Paraphrasing Williams (1981, p11) culture may be defined in three ways:

(i) as a state or attitude of mind held by a person of culture or member of a culture;

(ii) the processes of development through cultural interests or activities such as reading literature, viewing television (TV) and attending theatre;

(iii) the means of these processes as in the arts or the messages, media and technologies through which culture evolves.

The extent to which people talk about, identify and engage with a media product is influenced by the cultural impact of the product. This may be through the sustenance of accepted social values, or by creating contrast, contradiction or conflict to stimulate questions and emotions. These phenomena will form a complex dynamic, in which people are members of more than one cultural grouping at any one time. For example as a member of a family, religious group, workforce, sports club and peer-group. For example Barker (1997) studied the hybrid identities of British Asian girls and found the multiple influences that are involved in self identification. He says of one young woman:
"At the very least she has identifications with being Bengali, English, a women [sic], with youth culture and with Rap, an American-Caribbean hybrid, now appropriated as Anglo-Bengali. She is involved in shifting identifications and in enacting a hybrid identity constituted from multiplying global resources."

(Barker, 1997, p615)

Each area of life is likely to have its own set of (interrelated) values, beliefs and standards of behaviour and means of social identification which each person moves between according to personal preference, social situation and regulating conventions and rules.

5.1.2 Political influences

The fact that the use of media involves the presentation of information, and representation of people’s ideas, for interpretation by an audience means that there must be an inherent political influence (Mantovani, 1996, p65). For example, representation of the issues relating to care during pregnancy will have a different bias if produced by a government body, health service professionals, soap opera dramatist, or natural birth campaign groups. It’s impact will depend upon the way in which the media is exploited and distributed. The message it contains will be interpreted and responded to in different ways, depending upon the values, affiliations and receptiveness of the viewer.

5.1.3 Language

The linguistic conventions that are adopted to communicate to different people and for different purposes are tied up in the cultural identity and values of the people that produce them and the market they are intended for. This also relates to the processes of linguistic development interrelated to thought, memory, imagination and consciousness as described in Section 3.6.

As described in Chapter 4, the role of language and conversation in learning can be seen to fulfil a number of purposes, that include:

- creating a common reference to objects and events;
- ascribing meaning to physical and mental phenomena;
- condensing complex concepts and events into readily communicable form;
- sustaining a cohesive identity within the social and cultural groups that each person belongs.

1 Barker’s spelling.
Writers such as Vygotsky (1978), Habermas (1991), Harré et al (1985) and Harré and Gillett (1994) have placed strong emphasis on the way in which language facilitates and controls psychological development and function of the individual within society. Their perspectives place language at the centre of social and psychological theory:

“Social systems can be viewed as networks of communicative actions; personality systems can be regarded under the aspects of the ability to speak and act.”

(Habermas, 1991, p98)

“Throughout life, the brain stores 'experience in terms of meanings' that have structured that experience and the responses made by the individual to aspects of the events experienced. We have argued that the meanings used to structure the responses of an individual draw on rules that have been shaped in human discourse. This implies there must be a deep relation between the language that a community speaks and the categorizations or significations that members of that community use to unify stimulus presentations and group them into meaningful patterns. In this way, interpersonal rules and the terms they govern can be thought of as producing the articulation (complex patterns of interconnectedness) in human behaviour that ultimately explains our multiplicity of responses to things around us.”

(Harré and Gillett, 1994, pp81-82)

The views of Habermas, Harré and Gillett on the relationships between language, community and the formation of behaviour also manifests itself through the creation of cultural artefacts such as works of literature, artworks, architecture, media productions and other forms of human endeavour. Of these, the various kinds of visual representation make one of the most important contributions to a society’s culture.

5.1.4 Visual culture

Visual Culture refers to our perceptions of images and other visual forms, and the socially accepted conventions that are used to represent information, ideas and experiences. It encompasses not only representation under the auspices of the creative arts but also the representation of knowledge for scientific, technological, academic or other rigorous applied purposes. Until the latter half of the 20th century, in Western societies, the main mode of knowledge representation in these applied areas relied on symbolic modes of communication almost exclusively.

“The ultimate legacy of modern science is a world view in which “reality” is expressed in abstract mathematical symbols and formulae. It is a world in which being and appearance part company forever and there can be no trust in the efficacy of the seen, the visible.”

(Olsen, 1991, p18)

Visual culture of the 20th century has been predominantly populist and centred upon entertainment. There are however signs of change, driven by increased technological capabilities, and the need to represent evermore complex information for scientific and other forms of analytical interpretation. Graphic or visual representations of data can compress large amounts of information into intelligible and manageable form, to make new forms of diagnosis and decision making possible. For example it is possible to:
represent complex multidimensional statistical models as manipulable 3-D images; look inside the body without surgery by using body scanners; create working engineering models using 3-D computer aided design tools. The development of such capabilities has led to the idea of a 'New Renaissance' where visualisation once more becomes the key element of knowledge representation.

"It is often said that we are living in the early stages of a "visual revolution" that promises to transform the human world. But this is usually taken to indicate that television and media have come to occupy primary places in modern life. This is undoubtedly true, for better or for worse. But it is also important to realise that visual thinking is a higher order of cognition, one that complements other, more abstract approaches to the world."

(Olsen, 1991, p18)

There is plenty of anecdotal evidence to show how visual thought has enabled scientific progress and creativity. In the 15th century Renaissance of Europe, technological innovation went hand-in-hand with visualisation and fine artistic representation. For example Leonardo da Vinci expressed his complex technological ideas of ornithopters and helicopters through his drawings and his investigations into human anatomy through detailed illustrations (West, 1991, p145).

There are also many examples to show how other great scientific minds used visual modes of thought to resolve problems and bring innovative ideas to fruition. Olsen, (1991, p15), Kaufmann (1979, p61) and John-Steiner (1985, p86) give examples including Copernicus, Albert Einstein, and Crick, Watson and Wilkins (discoverers of the structure of DNA molecules) as being representative of scientists who exploited visualisation and visual representations in their innovative work.

Perhaps the most apparent use of visualisation technology is in the field of medical imaging, where the impact of technology, visual representation of otherwise unseen phenomenon, and expert diagnosis may have direct implications for personal situation. One of the findings of the subject matter research for the multimedia learning environment (MLE) design project (described in Chapter 10) was the powerful emotional response that a foetal ultrasound scan has on prospective parents.

The power of medical imagery also has a wider appeal and sociological influence. Belling (1998, pp1-23) has looked at the effects of televised medicine.

"Patients who have watched surgery on television bring to the doctor-patient relationship a whole range of new images, terms, and expectations. Incorporating these productively into the clinical interview, the case history, and the relationship provides a new set of challenges for both doctor and patient. Because even an erroneous impression is real in its effects, the mixture of science and storytelling in televised surgery requires a response sensitive both to accuracy of data and to the textual strategies that make such shows a compelling source of knowledge. For all its "realness," an operation shown on television has been placed in an interdisciplinary domain where spectacle and storytelling overlap with the material effects of surgery on actual bodies."

(Belling, 1998, p1)
As will be described in Section 6.2.2 this effect is not restricted to documentary programmes and has implications for dramas or soap operas with a medical or health related storyline. The evolution in visual culture is tied in to technological development and social change. This in turn feeds in to the portrayal of the world in the media and the theory that emerges from it.

5.1.5 Media theory

Media Theory provides the academic perspective on specific codes of communication that are used in the various media forms. They are codes that can be adapted and brought into the realm of multimedia to improve design strategies, techniques and output. The development of theory regarding new media forms has always drawn upon the theory of other media, and other related disciplines (psychology and linguistics for example). A good reason for this is the way in which conventions of one medium can be used to explain and interpret the possibilities of another, enabling the development of new uses for media techniques and the exploration of creative practice and theory. Equally, drawing upon references from existing media provides a contextual framework upon which users can build their understanding of the new media and information conveyed. A good example of such theoretical development is the development of film theory.

Stam et al (1992, pp28-65) explain how film theory has drawn upon other disciplines such as linguistics, literature and visual arts. In particular they explain how this has influenced film semiotics and narratology, and the development of the concept of “cinematic language”. Whilst direct comparisons between verbal and cinematic language has its limitations, that they are both inherently linear and have a syntactical form are features common to most communication media. Eisenstein emphasises the limitations of this analogy:

"The film-frame can never be an inflexible letter of the alphabet, but must always remain a multiple-meaning ideogram. And it can be read only in juxtaposition, just as an ideogram acquires its specific significance, meaning, and even pronunciation (occasionally in diametrical opposition to one another) only when combined with a separately indicated reading or tiny meaning—an indicator for the exact reading—placed alongside the basic hieroglyph."

(Eisenstein, 1977, pp65-66)

It is the symbolic conventions of the media that make the message coherent to the audience. These conventions are derived from a combination of mechanisms to exploit sensory perception, cognitive processes, linguistic forms, and the socially constructed norms that reflect cultural values and beliefs. How such media theory can inform interactive drama based MLEs is discussed in Section 7.2.2.
5.2 Discussion

This chapter has described how the elements, within the Social Dimension of the Knowledge Framework, influence society and culture. It has identified the importance of media and visual culture to society in general and suggested some of the major issues that need to be considered by MLE and interactive drama designers. The issues considered also feed into the areas of knowledge related to MLE production (Chapter 8) and Multimedia Design (Chapter 9). This chapter has also identified the broad range of issues and theory that are included within the Social Dimension.

The major area of interest in this project, that relates to the Social Dimension, is the design of interactive drama. In the next chapter, the way in which drama has been used to portray human experience is discussed in more detail and research from the human sciences considers reasons for, and benefits derived from, audience attention. The discussion develops themes introduced in this chapter, and considers the potential of drama as a medium for humanistic learning. This discussion is followed, in Chapter 7, by review of current research that is directly relevant to the design of interactive drama.
6. Representation of experience through drama

This chapter develops the discussion developed in Chapters 3, 4 and 5 by drawing upon the literature from human sciences, and related disciplines, about the way mass media influences people's opinions, ideas and knowledge. In particular the representation of relationships and social values are considered through the genres of soap opera and related drama forms.

The way in which people become involved with drama, the benefits that they gain from viewing, the learning that may be derived, and examples of the way in which learning can be built in to drama are also considered. The medical theme to this research project is addressed through discussion of the issues surrounding the delivery of medical information and the portrayal of medical stories.

In most mass media forms, drama production is focused upon the creation of a world in which the characters, events and development of a story are intended to offer a convincing representation of the real world. The audience is expected to directly relate to the circumstances and content of the story and drama based upon their knowledge and experience of the world and society in which they live. The constructs of these media presentations are reflections of those which form the society, cultures and personalities of the audience. They can be identified in drama works throughout the history of theatre, film and TV. The knowledge within this area makes a significant contribution to the form and content of the Social Dimension (Chapter 5) of the Knowledge Framework.

In order to successfully design and produce drama it is important to understand the creative processes involved, the cultural and symbolic conventions used to structure them, and the impact that they are likely to have on their audience. In this chapter, examples of drama with a strong human interest, review of research literature and theories of practice are used as a basis for understanding the potential of drama as a medium for humanistic learning. This reference to drama developed for conventional media forms is intended to set a creative and cultural foundation that informs the discussion in Chapter 7, and builds upon issues of psychology and learning discussed in Chapters 3 and 4.

William Shakespeare based his play King Lear on a traditional fairy tale. He produced a powerful work based upon the nature of family relationships, and the political intrigue and power plays that can develop. It presents a chain of catastrophic events that lays bare the characteristics, motives and frailties of the people involved. The interaction between the characters, each with their own motivations, roles and
positions, provides the basis of a drama founded upon ‘the family’, and the effects that it can have upon itself and the society that it exists in.

There are many examples from literature and drama where social experience, relationships and personal dilemmas form the main constructs of the plot. These issues have been commented upon in film from its earliest exploitation as a dramatic art form. It is perhaps easy to assume that the problems of poverty and social degradation have only been addressed in comparatively modern cinema. This is not the case, stories with a strong social emphasis have always been popular subject for film. For example, Charlie Chaplin’s films dealt with contemporary issues:

- The Immigrant (1916) the “Little Tramp” arrives in the USA and tries to establish himself in his new country;
- Easy Street (1916), the Tramp joins the police and meets problems such as domestic violence, mob rule and even illegal drugs being injected by a deranged addict.
- Modern Times (1936) looks at the effects of industrialisation and capitalist economy on the everyday life of the common man through a series episodes in the life of the Tramp.

There are also many examples of social issues and relationships providing the plot and drama in the history of British Cinema. It is only possible to present a few examples here:

- Réveille (1924), a film by George Pearson revealed the affects of World War 1 on the people of Britain (BBC, 1995).
- This Happy Breed (1944), a David Lean film based on the Noel Coward play, follows the lives and relationships between two neighbouring families between World Wars I and II.
- Brief Encounter (1945), again a David Lean film, explores the relationship between two strangers who meet in a railway station, and whose developing love for each other enriches their otherwise boring domestic existence.
- Spring and Port Wine (1970), directed by Peter Hammond, contrasts the values and attitudes of a dictatorial (almost Victorian) father and those of his wife and four children. The refusal of his daughter (who is secretly suffering from morning sickness) to eat a meal of herrings exposes the tensions and politics of family life, and contrasts the ways
in which the family members deal with their position in the pecking order.

- Life is Sweet (1991), a Mike Leigh film, revisits the themes of Spring and Port Wine in his story of a middle class London family. In this story it is the decision of the father (Andy, a chef) to leave a large kitchen and go it alone as the owner of a mobile food stand that exposes blinkered viewpoints and frailties of family members.

- Raining Stones (1993), a Ken Loach film, is a black comedy that tells the story of Mancunian family man Bob. It follows his struggles against unemployment, poverty and loan sharks.

- Secrets and Lies (1995), another Mike Leigh film, looks at the growth of a relationship between a mother and the daughter she had adopted many years before. The issues and drama is accentuated by the fact that the mother (Cynthia) is working class and white, but her daughter (Hortense) is a black professional woman.

The years from the 1950s have seen TV take over as the main medium for news and entertainment. A major component of which has been the production of plays, drama series and soap opera. Of these, it is perhaps the soap opera that has made the biggest cultural impact and is the most popular genre of British TV (Buckingham, 1987, p3). The most notable examples of British soap opera are:

- Coronation Street (1960 to date) set in the fictional Manchester borough of Weatherfield, created a white working class vision that is contemporary to the early years of the programme. It has sustained its character base over many years, drawing an older viewing audience, and adopted the now classic form of British soap opera “embracing an ideal of a nostalgic past in which earthy, authentic, working-class people lived in friendly communities” (Liebes & Livingstone, 1994, p736).

- Brookside (1982 to date) is set around a real cul-de-sac in a Liverpool housing estate, and is noted for its inclusion of social issues, strong stories and quality acting.

- EastEnders (1985 to date) took the theme of life in a big city borough, the fictional Walford in London dockland, combined it with the realistic feel of a (reconstructed) outdoor location, and added its own gritty social realism of a multi-cultural working class drama. It has sought to
make itself attractive to a broader audience, than the targeted female and elderly viewers of other soaps (Buckingham, 1987, p16), by developing stories attractive to young and male viewers.

"The initial balance of characters chosen thus meant that certain issues were bound to be raised, given the commitment to a degree of realism. The decision to include a range of ethnic minority characters for example, meant that racism was inevitably on the programme agenda. Likewise, the presence of a number of teenage characters meant that 'teenage problems' — pregnancy, unemployment, family strife — would inevitably be dealt with in some way."

(Buckingham, 1987, p16)

Each of these British soap operas have developed their own audiences and cultures, using drama, humour, social issues and storylines in their own way. They have helped to inform and influence the shape of TV drama. The family, interpersonal and social interaction of daily life are the lifeblood of soap opera. EastEnders epitomises these features.

"In several respects, then, EastEnders draws upon the familiar qualities and staple concerns of soap opera. Its storylines are largely based on the problems of personal relationships and family life. It allows its viewers privileged access to the intimate secrets of its characters, and invites them to pass moral judgement on their behaviour. It develops a number of different narrative strands simultaneously, and encourages viewers to speculate about future developments."

(Buckingham, 1987, p4)

In Section 6.1 a literature review of research into the soap opera genre, and other drama related forms, explores the way in which they tell their stories and are consumed by their audiences.

6.1 Review of human interest drama (HID) research

In this section, the structure and characteristics of soap opera, and related drama, are described. The literature described builds an initial foundation for the content of the Social Dimension used in the development of the interactive drama described in Chapter 12. The features of audience-programme relationships are explained, and the ways that many viewers engage with the stories, characters and other viewers are discussed. The ways that these issues can inform humanistic learning processes are also considered.

The roots of TV soap opera can be found in the serialised domestic novel of the 19th century (Cantor & Pingree, 1983, p20), early American commercial radio (Stern, 1991, p164), and latterly “a marriage between movie and radio formats” (Cantor & Pingree, 1983, p46). The Reithian tradition of public service broadcasting, that programming should seek to inform and educate, also influences the content of British soap opera (Liebes & Livingstone, 1994, p735).
The definition of the term "soap opera" has been defined narrowly by some writers, for example Cantor and Pingree (1983, p17) who confine the term to daytime dramas on the US commercial television channels. They characterise them in terms of:

- daily broadcasts throughout the year (1983, p19);
- as a form of "entertainment specially targeted by advertisers for the female audience" (1983, p11);
- lower production costs and limited budgets in comparison to prime time programmes (1983, p26);
- presentation to "national audiences views of social relationships and sexual intimacies" (1983, p13);
- the ongoing narrative structure that has no beginning or end, and contains "competing and intertwining plot lines introduced as the serial progresses" (1983, p22).

Other writers offer more liberal definitions of the term to include prime-time programmes, those broadcast as series and mini-series, and that have no involvement with commercial sponsors. Mumford (1995) offers a definition that seeks to identify the key characteristics of the genre:

"A soap opera is a continuing fictional dramatic television program, presented in multiple serial installments each week, through a narrative composed of interlocking storylines that focus on the relationships within a specific community of characters."

(Mumford, 1995, p18)

This more open definition would not, for example, exclude many British soap operas that are transmitted at prime time and have little or no influence from commercial sponsors. It does however eliminate some drama types that have characteristics similar to soap opera, these include ensemble and episodic series, TV movies and one-off docu-dramas. This research uses Mumford’s definition and refers to the other drama forms as Human Interest Drama (HID).

There is a body of literature that describes the study of the audience-programme relationship, structure and forms of programmes, and the role of TV as a reflection of

---

1 For example: programmes such as: Stephen Bochco police series, NYPD Blue (1993); BBC’s hospital drama Casualty (1989); and, Kate Mellor’s series about the lives of several Bradford prostitutes, Band of Gold (1995).

2 For example: BBC’s TV movie, Alive and Kicking (1991), about the dilemmas of a drug pusher dealing with his addiction, business interests and the need to go through rehabilitation to keep his wife and new-born baby.
society. This work provides a great deal of knowledge to inform and support the creation of interactive drama, especially in the development of media theory (Section 5.1.5). These fields of research create a complex picture of the interrelationships between the TV presentation, viewers' motivations and reading of a drama, and the wider influences of television drama (notably soaps and HID). The understanding and exploitation of such research may make an important contribution to the creation of interactive drama that is useful and believable.

6.1.1 Parasocial interaction

Parasocial interaction may be defined as the imagined relationship and involvement between viewer and media character(s), that develop through vicarious experience and imagined shared intimacy (Hoffner, 1996, pp390-391). Through the auspices of the TV drama (or other TV format) the viewer shares the experiences and viewpoints of characters (or personalities) and identifies with their values and behaviours. Characteristics that encourage parasocial interaction may include those that are highly valued in a society or those engendered by personal desire. For example strength and courage in men are valued by societies with strong militaristic traditions, whilst a wish for the money and lifestyle of a character relates to personal ego.

Stern (1991) goes as far to say that soap operas viewers have such a high level of identification with their favourite programmes and characters “that no barrier is erected between fact and fiction” (Stern, 1991, p170). However, Buckingham argues that the relationship between the viewer and soap opera is more sophisticated. His work shows that viewers did not confuse representation of the world in a soap opera with reality, and they could not be seen as ‘‘dupes’ of television” (Buckingham, 1987, p200). He goes on to suggest that:

“Perhaps the most appropriate metaphor for soap opera is to regard it as a form of collective game, in which viewers themselves are the major participants. The programme itself provides a basis for the game, but viewers are constantly extending and redefining it. Far from being simply manipulated, they know they are playing a game, and derive considerable pleasure from crossing the boundaries between fiction and reality. Yet although the rules of the game are flexible, they are ultimately determined by the programme-makers: while viewers may seek to play by their own rules, they must inevitably acknowledge those which are set for them.”

(Buckingham, 1987, p204)

One significant way in which viewers move between the worlds of fiction and reality is in their moral judgements of characters and the contrasts they make with their own beliefs and standards of behaviour. Barker (1997 & 1998) has completed extensive analysis of the identity of British Asian and black teenage girls and their interpretation

---

3 For example: Hillsborough (1996) the story from different perspectives of the football tragedy.
of soap operas. For example, Barker (1997, p619-620) describes how the representation of a relationship between an Asian girl and white boy, in Australian Soap 'Neighbours', is seen as unlikely in their own social setting. Their discussion is framed in the way that the soap character is portrayed, the values of the girl's own culture and the values of their peers. Clear tensions emerge between their identities as member of an Asian culture, experiences in the British education system, and their inner moral values. They are aware of the possibilities of getting a 'bad reputation', rumours and gossip of sexually active friends and acquaintances, and their own private sexuality. Soaps provide a way through which these moral issues can be discussed "in an 'active' and creative way" rather than "positioning the viewer in one moral discourse" as the only acceptable behaviour or decision (Barker, 1998, p65). Barker goes on to argue that two themes emerge in their discussion of sexuality:

- the morality of condemnation where individuals acted against cultural codes;
- morality of recontextualisation where mitigation and forgiveness of the indiscretions can be offered.

The tensions between the two create the dilemma necessary for dramatic effect and debate. The portrayal of more assertive women (Barker, 1998, p69) or successful black women (Barker, 1997, p623) create senses of pleasure and identification for the girls.

The issues of identification, moral judgements, critique and discussion of soap operas are essential parts of the shared and collaborative viewing processes described by Barker (1998, p69). Buckingham (1987, pp164-167) describes how some of these activities evolve to create a wider environment of existence for the soap opera EastEnders. This includes:

- the development of EastEnders scrapbooks;
- following the lives of actors (for example actress Gillian Taylforths breast cancer scare);
- using humour and ridicule to draw further pleasure from the plot;
- prediction of future story developments.

---

4 As explained in 6.1.3, individual morals, beliefs and values can also be related to educational initiatives with political motives.
These wider processes of the soap opera phenomenon are also exploited through the media. TV listings magazines, newspapers, radio commentary, book publications, and special video editions of programmes have all been used to offer new insights into the narrative, characters and actors who are part of the soap operas (Buckingham, 1987, pp116-144; Butler, 1991, pp74-75). The Internet also provides a venue for many soap related Web sites. Whilst many soaps have their own official sites, run by the broadcast companies who make the programmes, there are many more run by fan clubs and individual viewers. Baym (1993, pp151) has analysed and identified a range of interactions of an Internet discussion group that serves fans of US day-time soap opera, showing how the soap opera culture is developed outside of the programme to a sophisticated level community interactions and activities.

Activities that have grown up around soap opera have formed new avenues for parasocial involvement and enrichment of the viewers’ experience. These processes are extensions of the basic conversation that encourages people to learn what “everyone’s been talking about” (Buckingham, 1987, p162) and that “stimulates people to consider and incorporate the serial’s ideas and messages” (Bouman et al, 1998, p506). These areas of research suggest the existence of a wider range of rewards and motivations than simple enjoyment of television drama as a passive viewer.

6.1.2 Gratification and audience activity

The phenomenon of parasocial interaction suggests that the viewer is involved (to some degree) in a compulsion or inducement to build a relationship with a programme or character. A viewer has to seek out the programme they wish to watch, if only by switching channels. At a deeper level, cognitive and affective factors play their part in creating the incentives to select a programme, pay attention to the broadcast and reflect upon or respond to its content. Research on the reasons why people continue to watch TV and seek out particular programmes and viewing experiences may be placed under the topic of ‘gratification’.

The gratification received from a TV programme involves some measure of positive action, with the psychological processes described in Section 3.4 to 3.8 coming into play. Passive use of the TV without selectivity or expectation is less likely to produce gratification for the viewer. This has important implications for programmes with an educational motive because they must attract the intended audience if they are to achieve their goal and actively engage them in learning.

This raises the question of how to position and focus a programme for consumption by an audience. If the learning content of a programme relates to very serious personal or social issues, people who are involved in such circumstances may not want to think about the implications of their problem. The challenge is to attract the attention of the
audience (both collectively and individually), sustain their interest, and provide a message and knowledge to add to their learning.

Canary and Spitzberg (1993, pp816-817) have studied the relationship of between loneliness and gratification received from media. They show that there is a difference in the rewards received from media when people are situationally lonely as opposed to chronically lonely. For people who have moved to a new area, or have relationships that have broken down, media would seem to offer greater rewards.

"Situationally lonely people, who still attribute their loneliness to external and unstable causes, believe their soaps are essentially fun and engaging."

(Canary & Spitzberg, 1993, p816)

People who are chronically lonely feel their isolation is the result of their own personality, characteristics or other factors of their own making. They are less likely to find the same gratification from media.

"It is feasible that as social skills deteriorate, people engage in routinized behaviors that exclude, inhibit, or diminish functional behaviors. In this vein, as loneliness persists, people become more habituated and less instrumental users of media (Perse & Rubin, 1990; Rubin 1984)."

(Canary & Spitzberg, 1993, p817)

Lin has put forward a model for the activities that a viewer engages in to generate such gratification. This, she says, "reflects the audiences' cognitive, affective and behavioural involvement with the media use process" (Lin, 1993, p224). She puts forward a model (Figure 6.1) of audience activity based upon the sequence of behaviour that happens in three interrelated phases of viewing. The sequence of events are as follows:

1) the selection and planning of viewing activities occurs in the pre-exposure phase;

2) the psychological, emotional and behavioural involvement with the media and programme content (for example watching, thinking and discussing a programme) occurs in the during-exposure phase;

3) the post exposure phase produces responses to the viewing process (such as introspection, pleasure, excitement, etc.) and use of the media experience—post-viewing utility—to prompt related activities (such as talking about the programme, reading TV magazines, plan further viewing).

These viewing activities are connected to the gratification received by a complex set of influences, related to the development of expectations and preferences for TV viewing. Such behaviour can perhaps be linked to the processes of thought and action referred to in Section 3.7. Through the viewing sequence the strength of relationships and level
of activity between the different elements vary. The gratification seeking process is represented in Figure 6.2. Lin comments that the new multi-channel media rich era creates a new situation that influence audience gratification.

"The multichannel phenomenon is particularly in need of a closer examination, due to its capacity to change the nature of audience viewing processes and hence audience behaviour. For instance, a typical cable television household has at least 36 channels encompassing various types of niche programs that appeal to differing viewing preferences. The remote control device, a standard piece of equipment in a cable home, enables viewers to better control their selection process and viewing conditions (Heeter, 1985)."

(Lin, 1995, p225)

<table>
<thead>
<tr>
<th>Activity Sequence</th>
<th>Activity Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Exposure</td>
</tr>
<tr>
<td>Step I</td>
<td>Viewing</td>
</tr>
<tr>
<td>Step II</td>
<td></td>
</tr>
<tr>
<td>Step III</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 6.1 Audience Activity Phases and Sequences (Lin, 1993, p229)

Lin draws three general conclusions from her work.

"First, more “captivated viewers” (i.e. those with stronger viewing orientation) who have access to more abundant program options are prone to be heavier viewers. Second, viewers with greater gratification expectations tend to be more captivated viewers, who are more inclined to actively engage in the viewing process, through certain cognitive processing and reflection, affective response, and behavioural reaction. Third, these more motivated, captivated and engaged viewers would also derive more gratification from their viewing experience."

(Lin, 1993, p240)

If put in the context of the convergence of media and computing technologies described in Chapter 1, and the discussion on parasocial involvement in the previous section, the gratification seeking process becomes an important design issue. It relates to the ‘Social Dimension’ from the Knowledge Framework, from which the components feed into the design of drama to stimulate, sustain and fulfil vicarious learning experiences. A viewer’s orientation and motivation towards a particular drama and media form will support their suspension of disbelief and engagement with the story and performance. The designers and producers of a drama need to provide an
appropriate experience for their audience that fulfils social, cultural and psychological expectations. Failure to do so is likely to raise a barrier to its acceptance. The effect of ignoring these issues can be imagined by considering the example of the direct TV broadcast of a play staged in a theatre. Limitations of camera framing and set design, distance from the performance, and the unfulfilled expectations of an audience schooled in TV conventions, would probably undermine the experience of the drama. The evaluation done for this project, discussed in Chapter 13, has explored these issues further.

6.1.3 Learning from human interest drama

Cantor and Pingree (1983, pp127-128), citing the work of Herzog (1944) and Blumler et al (1970), say that audiences of early radio soaps listened to them for reasons that include emotional release, wishful thinking (filling the gaps in their lives), advice, reinforcement of values, and companionship. They say, quoting the work of Compesi (1977), that viewers are less likely to take advice or increase self knowledge from TV programmes. They suggest that this may be because viewers are more "worldly" than audiences in the early years of radio (Cantor & Pingree, 1983, pp129-130).

Whilst direct advice and instruction may not be taken as a matter of course from drama, and other TV genres, there is evidence to suggest that various media provide an important resource for information. There is also more recent evidence to suggest that

---

Figure 6.2 Gratification-Seeking Process Model (Lin, 1993, p232)
the values and behaviour portrayed on TV influence the perceptions and beliefs of the audience.

Larson (1996, pp97-110) has compared the portrayal of teenage single mothers in the media and the reality of single motherhood in the USA. She argues that “television is an important purveyor of messages about gender roles, and that most of those messages contain traditional and stereotypical images about appropriate gender roles” (Larson, 1996, pp97-110). Larson’s study looks at the perceptions of young people toward single motherhood. She finds that heavy viewers and younger viewers are more susceptible to believing that soap operas are a true representation of reality, and that “boys may see the possible pregnancy of their girlfriends as a situation with few problems” (Larson, 1996, p 109). The influence of soaps on this age group is accentuated because of their viewing habits and the targeting of adolescents by programme makers.

Hammersley et al (1997) investigated the sources of drug information used by 12-16 year old school children. They found that children’s knowledge and attitudes about drugs had a number of important influences. They suggest that whilst knowledge about drugs comes from a variety of sources that “attitudes were not related to sources of drug information” (Hammersley et al, 1997, p239) but are formed experientially. They conclude that “future drugs education needs to differentiate the moulding of opinions and morals from the provision of information” (Hammersley et al, 1997, p239) and that medical professionals, parents, and the media all have a useful contribution to make in supporting this process.

A study (Ma et al, 1998) into the perceptions of Native American adolescents towards the effects of foetal alcohol syndrome (FAS) reaches similar conclusions.

“Findings from the survey indicated that the elements of a multi-faceted prevention and intervention program in FAS must be age-, gender-, and culture-sensitive; must reflect shared responsibility between adolescent males and females; must be rooted in the family, community, and the school; and must use media avenues appropriate to adolescents.”

(Ma et al, 1998, p135)

Although there is literature to suggest that people are reluctant to accept a direct learning message from TV drama, Ma et al (1998) found that the preferred way of finding information by the adolescents in their study was through videos and computers. This may reflect the different expectations, cultural values and language, viewing habits and education experiences of the young people in their gratification seeking (Section 5.1.3).

There have been a number of educational and politically motivated initiatives to exploit entertaining drama to develop awareness of social issues, making the political
influences described in Section 5.1.2 explicit. Nariman (1993) describes the work of Miguel Sabido in creating the entertainment-education genre in Mexican TV programming. Sabido takes a holistic approach, using theory from a number of disciplines, to draw together melodrama that presents moral dilemmas with educational issues important to Mexican society. The theoretical basis to his work, summarised in Table 6.1, is used to "guide the structuring of soap opera characters, plots, and messages to reinforce specific values, attitudes, and behaviours among the target audience (Nariman, 1993, pp45-46). A similar approach of theory informing (and developing from) practice has been employed in this research and is described more fully from Chapter 10 onwards.

<table>
<thead>
<tr>
<th>Theory</th>
<th>Function in Entertainment-Education Soap Opera</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Theory</td>
<td>Provides a model for the communication process through which distinct sources, messages, receivers, and respondents are linked.</td>
</tr>
<tr>
<td>Dramatic Theory (Bentley(^5))</td>
<td>Provides a model for characters, their interrelationships, and plot construction.</td>
</tr>
<tr>
<td>Archetypes and Stereotypes (Jung(^6))</td>
<td>Provides a model for characters which embody universal human physiological and psychological energies.</td>
</tr>
<tr>
<td>Social Learning Theory (Bandura(^7))</td>
<td>Provides a model in which learning from soap opera characters can take place.</td>
</tr>
<tr>
<td>Concept of the Triune Brain (MacLean(^8))</td>
<td>Provides a model for sending complete messages which communicate with various centers of perception</td>
</tr>
</tbody>
</table>

Table 6.1 Function of Theories in Entertainment-Education Soap Operas. (Nariman, 1993, p29).

---

\(^5\) This refers to Dr Eric Bentley's (1967) description of five key theatrical genres: tragedy, comedy, tragi-comedy, farce, and melodrama (Nariman, 1993, p34).

\(^6\) Carl Jung, Swiss psychologist and psychiatrist, uses the term 'archetype' to refer to the personification of cultural stereotypes and "the movers of events in mythological stories" (Nariman, 1993, pp36-37).

\(^7\) Albert Bandura’s social learning theory is used to guide the design of role models to reinforce the values of the audience and promote observational learning (Nariman, 1993, p39).

\(^8\) Paul D. MacLean (1973) postulated a three level model of human brain structure: the reptilian brain that controls behaviour, the paleomammalian brain that relates to emotional behaviour, and the neocortex that governs creative and intellectual activities (Nariman, 1993, p44).
Examples of the issues raised in Sabido’s soap operas include adult literacy, family planning, women’s health and family welfare. Actors portray behaviours relevant to the chosen social message to show how learning and adopting such values effects the characters’ lives. (Nariman, 1993, p47). Figure 6.3 represents the way in which values are designed and communicated in the soap opera “Acompáname”.

![Value Network and Communication Circuit of the Entertainment-Education Soap Opera “Acompáname”](image)

Figure 6.3 Value Network and Communication Circuit of the Entertainment-Education Soap Opera “Acompáname” (Nariman, 1993, p60)

Sabido designed his soap opera productions specifically as a vehicle for delivering learning messages. Bouman et al (1998, pp504-518) report the use of Sabido’s entertainment-education strategy by the integration of medical messages into an existing weekly medical drama. The Netherlands Heart Foundation decided to sponsor a number of health messages, in ‘Medisch Centrum West’, by checking story content and showing posters and leaflets during the serial. Three issues were addressed:

- nutrition and cardiovascular issues, and the purposes of regular cholesterol tests;
- women and increased risks of cardiovascular disease after the menopause;
- heart transplants and the filling in of a donor card.
They call this approach a social marketing perspective. The aim in this case was to reach people in lower socio-economic who have a 5-7 year lower life expectancy. The results of this study suggest that the educational message was successfully included into the serial without being perceived as preachy or undermining the entertainment value of the drama (Bouman et al., 1998, p516). However, regular viewers of the programme appreciated the health message more than non-regular viewers. In the UK, soap operas have tended to explore issues and storylines because of topical interest and the desire of programme makers to create social and cultural commentary. However this does not mean that the educational potential of soap operas have been ignored. In September 1998 the UK Education and Employment Minister David Blunkett announced that a number of popular soap operas would look at issues to support the government’s National Year of Reading. This initiative is intended to help improve the levels of adult literacy in the UK, because “nearly one in four adults has very poor literacy” (Fletcher, 1998). Phil Redmond, executive producer of Brookside, Hollyoaks and Grange Hill, agreed to run stories on literacy problems in all three soaps (Midgley, 1998). The two most popular British soaps, Coronation Street and EastEnders were also reported to be giving support through existing storylines (Midgley, 1998; Lightfoot, 1998).

The relationship between the intended government messages and programme makers interpretation are not always harmonious. Midgely (1998) reports that in early 1998 Frank Field, the Minister for Welfare Reform, wanted the consequences of benefit fraud to be illustrated, but ended up criticising the resulting story on Brookside because the punishment received by the offender was unrealistically light. Also, in 1997, David Blunkett was rebuffed by Coronation Street and EastEnders producers when he requested help to show the positive side of the teaching profession. Phil Redmond’s Brookside adopted the storyline, but with a controversial dramatic twist. ‘Jimmy Corkhill’ a character with a history of drug abuse and criminal activity managed to get on to a teacher training course with faked qualifications.

"The message, said Brookside, was that "a good teacher is a good teacher". But there was uproar. The Teacher Training Agency protested that the profession was being given a bad name."

(Midgely, 1998)

Clearly there are many ways in which messages, plots and portrayal of characters can be delivered, read and used by creators, audiences and sponsoring agencies. The motives, reasons and interpretations of even the same message and programme may be very different. For example, the intended message of ‘if you have a sexual relationship, make sure you take precautions’ may just as easily be understood as ‘it’s OK to have sex’ by some viewers.
There is no way that a drama can be guaranteed to present one message that is interpreted universally, however the issues raised thus far suggest that analysis of subject matter and dramatic content are an important aspect of designing a product that draws attention, meets audience expectations, and sustains interest. The complex interrelationships between learning needs, psychology of the audience, psychology and creative processes of the designers, as well as the political and business motivations involved in media production can also interact to create a range of perceptions from one programme.

6.2 Media representation and reality

Drama has the potential to involve its audience in a vicarious experience and involve them in reflection of social issues and personal dilemmas, which in turn can produce emancipatory, self-reflective and social-communicative learning processes (Section 4.3). However a drama can only be a representation of reality. It is one in which events can be distorted, or be made to do the impossible, to make a story intelligible or interesting and to fit in with the visual culture of the medium and audience. Factors such as the compression of time, the heightening of emotional tension, or the concentration of social relationships may be used to increase impact or enhance narrative. Information may have to be summarised or simplified to avoid obscuring a particular message. The results of using such methods may be to misinform or lead people to hold the wrong beliefs. There is a tension for the designer between creating engaging experiences through drama and delivering poor information or bad learning. In this section these issues are considered in relation to studies made of the way in which media is viewed, interpreted and used. Particular attention is given to the portrayal of relationships and medical dramas because of their relevance to this research project.

For example, it is interesting to note that for the characters of soap opera mortality rates are very high, and that causes of death are often unusual or violent. Crayford et al (1997) completed an analysis of the four most popular British soap operas and found a large disparity between mortality in real life and drama.

"Of course soap opera has to be melodramatic to be interesting, but should not the portrayal of death be a little more reflective of real life? It seems sad that for soap operas to hold our interest they have to be about as dangerous as Formula One racing."

(Crayford et al, 1997, p1652)

The tension between dramatic effect and reflection of reality is an important issue in the design of educational materials. Larson's (1996) contrast between the reality and representation of teenage motherhood has been described in Section 6.1.3. A number of writers have made comparisons between other aspects of human existence and activity (described in the following sub-sections). The purpose of such analysis may...
be to understand the uses and effects of drama, or to study "the interaction between the
genre and the producing culture" (Liebes & Livingstone, 1994, p717).

6.2.1 Relationships and social interaction

The way in which the Social Dimension, described in Chapter 5, can be exploited to
meet the needs of different cultures can perhaps be suggested by a comparison between
the characteristics of soap operas produced for different cultures. Mumford's definition
of the soap opera genre (stated in Section 6.1) emphasises the interest of relationships
and the interlocking storylines. These features are seen to be important in making
"apparent the complex interconnections and interdependencies of text and viewers" (Liebes & Livingstone, 1994, p718).

Liebes and Livingstone (1994) have studied the way in which the role of women is
portrayed in British and American soap opera, and how conflicts between their identity
as mother, wife, lover and careerist are resolved. They see these representations as
"the ways in which each culture socializes women toward its preferred solution" (Liebes & Livingstone, 1994, p723). Their analysis shows an emphasis on romantic
ties, career progression and personal fulfilment for women in the US soaps, and that
the romantic ties are often part of a long line of interchanging relationships between
main characters. They describe the resulting kinship structures as "a dense crisscross
of past, present, and future heterosexual dyads entangling the soap opera families in a
destructive wrestlers' embrace" (Liebes & Livingstone, 1994, p725). Their analysis of
British soaps show them less conspiratorial and political in their content, family ties are
better defined, with common membership of the local community being the
predominant theme (Liebes & Livingstone, 1994, p731).

The two different approaches to sustaining interest and continued attention are founded
upon very different cultural assumptions about role, moral responsibilities and
acceptable actions. One area in which the behaviour and actions of characters in soap
operas has been studied is that of sexual activity. Olson (1994) and Greenberg and
Busselle (1996) have made studies of the sexual content of American soap operas.
Their research has identified a number of prevalent themes and representative
behaviours in the representation of sex and sexual relationships. The findings of the
research suggests that the sexual activity portrayed is biased towards their intended
audience, that it is often centred upon wanted or unwanted pregnancy without any
discussion of how it occurred, and that sexual health was seldom mentioned. These
examples can only give a view based upon the soap operas included within the
respective studies and the cultural influences behind them. They do however illustrate
some of the ways in which stories can distort or compress reality to create interest in
drama and retain viewers.
The stories and plots developed in soap opera have, according to Bandura's (1977) social learning theory, an effect on the attitudes and behaviours of audiences. If this view is accepted it imparts some measure of responsibility on programme makers for the way in which events are presented. From the designer's viewpoint the practical implications of a sexual encounter will have an informational content, this may be in terms of either emotional or physical well-being. The content of that message needs to have an acceptable knowledge base and moral code. This is very important in the presentation of educational drama, especially where there is a medical or other life-changing implication to the events portrayed.

6.2.2 Medical drama

The contribution of medical TV programming to visual culture, described by Belling (1998), has already been referred to in Section 5.1.4. Belling (1998, pp2-3) argues that patients bring knowledge from a wide range of sources to a medical consultation, one of the most influential of which is television. For her the mixture of scientific knowledge and documentary narrative become blurred into one form that has been carefully constructed. The editing of an operation to fit into an hour long episode, means that the presentation of the operation must be read critically. “What can be called realistic is not reliably faithful to external reality” (Belling, 1998, p3).

The popularity of medical drama has grown in recent years. Programmes such as ER, Chicago Hope (1994), Casualty (1989) and Holby City (1999) provide entertainment and a (dramatised) insight into medical practice. Other fly-on-the-wall docu-drama also provide a graphic insight into the processes of medical care and surgery. There is evidence to suggest that people use this information in their interactions with medical practitioners and institutions. Programme makers therefore have a responsibility to make efforts to provide information that is factually correct and avoid misinformation. However, as with sexual activity discussed in Section 6.2.1, there is a tension between creating objectivity and creating dramatic storylines.

In their study of three medical dramas—ER, Chicago Hope and Rescue 911—Diem et al (1996, pp1578-1582) looked at treatment and recovery of cardiac arrests. They report that television is an important source of information about Cardiopulmonary Resuscitation (CPR), and that in the three programmes depicted significantly higher rates of recovery than the highest rates recorded in medical literature. They estimate a short-term survival rate, when the casualty's heart is returned to regular rhythm as 75%, compared with 40% in the literature. The number of patients surviving to discharge from hospital (long-term recovery rate) was 67% compared to 30% recorded in the literature (Diem et al, 1996, p1579). They succinctly put forward the importance of TV medical programmes as a source of information:
"Patients participate in decisions about their care today as never before. As the physician-patient relationship has evolved into a collaborative one, patients are expected to digest and evaluate complex information, often at a time of great emotional stress. This is particularly true with respect to decisions about the end of life.

Patients have few sources from which to learn about illness and death. Acute illness — and, in particular, terminal illness — is for many people no longer part of everyday life. Therefore, images in the media strongly shape the public’s beliefs about medicine, illness, and death."

(Diem et al, 1996, p1580)

The effects of television on public perception have also been considered by Pfau et al (1995). Their study considers the depiction of physicians. They conclude that television depictions have a clear influence on public perceptions, and contribute to secondary socialisation even when people have direct experience of physicians. However, the way in which physicians are depicted in “the new genre of fast paced medical shows” (Pfau et al, 1995, p455) opens up consideration of their personal lives as well as their professional persona. In the past, TV physicians were depicted as “super-doctors”, but current depictions and perceptions are of physicians “lower in character, meaning less moral, right, unselfish, good, and honest” (Pfau, 1995, p455). Whilst Pfau suggests that this is a threat to the confidence, it may also suggest an opportunity to make clear the responsibility and role of patients as participants in informed decision making. This is a stance taken in this research, after discussion with medical practitioners, and is expanded upon in Chapter 10.

The debate on the effects of medical drama is also underway in the United Kingdom. Collins (1993, p926) reported, in the British Medical Journal, that he had experienced a rise in overdose by teenage women following an episode of Casualty. However on a more positive note Stinson et al (1993, pp 1415-1416) suggest that the programme can have more positive educational effects and that awareness of medical issues by relatives or friends can have positive benefits.

"Recently a 19 year old woman was admitted 18 hours after taking an overdose of 48 tablets each containing 500mg of paracetamol. She was subsequently reviewed by a psychiatrist and considered not to be suicidal but that the overdose had been impulsive. She stated firmly that she would not have come to the accident and emergency department if it had not been for her close friend in whom she (solely) confided, who insisted that this could be dangerous and referred to the episode of Casualty, which had been screened the previous week. It was only when the friend detailed the fate of the young girl in the television series, who had taken an overdose of paracetamol and progressed to liver failure, that our patient reluctantly agreed to go to hospital. This patient had not viewed that episode of Casualty."

(Stinson et al, 1993, pp1415-1416)

In defence of his programme ER, producer Baer (1996, p1605), emphasises the care taken in ensuring the accuracy and credibility of the drama by including medically trained writers on the team (Baer is also an M.D.) and specialist technical advisors. Belling (1998, p9) also cautions on “a positivistic dependence on hard data” saying
that vivid and emotionally engaging drama "tends to be more compelling than empirical facts, and we learn what compels us". She calls for a more "humanistic critical interpretation" of the cultural influence that medical programmes have on the audience. The danger of misinformation does not come from the use of TV documentary and drama in patient education, but "in the expectations and assumptions of uncritical viewers" (Belling, 1998, p18).

6.2.3 Effects of drama and mass media

The main theme of the discussion has been the way in which drama and mass media represents social, cultural and personal realities. It has also highlighted the power of mass media in communicating information and learning. The task of designers, wishing to exploit the learning potential of a particular medium, is to draw upon relevant theory and knowledge such as that presented in Chapter 4. In order to engage and sustain audiences interest they must also create an appropriate social dimension as has been suggested by discussion in this and the previous chapter.

It is evident that the portrayal of life events through dramatic and documentary techniques can influence or reinforce the attitudes, expectations and responses of people to the events that they experience through television. A number of key issues have emerged from this discussion:

- the evolution of visual representation to encompass both entertainment and scientific applications as part of popular TV programming;
- the mass appeal of storylines about relationships, families, deeply personal and social issues in the various dramatic art forms;
- the importance of psychological, emotional and behavioural involvement of viewing media, including pre-exposure and post-exposure activity
- the risks of misinformation and the desire to deliver stimulating and gratifying content for an audience;
- the possibilities of combining an educational message within popular drama, founded upon the application of an interdisciplinary approach to design and production;
- the subjectivity involved in the design and subsequent interpretation of a message delivered through the media.

The question remains of how the experience of conventional media may inform the development of new interactive media forms and dramatic arts.
7. Possibilities for developing interactive drama

The representation of human experience through theatre and other dramatic art forms is probably as old as civilisation itself. The twentieth century has seen the development of media technologies that enable the production and performance of drama in new ways. Current developments in technology are now beginning to promise a further evolutionary step in dramatic art where interactivity enables a degree of audience control or participation.

This chapter reviews theory and recent research relevant to the design of interactive drama and provides some examples of existing work. Finally it discusses the potential of interactive drama as a medium for humanistic learning.

So far, the discussion has developed around the way in which conventional media have been created, consumed, analysed and interpreted. As already suggested, in Section 5.1.5, the conventions of existing media are likely to be used as references for the interpretation and understanding of new media forms. This process links the social dimension into the multimedia design and production issues related to the development of interactive drama and MLEs.

Dramatic performance offers the opportunity for an audience to engage with a view of human experience and reflect upon its meaning. As discussed in Section 3.4, and the previous Chapter, this involves both interpretation of the situation portrayed and the development of appropriate literacy skills to understand the progress of a story within the media form.

This discussion begins with an explanation of three theoretical paradigms, drawn from the dramatic arts. They are presented as possible foundations to the interactive drama design.

- Realism (based around Stanislavsky's work) seeks to create an authentic impression for a drama, and the audience is expected to put aside any signs that the drama is unreal.

- Objectivity (exemplified by Brecht's theatre) seeks to remove the audience from the real world, and engage them in the performance at an intellectual level, to open up the issues of the play for deep reflection and insight into new ideas;

- Boal's spect-actor paradigm is a form of participative drama in which members of an audience identify a problem or scenario, formulate and perform a play about it, and come to a solution from their interactions.
7.1 The three paradigms

The three paradigms form a basis to question the nature of the perceived reality within an interactive drama, the symbolic representations of ideas and phenomenon, and the nature of interaction and participation of the users. These models have been identified through reflection upon the design work by the scriptwriter, rather than as a planned precursor to the design project. For this project the use of the realism paradigm was adopted from the beginning of the research.

Further to this theoretical perspective, the discussion is developed (in Section 7.1.4) by looking at different genres of film and television to consider the possibilities of developing interactive drama that users can quickly learn to understand and engage with.

7.1.1 The realism paradigm

Drama is inevitably an artificial experience for both actors and audience. Realism seeks to remove awareness of this artificiality. The actors’ and director’s creative abilities are crucial in producing the necessary conditions for the suspension of disbelief. Moore (1991, p2) describes Stanislavsky’s method for the development of acting skills in terms of learning:

- how an actor may function naturally on stage;
- control of the “subconscious mechanism of emotion”;
- how to create a character.

Stanislavsky developed a number of characteristics of human behaviour that could be employed to bring an actor to “a creative, spontaneous state” (Moore, 1991, p2) necessary for a naturalistic portrayal. These characteristics emanate from the context and content of the play. They include “concentration of attention,” “relaxation,” “sense memory,” “emotional memory” and “imagination” (Moore, 1991, pp2-5). In later work he built this approach to form a more holistic acting method:

“After a brief discussion of the superobjective and major physical events, the actor using the Method of Physical Actions, investigates the play through improvisations on actions, i.e. the character’s behaviour. In these improvisations, the actor’s mind, his senses, his intuition, the muscles of his body, his whole psychological and physical nature participate. Actors trained in Stanislavsky’s final technique will reject the use of clichés and concentrate on the revelation of the individual psychology of the character; this technique will bring them to the birth of an organically functioning character on stage”

(Moore, 1991, pp6-7)

1 The review of the project by scriptwriter, Simon Turley, is discussed in Section 13.2.
From the audiences point of view, the realism paradigm assumes the existence of an invisible ‘fourth wall' between them and the theatrical stage (or screen). This provides a window through which the audience views the world in which the drama takes place. The portrayal is thus viewed as being real:

“[...] the audience witness, indeed experience, real action in sections of real time occurring between real characters. These characters wear real clothes, they sit on real chairs, they eat real food. Above all, they experience real emotions, and the audience, in that sympathy which is either natural, or else so deeply culturally transmitted as to be virtually natural, catch a glint of every emotion, too.”

(Turley et al, 1998, p5)

Realism is the paradigm adopted by most TV drama. Bouman et al (1998, pp505-506) suggest that drama, employed in the entertainment-education paradigm, should have “true to life characters” and “realistic, credible plots and storylines”. They say that realism is not about recreating every detail of a situation, but define it as “the way it makes sense of the real, rather than by what it says the real consists of” (Fiske, 1987, p24—quoted in Bouman et al, 1998). They identify three characteristics (drawn from Williams, 1977) of realism as: having a contemporary setting, concerning itself with human issues from a human perspective, and dealing with ordinary peoples lives and situations. They suggest that human interest issues and emotional appeals “can lead to attitude change especially when people’s motivation to think about the message is low” (Bouman et al, 1998, p506).

7.1.2 The objectivity paradigm

For proponents of the objectivity paradigm, the empathy and passionate involvement of the realists is seen as a barrier to the potential of theatre as a medium to inspire and change views. It is perhaps Bertolt Brecht who most optimises this paradigm. His play Drums in the Night (1919) “dealt with the disillusionment after World War I and the German revolution (Kellner, 1997, p281). At its Berlin premiere, in 1922, he placed provocative banners telling the audience to “Stop that Romantic Gaping” (Stegmann, 1997, p243). His intention was to make an audience think about and reflect upon the performance from an objective viewpoint. Brecht’s idea was “that that the spectator should assume the distanced and reflecting disposition of a smoker” (Stegmann, 1997, p243). “If audiences could be taught to watch and to think, then theatre might be something, which changed the world rather than simply representing it.” (Turley et al, 1998, p6). This attitude he called Verfremdungseffekt or alienation and was the “primary theatrical device of epic theatre” (Kellner, 1997, p285).

Epic theatre—originated by Brecht—dispensed with conventional notions of narrative, seeking to move away from realism which he felt perpetuated existing dominant cultural and ideological viewpoints. He sought to show how environment and social conditions “influenced, shaped, and often battered and destroyed the characters"
In this style of theatre, emotion and human responses are the outcomes of events rather than being central to the story. Actors were trained not to identify with characters they played, in order to force the audience to evaluate the character in context of the events that happen.

In parallel to epic theatre, Brecht also developed a type of theatre called Lehrstück, or learning play, which involved the actors presenting a scene and then discussing it with the audience as means of engaging in political action. (Kellner, 1997, pp287-289).

"Brecht intended his learning plays for schools, factories, or political groups; actors and audiences could read, improvise, and alter the plays at will as Brecht himself had done in working on the plays with many different groups. Thus, in Brecht's concept of emancipatory pedagogy and revolutionary theater, the learning plays are to engage a small audience in a process of learning."

(Kellner, 1997, p288)

This form of theatre was overtly political in motivation and content, reflecting Brecht's interest in Marxism and its revolutionary ideals.

7.1.3 The spect-actor paradigm

"In a 'Stanislavskian' production, the actor knows she is an actor, but consciously tries to be unaware of the presence of the audience. In a Brechtian production, the actor is completely aware of the audience, which she transforms into genuine interlocutors. (So even in this case, soliloquy is the form we are dealing with. Only in a Forum Theatre show do the spectators acquire voice and movement, sound and colour, and thus become able to demonstrate their ideas and desires. That is why the Theatre of the Oppressed was invented.)"

(Boal, 1996, p23)

Boal, like Brecht, developed his approach to theatre as vehicle for learning and social change. However, in his work, Boal seeks to facilitate change by involving the community and audience in creative processes and emancipatory learning through:

- the establishment of the subject of the play in terms of a specific problem or issue;
- its development as a piece of theatre;
- performance of the play using co-operatively reworking ideas and using improvisation to resolve the problem or solution.

To explain the role of audience as both spectator and actor Boal uses the term, "spect-actor". Boal's work, has been developed through a number of different theatre forms of including Forum Theatre, Peoples Theatre and Invisible Theatre. These theatrical forms are generally created by a the adoption of a number of participative methods. A brief description of these methods is given below.
In his work, Boal involves himself and his actors with the people and problems of the community. He explores the life of a particular community seeking to identify a source of social tension, or "oppression". This may be done by getting the people of the community to tell stories or to record their situation and problems by giving them cameras to use. On one occasion, working on a Literacy project in Peru, people were asked to produce a picture of where they lived. One man produced a photo of a child's face. He defended his choice by saying:

"Look at his face: there is blood on it. This child, as all the others who live here, have their lives threatened by the rats that infest the whole bank of the river Rímac. They are protected by dogs that attack the rats and scare them away. But there was a mange epidemic and the city dog-catcher came around here catching lots of dogs and taking them away. This child has a dog who protected him. During the day his parents used to go to work and he was left with his dog. But now he doesn't have it any more. A few days ago, when you asked me where I lived, the rats had come while the child was sleeping and had eaten part of his nose. This is why there's so much blood on his face. Look at the picture; it is my answer. I live in a place where things like this still happen."

(Boal, 1979, p124)

Such personal views of a community would be unlikely to occur were there not such intimate knowledge of a problem. These activities create a powerful means for the production of drama that promotes reflection and social action. The portrayal will be a representation of the oppression, which members of the audience are able to relate to as members of the community, through the story of a protagonist.

Boal’s latest theatrical innovation (Vidal, 1998, p9) is legislative theatre. It visited London in November 1998, and was held at County Hall, the former Greater London Council building. Boal involved a number of professionals, housing and transport activists to develop theatre that expresses their desires and mediates their relationship with politics.

"What I am trying to show is that it is possible in only three hours to make people's desires become law. Every law is someone's desire. But it is always the desire of the powerful. Let's democratise this desire. Let's make our desire become law, too."

(Augusto Boal quoted in Vidal, p1998, p9)
7.1.4 TV and film genre: fulfilling media expectations

Cook (1985, p58) describes a film genre as having a "recognisable repertoire of conventions running across visual imagery, plot, character, setting, modes of narrative development, music and stars". However these characteristics cannot be seen as consistent between genres or sustained over time. Bordwell and Thompson (1986, p97) suggest that genre should be viewed as a "tacit agreement" between film producers and audiences on how different types of movie may be identified at a particular point in time. They say that particular genres may be identified by shared subject matter (e.g. psychological drama), particular objects or settings (e.g. westerns), a type of story situation (e.g. road movies), or a style of performance (e.g. comedy farce). Many film genres may be identified by some or all of these characteristics and many films can be included in more than one genre category. The key feature for this research is that genre enables film makers to provide cues to build expectations for the audiences, and for audiences to interpret these cues and those that unfold during the viewing experience. A number of film and TV genre references are proposed here, as possibilities to inform the expectations of the users of an interactive drama audience.

Soap opera has been described (in Sections 5.3 and 6.1) as concentrating upon domestic issues such as the family, interpersonal and social interaction, personal decisions and dilemmas. Also, as having complex interconnected narrative strands that encourage moral judgement and speculation. All of these features are directly relevant to the development of an interactive drama based multimedia learning environment (MLE) on pregnancy and childbirth. The broadcast of never-ending multi-instalment stories is analogous to the integration of interrelated episodes and topics through multiple visits by a user in a learning environment.

We have used the term Human Interest Drama (HID) to encompass other TV genres (Section 6.1) a number of these dramas offer possibilities for the development of their features within interactive drama. Of these, perhaps the most obvious is in the way that medical dramas represent and communicate treatments through the depiction of medical equipment and procedures, identification and explanation of terminology through health professional’s conversations with patients and their families. The major implications of this have been discussed in Sections 6.2.2 and 5.1.4. The development of ensemble drama series based around specific working or social situations (e.g. Hill Street Blues, 1981; LA Law, 1986; Playing the Field, 1998) creates a set of characters with interconnected lives and histories that are fed into each self-contained episode. In film, the possibilities of complex plot and narrative have explored in Robert Altman’s films Nashville (1975) and Short Cuts (1993) both of which involve the audience in the intermeshed lives of many characters who are each involved in a number of stories...
(Beacham, 1995, p36). Finally, the single plot HID offers a means through which the complexities of issues and characters around a single dilemma or event can be explored. Examples include:

- Alive and Kicking (1991) about the dilemma of drug pusher who is under pressure from drug dealing colleagues, a wife desperate to stop her own addiction after the birth of her first child, and a hard headed drug councillor and ex-addict who is trying to help him.

- Murder One (1995) a series followed the chain events and entanglements of characters encountered in a complex murder case. It follows the story through the eyes of the leading defence attorney, Theodore Hoffman, in the case.

The examples above have been oriented towards the portrayal of events and situations, through which characters are introduced and developed. Biographical films bring the life of a (historical) principal character to the fore, and use the events to provide an insight into the emotional make-up, motivations, attitudes and influences. Examples of this genre include Spike Lee’s biography of the civil rights leader, Malcolm X (1992) and Martin Scorsese’s film, Raging Bull (1980), about the life of boxer Jake La Motta.

There are a number of movies that have portrayed the attitudinal, emotional or psychological transformation of a character as they pursue a particular goal or path. These films enter the audience into the unique perspective of the protagonist. Examples include:

- Bergman’s film, The Seventh Seal (1957), that questions the nature of mortality and the existence of god through the quest of a knight upon returning to his homeland in the Middle Ages;

- Powell’s film, Peeping Tom (1960), that looks at the voyeuristic nature of both film maker and the audience in a story that follows a psychologically scarred film maker and serial murderer;

- Scorsese’s film, Taxi Driver (1976), about one man’s alienation and inner anxieties that are derived from his squalid existence in inner city New York;

- Coppola’s film, Apocalypse Now (1979), about the madness and experience of war.

An alternative way of portraying events that transform the perceptions of characters, and possibly audiences, is through the presentation of a story with a strong socio-
political purpose. Such an approach has been discussed in the context educational HID in Section 6.1.3. A number of film makers with a social message or political motive have sought to deliver a message through their work. Examples of this include: Chaplin in his film Modern Times (1936) that relates the implications of mechanisation and mass production on the individual; Eisenstein's Battleship Potemkin (1925) which was commissioned by the Soviet government to commemorate the failure of the 1905 revolution. The production of TV drama with a strong socio-political message has emerged in documentaries, news reports, and more recently in the form docu-drama. One of the most powerful and earliest of this genre was made by Ken Loach for the BBC's Wednesday Play series, called Cathy Come Home (1965) it portrayed the impact of homelessness on a young mother and was instrumental in the formation of Shelter the charity for homeless people. A second example is a portrayal of the very controversial events behind the Hillsborough football stadium tragedy that led to the death and injury of many Liverpool football fans (Hillsborough, 1996).

The examples given here provide a rich resource of existing methods that interactive drama can perhaps exploit to help users of the environments understand the way in which scenes and stories will unfold. Their exploitation and relevance to the design work undertaken in this project is shown in Chapters 10 and 11.

7.2 Interactive drama

The preceding discussion has argued that theory and practice from film, TV and other media forms can be adopted and adapted for use in the creation of MLEs. In order to exploit them however, they must be adapted to meet the needs of the new media and provide an appropriate knowledge framework to support the process of multimedia design. Interactivity creates a fundamental change in the concepts of narrative and plot that audiences and designers must adjust to.

Conventional media has to be delivered in a single linear narrative flow. This creates perceptions of the chronological flow of events, physical space, relationships between locations and characters, and audience viewpoint. To paraphrase Eisenstein's (1977, p69) description of this phenomenon: three dimensions are spatially inexpressible and can only be seen to emerge from, and exist in, the fourth (time added to three dimensions). An interactive environment relinquishes this constraint, where the spatial constructs and chronological characteristics are intermeshed, to create an experience for the user who can then build their own narrative from that experience.

Multimedia can be developed in many ways, but its uniqueness arises from the creation of non-linear structures that enable users to interact with individual objects (words, images, three dimensional models, etc.) contained in a screen, and the facility to navigate through interlinked spaces. This presents a whole new set of possibilities and
challenges to designers for the delivery of learning resources that are coherent and intelligible. In the case presented here for a MLE, using techniques to exploit interactive drama, the concept of delivering a story is significantly altered. Not only must the story be conceived as a convincing model of reality, it must be articulated and produced as one. Such issues are considered in the production issues (Chapter 8) and multimedia design process (discussed in Chapter 9 and illustrated in Chapters 10 to 13).

There is an active exploratory relationship between the media components inlaid into the interactive environment and the user who constructs understanding and a narrative from them. The spaces built into a MLE enable this constructive process. Three dimensional space is one example of space that draws the user into the subject matter, but there are other forms of space that may be engaged with. The words of Harré et al suggest another possibility.

“For many purposes the physical place of a conversation utterance is irrelevant; what matters is who said it. The Queen can declare someone a knight almost anywhere, but if one of us were to do so, even in Buckingham Palace, our declaration would be null and void. What corresponds to the causal relations that make up the physical world is conversational interchange, public and interpersonal, in which the intentions of speakers are matched by the understandings of hearers and so create a social ‘world’. We should like to think of conversation as located in a grid of ‘places’ constituted by persons, just as causally interacting things are in a grid of places constituted by locations in physical space.”

(Harré et al, 1985, p71)

These features can be seen in conventional drama forms, however within interactive drama the decision to explore different spatial forms builds the story for the user. The location of the action and spatial relationships between different houses, shops and public houses creates one kind of space for the viewer to relate to and map out in their memory. Other spaces may be formed by the often vivid relationships between characters, their conversations and opinions, and the emotional stances that they take as plot and story changes. An example of the creation of such spaces between characters is shown in the rehearsals carried out during the project (Section 12.3, Figure 12.4). It is perhaps interaction with these less tangible spaces that will perhaps make interactive drama a compelling form of education and entertainment.

7.2.1 Examples of interactive drama

Dramatic content can be found in a variety of interactive learning, gaming and entertainment products. For example, Blackwell et al (1995) report on the development of a simulated virtual workplace, designed as a distance learning resource, to help disabled people develop problem solving skills needed in software engineering (Figure 7.1). The system considered both the logical and interpersonal skills involved in such work. Cloke et al (1996, pp86) report on the use of an IV laser disk intended to help
students learn counselling skills. It is structured as nine simulated counselling sessions, each divided into short sequences followed by (usually) two options of what action to take next. Cloke et al reports that:

"Although the acting was not seen as brilliant, students found the visual effect of the video very helpful. The situations were sufficiently realistic for them to relate the material to their teaching practices, and for them to develop a sensitivity towards such things as family situations and using adult language. The added facility of a computer programme provided the opportunity for students to make mistakes, to see the consequences of their errors enacted, and then to rethink their strategy. The ability to explore alternatives and to learn by their mistakes encouraged curiosity in some students, who followed alternatives they realised were inappropriate to see what response they would get."

(Cloke et al, 1996, p 87)

Most significantly, from the point of view of this research, is that Cloke et al report that the "visual effect of seeing a pupil turn away powerfully demonstrated the emotional response to a supportive or challenging skill inappropriately used" (1996, p87).

As discussed in Chapter 8, and shown in Chapter 10 to 13, the production of a multimedia product involves a significant amount of time, financial investment and co-ordination of resources. The impact of high production qualities upon an audience is best illustrated by examples of commercial products. Canadian designer Jeff Green has created two award winning CD-ROM entertainment products, with a strong dramatic content, aimed at an adult audience. The stories are presented through a series of video inserts within panoramic scenes. Midnight Stranger™2 and Mode™3 are based around exploratory environments that enable the user to interact with a variety of characters from a first person viewpoint. A number of third person scenarios are also presented. A game playing element forms a part of, rather than leads, the interactive narrative. The interface for these products employs a Moodbar™ based upon a colour spectrum to suggest an emotional and intuitive response to the characters. Instead of presenting several discrete text options, often found in character based interactive games, dialogue is prompted from the characters (via the Moodbar™) with responses imagined by users and responded to intuitively. This approach means that the depth of the story, and characterisation, only become apparent through revisiting the drama to explore different responses and outcomes. The perceptions created by the media production and story depth are important factors in engaging the user and drawing them back to the product. Figure 7.2 and Figure 7.3 show a number of screen shots from Midnight Stranger™ and Mode™.

2 © Jeff Green; Animatics Interactive. All rights reserved.
3 © I. Hoffmann + associates Inc. and its licensors. All rights reserved.
It was estimated that the Requirements and Analysis and Definition would take about a month. The job was divided up into separate tasks which were given to different members of the team.

The final step in this phase is to present the Requirements Definition to the managers and staff of the user departments, to ensure their needs are met, and to obtain management approval to continue.

The sales department is having difficulty answering customers' enquiries about the availability of TVs and video in the warehouse. A computerised system is needed to keep an accurate record of what is available for sale in the finished goods warehouse.

Figure 7.1 Illustration of drama elements used in the creation of a 'simulated virtual workplace', reported by Blackwell et al 1995.
Figure 7.2 Illustration of drama elements used in Midnight Stranger™. © Jeff Green; Animatics Interactive. All rights reserved.
Figure 7.3 Illustration of drama elements used in Mode™. © I. Hoffmann + associates Inc. and its licensors. All rights reserved.
7.2.2 Theory relating to interactive drama

There is a body of literature that supports the discussion presented Section 7.2 and is directly relevant to the development and use of interactive drama. This work has looked at issues relating to the development of interactive story-telling, narrative and drama.

Davenport (1996b) has argued that the development of suitable story-telling models is an essential part of developing effective flow and continuity of ideas within an interactive multimedia environment. She also criticises existing paradigms for the way in which stories are developed in an computer based interactive environment.

"James Joyce once argued that he wrote Ulysses to keep university professors on their toes; he also commented that Finnegans Wake should take us as long to read as it took him to write (about seventeen years). Ferreting out the secrets of an author gives immense pleasure to the audience and allows for multi-layered readings of the story that can be shared with others, or not. This task of interpretation requires more "common sense" than we can currently define and catalog, let alone program into machines. There are also looming issues of "uncommon sense" reasoning required to understand complex works.

Nonetheless, we appear hell-bent to drag simple models into the realm of storytelling and make them the foundation of automated storytelling systems. Virtual worlds with "chat rooms" peopled by avatars; teleconferencing to faces texture-mapped onto coarse, roughly modeled heads; object-oriented transmissions of various kinds; 3D sound environments—all rely on simple, limited-aspect models of the story space. A few systems also require some modeling of user preferences and expectations, but the extraction of this information is either cumbersome and intrusive or is gleaned only after long hours of use. None of these experimental models pays meaningful attention to the cognitive and sensory satisfactions of storytelling."

(Davenport, 1996b)

She argues that it is important to realise that the use of multiple viewpoints and "twirling around in 3D space, as if you are a camera on a mission, does not intrinsically generate a coherent and compelling story view" (Davenport, 1996b). The creative process needs to use "the range of character, action and point-of-view elements" to "create the progression of character growth and change essential to a satisfactory story" (Davenport, 1996b). This view is in accord with the experience and findings of developing interactive drama for this research (discussed further in Chapters 10, 11 and 12). In an earlier article Davenport (1996a) also calls for interface designs that "allow for deeper, more intuitive engagement with the story" and to find ways of connecting with "the vast range of human thoughts, feelings, desires, and actions" through better sensory feedback devices and story-telling mechanisms.

The three drama paradigms (Sections 7.1.1, 7.1.2 and 7.1.3) have been discussed as a means through which to develop our ideas for the development of interactive drama. Laurel's (1993) work employs an Aristotelian paradigm in relation to human computer interaction (HCI). Laurel's concern is in the use of dramatic paradigms in the design of
interactions and interface mechanisms. The relationship between Laurel’s area of interest and, the concern of this research in, the development of drama based MLEs to support humanistic learning is shown in Figure 7.4.

Laurel makes an important distinction between drama and narrative. Central to her discussion is the Aristotelian definition of drama: “the imitation of an action with a beginning, middle, and end, which is meant to be enacted in real time as if the events were actually unfolding” (Laurel, 1993, p94). Narrative is formed from the causal relationships between, and arrangement of, dramatic episodes. The main characteristics of the Aristotelian paradigm and comparisons between drama and narrative are summarised in Table 7.1. Garrand emphasises the nature of an interactive narrative in contrast with other interactive environments.

“An interactive narrative should not be confused with a simulation or a “worlds” structure. These are three distinct forms. [...] Interactive narratives have beginnings, middles, and ends, even though each user may experience these elements differently. There is nothing unplanned in an interactive narrative. If one plays the program long enough, one will eventually see all the material the writer created. An interactive narrative essentially allows each player to discover the story in a different way.”

(Garrand, 1997, p67)

---

1 The Aristotelian paradigm has many commonalities with the realism paradigm.
In the design of interactive drama based MLEs, both the dramatic and narrative elements are important. The drama contained within an individual scene or episode needs to be linked into the overall narrative structure and interconnected with supporting information resources.

<table>
<thead>
<tr>
<th>Characteristic:</th>
<th>applied to drama</th>
<th>applied to narrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Representational form</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>enactment</strong> the emphasis of action and direct sensing as well as cognition</td>
<td><strong>description</strong> the objective representation through the symbolic forms</td>
<td></td>
</tr>
<tr>
<td>Temporality</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>intensification</strong> of events and situations portrayed in real time to emphasise the emotional content and condense chronological developments</td>
<td><strong>extensification</strong> involves the examination of events and situations through the distortion of time (e.g. flashback, extension, summary) and use of multiple perspective</td>
<td></td>
</tr>
<tr>
<td>Structure of events</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>unity of action</strong> refers to a strong central focus of action and linked causality of events leading to emotional catharsis</td>
<td><strong>episodic structure</strong> where events tend to have thematic interconnections</td>
<td></td>
</tr>
</tbody>
</table>

Table 7.1 Comparison between drama and narrative using the characteristics of Laurel’s Aristotelian paradigm. (Paraphrased from Laurel, 1993, pp94-95).

Project Oz at Carnegie Mellon University in the USA has researched the theory of interactive fiction (IF). IF is a term that has been adopted to refer to interactive drama and narrative applied to synthetic realities (SR). The OZ system architecture is shown in Figure 7.5. It is concerned with the creation of systems for the development of “rich, highly interactive worlds, inhabited by dynamic and complex characters, and shaped by aesthetically pleasing stories” (Kelso et al, 1992, p1). These issues are explored through the production of textual and simple animated environments and a number of related experiments. Mateas (1997) describes the project as having four primary concerns:

- **characters**, described through their physiology, sociology and psychology;
- **presentation**, the means through which viewpoint and style of the imagery or textual description is presented and the user interacts;
- **story**, the temporal structure of an experience;
- **drama**, that generated from the sum of the first three.
Bates (1994) has looked at the issues of creating believable characters. This is a character "that provides the illusion of life, and thus permits the audience's suspension of disbelief" (Bates, 1994, p1). He contrasts the approaches of AI research and animators in creating representations of life.

"Further reading on the dreams of animators and AI researchers finds both groups speaking of thinking, feeling, living creatures, of creating at least the illusion of life, of building apparently autonomous entities that people, especially the creators, would genuinely care about. Both groups also speak of achieving these dreams by finding the essence of creatures to be simulated, and reconstructing that essence in the medium of the artist's or scientist's choice."

(Bates, 1994, p1)

Computer scientists have tended to explore a more objective viewpoint of humanity based upon reasoning, problem solving, concept building and other information processing activities that are applied to their notions of intelligence. Animators invest their effort in a deep (frame-by-frame) analysis and portrayal of character based upon behaviour and emotion, seeking to instil the crucial elements of humanity in relatively simple imagery. Bates argues that the animators' approach comes "closest to understanding and perhaps capturing the essence of humanity that [...] AI researchers, ultimately seek" (Bates, 1994, p2). He suggests that to increase the successes AI researchers should move their stance to include the emotional dimensions of human character, and that interactive characters should include "the appearance of reactivity, goals, emotions, and situated social competence" (Bates, 1992, p6).

In his discussion, Bates (1992, p6) points out that there is an important distinction between copying reality and the creation of realism, between "genuine life" and the "illusion of life". Ways in which such representation of worlds and portrayal characters may be presented has been considered by Smith & Bates (1989). They
argue that *storylines* do not convert well to freely navigable worlds, where users are expected to take a “wander in this” approach. Further to this, they suggest that IF designs should “be extended beyond mechanisms for influencing the users mood and for communicating in ways that lie beyond the scope of ordinary world presentation” (Smith & Bates, 1989, pp1-2). They propose four characteristics to allow effective interaction mechanisms:

- the user should identify with the characters, but this should not be so strong as to remove the ability to appreciate experiences and make judgements;
- there should be an illusion of free will, even in the presence of a plot that guides the reason and action of the user;
- that the experience offered should model the physical world and some invisible underlying mental, moral, or emotional world;
- mechanisms are in place to bring about interesting and rewarding cognitive and emotional states.

Smith and Bates (1989, p6) suggest that Editing techniques from cinema may offer a means through which these models of illusion, experience and underlying worlds may be communicated. These techniques, drawn from literature and experience, are summarised in Table 7.2. They have relevance to designers understanding of production possibilities (Chapters 8 & 9), the representation of spaces and situations (Chapters 5 to 7) and the portrayal of emotion and physiological response (Chapter 3).

The Interactive Cinema group at the Massachusetts Institute of Technology have developed software to present ‘multi-threaded movies’. Their system uses a computer to form the story structure by drawing “literally thousands of individual image, sound and music clips to assemble its own scenes” (Beacham, 1995, p36). They have also developed a set of tools to help film makers build a knowledge representation of the writing, direction, editing and cinematography activities to form “a map the computer can act upon” (Beacham, 1995, p36). Story structures are built up through:

- the attachment of clips to characters in order to define their depth and complexity;
- definition of precedents and ordering;
- the ordering of seven structural elements—*speaker introduction, introduction of character and setting, conflict, negotiation, resolution, diversion of the plot*, and *story ending* (Brooks, 1997, p382).
<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lap dissolve</td>
<td>The transition of a scene fades out as the next scene fades in.</td>
</tr>
<tr>
<td>Pan shots</td>
<td>Camera moves smoothly around scanning a scene.</td>
</tr>
<tr>
<td>Strange camera angles</td>
<td>These are used to emphasise drama or increase anxiety by suggesting strange situations.</td>
</tr>
<tr>
<td>Close-ups</td>
<td>Give a scene a sense of detail and reductionism.</td>
</tr>
<tr>
<td>Cross-cuts</td>
<td>The parallel presentation of physically separate events allow links between scenes and their contents to be established and developed.</td>
</tr>
<tr>
<td>Repetition of a device</td>
<td>A symbolic or behavioural contrivance may be employed to represent a particular point or problem for a character.</td>
</tr>
<tr>
<td>Quick flashbacks</td>
<td>Brief but important events from a character’s past are replayed at salient times to stress an otherwise unknown relevance to a situation or to disclose a history.</td>
</tr>
<tr>
<td>Symbolic camera movement and positioning</td>
<td>Can be used to mimic emotional responses of characters, or those intended for the audience, or to consider alternate perspectives on a scene.</td>
</tr>
<tr>
<td>Visual rhythm</td>
<td>Can be used to describe the regular or co-ordinated actions of characters or physical phenomenon (e.g. soldiers marching, waves crashing) to chronological or narrative development.</td>
</tr>
<tr>
<td>Conflicting movement</td>
<td>The movement of characters and/or physical features can be used to represent conflict or harmony.</td>
</tr>
<tr>
<td>Distortion of natural rhythms</td>
<td>For example, the use of slow or accelerated motion or distorted sound to emphasise emotional and perceptual features.</td>
</tr>
<tr>
<td>Zoom-freeze</td>
<td>The zoom in and hold on a feature of a scene to arrest the viewers attention.</td>
</tr>
<tr>
<td>Iris</td>
<td>Irising is an archaic, little used technique, that masks everything but a particular feature (e.g. wringing hands or anguished eyes) to emphasise details.</td>
</tr>
<tr>
<td>Imagery</td>
<td>The use of visual allusion to other myths and visual identities.</td>
</tr>
<tr>
<td>Nearly “subliminal flash shots”</td>
<td>Near instantaneous shots that foretell coming events, emphasise emotion or portray imagined thoughts.</td>
</tr>
<tr>
<td>Momentary excursions into subjective reality</td>
<td>For example, the use of a telescope by a character shows an impossible magnification or a character performs an impossible physical feat in a way that allows suspension of disbelief to the benefit of the story.</td>
</tr>
<tr>
<td>Reminding viewers that they are watching a movie</td>
<td>For example, by characters talking directly to camera or using subtitles to provide direct communication of character’s thoughts.</td>
</tr>
<tr>
<td>Contrast between shots and subject matter</td>
<td>For example, using camera position to emphasise the normality of a situation against a particularly gritty dialogue.</td>
</tr>
<tr>
<td>Presenting a scene through a sequence of myopic close-ups</td>
<td>To emphasise the intimacies and small nuances of interpersonal communication and social behaviour.</td>
</tr>
<tr>
<td>Voiceovers</td>
<td>For example from characters as narrators, external narrators, on screen narrators.</td>
</tr>
</tbody>
</table>

Table 7.2 Summary of Smith and Bates proposed adoption of cinematic editing techniques in IF environments (Smith & Bates, 1989, pp6-9).
The architecture for a software tool to support the creation of multi-threaded movies has been described by Brooks (1997, pp380-386) and shown in Figure 7.6. The system is constructed from three main components. The story framework, which is defined by the artist(s), guides the narrative delivery through the construction of the seven abstract story elements mentioned above. Software story agents (given the anthropomorphic names of Bob, Carol, Ted, Alice and Isadora) can be selected by the audience to deliver different styles of narrative and different behavioural responses. The story resources form the depth, complexity and perspectives of the narrative that can be delivered.

Figure 7.6 The story framework, the story representation and the story agent work together to form an authoring and presentation system with multiple feedback loops (Brooks, 1997, p384).

Models of story structure and plot development have been considered by Garrand (1997) and Laurel (1993, p81-86). They discuss similar classical models for conventional narrative as shown in Figure 7.7.
Beyond this classical structure, Garrand (1997, pp72-75) has proposed four models for interactive narrative (Figure 7.8), based upon evaluation of a number of CD-ROM games. He argues that the key characteristic of the classical linear narrative is that it is character driven and that audiences are drawn into a story through their actions and situations (Garrand, 1991, p67-68). The presentation is structured through:

- scenes, action that takes place in one location;
- sequences, a series of scenes based around a single concept or event.

The additional feature of interactivity creates new challenges for the story writers and designers, where achieving a balance between user freedom and narrative structure is a primary issue. A number of concerns for the interactive designer are discussed:

- The degree of control that the player has over characters, for example control of scenes displayed, action points or all behaviour (Garrand, 1997, p68);
• The story structure, derived from the basic models of narrative structure shown in Figure 7.8 (Garrand, 1997, p74).

• Managing exposition, plot points (decision points and navigational changes) and scenes (Garrand, 1997, p75).

• Management of pace and time of the interactive experience (Garrand, 1997, p77).

• The management and use of dialogue and sound (Garrand, 1997, pp77-78).

• Multimedia genre development and references (Garrand, 1997, pp78-79).

Figure 7.8 Narrative models for interactive multimedia: (a) Linear structure with scene branching; (b) Hierarchical branching explosion; (c) Parallel structure; (d) String-of-pearls structure. Drawn from Garrand, 1997, pp72-75.
Little work has been done on the user's viewpoint and interpretation of interactive drama based MLEs. A number of works have, however, looked at the characteristics of interactive video (IV) used in an educational context. Plowman's work supports the case for linking learning issues, psychological issues, and social dimension discussed in earlier chapters.

Plowman (1991, p14) has said that "learning theories that tend to be cited and form the basis of work on instructional design are inadequate for the medium of IV and are only minimally transferable". She also highlights the need to embed a strong motivational element into IV, saying that this is "fundamental to learning" and that creating "learning media to be fun is not frivolous" (Plowman, 1991, pp191-192). Boredom was a common complaint amongst the children in her study about the less popular products used in the classroom. Boredom tends to occur when there is "too much repetition, long sections of text, extensive instructions, too much information to assimilate, tasks which were perceived to be unfair, or poor learner control and navigation" (Plowman, 1991, p192). She argues that:

"Production costs for IV are very high and it seems a poor use of this investment unless more time and thought is devoted to design. Children are media sophisticates, and expect and are entitled to materials which are of high quality. It should be possible to import features from media which have successfully evolved conventions to maintain viewer's interest, such as children's television, and still retain medium-specificity. Findings suggest that combining a clear macro-structure with smaller units is likely to be effective in terms of motivation, navigation, comprehensibility of the tasks' structure, and group interactions."

(Plowman, 1991, p195)

In a similar vein to Section 4.6, Plowman (1991, pp192-194) suggests that there is value in the group use of IV and that the key benefit is as a catalyst for communication. However, to achieve this, she says that designs need to recognise the circumstances and media requirements of such use. The design features that may be helpful in this respect include role play, team scoring (in the classroom context of the study), and use of a trackerball that can be passed around for turn taking. She also notes that open tasks create more procedural rather than substantive talk, that text input suspends discussion whilst one person types in a command, and that complex or heavy information loads in video sequences also reduce the frequency and intensity of group discussion. Talk became most intense around decision points where navigation or problem choices are presented. Group interaction becomes most valuable when centred around substantive (subject matter oriented) talk, and in promoting co-operation and team working. This view is echoed by Cloke et al (1996, p91) in their evaluation of a drama based IV training course for counsellors.
“It is evident that students learned as much from each other as they did from the programme. The high quality of discussion was apparent after analysing transcripts. Students listened to each other’s reasoning, clarified issues, and shared their own experiences. By communicating their own understanding of a situation, they helped others understand. They had the opportunity to learn from other’s mistakes as well as from their own. By sharing personal experiences, they triggered memories in each other.”

(Cloke et al, 1996, p88)

In his study of interactive video (IV) design, Stratfold (1994) makes the point that giving the user more freedom demands good information about the resources available to them and appropriate support to find their way around a multimedia program.

“If students have more control over their learning then they must know more about the available resources as they plan a course for their learning. A traditional narrative would not offer enough detail for this to happen. On the other hand, simply laying out the resources and setting the student the goal of analysing them to gain a particular understanding is also not feasible. This would require the students to have great learning skills, to be able to find their way through an unfamiliar subject domain and be able to see the perspectives of the author/expert without any guidance from the expert/teacher.”

(Stratfold, 1994, p194)

To meet these needs, Stratfold (1994, p206-207) suggests that a multimedia grammar (akin to film grammar) needs to emerge and evolve from design practice and user adoption of particular conventions. He (1994, p 204-205) presents a number of “key properties” that distinguish multimedia from other forms of media and that “resist the conventional linear narrative”. He argues that multimedia designers need to find ways of overcoming the following issues:

- The user is able to control time and pacing, where as in conventional media these are carefully edited to create different effects and responses from the audience.

- User control means that the different routes can be taken through a program and this can create problems in producing a coherent narrative.

- No conventional narratives change with the users’ actions.

- The non-continuous nature of interactive media, where users can stop and start, make detours and proceed at their own pace is very different from the way that a viewer sees a film or video narrative.

- The explicit structure of multimedia programs, in contrast with the hidden structure of film and TV narrative, may destroy any illusion of reality.
The concept of engagement with a multimedia environment is commonly accepted as an essential characteristic of a successful learning or entertainment product. This discussion has attempted to demonstrate the complexity and sophistication of the knowledge, skills and creative abilities that are necessary to create such engagement. Laurel (1993, p112) suggests that engagement and the theatrical notion of “suspension of disbelief” are very similar. Laurel also suggest that the exploitation of the first person viewpoint are important “in creating satisfying human-computer experiences” (1993, p117) and that catharsis should result from interaction with a computer programme. When interactive drama is brought into a scenario for computer based drama, the possibilities and challenges for creating an engaging experience are significantly increased.

This research considers the importance and value of these issues in the context of creating humanistic learning experiences. The production, interpretation and the values placed upon media representation becomes a very important contribution to the learning experience. Poorly designed and produced, interactive drama and narrative creates an insurmountable barrier to engagement. If well produced, it can sustain attention and interest and create a memorable and useful learning experience. In the following chapters, the theory of design and production processes related to the creation of interactive drama based MLEs are described in more detail to complete the description of the Knowledge Framework. From Chapter 10 on, the use of these methods and theory is demonstrated through the completion of the prototype learning materials and interactive drama materials, undertaken to explore the Design Process and produce the conceptual design model introduced in Chapter 1.
8. Issues of producing multimedia learning environments for humanistic learning applications

The practical activities involved in producing multimedia learning environments (MLEs) require many types of expertise. This ranges from the intensely technical to the highly creative.

Such a wide range of activities cannot be done justice in the confines of this work. However recognising the needs of the production process for MLEs, that meet their learning objectives and that are matched to the technology and resources available, is an essential part of the designer's role.

In this chapter, three main areas of production activity are considered and discussed in terms of three areas of activity:

- the production of learning materials;
- the production of software;
- the production of media assets.

Attention is given to the designer's knowledge of the production process, the relationship between design and production, the relationship between the above areas of activity, and methods of evaluation.

8.1 Introduction

Although the primary interests of this research are upon the analytical, creative and architectural processes of design, production issues cannot be ignored in a comprehensive design model. Production issues must be considered and accommodated to ensure that proposed design methods are feasible. Effective production can greatly enhance the function and aesthetics of a Multimedia Learning Environment (MLE). Poor production qualities will disrupt engagement and interest for the user.

In order to bring the constituents of an MLE together as a coherent product at the desired time, effective project management is also required. A designer will need to recognise and adapt his or her developing ideas to the constraints and opportunities of the resources available. The personnel and resource needs of a project must be an implicit part of any design brief, and an explicit part of every production plan. Project management (Canale & Wills, 1995, p87; Boyle, 1997, p192) involves a range of activities including:

- feasibility assessment;
- development of project goals and milestones;
• costs minimisation;
• control resources and manpower use;
• prioritisation and scheduling;
• achieving project milestones;
• planning and minimising uncertainty;
• personnel development and team-working;
• leadership.

These activities are recognised as an important part of any commercial production project. However, to fully understand the challenges involved in project management would require observation (or involvement) in a complete product development life cycle. In addition to project management, the range of technical, craft and artistic expertise involved in these production activities would also need to be described. To explain their contribution to the different aspects of MLE development would be a huge undertaking. That was not possible within the remit of this research.

In this chapter, discussion of production issues concentrates upon three areas, which are outlined in Sections 8.2 to 8.4:

• subject matter development;
• media production;
• interface and software development.

These issues relate to the technicalities, aesthetics, and economics of translating subject knowledge into different forms of media and information structure in a MLE.

8.2 Subject matter development

The main purpose of researching and drawing together subject matter content is to create a set of useful (mental) models for the learning domain. These activities involve production of information structures for the representation of relevant knowledge and the skills involved. It also requires assessment of the existing abilities, learning processes and behaviour that may be expected from the target learning group. Subject matter development involves three types of activity:

• The identification of the domain and purpose of the MLE, derived from a perceived need or learning problem.
• The analysis and collation of relevant knowledge, skills and experiences involved in the domain. This can be achieved through a variety of research and knowledge acquisition techniques (Cooke, 1994; Yin, 1994). These range from record archive and literature search, to media review, to interview and participant observation.

• Organisation of materials to meet the intended purpose. This may be achieved through a variety of needs assessment and evaluation techniques. These include qualitative interviews and concept mapping (Wiener et al, 1994), usability walkthrough techniques (Polson et al, 1992; Bias, 1994), and other forms of task analysis and evaluation (May & Barnard, 1995).

The processes and activities of subject matter development undertaken in this research are described in Chapters 10 and 11, evaluation is reviewed in Chapter 13. The knowledge employed in these activities is drawn mainly from the learning issues (Chapter 4) and psychological factors (Chapter 3) in the knowledge framework.

8.3 Media production methods

The theory and techniques that may be exploited in conventional and interactive media forms have been discussed in depth in Chapter 6 and 7. The media production activities for MLEs draws upon many different types of technical and creative skill. A MLE may, for example, include the combinative exploitation of two or more of the following media:

• text;
• mathematical and other symbol forms;
• 2-D graphics;
• photographs;
• video;
• 3-D objects and environments;
• animation;
• sound and music.

Each involves its own set of design and production skills. In addition there are extensive skill demands to blend the various media forms for an interactive and navigable framework. The knowledge required to undertake these activities relates to
the psychology factors from users and designers perspectives (Chapter 3) and the social dimension as described in Chapter 5, and developed for interactive drama in Chapters 6 and 7.

Phillips (1994, p 11-13) has made the analogy between the creation and structure of 14th century stained glass windows and 20th century media. The combination of coloured glass creates the aesthetic, image and narrative of the story contained within the window and the lead work holds the message together in an understandable form. TV, film and video may also be viewed as a 'window'. The images formed through chemical or electronic processes are held together as a coherent whole by camera shots, edits and transitions to convey structured plots and narratives. Further examples are the way in which theatre scenes are structured through the use of lighting and scenery changes and the layout of text and images in the columns, pages and supplements of newspapers.

Stratfold (1994, p162) and Hodges and Russell (1993, p42-49) draw upon Eisenstein's (1977, 15-16) concept of mise-en-scène to explain this concept. Mise-en-scène concerns the content and construction of individual scenes. Quoting Bordwell and Thompson (1986), Stratfold (1994, pp162-164) divides the concept into four general areas:

- **Setting**, refers to the design and presentation of the studio set or the selection and depiction of a location for a scene. The physical form, visual style and movement that occurs in a scene can create an atmosphere and suggestion of how the narrative should be understood. It also relates to the use of the camera (framing, focus and movement) and to create impression of space and emotional response from the audience;

- **Costume and make-up** are used symbolically to add cues and suggestions of how characters should be interpreted. "The selection of the actor and the use of costume and make-up can be used to create recognisable stereotypes that the viewer uses as a basis for predicting how this character might behave" (Stratfold, 1994, p163).

- **Lighting** "controls the impact of the image" (Stratfold, 1994, p163). It may be used to create an emotional or atmospheric impression on the audience, to draw attention to a particular part of the screen or object, or to create a sense of space or time.
• **Figure expression and movement** are used by actors, through guidance from the director, to suggest conventions of behaviour, emotional stance and the nature of relationships between characters.

Hodges and Russell (1993, p42) suggest that the concept of mise-en-scène has "three design concepts that are especially relevant or unique to multimedia". The first is the composition of media elements to communicate and emphasise certain types of information rather than be used explicitly for art. The second relates to the inclusion of dynamic elements in interactive materials and how they interact with other elements of the interface. They focus on the use of video and suggest three possible applications:

- the creation of decorative displays (e.g. video as novelty that adds no significant advantage to subject content);
- the use of video as the primary focus of content delivery (e.g. video as full screen or primary narrative element in a game or interactive drama);
- the use of video purely as a means of delivering data to the user (for example to show an instrument display through progress of an experiment).

The third concept is the organisation and representation of the controls and actions that are open to the user. Here the primary issues are the creation of clarity for the user, to eliminate difficulties in accessing subject matter. The issues that Hodges and Russell (1993, p47-9) suggest as the main concerns for developers are consistency in the design of the interface, suitable representation of the relative importance of actions through effective layout, and the management of 'transient actions' that must be context sensitive to user interaction.

Hodges and Russell (1993, pp49-53) and Stratfold (1994) also adopt Eisenstein's concept of *Montage*. Montage explains the practical techniques for interlinking interactive screens of multimedia learning.

"Montage deals with the transition from one scene to the next, and the combination of scenes. In multimedia design it refers to the combination of contexts in space and time. In space means the arrangement of more than one context on the screen. In time speaks to the transition from one context to another in sequence."

(Hodges & Russell, 1993, p49)

"One element of film language that is under the film maker's control is montage or editing. There are two ways that editing is used. One way is to create seamless transitions from shot to shot, used to concentrate attention on the action. This editing avoids cuts that disrupt flow of action, whereas good edits are the ones that go unnoticed. This seamless editing even works over cuts that eliminate a section of action. For example, a person may be seen to enter a building then a cut shows them arriving at a desk: a whole sequence has been omitted, but still the cut looks smooth."

(Stratfold, 1994, p164)
Stratfold (1994, pp164-167) again uses Bordwell and Thompson (1986) to identify four characteristics that may be manipulated through editing:

- *graphic relations* that relate to different framing, shots and viewpoints to connect meaning between characters and objects;

- *rhythmic relations* to communicate pacing of action or the building of dramatic tension (e.g. accelerated cuts between aggressor and victim before a murder);

- *spatial relations* to intercut scenes from different locations or viewpoints (e.g. a telephone conversation);

- *temporal relations* to intercut different time frames (e.g. flashbacks), synchronous events in different spaces, to compress or extend time, or using filmic punctuation (e.g. blank frames, dissolves, text pointers) to mark time.

Stratfold (1994, p167) also highlights the use of sound to help manage the audiences attention, creating atmosphere and dramatic effect, and its interaction between film and narrative. It can also be used to link scenes, episodes and locations.

Hodges and Russell (1993) suggest that there are three main areas of interest for adoption of Montage as a concept applied to interactive multimedia. Firstly, *balance of the contexts* and representation of media elements and information is necessary "to avoid dividing or misdirecting the viewer’s attention" (Hodges & Russell, 1993, p49). There is a need to communicate why different media elements appear together, and to orientate the user to their concurrent presentation. Secondly, the term "*articulation*" is used to explain the separation, boundaries and relationship between different media forms and their contexts for the user. Thirdly, the *transition of screens*, to introduce new elements or remove redundant ones or to present completely new screens creates new challenges in terms of developing techniques to manage continuity, orientation, the dynamic layout of screen space and visual styles of transition.

In terms of interactive drama development, the directors role of managing location or set, actors and camera viewpoint and framing is made more complex by the need to consider the possibilities of multiple narrative routes and environmental structures. The emotional or behavioural outcomes of actors and the interlinking of dialogue through these scenes needs the development of sophisticated methods for editing and continuity management.

In multimedia the structure of the materials may be created on one hand by the hyperlinks and navigation routes (Phillips, 1994, p13), and on the other by the
interrelationship between the different media forms it contains. A further complication is created through the need to integrate the production of media with the software mechanisms that make interaction a possibility. This has special relevance to the development of MLEs that contain interactive drama, and that must address the issues described in Chapters 6 and 7.

MLE designers must hold models of the way that media can be used in combination, to exploit communication possibilities and mechanisms for interaction, to realise their creative ideas, and integrate their visions and plans with those of media and software producers. The way that these issues have been addressed in this research is described in Chapters 9 to 12.

8.4 Courseware/software production

The production of software can be thought of as an engineering activity that relies on formal production methods. This contrasts to the tendency for artistic practice and craftsmanship that tend to be employed in media production. The development of the interface is the point at which the creative processes, meet the analytical and technical aspects of software development.

The technical requirements of software development requires a complex interaction of different activities. A number of models have been used to describe software design and production methods, they are described in Section 8.4.2 to 8.4.5 below. These models are not mutually exclusive, and can be exploited in combination (Pressman, 1992, pp33-34).

In this section, issues of interface design and software development are described in terms of a number of models from the literature. They are proposed as the main issues that designers need to build into their internal design models, to support their creative practice.

8.4.1 Interface Design

The interface between human and computer is the point at which the technology, media representations and the consumers of the MLE come together. This is the point at which the success and failures of the creative process are most apparent, and the learning process is generated through engagement with the subject matter.

Laurel (1993, pp12-18) has discussed her view on the adequacy of the interface in terms of four models, represented in Figure 8.1. The basic model (Figure 8.1a) of the interface is a technological representation, where the shaded rectangle represents “the screen, hardware input/output devices, and their drivers” (Laurel, 1993, p12). This overly simplistic model takes no account of the user’s mental model for the
requirements of controlling the computer and what interactions the computer will accept. Laurel goes further to argue that:

"These two phenomena—a person’s “mental model” of the computer and the computer’s “understanding” of the person—are just as much a part of the interface as its physical and sensory manifestations [...] However in order to use an interface correctly, you must also have an idea of what the computer is expecting you to do. If you are going to admit that what the two parties “think” about each other is part of what is going on, you will have to agree that what the two parties think about what the other is thinking about them must perforce be included in the model [...] This elaboration has dizzying ramifications.”

(Laurel, 1993, p14)

Laurel suggests that designers, programmers and other multimedia practitioners pull back from such theoretical issues in favour of more practical concerns of method and technique. This tends towards the working definition of an interface as simply the way that people and computers interact (Figure 8.1d). This, she argues, “avoids the central issue of what this all means in terms of reality and representation” (Laurel, 1993, p14).

![Figure 8.1 Interface models. (a) The pre-cognitive-science view of the interface. (b) The mental-models view. The thought bubbles and their contents are considered part of the interface. (c) The “horrible recursion” version of the mental-models view of the interface. More bubbles could be added ad infinitum. (d) A simple model if the interface, circa 1989. In this view the interface is that which joins human and computer, confirming to the needs of each. (Laurel, 1993, pp12-14)
As an alternative to these interface models Laurel looks to create a metaphor for a computer interface based on the theatrical stage and performance¹. Figure 8.2a represents the audience, stage where performance and action take place to full view of the audience, the backstage and wings area is where supporting activities (such as lighting, scenery changes, sound affects and prompts) are generated. In a successful performance, Laurel argues that these supporting activities are unseen (Figure 8.2b) by the audience, engagement with the play means that “the action on the stage is all there is” (Laurel, 1993, p16). This view is akin to the realism discussed in Section 7.1.1. The notion of audience as participating actors on the stage is considered as an alternative conception (Figure 8.2c), where the notion of audience as passive observer disappears (as in the spect-actor paradigm described in Section 7.1.3). This is transformed into the final model of the stage as a virtual world where “representation is all there is” (Laurel, 1993, p17). This representation consists of human and computer generated agents and other representational elements such as windows, desktops, and icons. The software and hardware provide the unseen, backstage support.

Figure 8.2 Theatrical models (a) Plan view of a typical proscenium theatre. (b) For the audience, what’s happening on the stage is all there is. Triangles represent the actors. (c) Putting the audience on the stage creates confusion. (d) An alternative view of human computer interaction, in which the representation is all there is. The triangles represent agents of either human or computer-generated types, and the other shapes are other objects in the virtual environment. The shape of “the stage” is oval, like the beam of a spotlight, to suggest that all the matters is that which is illuminated. (Laurel, 1993, pp14-18)

¹ The relationship between Laurel’s interface model, and the interactive drama concepts developed in this research project, are shown in Figure 7.4.
Other writers, for example Poovaiah (1996, pp317-322), take a more analytical systems approach to describing the design of multimedia interfaces. Poovaiah presents a five level model of an interface that relates to the relationship between users and the technology, the adaptivity of the interface to user action and response, the linking and structural relationships between different media and information resources, the patterns of information and arrangements of environments, and the variety and combinations of information that are processed.

Poovaiah (1996, p321) highlights the interdisciplinary, multi-sensory and multidimensional nature of the interface design process. He argues that this demands a team based approach to interface design. Such activities require that design and production activities are co-ordinated, and that designers understand where their contributions to product development need to be made. For example as in this research in the development and integration of video materials for the development of an interactive drama interface, and the structural interrelationships between scenes and supporting information. The approach taken in this work is described in Chapters 11 and 12, the creative design issues involved are described in Chapter 9 and draw upon knowledge of the earlier chapters. In the remainder of Section 8.4, several models for software development are presented that are drawn upon to support decisions made by designers in MLE development programmes.

8.4.2 The waterfall model

![Waterfall Model Diagram](image)

Figure 8.3 The classic life cycle or waterfall model (Pressman, 1992, p25)

The waterfall model (Figure 8.3) is a generic model that explains software design as a staged progression from feasibility study, through analysis, design, programming, evaluation and testing, followed by maintenance and update of the product through the product lifetime (Pressman, 1992, pp25-26; Boyle, 1997, pp184-185; Boehm, 1988,
This approach emphasises formal planning and staged validation. It is more likely to be applied to larger projects with complex interrelationships between the people and disciplines involved. Within each of the stages it is possible that other models, such as rapid prototyping will be employed to accomplish individual tasks or component software parts.

### 8.4.3 Rapid prototyping

Rapid (or iterative) prototyping methods, describe development processes that follow a pattern of repeated problem solution, with increased sophistication or refinement each time the problem is revisited (Pressman, 1992, pp26-27; Boyle, 1997, pp185-186). This pattern of development is intended to create a much greater degree of flexibility, to take advantage of innovatory problem solving during development. The cycle stops when the customer or design team are satisfied that the intended form and functional requirements have been created.

### 8.4.4 The spiral model

The spiral model, (Boehm, 1988, pp61-72) seeks to integrate the benefits of the previous two models, by integrating an iterative process of design, production and evaluation, with planned progress towards a defined set of requirements. Through each design cycle, decisions on risks involved in design decisions, engineering methods, evaluation and planning are conducted on a formal footing (Pressman, 1992, p29).
8.4.5 Software based development methods

Technological developments have enabled the development of specific methods for software design and development. These include DSDM or Dynamic Systems Development Method (Boyle, 1997, p187-190), a specific method for rapid and flexible system development, and 4GT or Fourth-Generation Techniques (Pressman, 1992, pp30-33) that is based upon software tools for automatic code generation.

8.4.6 Choice of development model

It is possible to use different development models for different stages of design and production, and different scales of task. For example, in the design project for this research the general approach to project development loosely followed the spiral model. Where each stage was planned, the possibilities and risks of development were considered by questioning:

- whether the work was technically feasible with the computing equipment available;
- if there were enough resources and time to produce the prototype;
- if the outcome of the work would add to evaluation of the design process and prototype concepts;
- what could be learned to answer the research question.
The prototype materials were then developed (as described in Chapters 10 to 12), and the results were fed into subsequent design work and prototype development.

Within each of the steps the development of prototype materials, a rapid prototyping approach was adopted to maximise the flexibility of design generation, and to suit the explorative nature of the design activities in this research. The content and outcomes of the design activities are described from Chapter 10 to 14.

8.5 Evaluation

"If constructivist environments are created to engage learners in relevant and meaningful knowledge construction, then as designers we are obliged to implement alternative methods for evaluating learning from them. Objectivist evaluation methods, like criterion-referencing, are not appropriate for evaluating learning and are likely too insensitive to perceive the types of learning that constructivist environments are designed to support. The methods by which we evaluate learning from these environments should be more goal free; they should assess knowledge construction in relevant real-world contexts requiring authentic learning tasks that represent multiple perspectives and viewpoints."

(Jonassen, 1992, p145)

This research is concerned with the complex interrelationships between the episodes, individuals, institutions and environments that are encountered as part of our everyday lives. More specifically it is concerned with the way that people learn to exist, function and thrive (or not) in their lives, and resolve the challenges, decisions and problems they meet. As discussed in Sections 4.10, 4.11, 6.1.3, and 7.2.3. such learning inevitably has a strong subjective element where the interpretation and meaning given to phenomena, events and episodes are closely related to cultural, social and moral values held by the learner.

Given the uniqueness of each person's character and life experiences, and the explanations of constructivist learning and cognition (discussed in Chapters 3 and 4), it is unlikely that evaluation against predetermined learning objectives will satisfy every learning need. With the human interest content of this research, the learning materials are also likely to be viewed and used in different ways.

"If specific goals are known before the process begins, the learning process as evaluation would be biased. Providing criteria for referencing evaluation results in criterion-referenced instruction. That is, the goals of the learning drive the instruction, which in turn controls the students' learning activities. Criterion-referenced instruction and evaluation are prototypic objectivist constructs and therefore not appropriate evaluation methodologies for constructivist environments."

(Jonassen, 1992, p140)

"Because learners interpret the world somewhat differently, the outcomes of learning will vary somewhat, and so objectives, if they are useful at all, can best be used as a negotiating tool for guiding learners during the learning process and for self-evaluation of learning outcomes."

(Jonassen, 1992, p144)
Jonassen argues that constructivist learning evaluation should focus upon assessment of learning needs, and that it must "possess the cognitive sophistication implied by the goals of constructivism" (Jonassen, 1992, p140). For the purposes of evaluation these goals can be assessed against the following questions:

- How relevant, authentic and useful are the learning materials to the learners?
- How well do the learning materials support the building of knowledge and/or skill?
- Are the experiential elements of the learning made explicit to show 'how' people learn?
- Is the representation of the learning environment in context with the reality of the situation or phenomenon?
- To what extent are multiple viewpoints and user needs catered for?
- How well are socially created values and approaches to learning accommodated?

Kearsley (1983) has identified three stages of formative evaluation. These are represented in Figure 8.6.

![Figure 8.6 Major activities of formative evaluation (Kearsley, 1983, p146)](image-url)
This research has followed the process of MLE design from conception through to the development of prototype materials. The purpose of this work has been to explore the processes and theoretical issues of design, therefore the evaluation of learning materials has followed the approach described by Kearsley:

"The purpose of such a prototype is to determine if the design of the system or lesson is appropriate or usable before expending resources to develop the entire system or training program. Thus, a prototype represents some small portion of the system or curriculum, usually selected as exemplary of the full-scale effort. This may involve the use of "mock-up" equipment or lessons, e.g., the use of hardcopy illustrations instead of screen displays or a much simpler hardware configuration than is actually intended. The use of mock-ups is similar to what engineers or architects do when they create scale models of equipment or buildings. The intent is to create a concrete representation of the specifications before proceeding with further development. This happens to be a very important aspect of project management since it allows the decision maker(s) to provide feedback on, and input to, the acceptability of the design before it is finalised."

(Kearsley, 1983, pp. 145-146)

To achieve the aims of the present work, the evaluation has been taken to the second stage (pilot test) of formative evaluation in Kearsley’s model. This has been achieved by asking multimedia researchers and practitioners to comment on the design process and target users to comment on the design of the learning materials. Emphasis has been placed upon assessing the adequacy of design methods for interactive drama based MLEs, and the identification of the issues that make interactive drama a useful and engaging medium for learning.

"The programme is to be seen through the eyes of its developers and clients [...] Benefits are to be described, not reduced to quantity. Observations are to be opportunistic and responsive to the local scene, not prestructured."

(Chronbach, 1988, p. 19)

Discussion of the evaluation undertaken in this project is given in Chapter 13. Formative evaluation has been conducted qualitatively, through presentations, workshops and focus groups.

8.6 Discussion

The issues of producing MLEs and interactive drama have only been given brief consideration. It has only been possible to suggest the main areas of knowledge that designers may draw upon during their design practice.

It has been argued that the methods and tasks involved in MLE production need to be understood by designers to inform the way in which they structure and present their design ideas. This has been argued in terms of the development and subsequent interpretation of subject matter, the possibilities of exploiting different media forms, and the processes of creating software and interface designs.
In the next chapter, the way in which this knowledge, and the issues raised in earlier chapters, may be put into practice is discussed in terms of theory on design practice.
9. Design Theory

The preceding chapters have considered the main issues that inform and influence design practice for the development of interactive drama based MLEs. These issues relate to the knowledge that supports design practice. In this chapter, an explanation of the processes and practice of design is drawn from the literature. It is presented in terms of the following issues:

- theoretical assumptions and paradigms of design;
- methods and models of MLE design;
- expertise and wisdom of design practice.

In addition to the process of design, the major environmental influences that a designer works within may affect how knowledge is used and design activities are carried out. These different influences are described as the technological, social, economic, political and moral environments of design.

9.1 Multimedia Design

The nature of design has been considered by a number of writers. Pugh (1996, p90) questions the concept of design as a discipline in its own right, suggesting that this creates a "separatist culture" that will only serve to create "another incomprehensible pile of gobbledygook which will not be understood by the occupants of arts and sciences [...] or for that matter by design practitioners". Rather he proposes that design be thought of not only as an "integrative mechanism for the arts and sciences but also as a the culture which envelopes both" (Pugh, 1996, p92). This demands that design is seen as more than a set of procedures or purely rational approach.

Pylyshyn (1991, p41) argues that there is a gap between the rational approach of (academic) theory builders and the realities of design practice. Although rationality and scientific method are important aspects of the spectrum of design knowledge, successful design practice encompasses a much wider range of influences. The challenge of creating an effective design method for multimedia learning environments (MLEs) must encompass an understanding of the way that people perceive the world, learn from experiencing it, and the means that they use to represent it in mind and in media form. This involves the MLE designer in both the structured activities of software design as well as the artistic activities of media design and production.

These aspects of design have been represented in the present research project through the four outer areas of the Knowledge Framework (Psychological Factors, Learning Issues, Production Issues, Social Dimension) described in Chapters 3 to 8. As Pylyshyn (1991, p41) has suggested, design is a complex activity that is influenced
“by reference to massive interaction effects among knowledge, goals, perceptions, and resource-constrained mechanisms that instantiate the relevant processes, and these phenomena themselves may change in response to factors quite outside the domain of the theory”. The revised form of the Knowledge Framework is presented in Figure 9.1.

Figure 9.1 Knowledge Framework including contributions from design literature.

There remains a need to describe how the creative insight and vision of multimedia design may be explained. This area of knowledge then feeds into the account of the Design Process for MLEs and in particular the development of interactive drama materials (Chapters 10 to 13). This chapter provides a description of the nature and issues of design practice and the theory that supports it.

9.1.1 Design theory/methodology

The two main paradigms, or schools, of design theory may be termed rationalist and constructivist. Dorst and Dijkhuis (1995, pp262-263) have compared these paradigms in terms of five characteristics:

- the role of the designer, as rationalist information processor or interpreter of their own world view;
- the nature of design problems, as complex and undetermined or new and unencountered;
• the nature of design activities as being programmable and based upon structured information processing or as an interpretative process of reflection based action;

• the assumptions behind design knowledge as being based upon scientific knowledge and method or based upon the eclectic approach adopted by artistic practice;

• the underlying academic model as being that of positivist scientist or engineer in contrast to creative artist or qualitative (social) scientist.

These paradigms are not mutually exclusive and are likely to be found in various combinations, depending on the nature of the design problem. Ramirez (1996, p199) distinguishes between design as synthesis (essentially constructivist) and design as analysis (essentially rationalist). Design as synthesis is more often encountered in conceptual stages of a project, whilst design as analysis forms the later stages of a design project which creates the design as computer model and/or physical prototype.

This present research has concentrated on the conceptual stages of MLE design with emphasis placed upon the constructivist paradigm, because of the exploratory nature of the design activities that have been undertaken. However, the rationalist dimension of how to produce an MLE that is coherent, robust and reliable has necessarily been considered as a part of this work.

9.1.2 Design models

Several software design models have been described in the Courseware/Software Production area of the Knowledge Framework (Chapter 8). These models tend to adopt a rationalist approach to design, relating to the chronological stages of design life cycles.

Davenport (1996b) has described a good model as being "a redescription of the world" and "a scaled down, codified representation of objects, processes, and their interrelationships". Fundamental to the usefulness of a model, she says, is representation it contains and the ability to play with it. One approach may be to build "a vast library of micro-models and linking them together in various ways to form powerful wide-ranging "universal models."" (Davenport, 1996b). Such an approach is helpful in understanding the complexities of creating MLEs that contain rich media forms such as video, that "pays meaningful intention to the cognitive and sensory satisfactions of storytelling" (Davenport, 1996b), and that exploit the possibilities of programmed interactivity.
This approach can be seen throughout the development of the MLE and interactive drama prototypes in this research project. The structural model (described in Section 11.1) is made up of a set of five, interrelated time lines, and a number of special topics and guidance points, and a personal profile represent individual user needs. Each one of these elements are a model in their own right, and can be seen to combine to form the general model for the project design. The functional prototypes (described in Chapter 11.3) each comprise a model environment in their own right, containing activities, information and navigation routes. They combine to illustrate a simple MLE design and explorative learning environment. The interactive drama materials (described in Chapter 12) have many different types of model contained within their design and structure. The characters are based upon character profiles, that are in effect models of personality, personal situation, and motivation. The drama has been structured through events within the script and overall narrative structures. The scenes themselves have been placed within a spatial-chronological constructs, changes in narrative directions and viewpoints. There are also links to information structures, professional and parental opinions, and supporting learning activities within the design concept. All of these elements constitute models in their own right, that have been considered as specific design features and combine to form the overall model for each interactive scene.

The form that multimedia environments may take has been described by Florin (1990, pp31-48) in terms of “information landscapes” that are made up of five possible structures. These are defined as follows.

- **Collections of data**: ordered groupings of similar data or representations that can be accessed through search engines, database or other software tools.

- **Interactive documentaries**: structured representation of information and media based on a common theme and delivered in non-linear interactive form. This approach, described in Section 10.2.3 and Chapter 12, has been used to link special topics and information into the MLE and interactive drama materials.

- **Annotated movies**: a linear backbone of digital video which can be revisited and reviewed scene by scene (or image by image) supported by annotations of other media resources. As described in Chapter 12 and demonstrated, in particular, in 12.5.2 the annotated movie approach has been developed to involve multiple narrative routes and different viewpoints.
• **Networks of guides**: anthropomorphic guides (in various forms) that can "provide users with personalised assistance" (Florin, 1990, p43). This approach has been employed in Section 12.5.3, in an adapted form, to present the inner thoughts of characters.

• **Hands-on activities**: the various navigational and manipulative tasks that engage the user with, and provide feedback from, the environment. As demonstrated in Section 11.3 and Section 12.5.1, the use of hands on activities have been used to offer additional information and learning activities, such as the simulation of an ultrasound test.

The additional structures that Florin has not included, are the "more sophisticated" (Florin, 1990, p30) possibilities of interaction provided by virtual communication. These may be asynchronous forms such as e-mail and Internet discussion groups, or synchronous forms such as video conferencing and network virtual reality environments. Whilst these the possibilities for exploiting communication technology have not been explicitly explored in the present research, the findings that have emerged from the project have enabled some conclusions to be drawn on how communication technology may be used. These are described in Chapter 14.

Such schematic models provide a frame of reference through which the logic and structural dimensions of conceptual design can be articulated. However, they are less able to articulate the intuitive processes of design and the insight that comes through direct involvement with design problems.

Design models are not often used explicitly in the dramatic arts, where creative practice and performance are a fundamental part of the development process. An important stage in this research has been to document the activities of script writer, director and actors, to build models that fulfil the developmental needs of interactive drama design whilst sustaining the creative possibilities of the art form. Throughout the project the Knowledge Framework has been been drawn upon to support the creative work, bringing new aspects of theory from different disciplines and enhance the Design Process. The way in which knowledge and theory have been applied from each of the areas in the Knowledge framework is mapped out further in Sections 14.3.1 to 14.3.5.

### 9.1.3 Design methods and activities

As described in Section 4.3, earlier research by Chris Smith (Smith & Jagodzinski, 1995, p33; Smith, 1996, pp159-164) has looked at the problems of knowledge elicitation and representation, using the Cognitive Apprenticeship Model. His work identified knowledge as being of three types:
symbolic knowledge, that relates to the factual and procedural content of the domain knowledge (subject matter);

metacognitive knowledge, that provides the ability to contextualise, organise and process problem solving strategies;

experiential knowledge that relates to the dynamic, real world content of learning resources and complex interactions that occur everyday learning environments.

The ability to elicit knowledge and transform it into effective learning materials is an fundamental part of MLE design. Chris Smith (1996) developed his design around the production of a complex civil engineering learning problem. In common with most computer based learning, his work focused on the more formal methods of learning and MLE design using a knowledge engineering approach.

In contrast, the present work is intended to facilitate the primarily informal, experiential and intuitive processes, of humanistic learning. To further extend the exploration of MLE design this project has focused upon the creative processes that enable, the transformation of knowledge, experience and emotion, into the rich representational forms of interactive drama based MLEs. In so doing, it has identified and described some of the major questions and issues that are raised by such design practice.

The demands of creating interactive drama, within the framework of a MLE, bring the designer in contact with a range of design activities, drawn from a number of specialisms, including:

- subject matter investigation and interpretation;
- writing of learning materials and instructions;
- character and story development;
- interface and structural design;
- visual and graphic design;
- script writing and storyboarding;
- development of drama, media production and direction ideas.

The practical dimension of the conceptual design process, is the transformation of ideas, stories, and models held in imagination into tangible representations. These representations may be text descriptions, schematic or illustrative diagrams, sketches, photographs and video images. In many cases it will involve a combination of these
things each supporting the development of mental models (Section 3.3) and enhancing the use of perceptual, imaginative and creative processes (Section 3.4 & 3.5). The value and form of representation depend on the preference of the designer, the social context of the project (as explained in Chapters 5 to 7), and the meaning that the symbolic forms are intended to convey. Examples of the materials produced for this research are shown in Appendix E.

A number of writers (for example Scrivener & Clark, 1994, pp95-115; Schenk, 1991, pp168-181; Tovey & Dekker, 1995) have described the value of drawing and sketching in the development of designs. Others (Fish & Scrivener, 1990, p118 & 125; Lawson & Loke, 1997, pp171-183) emphasise the integration of different forms of media representation, such as words, text and computer models, in the communication of design ideas. A combination of representational forms (for example direct audio-visual recording, schematic diagrams, sketches and drawings, text based description of concepts and use of metaphors) enable the communication of design at different levels of detail and sophistication. The development of such representations provides a means of recording and communicating designs and also a way of stimulating further creative development of design concepts.

This complex interchange between internal and external realities enables the progression from uncertain origins of a design problem to concrete solution. This creates a richer description that is more evocative of the "very messy and convoluted" (Smith, 1996, p190) nature of much design practice.

9.1.4 Design expertise and wisdom

The ability to exploit the methods appropriate to multimedia, and interactive drama, design are dependent upon the expertise and wisdom of the designer. Effective design is reliant upon the ability of creative people to undertake design activities that exploit intuitions and perceptions, sensitive to the issues of the design problem (Pylyshyn 1991, p48). This concerns the ability of designers to identify, analyse, interpret and portray the subtleties of human thought and behaviour and thought (Chapter 3) in a way that engages people in learning processes and social experiences (Section 4.3 to 4.6). It also concerns the ability to exploit media techniques and production methods (Chapter 8) in a way that bring the social dimension (chapters 5 to 7) to life.

If design wisdom is defined as the possession of the knowledge to understand the methods and activities of design practice, it is likely to be found in the following areas:

- personal experience, the experience of colleagues and contemporaries;
- examples, models and descriptions described by practitioners and theorists;
• examples and techniques inherent within existing design work;

• the eclectic nature of everyday learning and experience outside of professional practice.

Design expertise may be defined as the capability to exploit this wisdom to realise a design that serves the functional and aesthetic demands of the product and user. These definitions are analogous to Boden's (1992) (historical) $h$-creativity and (psychological) $p$-creativity.

Schön (1983, pp 102-104) suggests that design expertise is practised through a reflective conversation with the situation. Within this reflective process, experienced designers have the ability to work with a range of existing experiences and the solutions that may be applied to a problem. They "reappreciate, reinvent, and redraw" (Schön, 1983, p 104) to meet particular demands and constraints of a design problem. This is a process in which designers "work by developing an understanding of both the problem and solution together" (Lawson & Loke, 1997, p 176), and results in the evolution of personal working habits and creative style. These processes can also be seen in the interests and recurrent themes that emerge in the fields of film, TV and Theatre. For example, stylistic conventions and recurrent themes can be seen in the work of:

• TV playwright Dennis Potter, in his preoccupation with life, death, and the nature of individual identity and personal relationships, and the interleaved development of stories through drama and music (e.g. Pennies from Heaven, 1978; Blue Remembered Hills, 1979; The Singing Detective, 1986; Blackeyes, 1989; Lipstick on Your Collar, 1993; Cold Lazarus, 1996; Kareoke, 1996).

• Creator, writer and producer Stephen Bochco (LWT, 1997) who brought complex multi-character plots to TV (e.g. Hill Street Blues, 1981; LA Law, 1986; NYPD Blue, 1993; Murder One, 1995).

• Alfred Hitchcock in creating suspense and drama in many notable films that maybe considered a genre in their own right (e.g. Psycho, 1960; North by Northwest, 1959; Vertigo, 1958; Rear Window, 1954; Notorious, 1946).

• In the theatre Sam Shepherd (BBC, 1997a), and his auto-biographical interest in the identity the American male and his relationship with family and society (e.g. True West, 1980; A Lie of the Mind, 1985; States of Shock, 1991; Simpatico, 1994).
In this research, the contribution and co-operation of scriptwriter Simon Turley has been instrumental in the development of design techniques for the interactive drama prototype materials. As explained in Chapter 12, his roles in scripting drama materials, direction and rehearsal of actors, and input of theory from the fields of drama and theatre have enabled the development of models and design methods that would otherwise have been ignored or considered irrelevant.

9.2 Design Environments

A designer works within a set of environmental influences and constructs that instil the values, motivations and beliefs to inform their activities and practice. These factors are interrelated and complex in nature. They are not necessarily separable, but are described here under individual headings to make clear the variety of such influences (Figure 9.2).

Figure 9.2 Knowledge Framework showing the environmental influences upon the designer.

Mantovani argues that technological development, and the possibility to do more complex things with greater efficiency, “has an almost inexhaustible potential for cultural transformation which coincides with its very nature” (1996, p61). Thus technology has an innate relationship with “the physical, social and cultural environment which contains it” (Mantovani, 1996, p61), both driving and responding to changes in the design process and situation.
A designer may find his or her practice affected by a variety of interacting influences or environments. These environments can be described as:

- Technological
- Social
- Economic
- Political
- Moral

9.2.1 Technological

The technology available for exploitation by a designer inevitably influences the decisions and choices that they make. The whole point of the present research is to elucidate the opportunities brought by the new technologies of interactive multimedia. Such technology may be that directly accessible (e.g. pens, pencil, paper, computer, software, cameras, etc.) or remote (e.g. media production services, network services, etc.).

There is an inherent link between technological tools used, or considered, by designers and the way that their ideas are brought to fruition. In using tools there is an interaction with, and transformation of, the social and physical environment (Mantovani, 1996, p61). This interaction leads to the evolution of new creative achievements and possibilities.

The availability of technology is not enough in itself to describe the technological environment, the knowledge and experience of how to use that technology is a constituent factor. The capabilities and skills of the people involved in the design and production process are also important. The skills of the designer may emphasise design as essentially an art or science (Pugh, 1996, pp89-96; Dorst & Dijkhuis, 1995, pp261-263) and technology as essentially a problem solving tool or as an information, creative and communication medium.

9.2.2 Social

The social environment is that which enables, supports and fulfils the need for interactions between people involved in the design process. This is important on a number of levels, that include:
Bandura's social learning theory has identified the relationship between individual cognition, behaviour and learning processes that happen through interpersonal relationships. Learning in a social setting enables assimilation of behaviour into a mental model for actions and their consequences to be interpreted and used. These processes allow "people to acquire large, integrated patterns of behavior" (Bandura, 1977, p12) including language and the conventions of social interaction based on the modelling of "social cues" (Bandura, 1977, pp12-13) and rules. Such social cues will also reinforce the emotional responses that result from different types of situation and help to construct various defensive and coping strategies to negotiate difficulties. (Bandura, 1977, p62). Social learning allows people to work as part of a team within an organisation. By learning specific practices and language, that holds the identity and goals of the team together, a sub-culture particular to organisation and specific team will emerge.

The ability to understand the needs of colleagues, clients and users and co-operate with them in the development of products also involves these social learning processes. Mantovani argues that the technical competencies involved in design practice are not enough to be effective. He says that "technical competence regarding artefacts must be grafted on to a more general comprehension of social processes" and that a "shared interpretation of daily situations" (Mantovani, 1996, p69) is required to enable co-operative design processes to be undertaken effectively. Winograd and Flores (1986, p60-69) place emphasis on the relationship between communicator and listener in the negotiation of meaning in the content and structure of language, and that this is instrumental in the co-operative design of software. A similar interaction and development of understanding is also present in the development of audio-visual medium. This is achieved through the combination of techniques explained through media theory, visual culture and language, as described in the social dimension of the Knowledge Framework (Chapter 5).

One way in which these social learning processes manifest themselves is through the relationship and understanding that builds between designer and MLE user. As described in Chapters 1 and 10, there is a significant minority of people who have difficulty in understanding official information and advice, completing forms and records, and medical guidance. The reasons for this may include poor literacy skills, the pressures of difficult personal circumstances and decisions, or the bewilderment of
new experiences. There is also a rising number women who have unplanned pregnancies, a trend that is growing particularly amongst teenage women. These trends have been associated with poor economic circumstances, future prospects and educational achievement. Formal approaches to learning can compound such difficulties because of poor educational experiences in the past, or because of a loss of control implied by the instructional nature of learning materials and advice received. A design goal for the MLE, and use of interactive drama, is to reduce disenfranchisement and to develop a sense of empowerment by offering humanistic learning experiences that support informed decision making in sometimes difficult, and emotionally sensitive, circumstances. This has been achieved in part by developing an understanding of the needs of parents, the learning issues associated to pregnancy and childbirth, and the concerns of the health professionals.

A designer’s ability to create materials that are able to communicate meaning to an audience, or to users, will rely on their social and cultural experience, expectations of users and knowledge of media conventions. Knowledge of the latter will come through communication and comparison of contemporaries, and the analysis and influences of previous generations. So for example, design teams or individual designers can seek to use the achievements of others to fulfil a design. This can be done competitively, as developments in the computer software industry have shown, it can also be done through co-operative creative practice as often happens in the film industry:

- Working associations over an extended period, notable examples include:

  ⇒ Michael Powell and Emeric Pressburger (e.g. 49th Parallel, 1941; The Life and Death of Colonel Blimp, 1943; A Canterbury Tale, 1944; I Know Where I’m Going, 1945; A matter of Life and Death, 1946; Black Narcissus, 1947; The Red Shoes, 1948; The Battle Of The River Plate, 1956)


- Informal social and professional relationships between contemporaries, for example between film directors Martin Scorsese, George Lucas, Steven Spielberg and Francis Ford Coppola (BBC, 1994).
• The mentoring influence of earlier practitioners, for example Martin Scorsese has cited Michael Powell as a major influence, seeking his opinions and input on the art and craft of directing (BBC, 1992). Scorsese has also drawn upon the style and techniques that Powell employed in his films (BBC, 1998a).

As described in Chapters 1 and 2, and discussed further in Chapters 13 and 14, an interdisciplinary approach has been taken in this research. Whilst there are inevitably some problems in understanding terminology and concepts from other domains, the benefits of such activities outweigh the difficulties. In particular the cross-fertilisation of theory and working practices enable the development of creative approaches to problem solving and design. The learning process that occurs through common participation in creative practice also generates new concepts and approaches to working.

9.2.3 Economic

Perhaps one of the difficulties in working within highly creative, multi-disciplined, teams is the potential for generating highly creative solutions to design, and learning problems, without enough consideration of resource needs. This research has shown that design and production of prototype MLE and interactive drama materials has placed an unexpectedly heavy workload upon those involved. These issues are discussed in Sections 13.2 and 14.2.2.

In general terms, the economic factors behind a product occur in a number of ways. Canale and Wills (1995, p87) identify ‘budget’, along with ‘time’ and ‘quality’, as the three main considerations in managing a multimedia development programme. Budgetary control relates to the funding, scheduling and control of resources and spending, assessment and regulation of risks, bringing products to fruition and seeking the intended rewards of the project.

Decisions about the market to be served, and the function of the product, influence its feasibility and the resources requirements to meet the need of the product. The delivery platform of the product will involve a certain level of resource demands, production commitments, and have a user base. The higher the cost specification for the delivery technology the smaller the number of users will be (Boyle, 1997, p193). The greater the consumption of resources the greater the profitability, savings or intangible benefits on the product must be. One of the reasons for choosing the topic of pregnancy and childbirth, for the design project in this research, was that it had a large potential user population, and it was estimated that the subject matter had a long life-time before becoming obsolete.
9.2.4 Political

Political environments are closely linked to the concerns of social environments described in Section 9.2.2. Political environments can be considered on two levels, the micro and macro-levels.

At the micro-level the issues of politics are interpersonal and organisational. These are issues of negotiating and co-ordinating the interests of different roles and disciplines involved in a design project. Morley and Pugh, working in the realms of industrial design, have suggested that there is a business design boundary (1987, p213) and personal design boundary (1987, p214) that identify the disciplines, constraints and characteristics that occur in the design life cycle. For them the interrelationships between individuals and groups have a bearing upon the definition of a design specification, roles and influence on the project, and the resource needs and allocations. This is not simply a matter of power brokerage, but the need to build consensus and manage decision making processes. In this context, the political activity is about "managing differences within and between groups" and it functions "to prevent premature commitment to decisions (designs) which have not been sufficiently well appraised" (Morley & Pugh, 1987, p217).

At the macro level are the politics of regulatory and government bodies that place demands upon the social role and activities of designers. In this context, political activity has more complex motives. This may relate to legal issues of intellectual property rights, the provocative use of media that is considered immoral or subversive, or to serve commercial purposes. Perhaps the best example of a political environment explicitly, affecting the creative activities of popular media, is to be found in the McCarthy Era of the USA. This not only instilled direct government influence and American culture, but also infiltrated the Hollywood institutions and the decisions of those involved in the production of creative output. It also resulted in comment and criticism through the arts, notably Arthur Millers play "The Crucible" (Film Education, 1997). More recent examples, given in Section 6.1.3, are of the UK government requesting help from soap opera producers to promote a number of issues for them, including the importance of the teaching profession and the difficulties of living with poor literacy skills.

Generally it would be expected that a product is original and properly researched, offers a considered viewpoint that takes into account the accepted norms to the culture it is intended for, and that its commercial content is obvious to users. For example, the character of a product about the introduction of wider choice in pregnancy care may be influenced by:
the sources of information and opinions (e.g. obstetrician, midwife, special interest groups, women with good and bad experiences of treatment) and the editorial decisions made in its creation;

the commercial motives of the project (e.g. the market and economic requirements for the product, and the moral or financial interests of funding bodies) may place some influence upon the way materials are presented;

the accepted moral values of the culture that it is produced within (e.g. the possibilities for medical intervention may be rejected or demanded by different cultural and regulatory institutions).

9.2.5 Moral

Processes of socialisation integrate people within societies and cultural groups. Through the habits, rules and rituals of a social grouping roles, values, emotional responses and beliefs are instilled into its membership (Mantovani, 1996, p46). A person's morals are the way in which these values and beliefs are employed to make decisions and take action. This often involves conflict between values and actions taken thus creating a moral dilemma (Mantovani, 1996, pp45-50). Bandura has noted the power of media in reinforcing "attitudes, emotional responses, and new styles of conduct through filmed and televised modeling" (1977, p39). This creates a moral responsibility for designers in the way that they exploit their chosen media to communicate a message or story.

Issues of morality may become explicit for a designer. For example personal beliefs towards underage sex or abortion may come into conflict with the need to create a MLE for people from a wide range of social and cultural backgrounds. Film producer, David Puttnam (BBC, 1990) has argued that cinema has the power to communicate ideals and moral values to an audience, but also to put forward corrupt or contemptible symbols as morally acceptable. As such, those involved in media production have a responsibility to consider their role in creating a message for consumption by an audience.

Moral dilemmas may also be created inadvertently. In the film Midnight Express (1978) where the brutality of a prison system and mental anguish on the main character Billy Hayes, played by Brad Davis, is represented by him biting out the tongue of another inmate. David Puttnam and director Alan Parker were shocked by audience reactions to the scene. Parker (BBC, 1997b) commented that he realised his responsibility of being a film maker on seeing the impact upon members of a film audience running out to be physically sick. Puttnam (BBC, 1990) was shocked to find
out that audiences were cheering the act. Both question the validity of including the scene in the film. Another example comes from the questions asked about the morals and values behind Michael Powell’s film Peeping Tom (1960). This story of a voyeuristic killer who films his victims have been interpreted in many different ways—from the work of a sick mind to a masterpiece that questions the nature of film and cinema—by critics, audiences, and film makers (Cook, 1985).

9.3 Design Theory and Design Practice

The Knowledge Framework of the issues and practice of MLE design, drawn together in Chapters 3 to 9, explain the approach taken in developing a design methodology for interactive drama based MLEs. Its evolution has been a symbiotic process both guiding and being informed by the development of the practical MLE design on pregnancy and childbirth. In describing the environments, processes and activities that a MLE designer may engage in, the aim has been to create the necessary depth in the Knowledge Framework to link theory to its use in practical design activities. This description has also considered how design theory may be applied to the development of interactive drama based MLEs. The details of the design problem, issues and possibilities of interactive drama, and creation of a set of MLE design methods are described more fully in the coming chapters.
10. The Design Problem: Requirements Analysis

The practical work of the research project explores the process of MLE design. The subject chosen for the MLE is pregnancy and childbirth. It is intended to serve the learning needs of prospective parents, but is also appropriate for others with an interest in the experiences and issues involved in pregnancy. This chapter describes:

- the context and purpose of the MLE;
- the target audience and their needs;
- identification of the content and boundaries of the subject matter;
- the emergence of emotional issues and learning needs;
- the reasons for using interactive drama;
- the main steps involved in the design process.

10.1 Outline and description of the design aims

The purpose of this research is to identify the issues that designers of multimedia learning environments (MLEs) need to concern themselves with to create successful learning experiences. This chapter introduces the practical design activities undertaken, and develops depth to the Knowledge Framework by describing the design process for the interactive drama based MLE on the topic of pregnancy and childbirth. This project has taken a constructivist approach to design (Dorst & Dijkhuis, 1995), or what Ramirez (1996) describes as “design as synthesis”, as discussed in Chapter 9. The subject area of pregnancy and childbirth has been chosen as an example of humanistic learning because it:

- involves much communication between different points of view within the medical professions and with parents;
- involves profound personal experience;
- is relevant at the level of the individual, institutions and the state;
- demands critical decisions;
- involves many technical, professional, social and personal values.

The designs have been created to explore the theory and ideas discussed in Chapters 3 to 9, and to understand the needs of the design process. They use a combination of text, graphics, still images, audio, and video to provide users with a useful learning experience.
experience. Existing methods for the design and production of learning technology and media have been used and adapted to serve the needs of the pregnancy and childbirth project (P&CP). The navigational and interactive characteristics of the multimedia were developed to specifically meet the needs of the project. This has been achieved through the use of multimedia and interactive drama, linked to supporting multimedia resources and information. By using computer technology, it becomes possible to add an (active) social dimension to learning media, where the implications of decisions, actions and choices can be followed. The design processes and their evaluation are described in more detail in the following chapters.

10.2 Issues of Content

A set of prototype materials have been created to embody the interests, concerns and ideas generated by the research and practical design activities. The prototypes demonstrate the interface design, structural elements of the P&CP MLE, interactive drama and kinds of learning resources that would be used in a full product. Interactive drama has the potential to both represent situations and represent drama from different perspectives, and less accessible if presented in generalised or abstract terms. Interactive drama is intended to enable users to pursue lines of thought, choices and decisions within the safety of the interactive drama scenario, and to reflect upon the outcomes that occur. These reflective processes can then be placed in context of their own situations. Interactive drama has the potential to both represent and draw the user into, the social and communicative aspects of learning. It is intended to engage learners in humanistic learning issues involved in pregnancy and childbirth, and as a framework for related factual information. By using computer technology, it becomes possible to add an (active) social dimension to learning media, where the implications of decisions, actions and choices can be followed. The design processes and their evaluation are described in more detail in the following chapters.
Internet, and more recent developments in digital TV, cable services, and DVD as a (limited interactive) alternative to domestic VHS video tape.

The overall structure of the project can be expressed as a waterfall model, described in Chapter 8. The design stages considered at the beginning of the project are shown in Figure 10.1. As indicated full implementation and summative evaluation have not been included in the research. However, as stated in Section 8.4.6, in practice the developmental cycles and progress followed a spiral development. This manifested itself in the development of the five phase model described in this and subsequent chapters, and discussed in Chapter 14. Down at the level of individual tasks and activities, the model adopted was that of rapid prototyping, involving iterative development of materials through each phase of the project. In the following subsections content issues are discussed in full, although necessarily, a small subset of topics were included in the prototype MLE and interactive drama materials.

![Figure 10.1 Stages in product development.](image-url)
10.2.1 Identification of learning needs

The learning topic originated from several meetings with members of the Perinatal Research Group at the Post-Graduate Medical School, Derriford Hospital. Clinicians in the field of obstetrics identified the pressing need to increase the awareness and knowledge about antenatal care and childbirth options amongst potential parents. This move means that parents will necessarily become empowered to influence the treatment they receive and encouraged to resolve the personal choices and problems they encounter. The wider opportunities within the NHS system for different care options, and the increasing pressures to maximise resource use and limit costs, are placing new responsibilities upon parents to make informed decisions. The motivations for creating a MLE were to improve the availability of basic information and to make consultations between practitioners and parents more effective (i.e. to reduce repetitive explanation of care options and focus upon individual need).

The MLE was therefore targeted at prospective parents, either considering having a child or expecting a child. The primary focus is on the needs and experiences of mothers, but with due concern on the role and input of fathers, other family members, or supporting friends.

From the early stages of the project, it was recognised that the learning materials should be aimed at people with a strong motivation for the learning product. Smith (1996, p142) comments upon this point, citing Somekh (1994) to argue that whilst motivation is essential to learning, a resistance to technology can severely inhibit motivation. Smith (1996, p142) also recognises the concept of flow (Csikszentmihalyi, 1982), or cognitive engagement (Kozma, 1991), and the ability to translate between different forms of representation as being important to the success of learning environments. The evaluation of the materials, described in Chapter 13, confirmed this as an important issue. The population of potential mothers is broad in terms of its demographic structure, covering all socio-economic strata, cultures and childbearing years (potentially from early teenage years to middle-age). However, advice from the Perinatal Research Group, highlighted a number of factors that needed to be addressed in the design, and helped to narrow the target audience for the MLE.

The problems of communicating medical information, important events, medical interventions, and decision points are considerably more difficult where parents are unwilling or unable to read information supplied by medical professionals. The most

---

1 The ethics of presenting prototype learning materials to prospective parents was a concern. The risks of misinforming parents or raising anxieties resulted in the decision to work with existing parents and 'possible' parents as evaluators.
Recent government statistics\(^2\) (Office for National Statistics, 1998a) show that 22% of 16 year olds were not involved in post compulsory education and that 7.1% had no graded examination results. The percentage of employees involved in job-related training (Office for National Statistics, 1998a) was estimated at 14.5%. As discussed in Chapter 1, these statistics suggest that there are significant numbers of men and women who have limited educational attainment and have probably not developed the learning skills to easily deal with complex information and advice.

A second factor considered to be important is the significant numbers of single mothers and teenage mothers that have to come to terms with their circumstances. The decade to 1996 has seen birth-rates amongst single women rise significantly, from 28.9 births per 1000 single women in 1986 to 40.7 births per 1000 in 1996 (Office for National Statistics, 1998b). The number of pregnancies of girls under 16 have also risen, by 11%, in this period. “The most recent figures for conception by girls aged 13-15 show a rise to 9.4 pregnancies per 1,000 in 1996, compared with 8.5 per 1,000 in 1995” (BBC, 1998b).

As Zabin and Hayward (1993, pp20-21) comment, of adolescent sexual behaviour in the USA, the use of blanket statistics hide regional and demographic variation. The greatest incidents of unwanted pregnancies tend to be in “poor, overcrowded, socially deprived, inner-city areas”. Such circumstances are also likely to be where low educational achievement is also prevalent. As discussed in Chapter 6, the use of soap opera as a channel for education has been shown to be effective in reaching such socio-economic groups, where TV viewing is a common leisure activity.

10.2.2 Acquisition and development of the subject matter

For the above reasons, interactive drama appeared to have the power and accessibility to be able to promote humanistic learning, and our choice of subject matter arose from the desire to explore this potential. Subject matter research for the P&CP showed that there are potentially many episodes that involve complex learning experiences, problem solving and decision making. Some of these episodes can be life changing or even life critical. The learning needed to adequately accommodate and resolve such episodes brings parents into contact with many different viewpoints, advisors and information sources. It may involve reflection upon very personal issues and basic social conventions, as well as influences from past experiences, education and cultural values. The events are also likely to involve deep emotional experiences. Often such learning will involve difficult compromises, and the resolution of conflicting or incompatible issues, under urgent time pressures.

---

In creating the designs and prototype learning resources for the P&CP, it was decided that the learning resources should do a number of things for the user:

- be relevant as far as possible to a broad range of women's social, cultural and medical circumstances;
- be sympathetic to a woman's beliefs or emotions;
- enable potentially trying events to be rehearsed and anticipated;
- map the changing requirements of the progress of pregnancy onto appropriate learning scenarios;
- enable parents to make informed decisions;
- take into account the influences and interests of partners, family or friends;
- avoid the introduction of information that results in undue cause for concern or anxiety for the individual.

The issues related to use of drama for the representation of information and learning, discussed in Section 6.2, become acutely obvious when dealing with such topics. It was also important to realise that whilst soap operas were being used as a model for the development of the interactive drama, they often exploit difficult and uncommon events to create dramatic tension. In the development of the MLE there is a responsibility to avoid sensationalising the issues represented and to consider the needs of the majority of users, rather than the most unusual or difficult situations.

It would be impossible to match every possible situation of every woman at any time in her pregnancy. Equally, there are too many differences in the type and content of health care services to represent every location, style of care, and the habits and preferences of medical professionals. Therefore devices and techniques need to be employed that will provide sufficient focus to allow users to identify with the media representation of key aspects of pregnancy, and give them the opportunity to explore and mentally rehearse the decisions that they may make.

Pregnancy and childbirth was found to be a particularly rich domain because it encompasses so many different—but interrelated—issues including medical knowledge, personal values and emotions, social pressures and cultural norms. It is also a topic that has wide interest.
In the course of this project, subject matter has been gathered from a variety of sources, including:

- members of the Perinatal Research Group covering the interests and motives of medical professions;

- recent parents to discover personal opinions and individual experiences of pregnancy and childbirth (see Figure 10.2);

- a video recorded scenario with a practising mid-wife, and an actress playing a pregnant woman, to simulate a first antenatal consultation (see figure 10.3 and further discussion in Section 11.1);

- advisory literature on the subject, aimed at prospective parents, to collate subject matter knowledge and examples of presentational style;

- popular press features to identify current topics and the approach employed in presenting them;

- personal home pages to look at parents’ experiences and their presentations of them (see Figure 10.4);

- TV documentaries to discover how the subject has been approached by conventional mass media.

The analysis and interpretation of this information provided the basis for conceptual models of the constituent topics, common themes, and parents’ and medical practitioners’ perceptions of childbirth and pregnancy. The use of these conceptual models is discussed further in Chapter 11.

---

3 Examples of notes and references to materials used in the subject matter research are listed in Appendix E.
MC: “But it was interesting because we would look at the book and say “oh this week we get finger nails and next week we get something else” ... and it was interesting because it was almost like we were mapping her development on a weekly basis and it was nice, to feel.”

MC: “That’s lovely when you feel them moving inside and (um) actually you can see them as well if you are lying down in the bath or in bed. You can see the little arms and legs come over.”

ML: “And the stomach sort of contracts ... and you can actually see that there is a baby lying there.”

ML: “... it’s very often easier to have a peer who has gone through it recently.”

MC: “That’s lovely when you feel them moving inside and (um) actually you can see them as well if you are lying down in the bath or in bed. You can see the little arms and legs come over.”

ML: “And the stomach sort of contracts ... and you can actually see that there is a baby lying there.”

ML: “For me it developed more after the birth than before ... I certainly didn’t feel broody over other people’s children, and I hated having children thrust in my arms.”

ML: “... it’s very often easier to have a peer who has gone through it recently.”

ML (On maternal instinct): “For me it developed more after the birth than before ... I certainly didn’t feel broody over other people’s children, and I hated having children thrust in my arms.”

ML (On antenatal tests): “Yeah, all the options were given and I certainly feel that I was badgered into it. The only one thing that I did feel was that they seemed quite willing to give counselling if you wanted to terminate but there didn’t seem to be that option if keeping the baby or counselling on how to look after a baby with spina bifida or Down’s syndrome. You know that they didn’t seem to be that geared up to keeping the baby if it had been found ...”

Interviewer: “So there was almost the assumption that if there was something wrong you were going to terminate.”

ML: “That’s right, that’s right, yes.”

MC: “And also it’s the thing of like, embarking on an adventure ... and like sharing it with somebody that you obviously think a lot about.”

FR: “To get in front of the scan, because it’s a real sized screen wasn’t it.”

MC: “Because he wanted to touch it, you could tell he wanted to touch it.”

FR: “It was incredible.”
The fact finding activities for the project highlighted the important contribution of communication, social interaction and culture as part of the learning process. This involves simple verbal interaction, but also the transference of empathy and trust, and assumptions about the accepted cultural roles involved in relationships.

The parents interviewed emphasised this point, by making clear the value they place on the thoughts and experiences of their contemporaries and of medical professionals. They also referred to the assumptions made about them by others, including people in various social groups and the medical practitioners they visited. The extent to which they as parents put themselves in the hands of medical experts varied, depending upon their sense of confidence and awareness of choice. The emotions of pregnancy, positive and negative, were also a feature of their experiences. The parents said that they found much of their factual information from parent education, medical practitioners and specialist publications, however they felt that some social and emotional issues were less well catered for. It was primarily through these interviews that the boundaries of the subject matter research extended beyond the factual and procedural.

In addition to the interviews, a number of other sources were investigated to understand parents views, concerns and motivations. These include a number of personal home pages. One of the most interesting and engaging examples is shown in Figure 10.4. Such Web pages provide personal accounts of parent’s lives during pregnancy, childbirth and the early lives of their babies. The most engaging pages are notable because of their emotional content and the representation of strong interpersonal relationships between the parents and their children. For example, it is interesting to note the strong attachment that is often created between parents and their child through the ultrasound scan.
Figure 10.4 An example of a parent’s home page, showing the progress and significant events of pregnancy and birth. ©Copyright Doug & Tracia Barbieri, used with permission.

There are many groups with their own perspective on the needs of women during pregnancy and childbirth, these provide further insights into the provision of services and support for parents. They include government, professional bodies such as the

---

Doug and Tracia Barbieri’s home pages can be found at http://www.mother.com/~trug/trug.html
Central Council for Nursing, Midwifery and Health Visiting, special interest bodies such as natural childbirth or active childbirth groups, or commercial organisations providing specialist pregnancy services.

Existing media have also been used to learn more about the way in which the events and experiences of pregnancy are presented by the mass media. The Open University programme “Culture Media Identities: Whose Body?” (1996) commented on the way in which pregnancy and fertility issues are reported in the news. The programme put forward three types of television presentation:

- investigative journalism, that uses moral language of right and wrong, and tries to put values on the private and public benefits of treatment and care;
- straight news, that may use emotive language, but seeks to take a neutral line in keeping with the underlying culture of its public;
- discussion based in which moral, political and medical issues are addressed through the contribution of those involved (parents) and often mediated by experts (medics, scientists, politicians).

In addition to these styles of reporting, the use of fly-on-the-wall documentary has become popular in recent years. This approach tries to give the viewer an impression of involvement and insight into an environment and situation. The viewer is left to make their own judgements on what is shown. Carlton UK Television's series “Special Babies” (Goldhawk, 1995) fits into this category.

A final category is that of drama. For example, the BBC soap opera EastEnders (1997) tackled the difficult issue of how parents deal with a positive test for spina bifida in their unborn child. Characters, Ricky and Bianca Butcher, are faced with a decision on whether to terminate their pregnancy. Here the scenario is presented, explored and concluded within a realistic but fictional world.

Newspaper articles tend to be written to highlight specific topical issues. Examples include the experiences of teenage mothers (Neustatter, 1995, pp24-29), the pressures of beating the biological clock (Trethewey, 1995, pp37 & 42-43), or specific health risks (Hutchinson, 1995, p26).

10.2.3 Further design and development work

The design for the MLE has assumed the realism paradigm from dramatic arts and the soap opera as a model for the interactive drama materials. Their development is described in greater detail in Chapter 12. In addition to these areas the interactive

---

5 These examples were simply drawn from a single newspaper in July/August 1995.
documentary model (Florin, 1990, pp31-48), mentioned in Section 9.1.2, is employed to link into general information, specific topics of interest and learning activities.

The design of interface and functional prototypes, to explore the use and development of conceptual models into structurally sound learning materials, is discussed in Chapter 11.

10.2.4 The designer’s interpretation of subject matter

Learning the subject matter information, assimilating it into the design requirements of the project, and transforming it into a new form involves many creative activities and processes. The designer’s perceptual, cognitive processing, problem solving and creative abilities must come together to address the needs of users. This is not simply an assembly process or a prescribed method of composition. It is a process that involves a complex interaction between all the elements of design practice that involves presentation and communication skills, to create a sophisticated blending of media content. An important result of this process is the creation of subject matter that attracts and motivates learners, sustains cognitive engagement and enables smooth translation between the different media forms as they are presented or selected.

These creative processes are akin to the processes of visualisation, the generation of mental models, and creative processes discussed in Chapter 3. Part of this process is the development of a dual perspective. On one hand, the designer must understand the techniques of creating stimulating media elements and effective learning content and activities. On the other hand, the designer must understand the users’ viewpoint to understand their needs, interests and frustrations in learning and engaging with the MLE. The relationship between the two viewpoints is presented in Figure 10.5.

For this project, the design activities involved in developing the subject matter included a great deal reading, viewing and absorption of existing published materials, and guidance from parents and medical professionals. However, this was only the first part of the process. The most important part is the reinterpretation of this information to meet the needs of users. It required the designer to create his own personal comprehension, or mental model of the subject. This involved the production of concept maps, written summaries and notes, and many sketches and diagrams. Where copyright allowed, the use of photocopiers, electronic data and printing from the Internet also helped to form the basis of a mental model that supports the design process and product development.
10.3 Reflections on subject matter development

Throughout the project, a variety of reference materials have been used to build an understanding of factual information within the design. The social, cultural and emotional aspects of pregnancy and childbirth were identified as very important characteristics to be captured in the MLE. Interactive drama was chosen as the ideal platform to do this. However, the representation of emotive issues need to be balanced by the provision of adequate factual information to support rational decision making, interpretation of the issues presented and create effective learning experiences.

A fundamental element of the design process is the designer’s development of a mental model that defines the structure of the learning environment. This is a complex set of elements that includes:
• imagery (e.g. auditory, visual, haptic);
• structural and functional representations and relationships;
• processes;
• symbols (e.g. text, diagrams and flow charts);
• personal experiences, stories told by others and by the media;
• emotional and intuitive responses.

The practical output of the subject matter research is essentially a tangible representation of a designer’s mental model. At the core of this model is the collation of factual information, and other resources, to form a dynamic multifaceted representation of the subject.

How this model was presented, used and developed into the prototype materials produced in this project, are described in Chapters 11 and 12, the evaluation of the materials are discussed in Chapter 13.
11. Prototype and Interface Design

The conceptual development of the design begins with collection of the subject matter, analysis of its messages and the organisation of information. The process of subject matter research, for example in talking to parents, leads to the emergence of priorities and key learning issues. The designer has then to use his expertise and experience to manage the iterative development cycle which leads to a coherent structure for the MLE.

This process includes:

- decisions on boundaries and contents of the subject matter;
- structural organisation;
- design of interface mechanisms and navigation routes;
- the selection of appropriate media and the message that is to be delivered.

In this chapter, the conceptual design process is explained and the results of subject matter research are built into prototype materials to guide subsequent design activities.

It was argued in Chapter 9 that design was a participative process, that involved a sometimes “very messy and convoluted” (Smith, 1996, p190) design process. The interdisciplinary nature of design practice, for creation of Multimedia Learning Environments (MLEs) and interactive drama, has been discussed throughout this thesis. The work described in this and the next chapter reflects this. A quote from Ramirez (1996) eloquently describes the way in which the design concepts and prototype materials evolved:

“In design, the development of the primary design concept need not happen all at once, but rather comes about in an aggregative manner (similar to the arts); details being blurred at first, to be filled in later when appropriate.”

(Ramirez, 1996, p202)

The advice, expertise and creative input of people participating in the project was instrumental in developing the form, content and individual features of the project. Those involved in an advisory or project management capacity tended to have greatest input in the iterations of the higher level ‘spiral’ development of the project (described in Chapters 8 and 10). Whilst those with a more direct creative input were more involved in the more frequent iterations involved in rapid prototyping. The members of the project team can be found in Appendix I.

The processes of iterative development continued from the subject matter research described in Chapter 10, through the development of interface and structural
developments described in Chapter 11 and Chapter 12. They are further considered in the evaluation of the design process and prototype materials in Chapter 13. In this chapter the design activities begin with the development of the pregnancy and childbirth project (P&CP) structural model.

11.1 Development of the P&CP structural model

Through the collation of subject matter, and the review of existing media resources, a model of the learning environment was formed by the author and approved by the other project participants. This was based on subject matter research and learning needs analysis described in Chapter 10. This structural model for the P&CP represents the overall structure of the MLE, the interrelationships between the different types of information and the way that they interact with each other. It is shown in figure 11.1. Production of this initial model, elaboration of its elements, and refinement of its content, lead to decisions of how to present the learning materials, engage interest and sustain the users through a learning experience. It is not intended as an implementation structure, but is a model of how the experiences of pregnancy and childbirth may generally understood. It has been derived from the interviews with recent parents, review of written and video materials on the subject, and consultations with the Perinatal Research Group at Derriford Hospital.

At the core of the design structure are a number of parallel time-lines that relate to:

- the processes of foetal development;
- the physiological and emotional changes that are experienced;
- the changes that occur within relationships and support that comes from partners, family, friends;
- the medical care and treatment that can be expected;
- the economic and social changes that need to be considered to prepare for a new baby.

The obvious boundaries to the structural model are the nine months of pregnancy, however it became clear from the subject matter research that there are a number of issues that can be of concern before conception (e.g. living conditions, health of parents, economic costs of parenthood and use of contraception) and the period after

---

1 This is the conceptual design for the P&CP MLE. The term structural model is used to clearly distinguish it from the conceptual design model that has been developed as a result of this research.
birth (e.g. infant care, emergency services, intensive care options). The period included in the model runs from conception to birth plus a period of postnatal care, ending with the postnatal examination at six weeks.

**Figure 11.1 Structural model of the MLE.**

Confirmation of the relevance of this structure, the detailed subject matter research behind it, and how information is typically presented to a woman during her pregnancy was completed later in the project. A qualified midwife went through the first antenatal interview with an actresses to produce the media resources for a simulation. The interview was structured under six headings:

- personal details (e.g. name and address, status and family support, living circumstances, employment);
- medical history (e.g. diabetes, heart, kidney, lung problems, drug use);
- family history (e.g. genetic disorders, prevalence of twins);
- gynaecological history (e.g. previous pregnancies, menstrual history);
- current pregnancy (e.g. estimated due date, pelvic size, antenatal care choices);
- explanation of care services and information resources available.
The relationship between the parents' viewpoint, developed from the subject matter research, in the design of the structural model and the content of the professionals' antenatal questionnaire is shown in Table 11.1.

Table 11.1 The relationship between the content of the structural model and the antenatal interview.

During the pregnancy, and in the run-up to the birth, there are questions to ask and special interests that need to be pursued in greater detail. These are represented in the structural model as 'special topics' and 'guidance points' in Figure 11.1. They employ subject matter from different parts of the time-lines, additional information, and are called upon by the parents (if needed or desired) at appropriate points on the time-lines. Examples of the issues that could become topic-models or guidance points may be as diverse as:

- functions of the placenta;
- antenatal tests (e.g. ultrasound, amniocentesis) along with, what they are for, the risks and choices involved;
- what caesarean section is and why it may be appropriate;
- choosing your care professionals;
- antenatal classes;
- making a birth plan;
- methods of pain relief;
- the affects of parenthood on relationships.
The term ‘guidance point’ is used to distinguish those issues in which medical concerns or the emotive content suggests a need for information or opinions to come directly from health care professionals or others with experience or expertise of the issue. ‘Special topics’ are more general in their content and contain less sensitive factual information.

Interviews, and informal conversations with parents, plus the insights provided by the Perintal Research Group, made clear the complexity of modelling the events, issues, processes and possible experiences of pregnancy and childbirth. Every woman has an individual character, medical history and social situation, her experience of pregnancy will be, to some extent, unique. Equally the different kinds of medical services available to her or which she chooses will affect her experiences and ideas. In addition to differences between individual women, influences of partners and family can affect need and choices for care, and changes in requirement and opinion will occur in different pregnancies or during the course of a single pregnancy. Recognition of the view that pregnancy is a unique experience to each parent is addressed in the model through the specified use of filter questions to highlight certain parts of the product according to personal need (e.g. based upon age, medical situation, culture and personal values).

Difficult choices were inevitably made in terms of what is to be included in the research. As with any project, the scale of the design work undertaken needed to be controlled. It was decided that the requirements analysis and design of the filter questions for the population of potential parents would be too large a task to consider within this project. In this project emphasis was placed upon the development of structural form, interface and navigation design, and the development of interactive drama methods to support humanistic learning—the latter is described in Chapter 12.

11.2 Interface and navigation design

The structural model provides an overview of the kinds of information content, areas of interest and the relationships between them. It also presents a basic representation of the narrative flow of the learning materials. What it does not do is identify detailed content or consider methods of navigation and interaction. The content decisions for the prototype materials are discussed in terms of their functional and structural possibilities in Section 11.3. The interface and navigation design changes the perspective of the design activity to that of the users’ needs. The designer, in a sense places himself upon the viewpoint, in the structural model (Figure 11.1) to consider the way in which learning materials will be used, controlled and interpreted.

As already described, the interface design and navigation through the MLE materials is based upon interactions with the drama materials. The user engages with the episodes
and characters during the nine months of pregnancy. Within each of the episodes access to supporting information is provided through access to integral simulations, hyperlinked structures and linear presentations. This is represented in Figure 11.2.

This architectural convention of a primary interface for engaging the user in a learning experience, supported by additional activities and reference materials, is analogous to the structural architecture designed by Smith (1996, p166) for an earlier project. Smith's architecture is shown in Figure 11.3. Smith employed the cognitive apprenticeship model to gradually eliminate support from students' practice. In this project the access to supporting information needs to be universally available, but adaptation to user need would still occur, as important drama episodes, guidance points and special topics would be highlighted based on information they supply through filter questions.
Methods of navigation and interaction have been explored through a number of trials, focus groups and walkthrough sessions. This has involved the development of a number of interface designs, beginning with the use of video clips built in to a variety of graphical interfaces, and the development of non-linear narrative routes. Several interaction mechanisms were presented for evaluation. Examples of this work, following a short series of events within an office environment, are shown in Figure 11.4 and Figure 11.5.
• Figure 11.4 shows a design in which button symbols and cursor icons are employed to cue the user's interactions and navigation choices;

• Figure 11.5 shows a design where a simple cursor change and pictorial icons are used to create an interface that concentrates upon a style of interaction that may be termed 'naturalistic'.

Comparison of the two forms revealed advantages and disadvantages. The use of buttons and many context sensitive cursor icons provided obvious cues and pointers to interaction, however overuse created distraction from content (Figure 11.4). Uncertainty created by indistinct interface controls can also provide a barrier to engagement. When reviewed by a novice user, the complexities of multidimensional narrative links were found to be somewhat confusing (Figure 11.5). She commented, "I thought that the '3-D' interface was very clever... but it didn't give me any information ... it's not what I'm use to". Expectations of an information system go hand-in-hand with the media literacy, experience and intuitive capabilities of the user. She felt nervous about experimenting with hidden navigation routes. After a short learning period, the methods for navigation and interaction were mastered. Review of the interface designs and methods for interaction eventually led to a preference to the more intuitive interface.

Appropriate sign posting, and structural design of the materials, are important factors to the success of such a product, however simple user support measures can alleviate uncertainty and encourage experimentation. For this design project, the style chosen tended towards the simple pictorial version (Figure 11.5) of the interface, with simple framed or shaded highlights over hyperlinks and hot-spots. Simple changes in cursor design to indicate viewpoint and navigation route, plus simple unobtrusive buttons to link different scenes and viewpoints have also been used. How these methods were applied in the functional design of the MLE prototypes is described in the next section.
Figure 11.4 Illustration of the office experiments and interface designs (button & cursor based).
11.3 Structural and functional design

From these early trials, a set of prototype MLEs were produced to consider the form and functional possibilities for the P&CP. At this point in time the interactive drama scripts were still in production, therefore general episodes were developed in order to better understand relationships between different types of activity, interaction, and navigation that would be involved in the product. Figure 11.6 shows how the four prototype environments are interconnected. The design begins with a simple interview scenario that presents "talking head" video clips of parents talking about their experience in pregnancy and childbirth, followed by representation of a navigable space that is linked in turn to a simulation of an ultrasound test and presentation of a mother’s experience of childbirth in her own home.
Figure 11.6 Structural relationships of the four functional prototypes: (a) parental interview segments, (b) the waiting room environment, (c) an ultrasound test, (d) a home birth.

The purpose of presenting the interviews (Figure 11.7) was simply to develop an uncomplicated interactive representation of parents' views on the topic of pregnancy and childbirth, it also provided an introduction to the prototype materials. The user selects a character by a click of the mouse button and is presented with a short video clip of their views or experiences. The icon buttons of each of the people depicted is linked to more detailed information about the person's background and situation. From this introductory material, the user is taken into a more active exploratory environment that formed the basis for the antenatal waiting room scene discussed in Chapter 12.
Figure 11.7 Interviews, comments chosen by simple click of the mouse.
Figure 11.8 Spatial representation and simple interaction with characters.²

² Image of ultrasound scan, © Doug and Tracia Barbieri. Used with permission.
The waiting room environment (Figure 11.8) investigated ways in which space and simple episodes could be presented. For example:

- to consider if it is acceptable to select a route across a room and move to the new position instantly without showing relocation;
- to move out of a room without showing a door opening and the act of leaving;
- generally, to consider options for representing supporting information, manipulating objects and linking episodes.

This prototype environment also included several sound bites, video clips and images of people, as a way of continuing the presentational style of the earlier interviews. Once the user has left the waiting room to enter the corridor and office, they can link to the final two prototype environments. These are intended to represent the special topics/guidance points included in the conceptual model.

Figure 11.9 illustrates a special topic based around the ultrasound test, and is presented as a simulation. Users are able to select between three different stages of pregnancy and can manipulate the probe to search for the foetus. Supporting information is provided to describe the mother’s background and personal situation, an animated depiction of foetal development, and a video clip of an actual ultrasound test. Figure 11.10 depicts a prototype environment developed as a guidance point. It is intended to allow a user to become involved in the experience of a home birth. It allows the user to explore the scene, see an animation of how the baby makes its way into the world, follow the birth from the parents’ viewpoint and the medical practitioners, and discover the basic equipment that needs to be available for the birth.

Feedback from focus groups, giving the users’ perspective to the evaluation process, was particularly positive towards this prototype, because of the integration of hands on activities and video experiences of a patient having the test. This, and other comments from the focus group sessions are discussed in Section 13.4.
Figure 11.9 Simple ultrasound simulation and related digital movies.  

3 Image of ultrasound test, top left of three small screen shots, copyright © Doug and Tracia Barbieri. Used with permission.
11.4 Discussion of the design process

The activities involved in the development of the prototype materials could not be achieved without contributions from a number of people with expertise from different disciplines. The processes of design were, as explained in Chapter 9, an iterative process of development, reflection, criticism and comment from others, followed by improvement. This approach of rapid prototyping gradually formed and sharpened the required features and functional characteristics of each prototype. The completion of this work achieved a number of things:
development of artefacts to support the sharing of design concepts;

development of the spatial form for the MLE prototypes;

creation of a narrative structure;

suggestion of dramatic content;

development of structural relationships within the prototypes;

initial formative evaluation activities by the designers.

11.4.1 Development of artefacts

Perhaps most important, from the designers’ point of view, was the development of artefacts that create some of the potential and possibilities for interaction and navigation. These activities may be compared to the externalisation of mental models, and the contribution to creative practice that comes from sketching and other formative design activities as discussed in Section 9.1. They also enabled reflection upon the creation of spatial representations, in the form of objects and the environment in which events and episodes are contained. The prototypes were also used to present the links and structural relationships between different modes of interaction, kinds of information and media forms for evaluation by focus groups and designers. These activities provided the first opportunity to understand the implications of combining different media forms, and their value in communicating information, opinion, values and emotion.

11.4.2 Development of spatial form

In Section 7.2 a contrast was suggested between the linear delivery of film, through Eisenstein's montage of film frames to present episodes and impressions of space, and the spatial form of MLEs in which characters, objects and episodes are contained. It was during this phase of the Design Process that these ideas were first tested. Initial responses to the style, content, interface and structure of the prototypes were positive and later evaluation (discussed in Chapter 13) was also supportive of the design ideas. The general conclusion from this phase of the Design Process was that it is indeed possible to use a spatial metaphor to engage the user in activities and navigational decisions, and that the approach could probably be applied to the creation of narrative and interpretation of dramatic experiences.
11.4.3 Creation of a narrative structure

Laurel’s distinction between drama and narrative was presented in summary form in Chapter 7, Table 7.1. Within the prototypes described in this chapter, both dramatic and narrative are represented. The early prototypes of the office scenes have a narrative structure that distorts time in terms of the possible sequence of events that may be viewed by users, however the essential representation of the characters is in dramatic form (described in Chapter 12). The overall structure of the four linked prototypes illustrated in Figure 11.6 to Figure 11.10 represents a narrative structure. Using Laurel’s definitions they:

- provide representations through symbolic forms as buttons and queues to interaction (for example in the ultrasound simulation);
- distort time by allowing users to interact with the different parts of the environments in different sequences, and the selection of characters in different orders;
- have a thematic structure comprising the four different prototype environments.

11.4.4 Suggestion of dramatic content

The suggestion of dramatic content, in these later prototype examples, are limited to the representations of characters in the interviews (Figure 11.7) and characters shown in the antenatal waiting room (Figure 11.8). The home-birth prototype (Figure 11.10) contains more drama than the other prototype examples in that it has emphasis upon human activity and emotion, presents the events in essentially a chronological order albeit in a condensed format and is structured around the events and viewpoints of the child’s birth. If compared to the project OZ architecture⁴, elements of story and presentation can be identified and characters are apparent within the home-birth prototype. This constitutes a representation of the ‘physical’ world to be included in the learning environment and shows some consideration of presentation and interface issues. However, whilst the characters are shown with simple ‘behaviours’, if only as responses to user interaction, there is no evidence to show their personalities or motivations. Also, the materials show no story structure in terms of developing tension followed by a climax and resolution (Figure 7.7). As such, the environments cannot be said to show any obvious dramatic content.

⁴ Described in Section 5.6.2 and shown in Figure 5.7.
11.4.5 Development of structural relationships

The structure of the materials is simple scene branching, although elements within each prototype are similar to the “string-of-pearls” model shown in Figure 7.8. The structural relationships of the four prototypes provide a degree of understanding on how the scenes of a MLE may be linked into navigable spaces and sequences of interactions or scenes that are based around a common topic or issue. The interactions that may be experienced by the user are intended to relate to navigation of space, the manipulation of objects and alteration of viewpoint from one character to another.

11.4.6 Initial formative evaluation

Formative evaluation of the work produced criticism in the detailed design of the interface, in terms of the mechanisms of interaction and navigation. The use of the mouse as the primary control was decided upon to eliminate the complexities of the keyboard for novice computer users. However the use of changing mouse icons, highlights and button icons in various forms were found to be somewhat problematic. The incongruity of trying to create a visually naturalistic environment with mechanistic ‘switched’ decision changes creates a degree of distraction. The visual continuity of changing viewpoints and movement around the environment were also found to be problematic in some ways. For example, an instant jump to a different spot in the same room was seen to be acceptable, moving outside of the room through a closed door was felt to be disruptive.

In the next chapter, some of these issues are revisited, to consider the issues of presenting characters within an interactive environment and the design and structural possibilities of creating interactive drama.
12. Development of Interactive Drama Materials

One of the key points to emerge from the subject matter research was the importance of the emotional experiences involved in pregnancy and childbirth. These experiences are an integral part of the events and choices of pregnancy, the care provided and circumstances that extend through the nine months.

The need to address these experiences as an important part of parents' learning is an essential component of the design project. Understanding how the emotional, experiential and interpersonal aspects of learning can be integrated with the knowledge and information needs of inexperienced parents is a fundamental challenge for the design.

Interactive drama provides a means through which experience and emotion can be represented, communicated and reflected upon. More importantly it can enable an audience to engage in active learning through the story that unfolds according to the decisions and choices that they make.

In this chapter, possibilities for using interactive drama are considered through the development of three 'experiments'. These experiments look at a number of techniques for creating interactivity and engagement with the story, performance and learning constituents of the multimedia learning environment.

In Chapter 9, Section 9.1.2, reference was made to Davenport's (1996b) description of universal models being usefully formed from the development of a series of linked micro-models. One approach described is that of Florin (1990, pp31-48)—also described in Section 9.1.2—who recommends the identification and combination of different types of structures within information landscapes. A similar approach has been adopted in this project. Here the functional requirements of a multimedia learning environment (MLE) have been considered (Chapter 11) as a backdrop to the exploration, in this chapter, of the structural and creative requirements for creating interactive drama. Features described in Florin's taxonomy can be identified in the functional MLE designs, such as the structured (documentary) style of representation, annotations within the interactive media, and hands on activities. The primary focus, in the following sections, is on the representation of human relationships, communications and emotions within a navigable and interactive framework, that supports user reflection and decision making.
The development of functional prototypes enabled some of the mechanisms and HCI issues in the development of MLEs to be explored from a designer's perspective, and later evaluated (Chapter 13). The development of the interface design, described in Chapter 11, has been used to inform the approach taken in the design of the interactive drama and resultant media resources. Rather than reconsider the issues explored in the creation of the earlier prototypes, the focus of this stage of the work is upon:

- representation of relationships, interactions, behaviour and emotions;
- development of drama and narrative structures;
- the structural requirements of integrating learning resources with the drama materials.

It is important at this point to ensure that the term interactive drama is understood. The distinction between narrative and drama has already been considered in Section 7.2.2. It is concerned with the creation of action that presents episodes of human experience within a real-time framework, with a planned set of events and linked into an overall narrative structure. Drawing upon Laurel's terms of reference (described in Table 7.2) the primary characteristics involved are enactment, intensification of events and unity of action. This definition of drama is at the centre of the definition of interactive drama. The added feature of interactivity gives the viewer (or user) a degree of control over the navigation, interaction and sequence of events. However, the degree of freedom and delivery of information, and possibilities for interaction are ultimately constrained by the designers and producers of the environment. The creative aspects of interactive drama design also involves the development of characters, different presentational forms, and story development (Mateas, 1997).

To explore these issues further a number of activities have been completed to develop the resources, structural forms and narrative frameworks for several interactive drama episodes. The sequence of these activities are shown in Figure 12.1. They are described under the headings of:

- Script development;
- Storyboards and pre-production activities;
- Rehearsals;

---

1 HCI = human computer interaction
2 That may be experienced in different combinations and from different viewpoints at each visit to the MLE.
- Media production;
- Post production activities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Script development</td>
<td></td>
</tr>
<tr>
<td>Storyboards &amp; pre-production</td>
<td></td>
</tr>
<tr>
<td>Rehearsals</td>
<td></td>
</tr>
<tr>
<td>Media production</td>
<td></td>
</tr>
<tr>
<td>Post production</td>
<td></td>
</tr>
</tbody>
</table>

Figure 12.1 Diagram showing the sequence of the interactive drama design activities.

The representation of emotional and interpersonal issues through drama, and interactivity offered by a MLE, create a novel opportunity for humanistic learning. One that presents the learning involved as a complex everyday experience, with the scope to follow interests and make decisions based upon the scenarios presented. The need to address these experiences is an essential component of the design project. Understanding how the emotional, experiential and interpersonal aspects of learning can be integrated with the knowledge and information needs of inexperienced parents is a fundamental challenge for the design.

In this chapter, possibilities for using interactive drama are considered through the development of three ‘experiments’\(^3\). These experiments look at a number of techniques for creating interactivity and engagement within the story, performance and learning constituents of the multimedia learning environment.

### 12.1 Script development

Interactive drama provides a means through which experience and emotion can be represented, communicated and reflected upon. More importantly it can enable an audience to engage in active learning through the story that unfolds according to the decisions and choices that they make. The creation of stories and scenarios that are interesting, believable and engaging, requires the development of credible characters and well written scripts.

The transformation from learning requirements, character profiles and story ideas evolved through a number of iterations that involved co-operation with scriptwriter

---

\(^3\) The term ‘experiment’ is used loosely to mean an exploratory process of development and reflection.
Simon Turley. Because script writing for interactive drama was a new venture for those involved, it was decided to begin by writing straight-forward linear scenes and then develop the materials for an interactive environment. It was found that the use of a writer who worked predominantly in the theatre, and wrote for a three dimensional stage, was of great benefit to this process. The skill of the scriptwriter in writing dialogue that is structured to enable understanding of the issues, present different viewpoints and make the lines flow for both performer and audience was also of great value. The developments of the script centred upon their presentation so that they could be understood by the director and actors. The scripts were also developed for use during the production of media to monitor progress and continuity, and as a map to structure the materials in post production activities.

12.1.1 Case studies and scenario development

In line with Davenport’s (1996b) comments discussed in Section 7.2.2, the creation of believable characters was considered to be a very important part in the development of engaging drama, and the suspension of disbelief within the narrative of a story. The characters are also important for providing a figure through which an audience, or MLE user, can gather some sense of personal experience. It was thought that this may be done by putting users in-the-shoes of a character, creating a character that challenges accepted norms, or by making the user a fly-on-the-wall objective observer for whom experience is delivered through the exposure to the characters and drama. In this phase of the Design Process these different perspectives are all related to the realist paradigm, although retrospectively possibilities for using the objectivism and spectator paradigms can be seen (Section 7.1). These ideas eventually came to fruition in terms of the different camera framing and selection of character described below.

Materials were drawn together in the subject matter research and subsequently used to develop six possible characters for introduction into drama scripts, three of these were eventually used. The character profiles of the six mothers can be found in Appendix C. The decisions and choices for the characters and the scenarios for their lives and circumstances are based upon:

- the experiences related by parents;
- the key issues identified in the subject matter literature;
- the input from medical practitioners;
- the imagination of the designer and scriptwriter.

Each character is described in terms of their name and age, social background (e.g. spending power, income, education), personality, physical appearance, obstacles and
problems they may face in their pregnancy and other parts of their lives, their motivations and thoughts towards the pregnancy, their social situation and the major relationships in their lives. The six characters developed were:

- **A typical mother**: to reflect standard expectations of pregnancy, in terms of physiological development, emotional changes, relationships, antenatal care and treatment, and childbirth.

- **A young woman**: to portray some of the specific concerns and problems of teenage women.

- **A woman with an alternative lifestyle**: to explore some health care options, such as community care, independent midwives, relaxation techniques, homeopathy, and different viewpoints on prenatal care.

- **A professional career-orientated woman**: to consider the changes that pregnancy imposes, and how a hectic lifestyle can affect the experiences of pregnancy.

- **A woman with a medical complication**: in this case a history of insulin dependent diabetes, that can cause difficulties for mother and baby, and that requires special concern during pregnancy.

- **A woman under pressure**: in this case a woman for whom pregnancy is totally unplanned, is socially alone and unnerved by her predicament, is confused by all the things she must do, and the challenges that face her.

The characters chosen for the interactive drama were the ‘typical mother’ (Caroline), ‘the young woman’ (Denise) and the ‘professional career woman’ (Jayne). The character profiles were then developed and adapted during the script writing process and rehearsals.

It was decided that the pregnancies presented needed to be perceived as moving, without being unduly distressing. As a learning resource, it was important that the case studies did not portray pregnancy as a series of traumatic events; neither could they include all the worse complications imaginable. That did not mean that negative emotions were taboo, but the emphasis needed to be on how to deal with them rather than focus upon the pain and angst involved. This approach was intended to emphasise the notion of empowerment. Information on specific medical topics, or other related issues, are covered by supporting information outside of the case studies in the form of special topics or guidance points.
The scripted scenes focus primarily upon the period between 12 to 20 weeks of pregnancy, as this is a time when the characters would be considering some of the more basic concerns and questions of their condition. It also had the advantage, from a casting and production perspective, that the pregnancy would not be physically showing at this time.

To introduce the case studies and the prototype, it was decided to create a scene that brings the expectant mothers together in an antenatal clinic. A later scene of the young mother returning home is intended to follow on from this one. The issues and concerns drawn from the five timelines (described in Section 11.1) inform the content of the scenarios and script, and are found in the guidance points and special topics linked into the drama.

12.1.2 Script writing

Simon Turley was asked to produce scripts based upon character profiles and linked episodes. This offered a chance to develop an insight into his creative practice. As said earlier, at this point in the project the dramatic theory, discussed in Section 7.1, was not considered, instead it emerged as a significant factor in reflection on the project described further in Chapter 13. The scenes were instead written around the general thematic style of the soap opera:

"We focused, for example, upon the character of Denise. Aged 16 or 17, the profile stated Denise to be "in a failing relationship with her boyfriend", and to be living at home with parents who are "less than happy with news of the baby". The team asked that I write a scene that followed Denise's initial pre-natal visit. She would return home and the question of whether she should keep the baby at all would be discussed."

(Turley et al, 1998)

Simon also acted as director with a group of young actors to rehearse the scripts and develop performances for a subsequent video shoot. This extended the study of script and drama development into the rehearsal and performance process. The rehearsals are described in Section 12.3.

12.1.3 Adaptation of script for interactive media

From the original scripts, the text and story were reviewed and structured into elements. This visualisation process developed further through the production of design documents that linked interactions and hyperlinks to the structure and content of the script. The documents also broke down narrative routes or character actions depending upon the purpose of the scene. Examples of this script development process are shown in Figure 12.2. These activities were refined through many iterations to eventually become the interactive scripts included as Appendix D.
Figure 12.2. Examples of script and design document pages: (a) character profiles; (b) original linear scripts; (c) scripts segmented and adapted into individual events and episodes; (d) compilation of scripts showing narrative routes; (e) final image based scripts used in production of prototype materials and evaluation of drama materials.
Figure 12.3. A selection of materials used to support design and scripting used in Experiment A: (a) sketches of physical space, (b) storyboard of character interaction, (c) development of character interaction through rehearsal video, (d) annotated script showing possible interactions. Materials used to support design and scripting used in Experiment B: (e) storyboard sketches, (f) annotated video storyboards taken from rehearsals, (g) schematic diagrams representing spatial, chronological and interpersonal relationships.
These design documents, in combination with storyboards (pre- and post-production) and the experience of the rehearsals were used to support preparations for production of the video materials. They became even more important in the editing and digitising of video to help map the interplay between different viewpoints and interactions in the prototype materials. In this respect, they can be considered as an external artefact, a means of supporting the designer’s mental model of the drama, learning environment and user interaction (as discussed in Chapters 3, 9, 10 and 11).

12.2 Storyboards and pre-production activities

Storyboards and sketches have been used throughout the design process (examples of these materials are shown in Appendix E). They were developed in combination with interactive scripts, diagrams and other schematic information to support thinking, planning and elaboration of designs.

These storyboards and sketches were used selectively to support visualisation processes and consider specific parts of the script that were found to be complicated or problematic. This process of storyboarding was continued during rehearsals. These were used to capture performances, interaction between actors, lay-out of physical spaces, the progress of scenes, and to consider possibilities for video production.

In addition to the storyboards, a variety of schematic diagrams and spatial diagrams and sketches were also used to support creative activities and consider the implications of design decisions. A representative selection of these sketches and diagrams are shown in Figure 12.3.

12.3 Rehearsal and direction

Rehearsals were carried out over several days. The rehearsal process provided an opportunity to observe how a performance is built from a script, the actors’ skills and the director’s guidance.

This phase of the Design Process used a similar method to researchers involved in Project Oz in studying the role of actors and director (Kelso et al, 1992, pp3-16). The Project Oz experiment sought to consider the issues that may be important to users (or interactors) as controllers of a live theatrical performance as an analogy to a computer based interactive drama. It looked at ways that interactors may perceive, experience and interact with actors, and how users may suspend disbelief to control and interpret a drama. In this research, the perspective and purpose of the rehearsals was shifted to that of a multimedia designer. The rehearsals enabled reflection on the:
relationships between director and actors;

development of drama in its various forms and structures;

development of performance;

communication of emotion and dialogue;

refinement of ideas for video production, presentation and interface design.

Examples of the rehearsal activities and the way in which they informed the design process are shown in Figure 12.4.

Observation of, and involvement in, these creative processes did much to inform and support the work in the design of interactive drama. The rehearsal process enabled the structure and possibilities of creating drama and changing relationships to become more evident. For example, it showed how actors use language, intonation, emotion, behaviour and gesture to create different kinds of spaces (as described in Section 7.2) and interactions between one another. The rehearsal process also made clear the techniques and tools that a director can employ to develop effective performances, to cultivate interaction between the actors, and between the actors and audience.

Additionally, the process of using a video camera to frame shots, record scenes and review the rehearsal, contributed to the on-going evolution of the designer’s mental model. The strong images derived from rehearsals supported and enhanced the visualisation of requirements for subsequent work on the production of video and construction of prototype interactive drama materials.

The rehearsal process also revealed a number of potential problems. In addition to the continuity problems of conventional media forms, interactive drama presents its own challenges. These include:

- the transitions in emotion, attitude, behaviour and expression when a choice in narrative route is made;

- the pacing of video sequences when switching between two takes of a scene;

- the tracking of revealed information (to users and between characters) when multiple narrative routes are involved;

- the resources involved in producing video and other media for multiple narrative forms.
Initial read-through of the script builds a basic understanding of the story, narrative structure, dramatic content and interactions between characters.

Discussion of roles and lines leads to consensus of the way in which the drama is to be performed.

An actor's conversation with the director may be seen as process of negotiation and learning.

Early rehearsal of the script begins to build a better understanding of cues, pacing and dialogue.

Individual reflection on the content of the script and the role being played, leads to a better understanding of the character's personality, attitudes and behaviour.

The director's role is to draw upon, and interpret, the scripted materials to build up the actors' performance into a believable representation of a social reality for the audience.

Hot seating engages the actor with the personality, concerns and motivations of the character by questioning their interpretation of the script, their performance and interactions with others.

Changing emotional responses to the behaviour and attitudes of other characters can create different outcomes and consequences to the same script, and enhance the evolving performance.

The use of props can be developed to give important behavioural clues about the attitudes and emotional state of the character.

Figure 12.4. Illustration of the rehearsal activities and description of the influence they had on the later design of drama materials.
12.4 Drama and video production

The use of the drama scripts, and other design materials, progressed into two areas of development. The main thread of the work was in experiencing the process and challenges of producing video for interactive drama purposes. This was undertaken in co-operation with the young actors used in the rehearsals. The camera work and production activities were completed by the author and actors. This had the advantage of allowing repeated experimentation and reflection upon the activities from rehearsal through to production. This work is described in Sections 12.5.1 and 12.5.2. The second area of work was completed in order to look more specifically at the effect of production quality. An associated project was completed by a Plymouth University final year BSc MediaLab Arts student (Roberts, 1996) who used a professional cameraman and properly cast professional actors on a short section of a script. This work is described in Section 12.5.3 below.

As stated above, drama theory was not considered at this point in time. It was assumed that the realism paradigm, most often used in film and video, would be most suitable for the interactive drama based MLE. Further, the dramatic form of the TV soap opera seemed to offer the most potential for the episodic nature of the script and MLE design concept. It also offered a genre that is broadly understood and favoured as a mainstay of popular culture (as discussed in the introduction to Chapter 6). The characteristics of the soap opera genre that were most appealing and influenced the design ideas include:

- A narrative structure that has no definitive beginning or end, where characters are introduced without prior knowledge. For example, in the antenatal waiting room, the characters enter the scene with no introduction and when they leave their lives are left to continue without conclusion.

- The use of interrelated plot lines in the episodes and events. For example, in the antenatal waiting room, three mothers can be followed as they are introduced to each other. The characters can be selected to act as a guide to be followed through a particular event or discussion. For example, Jayne in her antenatal consultation, or Denise in conversation with Caroline. Denise can then be followed home to see how she and her parents come to terms with her pregnancy.

- A focus on the nature, developments and emotional drama, of relationships within a specific set of characters. For example, Denise responds differently to questions from a stranger, Caroline, in the
waiting room than to questions and conversation from her father when she returns home.

- The use of demographic profiles of the casts to attract target audiences. In this case women and their families experiencing the events of pregnancy.

- The parasocial interaction that tends to occur between viewer and media characters, and the gratification that results through vicarious experience.

- The effects on the attitudes and behaviours of the audience that emerges through shared experience, discussion emotional responses and moral judgements that are made about the decisions and events portrayed.

- The potential for including an educational message within the unfolding events. For example in the waiting room scene through the concerns and issues expressed about medical care and the opportunity to explore supporting information resources.

The choices of location, the video framing and drama presentation were developed with these issues in mind. Although somewhat crude in approach, the activities involved in the video production for this project were nonetheless demanding, confirming many of the concerns identified in Section 12.3. An additional factor that became very apparent was the technical and creative skill involved in camera work. The framing and perspective of the video had significant impact on the interpretation of emotions and behaviour (for example in terms of eye-contact) and the subtle issues of continuity within a single scene.

12.5 Post production activities

The capture of video images is only the first part of creating useful video resources. The development of the interactive drama is concluded with post production activities involved in the editing, digitisation and implementation of video and photo-images into an interactive programme. This point in the design process coincided with a decision point on the development spiral. Whilst it would have been possible to develop a simple interactive environment, it became obvious that even with video compression, and small digital video frame, the memory and processing requirements placed a large burden upon the computer technology available to the project. The full implementation

---

4 Other specialisms such as sound and lighting could not be considered as they were not available for use.
of all the scenes created would have been highly demanding in terms of time and resources, and the impact of the media would not meet the expectations of users. The fast pace of technological development, during the period of the research, also opened up possibilities for interactive drama on a number of computing and media platforms. Therefore it was decided to concentrate upon developing materials into a form suitable for evaluation by target users and designers (described in Chapter 13), and as a design with cross-platform potential (as discussed in Chapter 1).

These materials were developed into three experiments or trials, based upon the interactive scripts and the design model developed during the project. The experience of completing these experiments enabled consideration of, and reflection upon, the main issues and possibilities that designers need to accommodate in their own conceptual models of the subject matter and design activities. This includes the structural, chronological, representational and creative issues of design.

- Experiment A contains two episodes (Section 12.5.1), the introductory waiting room scene plus the simulated antenatal interview.
- Experiments B & C (Sections 12.5.2 and 12.5.3) relate to the experience of Denise as she returns home and talks through the pregnancy with her parents.

The primary form of representation was through a series of Web pages used to present the relationship between the spatial dimensions, drama content and supporting information of the scripted episodes. The Web pages were presented for wider criticism on the Internet and also for use in focus groups with supporting (conventional) video clips. The relationship between the experiments and additional materials are shown in Figure 12.5.
12.5.1 Experiment A: Waiting room scene

The purpose of this experiment was to introduce the users to the characters of the interactive drama, the subjects of concern to the characters, and the method of interaction with the drama. The scene exhibits the use of alternative camera shots and viewpoints. It explores the issues of design and user experience in the following ways:

- by establishing the three female lead characters, into new circumstances and relationships, in a way that allows comparisons and contrasts between them to be interpreted;
- representing conversation about personal feelings, perceptions and views on what it is to be pregnant through the integration of drama with hypertext and hypermedia links to guidance material and special topics;
- delivery of information and learning through a documentary\(^5\) form of environment for the drama based MLE.

Figure 12.6 shows how the dramatic content, and supporting information provided through guidance points and special topics are integrated to present a learning experience. The underlying narrative model developed for this scene is basically a linear structure with scene branching (described in Figure 7.8). The classical story structure (Figure 7.7) is also present within the drama from the entry of the characters, their assessment of each other, a rising tension caused by nervousness, and resolution through conversation beginning and concerns being shared.

One of the characters, Jayne, can be followed into her antenatal interview whilst the two remaining characters discuss their respective circumstances and pregnancies. The closure of the scene ends with two remaining characters going to their respective antenatal interviews. Denise the teenage mother can be met again, in Experiment B, when she returns home and discusses her situation with her parents. The full script for this scene is shown in Appendix D.

---

\(^5\) The term is used to reflect Florin's (1990, pp31-48) description of information landscapes discussed in Chapter 7.
Figure 12.6 The structure of the drama, guidance points and special topic materials in Experiment A.
12.5.2 Experiment B: Denise returns home

Experiment B addresses the issues raised in Section 7.2. It explores how a set of alternative routes through an interactive narrative can be constructed within a spatial-temporal environment. It constructs relationships between different forms of physical spaces, chronological ordering, character viewpoint, human interactions and social spaces.

The dramatic content of the scene follows the experience of Denise as she returns home from her antenatal interview, and discusses how her pregnancy has affected her circumstances. The primary motivations and viewpoints of the characters within this scene bring out some major emotional issues in a stressful family situation. The characters' perspective on the situation can be summarised as:

- The problems of Denise in coming to terms with her pregnancy and the way that it is likely to change her life, future plans and relationships. She feels the pressures of her parents' reaction, and is not at all sure what support or consideration she will get from her boyfriend. She is however determined to keep her baby.

- Denise's mother has taken the role of the peace maker, essentially trying to fulfil the demands and expectations of both father and daughter. She is doing her best to avoid major conflicts, and is seen as distant and unsupportive by Denise and too passive by her husband.

- Denise's father is hurt and shocked by the revelation of his daughter’s sexual activity and resulting pregnancy. He feels the need to solve the problem, and the only feasible solution is to stop the pregnancy and push Denise's boyfriend away. This, in his view, would bring everything back to normal and blank out the incident.

- Dave (the boyfriend) has yet to understand the implications of his girlfriend’s pregnancy, and whilst he wants to see Denise he has to work hard to think of her needs for support.

The sensitive issue of pregnancy termination is raised within this scene. This was done in order to contrast the values and desires of Denise with her father, who emerge as the main power brokers in the scene. The father is asserting his role as head of the household and disciplinarian, accustomed to controlling his daughter's life, against Denise who feels the need to assert her rights over her own body and take responsibility for the consequences of her actions. The moral and social implications of the decision to include a reference to abortion in the script needed some careful
consideration. The point here was to represent the pressures that may be placed upon a young woman facing such dilemmas. The moral implications and wider social values placed upon abortion were important factors, and the right of a mother to decide her future were paramount.

The scene is divided into five physical spaces or locations (shown in Figure 12.7) that may be accessed and searched by the user. Through the time that the drama runs, action moves between different locations in Denise's home, and a remote pay phone. The chronological development of the scene is divided into four episodes within which the characters act and events happen. This relationship is represented in Figure 12.8, where the chronological ordering of episodes and locations are cross-referenced to denote the events and interactions between characters. This model can be compared to Garrand's (1997, pp72-75) description of the parallel structure, shown in Figure 7.8, it also draws upon concepts discussed in Section 8.3 to help define the structure, organisation and presentation of the media elements and unfolding events.

Each episode is designed to explore the nature of the relationships, support, emotional commitment and viewpoints between Denise and the other characters. Within each of the cross-referenced events (termed interpersonal spaces6) shown in Figure 12.8, the script is written to allow movement between positive, neutral and negative narrative routes (Figure 12.9). The movement between each route depends upon the user's response to the unfolding events and their affinity with the different characters. It is also possible to take different character viewpoints, by using different camera shots and framing, as shown in Figure 12.10. The full scripts for the three scenarios are included as Appendix D. The structural form for these materials is that of a modified hierarchy, where possibilities have been limited to avoid high scripting and production demands. The flow of the classic story structure can again be followed in the development of the drama, however the emotional content, behaviour, linguistic style and intonation are adjusted, in each of the three versions, to match the intended outcomes.

---

6 The word 'space' is employed in the way described in Section 7.2.
Figure 12.7 Panoramic views of the locations used in Experiment B.
Figure 12.8 The spatial-time relationships between different scenes and episodes in Experiment B.
Figure 12.9 The structure of the drama showing multiple routes and switch of viewpoint to follow different characters.
Figure 12.10 Representation different character viewpoints within the interactive drama.
12.5.3 **Experiment C: Effect of casting and professional camera work**

Experiment C considers the effects of casting and professional video shooting on the dramatic scenario. Example images from the prototype are shown in Figure 12.11. Early feedback on the materials used in Experiments A and B highlighted the expectations and values that people have towards video images. It was found that many people ignored the main concerns of the research for design issues, methods and humanistic learning potential. Instead their initial attention was focused upon their expectations of production quality, visual cues and characterisation present in a professionally produced TV or film drama. It would seem that the visual and cultural influence of television provides a benchmark for dramatic media to be accepted. A further piece of work, the form of a final year degree project (Roberts, 1996), was commissioned to develop a short sequence of the script from Experiment B with greater attention to the production quality of the media.

A possibility that emerged, from early formative evaluation, was the opportunity to present personal perspectives and inner thoughts not usually revealed to participants in a drama. This feature was also included within these prototype materials as an option to learn the inner thoughts of characters at the beginning and ending of the scene. This provides the user with an insight into the reflections of the characters their experiences, perspectives, feelings and options for action.

---

7 Credit needs to go to Jane and reference made to her final year project. Difference in response needs to be noted, with respect to 'cast' actors.
Figure 12.11 Experiment C: example images from professional casting and video production.
12.6 Summary and discussion

The work undertaken during this stage of the research covered a number of activities concerned with the conceptualisation, design, scripting and production of interactive drama. Development of the three interactive drama experiments formed the final set of practical activities in the research project. The resulting prototype materials enabled evaluation of the structural, narrative and dramatic content and features of interactive drama. It also offered a vehicle to discuss the acceptability of the MLE concept and its usefulness in fulfilling humanistic learning needs. A summary of the activities involved in this process (for experiment B) is shown in Figure 12.12.

The effective use of scripts, storyboards and other supporting documentation is dependent upon its relationship to the designer’s mental model, and their use as a means of developing consensus amongst those involved in the creative processes. The production of these materials, simply used to record examples of the work, is a laborious and time consuming process. It is only when they are used to evaluate the realisation of the designer’s ideas, to question and to seed later creativity, that the physical object becomes a fruitful tool; an external artefact to the designers’ mental models (as described in Section 3.3). Iterative design activities, using the rapid prototyping approach, enhances the designer’s comprehension of the design problem, their creative practice, the skills and knowledge needed to complete the work and their ability to communicate their vision.

These complex interactions of the different features of design practice were most reliant upon individual creative vision applied to the design activities covered in this research. Future research would have the opportunity of improving on the techniques employed here by using a cooperative design approach between designer and IT specialists. The tracking of links were subjective and intuitive processes heavily reliant on individual creativity and are particularly apparent in the development of the interactive drama and video. The way in which they are developed was, however reliant upon the influences, advice, and co-operative work with others. This sophisticated interplay of different knowledge domains and types of expertise may be explained in terms of:

- the exploitation of perceptual acumen and use of imagination to create credible environments and stories (involving the processes described in Chapter 3);

- the development of resources that promote the experiential, reflective, communication and decision making activities that promote humanistic learning (drawing upon issues described in Chapter 4);
the ability to create drama and narrative forms that draw upon the theoretical models, cultural and social expectations, and techniques to stimulate emotional response, intellectual involvement and gratification in an audience (discussed in Chapters 6 and 7);

a knowledge of the possibilities in terms of the resource, technical, structural and functional aspects of MLE production (described in Chapter 8);

the evolution of expertise and wisdom that builds through experience of design procedures and creative practice (described in Chapter 9).

Co-operation with, and observation of, playwright/director Simon Turley in the process of directing the group of young actors produced the most important insight into the needs and opportunities of exploiting drama within a MLE. It produced a set of models that built an understanding of the creative needs and presentation of interactive drama in terms of structural form, interactions, context and content.

The activities involved in video production, and the associated post-production procedures, helped confirm adequacy of the spatial framework used in the design of the interactive drama. This spatial framework, on one hand, creates a representation of the locations where the drama takes place, and also forms a set of interpersonal spaces in which characters act and users are able to interact. The framework also provides possibilities for developing complex structural forms that can draw a user into a drama through a number of different perspectives and narrative routes.

In an interactive environment, involvement in a drama can be taken a stage further than conventional media, as it becomes possible to involve people in decision making activities that have corresponding outcomes and consequences. If the user is convinced by the portrayal of the scenario, and the consequences that follow a decision, it is possible that there will be a transformation in their perspective. It has been argued, in Chapter 3 and 4, that humanistic learning involves assimilation and resolution of complex circumstances that often entail diverse (and conflicting) types of information, influences and priorities. By using drama, within a MLE, the suggestion is that it becomes possible to condense such experiences into a useful interactive learning resource.

In the next chapter, the extent to which the design processes and prototype materials have led to effective interactive drama and effective learning experiences is considered through evaluation by the scriptwriter, practising designers and possible users. In the concluding chapter these findings are discussed, and suggestions are made for ways in which research may be taken further.
Figure 12.12 Illustration of the stages completed in the development and research of interactive drama.
13. Evaluation and discussion of the design process

The processes and activities of design are very much reliant upon personal experience and preferences of the designer with regards to problem solving and creative techniques. A completed design is the product of the vision and motivation of the designer and the specific requirements of the learning domain and media product. A multimedia learning environment (MLE) cannot be created at a 'generic' level if it is to provide specific learning experiences, and communicate values and meaning, for a target audience. However, this research seeks to develop knowledge that may be employed, by other designers, to complete new projects.

The question arises of how to evaluate the applicability of the design knowledge and methods, which have emerged from the project, for the benefit of other MLE design projects involving interactive drama and humanistic learning activities. The approach taken has been to consider the design process on three levels:

- reflection by the scriptwriter on the writing of interactive drama materials;
- the presentation of the theory and practical design activities for review, critique and discussion by academics and design practitioners;
- the formative evaluation of the MLE design through focus group and walkthrough techniques.

This chapter presents findings and issues raised by the evaluation.

13.1 Introduction

Evaluation has been conducted in a number of small groups and workshops using focus groups, brainstorming and walkthrough techniques. In addition a set of Internet pages, describing the project, have been published to encourage comment and feedback from a wider audience of design professionals and other specialists. This has enabled:

- the interdisciplinary requirements of multimedia design to be investigated;
- evaluation of the adequacy of the Knowledge Framework for describing the knowledge and expertise that inform design practice;

1 A term loosely adopted and applied from the work of Bias RG (1994).
evaluation of the general applicability of the design methods and features included in the MLE and interactive drama prototype creation;

- consideration of humanistic learning and the way it may be represented within a MLE;

- consideration of some possibilities for exploiting drama and narrative in interactive media.

The results of the evaluation activities are described in the following sections.

13.2 Reflection by the scriptwriter

Scriptwriter (Simon Turley) has written and directed, predominantly for the theatre, and is also a drama teacher. His contribution to the project as scriptwriter, and director, is described in Chapter 12. In many ways his contribution to the project was a learning experience for him, and reflection on his writing and work for the project produced a number of criticisms and suggestions. His written review of the project was produced shortly after development of script materials and completion of media development phase of the Design Process. The text was later updated to reflect ideas for the use of different theoretical approaches in the project. These reviews have been subsequently published (Turley et al, 1998; Jagodzinski et al, 1998) and presented and explored further in a workshop (Rogers et al, 1999).

The first of these criticisms is perhaps most significant in terms of the dramatic paradigms, described in Section 7.1, that may be exploited in the creation of interactive drama. Turley’s approach to writing, guided by scenarios and character profiles devised during earlier design, was to produce work with a strong sense of realism for the audience. However he has commented that theory "was very far from my mind when I was first asked to write some dramatic scenes for the Childbirth Project" (Turley et al, 1998). Reflection on the success of this approach to drama development, the rehearsal process and the opportunity to see interactive prototypes produced the realisation that exploitation of the objectivity and spect-actor paradigms (Section 7.1) could be drawn upon to enhance the drama content of the MLE.

Turley also felt uneasy with the use of soap opera as a model for the style of interactive drama produced for the research.

"I was presented with character profiles and a selection of situations in which to place those characters. This I did. I was asked to give these characters and situations different treatments; this I also did. I now believe that my first error, however, was a stylistic one. I wrote as though for television. The scenes then, almost inevitably, acquired the argot of the lowest common denominator of television - the soap opera."

(Turley et al, 1998)
The analogy with soap opera may have seemed unsatisfactory in terms of the creative, literary and educational concerns of the dramatist. However, its accessibility for an audience, whose primary media experiences come through TV, make it a useful mechanism for representing social situations and personal dilemmas. Research to support this view has been described in Chapter 6, and its effectiveness in this project is discussed in Section 13.4 below. The soap opera analogy provided a common reference model that contributors could discuss on a level footing. It also provided a common knowledge of the practical techniques and characteristics of a media genre and dramatic art form. It is from these common concepts, and discussions, that the plans, methods and models of design evolved.

One of the challenges for creating the scripts is to understand how different scenarios may play out, and how the techniques of a dramatist for creating structure and engagement will be interpreted by an audience. In many respects, it is the highly emotional and intently political aspects of relationships, and social situations, that are most likely to attract the attention and interest of audiences. The writing of drama material that avoids the more intense, or darker, aspects of life would seem to prove a more difficult writing task.

"As a writer, there were aspects of the work that I found technically interesting, indeed demanding. To have three separate versions of the same scene proved curious to me. The team requested one strand of each scene to have a negative outcome, another strand to be neutral in outcome, and a third strand to have a positive outcome. The rationale for the existence of these different strands was that the audience would be enabled to witness, and, vicariously, to rehearse, a situation which might be equivalent to an aspect of their own, real-life experience. Any writer, especially a writer of drama and theatre, will instinctively look to gathering points of tension and conflict in order to make a scene work. Conflict is the raw fuel of drama, and tension is the engine. If, then, you have to write a positive outcome to a scene which you have already worked through in a way that seemed to be dramatic, the experience can be, for the writer, enervating." (Turley et al, 1998)

This is Turley’s account of the development of the script, for Experiment B in Chapter 12. It provides an example of the way in which he visualises the development of dramatic tension within a scene, and the difficulty he had in creating a meaningful contrast to his original script concept. It would seem that the development of the classic story structure (Figure 7.7) provides a model upon which to base a satisfying writing experience for the author, and meets the audience’s experiential and emotional needs.
"The "negative" scene was relatively easy to write. Denise was frosty with her mother, the only other person in the house on her arrival; they interrupted one another, they did not really hear what one another was saying, and, generally, miscommunicated. David, Denise's boyfriend, interrupted the action with a series of botched attempts to phone her; not to ask her about the ante-natal appointment, only to harass her about some academic work which he wished to filch from her. Denise's father's arrival only made matters worse. He entered the scene a man with a mission - determined that Denise should abort the baby. The scene ended with Denise storming out of the house. With these characters all playing their aces, the scene was fun to write. A positive version of the scene, however, proved much more difficult to accomplish, mainly because my shoulders ached with cringing. There were more resolutions per square yard than on Princes Street during Hogmanay. I am still not very satisfied with my final draft, which seems to lack only mid-western inflections to belong in an episode of the Waltons. And yet it was interesting to discover how little sometimes had to be changed, in order for the intention of a character, or, indeed, the direction of the scene, to be radically altered."

(Turley et al, 1998)

An additional dimension of this writing process is the recognition of the work content and production needs of writing a number of dramatic scenarios with different outcomes. As described in Chapter 8, this is a necessary part of the creative process in terms of placing constraints of feasibility upon the writer or designer. Turley was concerned about the workload and resource needs required for writing and producing interactive drama.

"The aim of the Childbirth Project was only to produce a tiny fragment of the material: to demonstrate that the technological and artistic demands of such a programme could be met. It struck me, almost immediately, how labour intensive the writing would be, in order to script the programme as a whole. With a full range of character profiles, designed to offer as wide ranging an audience as possible the chance to benefit from the material, and the number of scenes one might want the piece to deliver dramatically, a massive writing undertaking would be required. When one adds to that the business of offering different versions of each scene, the writing demands multiply by three - always assuming that three different outcomes are sufficient. It might well be necessary to employ a team of writers in order to generate sufficient material. Following on from this, anything that was written would also need to be produced, directed and of course acted. I believe that the full-production costs of the programme, were it to be undertaken this way, would be huge."

(Turley et al, 1998)

A further concern, for Turley, was the nature of audience engagement, and the suspension of disbelief. He concludes that there are inherent difficulties with this need to interact through a technological based interface and yet become involved in human dilemmas and emotion portrayed in the drama. This, as discussed in Section 13.4, was a concern raised in the evaluation carried out with the group of potential users.

"The scenes that I wrote were designed to be watched. Interactivity beyond observation was not my primary purpose: a user could do little more than select, at junction points, different outcomes to the scene. Other forms of interactivity would be added later. The paradigm adopted was the realism paradigm. However close to their own situation the scene depicted portrayed, I must regretfully state here that I doubt that the suspension of a user's disbelief would survive the operation of the mouse to make a choice."

(Turley et al, 1998)
It should be emphasised that Turley is expressing his view of the writing process, and that the drama materials were subsequently developed into interactive forms. His work was used as a resource for further development in the pre- and post-production activities described in Chapter 12. Turley's understanding of the design process, and possibilities for interaction developed as the writing process, rehearsals and subsequent production activities progressed. In a future project, the involvement of the writer in developing the possibilities for interactivity could be explored further. A deeper involvement in exploiting and presenting dramatic elements from the different theoretical paradigms would be of particular benefit. It would promote reflection upon personal morals and values, the possibilities for action and decisions, and to heighten vicarious experience as part of the users’ learning. For example he suggests that:

"The addition of interior monologues - where the audience could access the internal thoughts of a character at particular moments in the scene - could generate layers of drama, meaning and learning. It might also have been possible to adopt Brecht's performance technique of "geste", where a character is demonstrated to the audience, rather than represented to them by an actor who is inhabiting the role. There would be minimal movement requirements for long periods of time if geste [...] were employed, this would allow stills or short loops to be used, speeding up production and saving memory."

(Turley et al, 1998)

As described in Chapter 12, the use of simple interior monologues has been experimented with in the development of the interactive drama prototype materials (Experiment C). The impact of this approach is discussed further in Sections 13.3 and 13.4. The possibilities for using geste as a technique to illustrate a character have not been considered. However, the selection of video clips and audio segments to represent particular functional or dramatic characteristics has been a feature of the prototype designs described in Chapters 11 and 12. There would seem to be a strong analogy between the two forms of representation.

Turley suggests that Boal’s forum theatre is the most apt paradigm for adaptation to the use of interactive drama based MLEs. He argues that the provision of an ‘official’ or ‘approved’ line of information may limit the ability of the audience, or user, to resolve their own problems or make the best choices for their situations.

"And what of Boal and Forum? I would define any kind of state of unknowingness as a state of oppression. For the potential audience of the Childbirth Project, ignorance of the minutiae of child-bearing might be exacerbated by "oppression" at the hands of professionals they encounter in the course of their pregnancy. In the Boalian model, the scene, or action, once played then becomes an open dramatic field. The audience is then enabled, as "spect-actor" to attempt to change the outcome of the action."

(Turley et al, 1998)

2 "I recognise that the word "oppression" has, perhaps, an unhelpfully colourful meaning here. And if it comes to that, Doctors, Midwives, Health Visitors, and Nurses are themselves the victims of the "oppression" of time, and market forces." (Turley et al, 1998)
This is not a demand to exclude advice and guidance information from authoritative institutions or individuals, but rather to provide an opportunity to actively engage the user in activities that:

- create an intimate involvement with the issues that has significance to their own lives;
- give them opportunity to view and take roles from different character perspectives;
- generate solutions and decisions through repeated experimentation and vicarious experience of a situation.

Whilst the spect-actor paradigm was not a part of the original concept for the interactive drama materials, a social setting for the use of the MLE was. A design that generated discussion amongst a woman, her partner and other family members was a central part of the design concept. It was considered that the opportunity to engage with issues involved in the experiences of pregnancy, and to prompt rehearsal of choices and decision making processes, was an important feature of using interactive multimedia for a humanistic learning application. Turley's useful input offers a view from a different sphere of expertise, where the performance of a dramatic scenario can be presented to introduce a challenging issue or problem to an audience. The direct participation of the audience through debate, improvisation and participation can lead to deeply meaningful vicarious experience.

"The spect-actor paradigm established in Boal's work [...] seems to offer a very satisfying synthesis of the other paradigms I have outlined. It moves effortlessly between belief and reflection; between feeling and thought. It makes available to its audience a rich variety of forms of learning: learning through observation; learning through empathy; learning through distanced consideration; learning through repetition and variation; learning through (safe) direct experience."

(Turley et al, 1998)

The interface design employed in this project has implicitly adopted the concept of the 'fourth wall' (described Section 7.1.1 and 8.4.1, and illustrated in Figure 8.2b) in terms of its presentation of drama. The interface design has adopted the mental model view (Figure 8.1a) at the level of MLE navigation and peripheral control. This model has also extended the concept to the interpretation of the media rich information, experiential and emotional content of interactive drama based MLEs. This is a relationship that recognises the wider diversity of influences upon the user and their attempts to engage with the drama and associated learning resources. This produces the more open view of the interface design, represented as Figure 8.1d, and moves towards the more complex view of interface, shown in Figure 8.2d. In terms of understanding the drama and narrative content, the model represented in Figure 7.4
illustrates the way in which this view of interface is formed. An inherent part of these models is the distinct division between the media and audience, provided by the physical interface. Turley’s ideal would be to make this interface transparent.

The key issue for integrating the spect-actor paradigm into a MLE is the exploitation and development of appropriate technology to suit the learning needs of the audience. Turley’s desire for developing the spect-actor paradigm demands the use of technology that provides a greater sense of immersion or deep involvement in the drama, and that “permits freedom of expression for the audience” (Turley et al, 1998). Although not considered in this research, a greater sense of physical immersion could be provided by the adaptation and use of virtual reality, or sophisticated 3-D models produced for the latest games. However it would lose the human realism offered by video for the representation of humanistic learning activities. It would also move away from the concept of interactive narrative described by Garrand (1997), and perhaps raise the concerns for the effectiveness narrative where the user has total freedom offered by camera twirling in space (Davenport, 1996b). These are areas that would require further investigation and fall outside the confines of this research.

Deep involvement in drama, and the lives of characters, is perhaps most effectively delivered through video and television technology. As described in Chapter 1, the possibilities for TV and video technology are now beginning to show significant developments in interactivity, supporting information resources and electronic communication. Possibilities for self expression, and discussion of deeply personal issues, that directs the portrayal and outcome of a drama could be achieved in a number of ways. This may come from the integration of computer mediated communication (CMC) in either synchronous (e.g. video conferencing, Internet chat rooms) or asynchronous (e.g. e-mail, text conferencing) forms. The integration of such technology is in its infancy, and the potential for design innovation is significant. From his perspective as a dramatist, Turley argues that:

If one translates the Boalian model to an interactive, multi-media program it may be possible to take a few steps in approach to this ideal. I believe that certain archetypal spect-actor responses might be predicted and oppression-maintenance counter-responses included in the material. The audience might then find their way through, by means of a variety of pathways, to the "positive" version of the scene. [...] The task of the designer of interactive drama is to look at how these structures can be adapted and assimilated by technology.

(Turley et al, 1998)

3 See Section 7.2.2.
4 Theatre in Education teams using these techniques tend to encounter repeated variations of "spect-actor" responses as they take their work from school to school.
The adequacy of the design activities undertaken in this research, and the supporting theory identified within the Knowledge Framework, is discussed further in the next section.

13.3 Evaluation of design models and methods

The research has sought to provide a description of the tasks, expertise and knowledge involved in the design of interactive drama based MLEs. To evaluate the success of the project, it has been presented to academics and design practitioners. This evaluation of the Knowledge Framework, and methods and models of design practice, has involved the following activities:

- Informal review and critique from contributors to the project (including that of Simon Turley, described in Section 13.2).
- Presentation of the project for review by academics and students, at the University of Plymouth, involved in interactive media design and production.
- Review of the project at workshops and conferences (Rogers et al, 1999; Turley et al, 1998; Rogers, 1997a; Rogers et al, 1997b; Rogers et al 1995).
- Review of the project by the academic community at large via a set of Web pages.

The presentation of the Knowledge Framework and design activities has, through the above activities, resulted in comment from approximately 30 people. This section presents the issues and criticisms raised during evaluation of the design process.

Of these various evaluation activities, the feedback via the Web Pages was perhaps most disappointing because of the low level of participation. In a future project, Web based evaluation would require the commitment and involvement of participants from the early stages of the project. Nonetheless, the comments received via this route were useful and constructive. The other means of evaluation, described in this chapter, were more effective in achieving the depth of review needed to meet the aims of the research.

13.3.1 Evaluation of the Knowledge Framework

Feedback on the research has been generally supportive and favourable. The Knowledge Framework has been said to provide a relatively comprehensive description of the knowledge domains that support design practice. The content and detail of the framework has been refined through the duration of the project. It was felt
that the framework offered an effective summary of the research, the knowledge involved in design practice, and for identifying the learning needs of the target audience. The following comments were received as feedback on the research Web pages:

“It is useful to see how the different elements [of the Research Framework] build the learning you have gone through and also the learning that prospective mothers will go through …”

(Web page feedback, Participation 5)5

“… the research map provides an excellent summary for describing the different elements of the research. For me it would be interesting to see how this could be used for participants on our courses to present their portfolios …”

(Web page feedback, Participation 4)

“Many thanks for your incredibly informative project. I am especially grateful for your Research Map (for I am a "visual" thinker) and for its thorough discussion of theoretical models.

For me, your analyses put into perspective why the basic MLE's that I've been in my French lit courses using have been successful. Nothing fancy here, just interactive course syllabi with links to background texts, student PowerPoint presentations and online forums for structuring knowledge and facilitating peer learning.

In short, you have given me the necessary background to think more critically about my pedagogy with respect to constructivist and objectivist paradigms.”

(Web page feedback—via email, Participation 6)

Criticisms and questions about the assumptions brought to the project, and the knowledge held within the Knowledge Framework, covered a number of issues related to the social dimension (Chapter 5) and multimedia design (Chapter 7). These can be summarised as:

- a need to define the term interactive drama more explicitly;

- the need to better explain interaction possibilities within interactive drama based MLEs;

- how the different areas of knowledge and expertise interact to form interdisciplinary—rather than multi-disciplinary—design.

The suggestion that there had not been an adequate definition of what is meant by interactive drama is, perhaps, caused by the gradual evolution of the concept amongst the people within the project. It may be, that the lack of an explicit definition early in the project was one of the reasons why the possibilities for exploiting dramatic theory emerged relatively late in the project. This weakness has been redressed by reviewing the discussion of interactive drama in Chapter 7, and during later evaluation (Section

5 The term ‘Research Framework’ was used in the developmental stages of the research and later replaced by the term “Knowledge Framework".  

Page -221-
13.4). The following elements (drawn from theory described in Section 7.2.2) are of particular significance in the development of this definition:

- The different chronological and spatial interrelationships, and interactions between characters, objects, environments and users within an interactive environment.

- Davenport's (1996b) discussion of storytelling provide another element.

- The definition of drama given by Laurel (1993).

- The structural, control and interactive fiction models taken from Project Oz (Kelso et al, 1992; Mateas, 1997; Smith & Bates, 1989; Bates, 1994).

The definition of interactive drama used in this research may be stated as:

\[
\text{The presentation of character based situations and interactions set within an environment built from media based spatial-chronological constructs. Action is portrayed through essentially real-time episodes, and the representation of events, and viewpoints, are influenced through the actions of an audience by means of interface technology.}
\]

The interconnections, and navigation, between individual dramatic scenes forms a narrative for the audience. The flow of the learning experience is formed from a combination of engagement with the drama, generation of narrative, and exploration of supporting information resources and learning activities. The second area of criticism, in this part of the evaluation process, concerned the way in which users could interact with the MLE. It was said, by an interactive media designer, that the modes and mechanisms of user interaction had not been described clearly enough.

"Thank you [...] for... this fascinating research. My own perspective on the subject leads me to ask that you more clearly define the concept of interactivity. Clearly all media is interactive if you're able to turn the page, change the channel, leave the theatre. All it means in this too-broad sense is that any action by the user alters the information flow. [...] I believe the keys to effectiveness of this medium are subjectivity and immersion."

(Web page feedback, Participation 3)

These issues have been discussed in some depth in Chapter 7 and explored through development of prototypes in Chapters 11 and 12. The most appropriate interaction methods for interactive drama have been discussed from the user's viewpoint in Section 13.4. Turley et al (1998) has described a four level model that represents the types of interaction employed in the prototype interactive drama materials. The four levels are:
1. *Whole Scene* interactivity enables the viewer to sample the same scene played out in different ways, through choices of emotional stance or desire for a particular type of action (e.g. positive or negative). This has been included, in Section 12.5.1, Experiment A.

2. *Point of View* interactivity enables the viewer to take the viewpoint of one of the characters, or an objective, fourth-wall, viewpoint in a scene. This has been shown, in Section 12.5.2, Experiment B.

3. *Soliloquy/interior monologue* interactivity enables the viewer to 'select' an individual character, to enable the user to hear the character's inner thoughts. This has been included, in Section 12.5.3, Experiment C.

4. *Expansion of information* interactivity enables the user to select hyperlinks to discover more information through special topics and guidance points. This has been represented in the functional prototypes of Chapter 11 and in, Section 12.5.1, Experiment A.

The final area of question, relating to the development of the Knowledge Framework, concerned the way in which the areas of knowledge merged to yield the benefits of interdisciplinary design activities. If the contribution from different areas of expertise were to have clear-cut demarcations, and the resulting design is seen to be the sum of individual contributions, the project could be described as multi-disciplined. Where there is greater interaction between different disciplines, producing unexpected emergent characteristics and features, the project is interdisciplinary. The specialisms of people involved in the research are described in Appendix I. The work in this research has a strong interdisciplinary quality, with expertise drawn from the fields of learning technology, HCI, drama and acting, and media. The research and design work have been shaped by input of a wide variety of skills and abilities, debate and discussion. This has resulted in the assimilation of alternative viewpoints and approaches to create the Knowledge Framework, exploration of the use of theory (described in Chapters 3 to 9), and the design of the prototype materials (Chapters 10 to 13). The ideas and methods for design practice, that have grown out of this research, enabled the development of new interpretations of theory and it has enabled that theory to be applied in new ways. The work that has been completed could not have been done from a single disciplinary perspective. Neither would it have been possible if participants had not moved out of their own disciplines to tackle new areas of experience and creative practice.
13.3.2 Evaluation of the design process

The design models and methods presented have also been given qualified approval by the practitioners who gave feedback on the design project. There have been many questions and criticisms offered during the evaluation process. However, it was said on a number of occasions that little design work had been seen to compare with the work carried out in this research. For example one of the people reviewing the project said:

"I work with a cable company and they have been looking at interactive TV, and what they have done is so poor, they just haven't thought anything through. Whilst I really don't like your analogy with soap opera, what you have done is almost perfect in comparison to their ideas."  

(Participant 17)

From the designers' perspectives the decision to base the interactive drama around a soap opera analogy raised concerns in terms of the prescription of values and stereotypes that this implies. It was argued that whilst the needs and personalities of each parent will be unique, the drama assumed that users' could be easily represented within a small set of scenarios and stereotypical characters. There was also some concern on how the drama would be interpreted and what messages would be delivered from the drama. Linked to this criticism, were questions of what information and learning should be included in the design of the MLE and interactive drama.

These concerns and questions go to the heart of the project, and relate to many of the elements within the Knowledge Framework. The use of the soap opera analogy was decided upon as a model that would have appeal for many parents. Rather than being thought of "the lowest common denominator", as Turley refers to it in Section 13.2, soap opera was adopted as an accessible, and stimulating, form of drama. One that can be exploited in a wide variety of ways to deliver the parasocial involvement, gratification and learning that have been described in Chapters 4, 6, 7 and explored at a practical level in Chapter 12. The characteristics, content and interpretation of soap opera as a medium of entertainment and education has been described in Chapter 6. These characteristics can be used in a number of ways to focus upon the portrayal of characters, the nature of relationships, personal dilemmas and their resolution. It does not necessarily demand the sensationalism, and endless twists in plot, of some long-running soap operas.

---

6 Concerns and criticisms of the soap opera analogy, from the users' viewpoint, is discussed further in Section 13.4.
Some of the concerns and questions of those evaluating the project were resolved during a workshop (Rogers et al, 1999) involving designers and HCI specialists. During the workshop the possibilities of dramatic representation, as a medium for reflection and learning, were graphically illustrated through participation in a number of dramatic and role playing exercises. These introduced participants to the three dramatic paradigms (described in Section 7.1) and the portrayal of human experience, relationships and emotions, represented in the development of interactive drama prototypes (described in Chapter 12). It was generally agreed that the different paradigms provided an effective means of representing humanistic learning experiences by:

- portraying events from different perspectives;
- providing different emphasis on the way messages are communicated;
- providing different approaches to learning and the generation of vicarious experience, where:
  
  ⇒ *realism* seeks to evoke a suspension of disbelief, emotional engagement and responses to drama,
  
  ⇒ *objectivism* seeks to produce an intellectual analysis of the drama and reflection on the personal, moral, social and political implications,
  
  ⇒ the *spect-actor* actively participates to understand the power relationships, personal stances and attitudes of characters, and to resolve problems and 'oppression' through practical experimentation.

Whilst Simon Turley has been self critical of his script, the work has shown that it is possible to create characters and interactive drama that are likely to engage an audience. It has also shown how supporting information and learning resources can be built in to an interactive drama based MLE. Sabido’s education-entertainment method (described in Section 6.1.3) provides a method to identify learning need, and embed educational messages and information into a soap opera format. Whilst not explicitly used in this research, a similar approach to Sabido’s can be identified. The approach described in this research enables the development of interactive drama with an integral learning message. It is an approach that has the aim of transforming audience perspective through vicarious experience and parasocial involvement.

How the information content, used in the learning materials, was developed is described in Chapter 10 and 11. The design of the MLE and interactive drama
prototypes has attempted to balance the concerns and interests of parents with the information and experiences (defined by literature and expert advice) that they are likely to encounter. The opportunity to break the 'oppression' of top-down information delivery and institutional regulation, to empower learners, has also been identified through the user centred problem solving perspective of the spect-actor paradigm.

The engagement or involvement, and the suspension of disbelief, that is needed to give interactive drama some sense of reality for the user, raised a further question from a number of designers. This concerned the mechanisms for interaction that are used in the prototype materials, and in a full product. In terms that echoed the comments made by Turley, in Section 13.2, the effect of using a mouse to direct interest was thought potentially to refocus attention upon the technology rather than the experience within the MLE. The issues of technology platform and interface design are considered in Section 13.4.

A final area of comment, from the designers' perspective, relates to the expertise and thought processes involved in creative design practice. It was felt that there was an opportunity to extend the different conventions and models of representation considered in the project, and draw upon alternative patterns and techniques of communication to present the information, drama scenarios and learning. The extra conventions and models suggested include: magazines (especially those aimed at women, parenting and health issues), TV commercials, and documentary forms. Some of these issues have been considered in Chapter 6, in relation to the nature of soap opera, and characteristics of medical documentaries and drama, and other forms of human interest drama. It has also been discussed in Section 9.1.4, in relation to the expertise and wisdom that inform design, using examples of genre and characteristics of design employed by notable names in film and TV drama.

Examples of distinctive creative vision and insight were seen as an important part of successfully forming the subtle qualities that make the media product, and that make an audience's experience, memorable and rewarding. As described, in Section 6.1.2, the gratification that is received from a media product will have an instrumental affect upon the continued use, and learning that may be acquired, from a product. The extent to which the design ideas and creative practice may fulfil the expectations and learning needs of target users is considered in the next section.

13.4 Evaluation from the user's perspective

The formative evaluation of the prototype MLE and interactive drama materials were completed through two focus groups. They were run to find answers to a number of questions, relevant to the evaluation of constructivist learning, described in Section 8.5. These were adapted, to suit the needs of this research, as follows:
• How relevant and useful are the prototypes in terms of meeting the needs of parents?

• How well do the materials support the building of knowledge, humanistic learning and the rehearsal of decision making activities?

• To what extent are the representations of the MLE and interactive drama in context with the reality of pregnancy and childbirth?

• How well are socially created values and approaches to humanistic learning accommodated?

• What values are placed upon multiple viewpoints, inner thoughts and different outcomes to the drama?

The two focus groups, involved eight women, selected to provide a range of ages, backgrounds and experiences. Their age range extended from teenage to early forties. Two of the women had children, the remainder had no children. The experiences of pregnancy (of the women without children) ranged from none to some involvement in the pregnancy of a sibling or friend. The women were encouraged to be critical of the project, and present their own views, concerns, experiences and ideas. It was decided to use exclusively women, to encourage more open discussions of their experiences, concerns and opinions. Several of the women were also selected because of their personal and vocational experiences, to enhance the quality of criticism and evaluation. One of the women had knowledge of ergonomics and had some knowledge of the project, another had an interest in learning theory and the use of learning technology, a third had experience of helping the long-term unemployed into work experience, and a fourth had studied drama and acted. The focus groups were organised into three stages:

• Discussion of the concept and processes of humanistic learning;

• Evaluation of the prototype MLE and interactive drama materials produced in this research;

• Development of ideas for improving the design features in the prototypes, and their application to humanistic learning, by looking at media techniques used in film and TV.
13.4.1 Discussion of humanistic learning

The explanation of the concept of humanistic learning was developed through the definition of the term, and semi-structured discussion, based upon material included in Chapters 3 and 4. The participants’ experiences were then explored, through a brainstorming exercise, to identify the main sources and influences upon their learning. It was considered important to put to one side the notion of learning as a syllabus based education or training programme, and to focus upon learning in the wider context of life experiences.

The outcome of the brainstorming exercise was a set of example humanistic learning experiences. These were experiences and factors that the women felt had contributed to their life development and abilities. These examples can be categorised as:

- **Parental and authoritative relationships.** These are the relationships that provide the basic standards of behaviour and motivations to survive in life. Examples put forward included the discipline and social skills instilled by parents, and expectations for love, support and encouragement that motivate people towards achievement.

- **Social, cultural and institutional frameworks.** These were identified as providing normative standards of behaviour, moral codes and values. These frameworks come from institutions that include families, schools, state and legal systems, religious institutions and employers.

- **Peer group involvement.** The inevitable involvement in a number of different friendships, educational, vocational and professional peer groups were said to instil informal social rules, values and beliefs.

- **Social experiences.** These are the experiences through which people build relationships and interact with others. Social experiences may be as simple as a simple acknowledgement (e.g. someone saying ‘good morning’), a longer interaction such as going to the beach, or spending time on a common interest or hobby. Alternatively it can involve more formal experiences such as learning to play an instrument or a team sport.

- **Behavioural cues and emotional responses.** Such experiences are encountered in the form of positive behaviour and response, such as comes from a show of affection. It may come in a negative way through an act of aggression or spite. It may also result in unexpected learning, such as an unwanted act of affection leading to a backlash.
• **Curiosity, experimentation and competition.** These are the self-motivated ventures into the unknown, or the use of existing skills that are used in spontaneous ways. It may be motivated by some environmental factor, a spontaneous personal urge or the desire to match the act of another. Examples that sit within this category include an attempt to climb a tree simply to see if it can be climbed, or an impromptu race between two friends.

• **Communication.** This category relates to the means of finding out new information and sharing knowledge. It relates to things found out from different media forms, from conversation with others, or from a professional consultation (e.g. with a doctor, bank manager etc.).

• **Life-cycle experiences.** Different stages in life involve new life experiences (such as a first period, first serious relationship, first job, having children, marriage, retirement etc.). These were seen as important learning experiences that transform personal perspective.

• **Formal educational experiences.** These enable the development of intellectual skills that inevitably affect an individual's life experiences, abilities, and potential for success. Examples include the development of literacy and numeracy skills, and problem solving skills.

Such examples of learning experience are, of course, influential in unique ways for each individual. They are reliant upon the individual circumstances of each person. The effect of such influences can be significant at a very low level, such as the personality of the people involved, and the nature of individual relationships. For example, two of the participants found they had very different experiences of their sibling relationships. One of the women (Participant 11) said that a sibling, several years older, had been an important role model and close friend. A second participant said that her experience, with a similar age gap, meant that she had felt like an only child (Participant 16). Another example is the onset of puberty, where one woman said how significant her first period had seemed (Participant 13). Whilst another said it was not something she could particularly remember (Participant 14), and that puberty seemed much more of a gradual transition her.

This part of the evaluation process resulted in the development of a common understanding of the kinds of complex learning that this research is concerned with. It highlighted the kinds of issues that were pertinent to the evaluation of prototypes, and helped to focus the evaluators upon the needs of users rather than the novelty of the MLE and interactive drama prototypes.
13.4.2 Evaluation of the prototype learning materials

The evaluation of the prototype learning materials involved a number of activities. It began with an introduction to the project by the facilitator (author), including a brief summary of the Knowledge Framework (shown in Figure 9.2), an introduction to the project (drawn from Chapter 10 and 11) and the MLE structural model (Figure 11.1). This ensured that the purpose and goals of the project were clearly identified for the participants.

Evaluation of the functional prototypes (described in Chapter 11) was carried out using a walkthrough technique, loosely following the approach described by Bias (1994). The prototypes were presented, and the methods for interaction were questioned and discussed. The design features, interaction methods, and navigation routes were considered and explored collectively by the participants. Learning issues were discussed as an integral part of the evaluation referring back to the categories of learning experience, developed in the last section, as and when necessary. Questions were answered by the author and the reasons for particular design decisions were explained. The evaluation of the interactive drama (described in Chapter 12) followed a similar approach, employing a combination of video clips, the materials presented for evaluation on the Internet (shown in Appendix G) and the interactive drama scripts (shown in Appendix D). The specialist expertise of the participants was drawn upon to consider the user’s perspective, the difficulties that they may have in using the MLE and interactive drama, and the learning they are likely to derive from it.

The prototype materials were given a positive review with many supportive comments about the intentions, functional characteristics and use of drama as a learning medium. However, there were also many concerns and questions about the specific content and design of the prototype materials.

There was some concern that the target users for the product had not been defined well enough. The scripted scenarios seemed to have concern for the experiences and decisions of Denise, the teenage mother character, yet the information content was more open in focus and used the example of Jayne (the working mother character). This criticism is accepted, with the qualification that the prototype design process was exploratory and intended to represent a selection of samples from a much larger product.

There was an interesting difference in the perception of the products between the older and younger participants. The older participants could see the advantages in development of the product as an exploratory product aimed at young women, looking at the issues and dilemmas of pregnancy. They felt that it would allow privacy and a resource to find answers to questions they would normally be reluctant to ask, that it
would enable them to find out the views of someone who had been through the experience, and improve their confidence by equipping them with relevant knowledge. Unfortunately, whilst the youngest women could see advantages in the purpose and motives of the product, they had reservations about their own use of it. A primary issue for them was that they simply did not imagine themselves getting pregnant, therefore the product had no relevance to them. They were also concerned about the privacy that may be afforded them, and whether their use of networked learning materials could be traced back to them. Finally, they felt uncomfortable about the notion of exploratory learning. The idea that learning needs to have given objectives, tasks to complete, and lessons to learn was a very strong in their interpretation of the learning materials. These are clearly important issues that would need to be considered in terms of the design of materials, development of learning content and the promotion of the materials for a younger audience. It may be, that for younger women, the social and emotional context of discovering a pregnancy needs to be a central part of learning experience to encourage them to use, and reflect upon, the resources within the MLE.

The contrasts in these comments suggests differences in learning that are age-related, dependent upon social relationships and the expectations of what it means to learn. For the younger women, learning is a process that is very much tied into the institution of the classroom, formal education and instruction from an authoritative figure. More mature women placed their learning experiences in context with their life experiences, personal relationships and the examples of others, and the need to find things out from wherever information can be sought. Perhaps the cognitive apprenticeship model, as used by Smith (1996), would be useful in supporting some users to enable them to become more active participants, rather than passive recipients, in the learning experiences offered. Similarly Boal’s spect-actor concept would promote reflection and affirmative action towards the resolution of a problem.

There was a more positive response from one of the participants, who in her mid-twenties had more experience of the world and was more accepting of the learning approach adopted for the learning materials. For her, the opportunity to explore and follow her curiosity of the topic was a significant advantage. She said:

"I would definitely use those learning materials if I was pregnant. I like the availability of all the information in one location, and the ability to choose what I want to see."

(Focus group, Participant 13)

The integration of a wide variety of information into a single environment was considered to be of much benefit by all the participants. The use of a single Web site or CD-ROM learning environment were seen to be accessible and relatively simple to operate. However, the use of a computer was seen as a potential problem for many parents, who have no knowledge of computers and relatively low levels of literacy.
One of the women, a regular computer user, also cautioned the use of the Web because of its high reliance of screen based text. There would seem to be a dichotomy between the aims of the project and the delivery platform (which perhaps will be resolved as interactive TV, DVD and other technologies become more developed).

There was also some discussion of how much information mothers need to know: “Do mothers have to absorb so much information?” one of the women asked (Participant 11). However, it was also said, that the system had advantage of always being accessible, so that information could be sought in manageable chunks whenever it was needed. The concept of the ‘push’ delivery of information from television and other conventional mass media, and the ability to draw upon information, as required, when using interactive media perhaps need to be reconciled. This would allow presentation of essential knowledge, supported by additional learning resources and information that may be accessed according to user interest and need.

There were few specific criticisms of the interactive drama experiments. They were found generally acceptable, although the use of inner thoughts7 during the course of the drama was not found to be particularly useful. The experiences of parents and professionals within the supporting information structures were more appealing ways of considering the concerns and motivations of prospective parents. The thoughts of ‘real people’ were thought to offer a better way of showing personal opinions and emotional responses to the inexperienced.

The ‘fun’ and ‘enjoyment’ characteristics of using an interactive drama were seen to be important motivations for its use by all participants. The ability to control characters and move between stories were noted as being particularly pleasing features for the user. Most of the participants also liked the possibilities for exploration of environments, and the concept of expressing their feelings within a situation. Participant 11 also commented on the different types of experience that come from factual and fictional elements. She valued the interplay, and contrasts, between the documentary approach of factual materials and the more personal nature of drama. Whilst not used as an explicit term, this would seem to suggest that the phenomenon of parasocial involvement (discussed in Chapter 6) also has relevance to the use of interactive drama.

The concept of rehearsal in preparation for personal experience were not raised as a primary interest or concern. However, one of the participants commented that her priorities for using a MLE would be to:

---

7 See Section 12.5.3.
A comment from the research Web pages, taking a user's stand point, also supports this statement:

"Having the ability to actually decide in the future how different scenarios may unfold as a result of interactive TV will allow the learning issues involved to become more developed for the individual."

(Web page feedback, Participant 1)

There was a general interest in finding out about the lives of other people and how they coped with interesting situations. These were seen to be important aspects of the gratification received from using interactive learning and drama materials. Most participants felt that being able to talk to their friends about their use and experience of the interactive drama was an important extension of its use.

The use of interactive drama was thought to be an attractive and beneficial way of delivering a learning experience. The participants found it generally useful to follow a character going through different experiences and sources of information. It was thought to be a potentially good way of keeping attention, and was described as "engaging" and "absorbing". This supportive view was, however, moderated by a note of caution by a requirement to see a full product before it would be given full approval.

13.4.3 Future directions and improvements

It was decided to review how the participants used conventional media and look at examples of soap opera and human interest drama (including a number of examples discussed in Chapter 6). This was done in order to identify improvements in the humanistic learning features included in the interactive drama, look at improvements in the design, and consider possibilities for future research.

To begin this part of the evaluation, a presentation introduced the possibility of moving the interactive drama concept away from the computer, and towards a TV paradigm. Developments in DVD technology, cable TV services and Web TV were raised as ways in which the types of learning experience, presented in the project, could come to fruition. The use of the Panasonic portable DVD player or a laptop multimedia computer were also raised as more fitting and convenient forms of technology for humanistic learning applications. These possibilities were thought to more attractive than the hard technological impression given by a desk-top computer.
The participants were asked if they watched soap operas and what they thought of them. Only one woman said that she did not watch them and that she disliked them. Several of the women watched two or more. All of the participants had strong opinions about them, and were able to identify the ones that they liked best or that they found most objectionable. There was a general consensus that a significant minority of people viewed soap operas as being real, and that they become very involved in the lives of the characters. They also felt that there was a strong obligation for a moral code to be written into the soaps because of their influence on individual and cultural values. It was also said that watching a soap character's dilemmas could be like watching a friend going through an experience. An example was given on the research Web pages of how this may occur.

"EastEnders has televised several episodes where only two characters have had a dialogue, set in a particular scene. On each occasion I have watched these I have found this style of drama to be quite effective in allowing you to become really immersed with the particular situation. The episodes in question have usually been a result of a well developed storyline which has reached its climax. This way of using drama is quite a gripping one and has held my attention throughout.

One of the episodes I remember involved Dot Cotton and her son Nick. This particular storyline had been running for quite a while, being re-visited from time to and in this particular episode, it reached its climax. Nick had slowly been poisoning his mother and she had become more and more poorly, but he had dissuaded her from going to the doctors. In this episode, she confronted him with her suspicions. Throughout the 30 minutes, a range of emotions were expressed by both characters. For example anger, denial, disbelief, fear, submission, contempt and resignation."

(Web page feedback, Participant 1)

Such sentiments would seem to confirm the research on the strong affinity of the public for soap opera, and the parasocial involvement and gratification phenomenon cited in Chapter 6. The style of soap opera, and other human interest drama, were said to be important in the sense of involvement and emotional responses. EastEnders, produced by the BBC, was identified as being the most realistic and engaging. Whilst others, notably those that are imported for daytime consumption, and meet the Cantor and Pingree (1983) definition of soap opera (cited in Section 6.1), are considered to be lightweight and for entertainment only. The accuracy and representations of characters and learning content was also raised as a concern. The accuracy of medical dramas and stereotypes used in Police dramas were given as particular examples for which an audience may be misguided. The ethics and morality of communicating sensitive issues from a particular viewpoint (and within a drama format) were raised as a point of concern. The potential for misinformation and disinformation were thought to be a risk, but it was agreed that the reflection that drama can promote has value in making people think about personal circumstances and issues.
The characteristics that make EastEnders credible are the characters who, it was said "feel like someone you know" (Participants 13 and 15), the wide age range and different backgrounds of the cast, the developments within the story, a sense of realism in the set, the entertainment value of the programme and the narrative hooks that continue to grab attention. It was felt that there was potential to exploit such characteristics to enable learning that challenged emotional and personal values, providing the issues were not forced upon the audience. One of the women said that it was possible, when watching a good drama, to "immerse yourself experiencing something 'safely'" (Participant 11). It was agreed that the use of new technology to offer alternative viewpoints and interactive experience was useful, but there was some uncertainty on how much advantage it offered. It was also said that part of the drama experience was a sense of being taken along with the pace of the story. A view that agrees with the comments of Turley in Section 13.2 above. The relationships between vicarious experience, interpretation of drama and narrative, and the way in which information systems are searched was clearly identified as an area for further research.

Another issue that was raised in the discussion of drama, was the impact of fly on the wall documentary which were valued with a certain amount of ambivalence. They were seen to have a high appeal, considerable impact with particular subjects (e.g. animal and medical topics), and yet they were seen to considerably distort reality. One of the women enjoyed 'docu-soap' style of programmes when she first started to watch them.

"I liked the 'real' programmes, fly-on-the-wall documentaries, when I started watching them. Like the one of about the Liverpool Hotel. Then I stopped watching when the characters stopped being themselves."

(Participant 12)

The popularity of talk shows were also suggested, by the women, as another avenue for delivering information. However they were considered to be sensationalist and exploitative of the audience. The younger women also mentioned their enjoyment of magazines for both their visual content and the topics they discussed. That they were brought into the discussion, would seem to support the suggestion by a design professional (in Section 13.3.2) that alternative media models should also be considered as a format for MLE design.

To conclude the evaluation, the participants were asked to consider the appropriateness of the examples shown as interactive drama. The hook of good characters, and issues of importance to the audience, were said to be essential ingredients for their use. This concurs with the comments on the importance of characters in drama and interactive drama, discussed in Section 6.1.1 and 7.2.2. It was thought that the use of different perspectives, and experiences of different characters, would be "really useful" in
reflection upon their own situation and seeing a partner's perspective. It was felt that it would “help where misunderstandings occur”. The idea of “moving from room-to-room” in the prototype materials was referred to in relation to the development of interactive drama as being a useful feature. It was felt that it would offer a way of building context for the audience and exploring different personal issues through the portrayal of others. However, it was also thought that the events in a drama may be more difficult to track, especially for people with no experience of computers. Referring to the design project, it was said that, “… as it stands, it would appeal to a working woman used to computers.” It was felt that to make the most of interactive drama, the technology should be easily available, affordable and allow the ease of interaction that matched use of a TV or video remote control. Such a device, it was agreed, would need mass appeal and investment from media producers and consumer electronics manufacturers. Despite the attractiveness, of the concepts of interactive drama based MLEs, HCI issues and impressions of the technology were a clear inhibitor to their take-up and demand greater attention in future research.

It is clear from this evaluation that the use of interactive drama can provoke reflection on personal situation or the situation of a character portrayed. It would seem that the experience of others, portrayed through drama, can provide a vicarious experience for users. This, combined with the possibilities to explore different viewpoints and different perspectives, can draw an audience into an active learning process involving intuition and emotional response assimilation of information and opinions. The ability to explore the MLE environments to engage in learning activities and source information in a naturalistic environment were felt to be of benefit in supporting women through vicarious experiences. Personal expectations of learning and experiences of life and perceptions of computer technology would seem to be key factors in the adoption of this kind of learning media. In particular, the technological barriers, of system responsiveness and intuitive interface, need to be reconsidered and resolved before many people would adopt such a system.

13.5 Summary and discussion

The evaluation has considered the viewpoints and opinions of people involved in the project, of practising designers and of people that may use such a project. This has formed a comprehensive review of the usefulness of the MLE design concept, the content of the Knowledge Framework, and the activities and issues that emerged from the design process. Whilst there have been many constructive criticisms, and ideas for improvement or alternative approaches, the work has been given general acceptance.

As the research developed, it became clear that the most significant design issues were growing from a number of MLE and interactive drama characteristics. These include:
the capability of the interactive drama to inform decision making;

the potential to represent emotions and interpersonal experiences through the use of interactivity, drama and media techniques;

the linking of the subjective and experiential aspects of pregnancy to formal information structures and simulations.

These characteristics need to be matched against the media expectations and literacy (textual, visual, computer, etc.) of the target users. Given that for this project, the breadth of experience and abilities could be as wide as the population, the representation forms employed need to be universally appealing. The creative use of techniques drawn from soap opera, or human interest drama, and supporting theory would seem to offer an effective solution for such needs. However, there due regard needs to be given to HCI and technological issues, as well as the creative and communication needs of using interactive media.

The prototype materials used to evaluate the design, and concepts of humanistic learning, were seen to offer advantages for meeting the needs of the target audience. The development of linking the spatial environments and interactive drama with supporting information seemed to work well in providing a learning experience with support from more objective view on the topic. The linking of the ultrasound simulation in with the functional prototypes (Section 11.3) and interactive drama experiments (Section 12.5.1) were particularly well received. The links from the home-birth environment (Section 11.3) to 3-D graphics, identifying the basic equipment requirements for having a baby at home, were thought to be an ideal way of supporting the experiential learning with useful information.

The interrelationships between underlying information and unfolding drama needs more detailed research, to understand the way in which can be effectively structured and when and how they are made available to the user. For example, if a user decides to access supporting information in the midst of an important drama episode during difficult decision making, the question arises of the extent to which the experience will be disrupted.

The extent that the dramatic representations, in the prototype materials, match the realities of pregnancy and childbirth, are not conclusive. It would be necessary to create a full product and complete a summative evaluation to be sure. However, it can be said that the idea for using such media would seem to have attractions for users and is seen to have potential advantages by the practitioners involved in the evaluation process. It can also be said that the personal values, and emotional issues, were seen as important and necessary characteristics to include within a MLE, designed to
involve users in a humanistic learning experience. Interactive drama is seen as a powerful means of portraying such experiences that an audience can involve themselves in and learn from. To these ends the need for realism is seen, by users, as an essential element. Perhaps, the use of other dramatic paradigms offer a means through which designers can challenge assumptions, and provide support to help users towards the solution of their problems.

The use of drama has been shown to draw the attention, and sustain the interest, of the users involved in the evaluation. The illusion of a social setting and the dimensions that are created by effective writing and production, yields the opportunity for reflection and consideration of complex issues and difficult dilemmas. The universal appeal of TV provides the preferred paradigm for such applications. The development of interactive consumer technology would seem to be an important requirement for providing a conducive learning environment.

One of the difficulties, in evaluating the learning contribution that interactive drama can make to a MLE, is that its success is tied up in the creative content and production qualities of the media. It is clear that learning activities, media message and personal and emotional responses to such learning materials need to be considered holistically if they are to be understood. This is, perhaps, not surprising because of the strong social and experiential emphasis placed upon the concept of humanistic learning and in the design of interactive drama. However, it can be said that there was strong appreciation of the purpose and value of humanistic learning within the focus groups. The additional features of MLEs were considered to be useful features to support knowledge development, vicarious experience building, and thus engender the reflection and debate necessary to help people make informed choices. It is apparent that these features, such as searchable environments, the portrayal of human experience through interactive drama, and the provision of supporting learning resources, need to interplay with each other to deliver greatest advantage.

To further develop a deeper knowledge of how these learning and media issues interact, and the extent to which they enable empowerment and transformations in personal perspective, is likely to require:

- the development of complete media products;
- comparisons between technology platforms and interface designs;
- the development of improved evaluation methods.8

8 Ethnographic methods, such as those used by Liebes & Livingstone (1994), or techniques drawn from grounded theory methodology (Strauss & Corbin, 1998) may be useful in this respect.
Research into the theoretical perspective and the development of prototype materials has produced an understanding of the design and creative processes for MLE, and interactive drama, design. This process has produced many new questions and avenues for further research. The possible implications of the research, and a review by a medical practitioner, are discussed further in the final chapter.
14. Conclusions: incorporating a rich knowledge model into the design process

To bring this work to a close, this chapter revisits the research question and brings together the two halves of the conceptual design model, integrating the Knowledge Framework (Chapters 3 to 9) with the Design Process (Chapters 10 to 13). It considers how the model can support design practice by describing, stage by stage, how theory within the Knowledge Framework may be employed in the Design Process. The benefits of MLEs and interactive drama used to meet humanistic learning needs are reviewed and possibilities for the development of fully implemented products are considered. Finally, possibilities for how the work may be taken further and a number of questions for future research are suggested.

14.1 Introduction

This research has addressed the question.

*What framework of knowledge and design processes are needed to develop MLEs using interactive drama for humanistic learning?*

The result of the research is a conceptual design model for the creation of MLEs using interactive drama to meet humanistic learning needs. This two part model comprises the Knowledge Framework and the Design Process which have been explored through the development of prototype learning materials and interactive drama on the topic of pregnancy and childbirth. The Knowledge Framework is a representation of the multidisciplinary knowledge sources which support the design of MLEs for humanistic learning applications. The Design Process provides a description of the phases of design that are involved in a practical design project of this type.

The convergence of multidisciplinary knowledge sources on a practical design project has led to the emergence of an interdisciplinary comprehension of design issues and solutions. Participants in the Design Process have been taken beyond their source disciplines into the understanding of what may be possible with interactive drama for humanistic learning. This cross fertilisation of ideas has produced new perspectives on MLE and interactive drama design. The research has been reviewed and given constructive criticism from a number of perspectives, as described in Chapter 13. These formative evaluation activities have included reflection by the author as designer, reflection and review by the interactive drama scriptwriter, and constructive criticism by practising designers and members of the academic community. The evaluation of the outcomes of the design activities, in terms of their potential for delivering
humanistic learning experiences, have been conducted from the end user's viewpoint through the use of focus groups.

The research has focused upon the processes of design rather than the evaluation of a completed learning product. The research methods employed have been described in Chapter 2. The research question has been addressed through the exploration of the Knowledge Framework, in Chapters 3 to 9, and the design of prototype multimedia learning environment (MLE) and interactive drama materials described in Chapters 10 to 13. The work culminates here in a generalisable conceptual design model.

A crucial factor in the evolution of the conceptual design model has been the interdependency between the Knowledge Framework and the Design Process. The experience of the designer, and reflection upon the process of design, has inevitably guided the direction of the academic research. Conversely, the practical design work has also been informed and structured by the theory and literature contained within the Knowledge Framework. Figure 14.1 shows how the two parts of the conceptual design model come together, with the Knowledge Framework being continually drawn upon and influencing activities within each phase of the Design Process. Section 14.3 summarises how the conceptual design model has been applied. The form and structure of the resultant design model is not intended to be a rigid construct, but one that is flexible enough to meet the needs of individual projects and designers.

Using a combination of observation, participation (reflective practice), and other qualitative research methods, the following phases of design have been studied in the research:

**PHASE 1.** The requirements analysis phase (described in Chapter 10);

**PHASE 2.** The prototype and interface design phase (described in Chapter 11);

**PHASE 3.** The creation of interactive drama materials (described in Chapter 12);

**PHASE 4.** The media implementation phase (described in Chapter 12);

**PHASE 5.** Formative evaluation (described in Chapter 13).

These phases provide the sequence for the explanation of the conceptual design model in Sections 14.3.1 to 14.3.5. This is preceded in 14.2 by a review of the main issues for design practice which the model seeks to address. Sections 14.4 to 14.7 conclude and reflect on the findings of the research.
14.2 Issues for design practice

The development of this approach has produced a number of findings that contribute to the understanding of effective design practice. These findings emphasise the creative advantages gained from the different specialisms and expertise involved in the MLE design process. These findings may be summarised as:
• The development of subject matter materials, for humanistic learning applications, are enhanced through attention to social and emotional context of a learning experience. It is important to understand the different interpretations given to events, activities and information involved in the learning experience, as well as the accuracy of factual and procedural content of learning materials.

• The holistic nature of the design process demands the development of a common working model, through which the design team can build and elaborate their common understanding of the design activities. In this project the concept of the soap opera (Section 6.1) has been employed as the common model for the development of interactive drama, whilst the MLE prototypes were used as an external artefact (Section 3.3) to develop a common model of the structural and functional possibilities of the design.

• The analysis of the requirements of humanistic learning, in terms of learning, psychological, and social processes, needs to be paralleled by the development of suitable drama and narrative models. These models should enable the creation of a reality for MLE users to engage in and sustain their active interest. They need to consider the spatial dimensions of interpersonal relationships, as observed in rehearsals (Section 12.4) and developed into the changes in viewpoints and character perspectives, as illustrated in the interactive drama experiments (Section 12.5). This research has adopted the realist paradigm for the development of these features (described in Section 7.1). However, reflection on the project has also suggested that there is much to be learned from exploitation of the objectivity engendered by the Brechtian approach to drama, and the participatory problem solving of Boal's spect-actor paradigm.

• The research has also looked at the requirements for use of drama models in combination with narrative models, such as those identified in Chapter 7. They include story architectures such as those developed for the OZ System (Figure 7.5), and the narrative models identified by Garrand (Figure 7.7 and 7.8). This research has developed drama models around the structural elements shown in Figure 7.4, and adapted Garrand's narrative models (as described in Chapter 11 and 12) to develop the prototype materials. It has also produced the spatial-chronological relationships shown in Section 12.5.
The use and development of design models and methods has emphasised the huge work requirement involved in the creation of multiple viewpoints, narrative routes and story outcomes within an interactive drama based MLE. This would suggest a need to develop methods to manage media resources, find ways of improving the productivity of designers, and to research the value placed upon different interactive features by an audience of learners.

In an earlier research project, Chris Smith (1996, p198) has argued that tightly defined, prescribed, design methods are unlikely to be adopted in the development of MLEs. This research accepts the need for a flexible approach, to meet the needs of individual creativity, especially in the generation of conceptual designs and early prototype developments. It is also apparent that whilst some theoretical models may not be explicitly used in design, knowledge of them can have an innate effect upon design practice in enabling designers to assimilate, rationalise and articulate the emergent phenomena of the design process. It should also be recognised that this project and Smith’s concentrate on early stages of design. As described in Chapter 9, there is a need to differentiate between design as synthesis and design as analysis (Ramirez, 1996, p199), and the characteristics of constructivist versus rationalist design activity as described by Dorst and Dijkhuis (1995, pp262-263). A possibility for further research in this area would be to investigate ways of enhancing the creativity of designers. It would also be of value to look at ways of sustaining the creative processes into the later stages of design where harder technological issues must be addressed to enable production and delivery of the learning experiences. It may also be appropriate to research the application of concurrent engineering and design techniques to the development of MLEs and interactive drama projects.

14.3 Applying the conceptual design model

The model is intended to provide designers with the basic constructs and considerations to develop their own MLEs for humanistic learning.

The conceptual design model (represented in overview in Figure 14.1.) structures the work described within Chapters 3 to 13. The model is presented as a resource for designers to draw upon and transform to their individual need rather than a prescription to be rigidly followed. It was found in this project that the usefulness or influence of different areas of the conceptual model assume different priorities as different phases of design are undertaken. As such the model offers a phased structure, a representation

1 For example Johnson-Laird’s (1983) typology of mental models and psychological theories of perception and understanding.
of significant design knowledge and issues, which provides a context for the design space and perspectives on how one aspect of design knowledge and practice is affected by others. The Knowledge Framework can therefore be used at each stage of the design process to inform and review the needs, progress and results of design. The relationship between theory and practice has been described in detail through chapters 10 to 13, and is reviewed in Sections 14.3.1 to 14.3.5 below. The relationships are illustrated in Figure 14.2 to Figure 14.6 and summarised in tables at the end of each section.

14.3.1 Requirements analysis phase

Requirements analysis involves the description of the design problem. It also involves learning needs analysis and subject matter research to identify and explain the kinds of learning experiences, media representation and information requirements needed for the MLE design. The requirements analysis undertaken in this research is described more fully in Chapter 10.
The external influences or Environments that enabled the development of this design project and represented in the Knowledge Framework are described in Chapter 1. The issues within each ‘environment’ are described in Section 9.2. Throughout a project the technical capability of computing and media change the Technological Environment. Interactive multimedia can increasingly support high quality digital audio, video and photographs and can be constructed to offer navigable environments and narratives. This creates new possibilities for designers to present information and engage users in active learning. Closely interrelated with the issues of the technological environment are those of the Social Environment. An increasing need to deliver complex information and enable clear decision making in a society where literacy levels of many people remain low, and where visual communication (e.g. television, video games) is evermore significant, places an alternative agenda of user expectations and needs for designers to contend with. A wider agenda of social responsibility and social inclusion, along with government policy change place new demands and responsibilities on professionals creating an important set of influences within the Political and Moral Environments to influence design decisions and outputs. The Economic environment had only incidental relevance to the Design Process in this instance because of its research focus, use of existing academic resources for design and production and the commitment of the participants without payment. Normally economic issues would have at least equal importance to other environmental influences in the form of production budgets.

During this initial phase, Multimedia Design involves the generation of design ideas and possible solutions based upon the Design Expertise and Wisdom of the design team and advice from experts and potential users (in this case doctors, midwives and parents). As discussed in Section 9.1.4 this is a reflective process, where possible Design Methods and Activities are assimilated and adapted to create a solution that fulfils the learning needs of the users. This enables progress to begin from the uncertainty of defining the design problem towards concrete solutions (as discussed in Section 9.1.3). Within this research a number of Design Models were drawn upon to help guide the developmental process, for example Florin’s informational landscapes (described in Section 9.1.2) and the architectural concepts that underlie the development of interactive drama (described in Section 7.2).

In addition to the adoption of design models, it was also important to consider the Learning Issues that would affect the design outcome. During this early stage of design the emphasis is on finding out how people learn and how learning materials are presented. This is investigated through the process of subject matter research discussed in Section 8.2 and carried out as described in Section 10.2. In this case a theoretical understanding of Instruction and Learning in terms of social and communicative, self-

Page -246-
reflective and emancipatory, and intuitive learning processes was generated from the literature (described in Section 4.3). Comparison and contrast of the Constructivist and Objectivist Paradigms guided analysis and interpretation of the subject matter research. Further structure was provided by drawing upon Learning Models such as Laurillard's conversational model and REALS as described in Section 4.2.

The interplay between Subject Matter Development and Learning Issues, along with developing design ideas, also begins to identify the essential steps required for Courseware and Software Development (adapted from the models described in Section 8.4). This informs the Production Issues within the Knowledge Framework and enables the subsequent identification of the necessary phases of the conceptual design model (Figure 14.1).

The development of subject matter knowledge, identification and analysis of learning needs, adaptation of learning models, and consideration of production activities create possibilities and interactions within the multimedia design process. Within the requirements analysis phase of this project it generated deeper understanding of the learning needs of prospective parents and identified the possibilities for using multimedia technology to integrate humanistic learning processes with interactive drama and knowledge delivery. Within such creative activities the designers' ability to exploit Perception, Visualisation and Imagination are of key importance. The internal and external representations of these processes in the form of Mental Models and related Schema were given a greater depth of understanding for the design team through a description of the underlying Connectionist and Symbolicist Paradigms, explained in Sections 3.1 and 3.2. This enabled development of the dual perspective described in Section 10.2.4 and illustrated in Figure 10.5.

The ability of a designer to serve the agendas and viewpoints of clients, subject matter experts and users, and meet them in an engaging and useful manner, relies on an ability to draw upon the elements contained within the Social Dimension of the Knowledge Framework (described in Chapter 5). During this phase of design project the designer's evolving perceptions and creative ideas interrelate with the way in which Social Interaction and Perspective can be presented. As said above, the prevailing circumstances and conditions within the Environments combine to make the proposal and development of a project viable. These circumstances and conditions feed in to the Political Motives and Values that are adopted by the team as agendas for the project and are in turn fed into the Design Process as objectives and constraints for the design of the MLE. How Language can be used to communicate information and meaning and how Media Theory can be used in the presentation of information and in support of learning are also considered at this point (Chapters 6 and 7). Of particular importance in this project were issues of Visual Culture (as defined in Section 5.1.4) to inform
both the presentation of learning through drama and representation of medical knowledge in sophisticated visual form.

Thus, the requirements analysis phase assembles the necessary information and creative ideas to begin design of the mechanisms, structures and interface concepts. The relationships between the Knowledge Framework and the Design Process are summarised in Table 14.1.

<table>
<thead>
<tr>
<th>Design Phase</th>
<th>Dimension</th>
<th>Fundamental</th>
<th>Practical</th>
<th>Incidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements Analysis</td>
<td>Environments</td>
<td>Technological, Social, Economic, Political, Moral</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multimedia</td>
<td>Design Expertise &amp; Wisdom, Design Methods &amp; Activities, Design Models</td>
<td></td>
<td>Design Theory/Methodology</td>
</tr>
<tr>
<td></td>
<td>Design</td>
<td>Instruction and Learning, Learning Paradigms, Learning Models</td>
<td></td>
<td>Learning Style, Social and Institutional Factors, Learning Environment, Group/Organisational Learning</td>
</tr>
<tr>
<td></td>
<td>Production</td>
<td>Subject Matter Development, Courseware/Software Development</td>
<td></td>
<td>Media Production</td>
</tr>
<tr>
<td></td>
<td>Psychological</td>
<td>Perception, Visualisation and Imagination, Mental Models</td>
<td>Schema Theory, Psychological Paradigms</td>
<td>Memory, Physical Response &amp; Behaviour</td>
</tr>
</tbody>
</table>

Table 14.1 Summary of relationship between the Knowledge Framework and the first phase of the Design Process indicating relevance and general order priority given to the knowledge areas.

14.3.2 Prototype and interface design phase

This phase involves the building of the structural design model and interface concepts, as described in Chapter 11. These activities include the development of navigation methods and development of structure to explore the relationship between physical spaces, dramatic action and information. This work may also consider the use of spatial forms, the manipulation of artefacts, creation of narrative structure and dramatic content and early formative evaluation of the MLE. This phase and the development of interactive drama materials (next phase) overlap in their development.

Within this phase of activity processes of design and creative thinking are of primary importance and it is these areas of the Knowledge Framework that are most relevant.
Whilst Learning Issues are recognised they are not considered in detail until the next phase. It is the functional and structural aspects of the design that are realised here.

Design work is underpinned by the Design Theory and Methodology, as described in Section 9.1.1. In this project, the approach taken to the design tended towards constructivist (Dorst and Dijkhuis, 1995) design or design as synthesis (Ramirez, 1996), because of the exploratory and original nature of the project. The process that unfolded in completing this phase was the messy, convoluted (Smith, 1996) and aggregative (Ramirez, 1996) as discussed at the beginning of Chapter 11.

![Diagram](image.png)

Figure 14.3 Representation of areas of knowledge drawn upon during Prototype and interface design phase

As stated in 14.3.1 a number of design and learning models will have already been considered in order to provide guidance and shape to the design process. These are acted upon in this phase to develop the structural model and interface concepts, as described in Chapter 11. The production of ideas and concepts involve many of the Design Methods and Activities described in Chapter 9.1.3. For example the elicitation
and interpretation of knowledge drawn from earlier subject matter research and representation in new forms to support the creative, communication and analytical needs of the design team. Within this context the different specialists within the design team draw upon and exchange their own knowledge, learning and applied experiences to generate new Design Expertise and Wisdom appropriate to the development of interactive drama and MLE design.

The designer's psychological processes are of primary importance to the success of these creative design activities. For example, the development of the structural model (Figure 11.1), interface design (Figure 11.2) and narrative models (e.g. Figure 11.4 and 11.5) are predicated upon an understanding of Perception, Visualisation and Imagination in the relationships between media elements, interaction mechanisms, navigation routes and interface. The use of perception and imagination draw upon Schema and Memory to form new concepts and exploit examples of previous creative solutions in new ways. The structural model and interface design are representations of Mental Models developed by the designer that enable adaptation of existing knowledge through the running of design scenarios and tuning of creative possibilities to desired goals and outcomes. The concurrent experiences and knowledge developed through the development of scripts, storyboards from phase 3 (Section 14.3.3) also inform these creative processes.

The developing design ideas create links with the Social Dimension to enable development and consideration of suitable techniques or methods to present media in a coherent and constructive way that link with the Media Theory and research described in Chapters 6 and 7. This theory was drawn upon in the:

- building of interface and navigation methods, from theory and examples represented in Figure 7.4 and practically developed in Section 11.2;
- development of spatial form (Section 11.4.2), from theory developed by Eisenstein and examples of other environments described in Section 7.2;
- creation of narrative structure (Section 11.4.3) and structural relationships (Section 11.4.5), from Laurel's work as summarised in Table 7.1 and Garrand's narrative models (Figure 7.8).

Adoption of suitable Language is required from two perspectives. The first draws upon the Subject Matter Development completed in the first phase to consider user's needs, and in this case the language of medical profession to consider how to present experiences and knowledge in a palatable form. It also links in with the Social
Interaction and Perspectives involved in the relationships and interaction between parents and medics, such as in the interview described in Section 11.1. The second perspective concerns the development of nomenclature for various features of the interface and information structures used in the design (described in Section 11.1 to 11.3).

The development of the structural and functional design for this project is discussed in Section 11.3 and shown in the form of the prototype MLEs. This enables some experimentation with appropriate imagery and graphics for the representation of complex information and physical and social settings. These activities also enable some assessment of the resource needs for Software and Courseware Production (Section 11.4) and possibilities for Media Production to be explored further in phase three. The contribution of the Knowledge Framework in the prototype and interface design phase are summarised in Table 14.2.

<table>
<thead>
<tr>
<th>Design Phase</th>
<th>Dimension</th>
<th>Fundamental</th>
<th>Practical</th>
<th>Incidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prototype and Interface Design</td>
<td>Multimedia Design</td>
<td>Design Theory/Methodology</td>
<td>Design Methods &amp; Activities</td>
<td>Design Expertise &amp; Wisdom</td>
</tr>
<tr>
<td></td>
<td>Psychological Factors</td>
<td>Perception, Visualisation and Imagination</td>
<td>Mental Models</td>
<td>Psychological Paradigms</td>
</tr>
<tr>
<td></td>
<td>Social Dimension</td>
<td>Media Theory and Language</td>
<td>Social Interaction and Perspective</td>
<td>Physical Response and Behaviour</td>
</tr>
<tr>
<td></td>
<td>Production Issues</td>
<td>Courseware/Software Development</td>
<td>Visual Culture</td>
<td>Political Motives and Values</td>
</tr>
<tr>
<td></td>
<td>Learning Issues</td>
<td>Instruction and Learning</td>
<td>Instruction and Learning Paradigms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environments</td>
<td>Technological</td>
<td>Social, Economic</td>
<td></td>
</tr>
</tbody>
</table>

Table 14.2 Summary of relationship between the Knowledge Framework and the second phase of the Design Process indicating relevance and general order priority given to the knowledge areas.
14.3.3 Creation of interactive drama materials

The requirements analysis phase and prototype and interface design phase provided knowledge of the subject matter, an understanding of learning needs and user motivations, a cultural and social context for the development of learning materials and a set of structural and functional mechanisms for the development of MLEs. The third phase of design, as described in Chapter 12, builds upon these important foundations to explore the creation of drama with embedded learning, experiences and emotions. The work involves development of characters and story lines, collaboration on the writing of drama scripts, adaptation of the drama materials for interactivity, and the development of links to supporting information. Pre-production activities include rehearsals and the planning of shoot schedules locations and other production needs. Finally the video, audio, and still photo-images needed for the prototypes are produced. The sequence of design and Media Production activities in this project is represented in Figure 12.1.
The primary area of knowledge for this phase of activity is the Social Dimension. The creation of appropriate characters, situations and scenarios to engage users in relevant learning experiences, activities and decision points requires close attention to the Production Issues and Learning Issues discussed in the paragraphs below. The development of an appropriate Social Interaction and Perspective is informed by the Political Motives and Values established in phase 1 of the Design Process. As described in Section 5.1.1, Social Interaction and Perspective is built up from the cultural norms, social roles, experiences and perceptions that reinforce personal identity and establishes a cultural context. The interpretation of these characteristics provides a basis for the complex everyday emotional and interpersonal experiences that need to be integrated within the interactive drama and humanistic learning materials. In this project characters were profiled by name, age, social background, personality, physical appearance, motives, current situation and major relationships (described in Section 12.1.1). This provided the constructs from which scenarios were developed into scripts. A significant part of the scripting process and interactive drama development involves the creation of appropriate voice and persona for each of the characters. This involves the use of suitable Language for dialogue and presentation of appropriate visual representations that would be acceptable for the intended audience. Such activities need to be concerned with building a suitable fit with the Visual Culture of the audience, not only in terms of the perception of characters, but also in terms of the expectations and perceptions that they have of the drama and media. This process also feeds through into the process of script development and media production, drawing upon Media Theory described in Chapter 7.

Within this phase the Production Issues focus upon Media Production. The scripting process involves collaboration with the scriptwriter, drawing on the developing plans and ideas for Courseware/Software Development (from phase 2) and Subject Matter Development (Phase 1), to develop narrative structures, drama and navigation routes. Rehearsals and video production enable consideration of issues related to pacing, sequencing and tracking of the interactive drama. This is supported by the use of existing documents and prototype materials plus production of storyboards and sketches, interactive scripts, diagrams and other relevant information that are produced to enable the actors to assume their roles (Section 12.1 to 12.4). The practical activities involved in the completion of rehearsals and video production also help to inform the post production activities in the next phase of the Design Process. The collaboration between designer, scriptwriter, actors and other people involved in design and

---

2 Described in Section 5.14, Chapter 6 and Section 12.4.
production help to build a consensus over the media resources to be delivered. This is described in Chapter 8 and particularly in Section 8.3.

One of the reasons for developing interactive drama is to enmesh learning in complex everyday experiences and enable learners to follow interests, make decisions and reflect upon the outcomes of their actions. As such, consideration of the Learning Issues associated with this phase of the Design Process places emphasis upon individual experiences of learning and starts with consideration of two Learning Models. The concept of REALS (Section 4.2.2) considers authentic contexts for learning, the creation of generative learning and users taking responsibility for decisions and learning from the outcomes. Laurillard's conversational model (Section 4.2.1) and its adaptation for different media enables consideration of the teaching-learning process and ways in which the learning resources may help users look at a situation from different perspectives. This in turn creates a focus upon the way in which Instruction and Learning is employed by the user. Of particular relevance to the use of interactive drama in this project was intuitive learning, experiential learning and emancipatory and self-reflective learning discussed in Section 4.3. This approach assumes that the user will have a Learning Style that prefers informal learning modes, appreciates the gratification and involvement offered by rich media forms and that they take a learning stance that values the social and interpersonal aspects of humanistic learning. This also relates to the Social and Institutional Factors of learning with the MLE where the involvement of more than one user is encouraged to engender discussion and reveal important issues. Such concerns are facilitated by the design of a product that draws users into parasocial interaction and seeks to produce gratification from the experience of engaging with the interactive drama based MLE.

Whilst the creation of interactive drama materials draws upon significant areas of theory, the Multimedia Design activities undertaken at this point focus upon applied knowledge. The interactions of the different Design Expertise and Wisdom (described in Section 9.1.) contributed by the members of the design team create new perspectives on the design problem. The blending of different knowledge and talents produce greater depth and richness in the reflective conversation, intuition and creative insights as the team work towards the desired outcome. Of particular importance in this collaborative creative process (as described in Section 9.1.3) is the use of artefacts such as scripts, storyboards, and notes to convey the developing design concepts to participants as they participate in the various Design Methods and Activities. This allows for a complex interchange of ideas and creative output at an individual and collective level, for example:
• production of characters and scenarios by the designer (Section 12.1.1);
• development of scripts with the scriptwriter (Sections 12.1.2 to 12.1.2);
• development of storyboards and pre-production plans (Section 12.2);
• further development of characters and scenarios in rehearsals with director and actors (Section 12.3);
• video production using different framing, camera shots and takes in collaboration with the actors for implementation in the next phase of the Design Process (Section 12.4).

<table>
<thead>
<tr>
<th>Design Phase</th>
<th>Dimension</th>
<th>Fundamental</th>
<th>Practical</th>
<th>Incidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creation of Interactive Drama Materials</td>
<td>Social Dimension</td>
<td>Social Interaction and Perspective, Language, Visual Culture, Media Theory</td>
<td>Political Motives and Values</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Production Issues</td>
<td>Media Production</td>
<td>Subject Matter Development, Courseware/Software Development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Learning Issues</td>
<td>Learning Models, Instruction and Learning, Learning Style, Social &amp; Institutional Factors</td>
<td>Learning Environment, Group/Organisational Learning, Learning Paradigms</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multimedia Design</td>
<td>Design Methods &amp; Activities, Design Expertise &amp; Wisdom</td>
<td>Design Models, Design Theory/Methodology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Factors</td>
<td>Mental Models, Perception, Visualisation and Imagination</td>
<td>Schema Theory, Physical Response and Behaviour</td>
<td>Memory, Psychological Paradigms</td>
</tr>
<tr>
<td></td>
<td>Environments</td>
<td></td>
<td>Technological Social, Economic, Political, Moral</td>
<td></td>
</tr>
</tbody>
</table>

Table 14.3 Summary of relationship between the Knowledge Framework and the third phase of the Design Process indicating relevance and general order priority given to the knowledge areas.

The progress of the practical creative processes and design activities involves elaboration of Mental Models to provide context, structure and detail for interactive drama. Collaboration between the members of the design team facilitates the convergence of different comprehensions of the tasks at hand, as each member draws upon their own Schema and Mental Models of their creative methods and expertise and
of the drama, learning environment and user interaction. Understanding of Perception, Visualisation and Imagination is of crucial importance in considering the links and interplay between different viewpoints and interactions of the characters and events within the drama, behaviours and interactions of users and the creative contributions of the design team. An example of how this took place is described in Section 12.3, where the rehearsals had an important role in developing models and plans for the video production and Media implementation phase.

The relationships between the Knowledge Framework and Design Process are summarised in Table 14.3.

14.3.4 Media implementation phase

This phase of design involves the representation of drama and narrative structures, using resources from the previous two phases. It involves the editing, digitisation and implementation of video and photo images into a set of spatial and chronological interrelationships for developing drama and narrative within an environment, and the integration of supporting information structures. This phase is described more fully in Chapter 12, from Section 12.5 forward.

Again the primary focus for this project is the Social Dimension, but the emphasis shifts towards the application of Media Theory and Visual Culture. In this project the three prototype experiments (A, B & C) described in Sections 12.5.1 to 12.5.3, and some additional video sequences, were built to provide the necessary resources for evaluation in the next phase. The process of creating the prototype materials enables exploration and reflection upon the implementation activities. Experiment A offered the opportunity to explore how the soap opera paradigm is an appropriate form of human interest drama to employ in MLEs for humanistic learning purposes. It allowed a number of issues to be addressed, such as the development of appropriate visual style for drama and information resources, use of suitable Language to suit the characters and learning resources, and the representation of different kinds of Social Interaction and Perspectives of the characters. Experiment B explores the development of alternative spatial structures, narrative routes and viewpoints, and further explores the Social Interaction and Perspective and the Political Values and Motives that can be represented within a piece of drama and the viewpoints of different characters. It also considers issues of exploiting user interaction as a means of producing an outcome to the drama. Experiment C focuses more on issues of Visual Culture and the inner thoughts and motivations of the characters. Issues of Media Theory discussed in

---

3 Discussed in Section 12.4 and drawing upon theory from Chapter 6.
Chapters 6 and 7, such as parasocial involvement, gratification and narrative structures and interface design issues were implicit within all three experiments.

Figure 14.5 Representation of areas of knowledge drawn upon during media implementation phase.

As with the previous phase, knowledge used in Multimedia Design has an applied focus. A knowledge of the possibilities for interactive drama, spatial and chronological constructs for the environment, technical and functional features and integration of information materials are established in earlier phases of the Design Process. This knowledge and theory is assimilated into the creative practice of the designer and its application in this phase is very much dependent upon Design Expertise and Wisdom. This work brings together the tangible resources, evolving design concepts and earlier design plans together to produce the complex structural forms of the interactive drama materials. It involves the utilisation of technical production skills and creative skills to produce the functionality, visual impact and subtleties of continuity necessary to make effective interactive drama.
The functionality needed in the prototype is developed from the Production Issues. These relate to the completion of Media Production activities and Courseware/Software Production. Media Production involves editing, digitisation and implementation of still images, video and other media resources into an interactive programme. The courseware (or MLE) is completed by integration with information resources and interactive learning materials. These are subjective and intuitive processes that often involve subtle techniques to allow the interpretation of behaviour and emotion allow suspension of disbelief and engendering of parasocial involvement. This work is intensive and detailed.

In this project, as described in Section 12.5, this point in the Design Process coincided with a decision point on the development spiral (Section 8.4.4) where the Economic Environment for the project curtailed full implementation of all video resources, restricting production to the development of web pages. This was because of an inability to purchase more technological resources and man-hours for implementation. The implementation work therefore focused upon producing appropriate prototype materials to allow formative evaluation (as described in Section 8.5 and Chapter 13) rather than producing a fully functional prototype MLE.

As stated in Section 12.6, the effective use of scripts, storyboards and other supporting documentation are dependent on their relationship with the designer’s mental model and their use in gaining consensus amongst the design team. Their role is to seed the creative processes that originate the Mental Models for the design and sustain it until its successful realisation. They also help to support the content of Schema and enable Memory to be structured in ways that makes the creative design processes more productive. An understanding of these psychological concepts provide useful support in negotiating and manipulating the growing complexity of the design related issues.

The Learning Issues in the previous phase address individual learning needs and processes. In this phase it is the social and cultural dynamic of learning that is addressed. The creation of interactive drama resources addresses one facet of the Social and Institutional Factors of learning. The implementation of the resources uses effective media production techniques to engender parasocial involvement, decision making and deliver a degree of gratification. The facility for interaction provides additional facets for the Learning Environment to enhance users’ learning experiences. These can be designed to promote the experiential, reflective and social-communicative learning that is so important to the concept of humanistic learning. The extent to which the use of interactive drama as a major constituent of a MLE supports Group/Organisational Learning relies on the expertise and wisdom of the design team. This is a subjective issue which needs careful reflection. The general accord drawn
from the literature (discussed in Chapter 6) and the evaluation carried out in this project (Chapter 13) suggests that it would. This issue was further explored in the final phase of the Design Process when the project was opened up to in-depth evaluation. The relationship between the Knowledge Framework and the Design Process is summarised in Table 14.4.

Table 14.4 Summary of relationship between the Knowledge Framework and the fourth phase of the Design Process indicating relevance and general order priority given to the knowledge areas.

<table>
<thead>
<tr>
<th>Design Phase</th>
<th>Dimension</th>
<th>Fundamental</th>
<th>Practical</th>
<th>Incidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media</td>
<td>Social Dimension</td>
<td>Media Theory</td>
<td>Design Theory/Methodology</td>
<td>Design Models</td>
</tr>
<tr>
<td>Implementation</td>
<td>Social Interaction and Perspective</td>
<td>Visual Culture</td>
<td>Design Models</td>
<td>Design Methods &amp; Activities</td>
</tr>
<tr>
<td></td>
<td>Language</td>
<td>Political Motives and Values</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multimedia Design</td>
<td>Design Expertise &amp; Wisdom</td>
<td>Media Production Courseware/Software Development</td>
<td>Subject Matter Development</td>
<td></td>
</tr>
<tr>
<td>Production Issues</td>
<td>Design Models</td>
<td>Perception, Visualisation and Imagination</td>
<td>Physical Response and Behaviour</td>
<td>Psychological Paradigms</td>
</tr>
<tr>
<td>Environments</td>
<td>Economic</td>
<td>Psychological Factors</td>
<td>Learning Models</td>
<td>Learning Style</td>
</tr>
<tr>
<td>Psychological Factors</td>
<td>Mental Models</td>
<td>Schama Theory</td>
<td>Instruction and Learning</td>
<td>Learning Paradigms</td>
</tr>
<tr>
<td>Learning Issues</td>
<td>Social &amp; Institutional Factors</td>
<td>Learning Environment Group/Organisational Learning</td>
<td>Learning Models</td>
<td></td>
</tr>
</tbody>
</table>

14.3.5 Formative evaluation phase

Formative evaluation aims to receive feedback from a number of different points of view and to consider different outcomes of the design project (and the research). Chapter 13 describes the evaluation activities in more detail, and in this project evaluation was undertaken on three levels:

- reflection by the scriptwriter on the process of writing interactive drama materials and their potential as a vehicle for learning;
- presentation of the Knowledge Framework and Design Process for review and feedback from academics and design practitioners;
• formative evaluation of MLE design through focus group and walkthrough techniques by potential users.

Review from these different perspectives enabled investigation of the interdisciplinary requirements of MLE design, adequacy of the Knowledge Framework and the Design Process in informing design practice, and the effectiveness of interactive drama as a vehicle for humanistic learning.

![Diagram](image-url)

Figure 14.6 Representation of areas of knowledge drawn upon during formative evaluation phase.

In this phase, *Multimedia Design* adopts a retrospective perspective on the design process to evaluate the success of the project and to provide useful information that will feed into future work. Emphasis is placed upon building a greater level of objectivity to feed into the rationalist design activities required for full product development (discussed in Section 9.1.1). In this research, the design process was considered using the *Design Model* and *Design Methods and Activities* to review the achievements and outcomes of the design work with practitioners and academics.
(discussed in Section 13.3). They were also considered in the walkthrough of the prototype MLEs with potential users (Section 13.4.2).

The areas with a less pragmatic and tangible knowledge content, Design Theory and Methodology and Design Expertise and Wisdom, are drawn upon to support reflection upon the way in which the models and methods were applied. These knowledge areas were are used more when considering the effectiveness of design decisions from the users' perspectives when the detail and subtleties of MLE content and presentation are reviewed in depth.

In the present work, the evaluation considered every one of the Learning Issues, taking into account the requirements of the Constructivist Paradigm and humanistic learning described in Chapter 4. The specific issues related to the evaluation requirements of learning materials are stated in Section 8.5 and 13.4. From the users’ perspectives this included the nature of their learning experiences and the effectiveness of the MLE prototypes in meeting their learning needs. The creation of the social, cultural and environmental elements of the learning experiences within the MLE were also considered within the review of the project by scriptwriter Simon Turley (Section 13.2).

In considering the Psychological Factors the emphasis is placed upon Perception, Visualisation and Imagination (Section 3.4). From the users' viewpoint the aim of evaluation is to consider their interpretation and use of the interactive drama and learning resources. Evaluation from the designers' perspective is in terms of their ability to create a coherent MLE containing interactive drama from the scenarios, characters and learning resources. For example those described in Chapters 10 to 12. This relates closely to the use of Mental Models and Schema to understand the structures that are built up during creative and learning processes. As described in Section 10.2.4 and illustrated in Figure 10.5 the extent to which the designer is able to accommodate the users’ viewing, interacting and learning needs within his or her design activities is important to the creation of effective learning materials and interactive drama. An important element of this is the Physical Response and Behaviour that may be expected from interacting with MLEs, interactive drama and interface technologies.

The evaluation process raises questions and tests assumptions about the Technological and Social Environments appropriate to the users' needs and experiences of learning. For example, as discussed in Section 13.4, the hostile nature of desktop computers was seen as a significant barrier to the use of the MLE by many potential users, and learning was seen as very much as an institutional, subject-based, activity by younger members of the focus groups. The MLE, based around interactive drama, was seen to
be very much more acceptable when it was suggested that it could be viewed as a domestic TV soap with an embedded learning experience, that could be delivered using consumer electronic appliances.

Evaluation of the interface mechanisms, navigation and interaction requirements, representation of drama, and learning activities also demands evaluation of the Production Issues. This needs to be done retrospectively, considering the development of MLE and interactive drama designs into prototype materials, to support assessment of the production needs for a full product. In this project, effectiveness of the Subject Matter Development was evaluated primarily though the focus group activities with potential users (Section 13.4), but was also considered to some extent by the review of the scriptwriter (Section 13.2) and the evaluation by academics and designers (Section 13.3). Evaluation of the Media Production was reviewed in some depth in Sections 13.2, with other perspectives being raised in Section 13.3. and 13.4. Review of Courseware/Software Production was limited to evaluation of interface design, navigation and structural design of the materials and considered primarily from the users' viewpoint in Section 13.4.

Within the Social Dimension, Media Theory is employed to inform the evaluation process on a practical level and its usefulness was demonstrated in this research by the emergence of the spec-actor paradigm (Chapter 7) as a model for interactive drama. However, it is the impact of the interactive drama on the users and other evaluators that is of foremost interest. Evaluation by the users (for example see Section 13.3) provides a better understanding of the way in which the characters, events and situations create Social Interaction and Perspective for the people to interpret and use as part of their individual learning experiences. This is supported by the representation of behaviours and Political Values and Motives in keeping with the characters' personalities and tensions that occur in the unfolding drama. Equally the Language and visual cues (Visual Culture) that engage and support the user in interacting with the drama, learning materials and interface are crucial elements that require careful evaluation to create believable and beneficial learning experiences.

The relationships between the Knowledge Framework and Design Process are summarised in Table 14.5.
<table>
<thead>
<tr>
<th>Design Phase</th>
<th>Dimension</th>
<th>Fundamental</th>
<th>Practical</th>
<th>Incidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formative Evaluation</td>
<td>Multimedia Design</td>
<td>Design Models&lt;br&gt;Design Methods &amp; Activities</td>
<td>Design Expertise &amp; Wisdom&lt;br&gt;Design Theory/Methodology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Learning Issues</td>
<td>Instruction and Learning&lt;br&gt;Learning Style&lt;br&gt;Social &amp; Institutional Factors&lt;br&gt;Learning Environment&lt;br&gt;Learning Models&lt;br&gt;Group/Organisational Learning</td>
<td>Constructiv Paradigm&lt;br&gt;Objectivist Paradigm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychological Factors</td>
<td>Perception, Visualisation and Imagination</td>
<td>Physical Response and Behaviour&lt;br&gt;Mental Models&lt;br&gt;Schema Theory</td>
<td>Memory&lt;br&gt;Psychological Paradigms</td>
</tr>
<tr>
<td></td>
<td>Environments</td>
<td>Technological&lt;br&gt;Social</td>
<td></td>
<td>Economic&lt;br&gt;Political&lt;br&gt;Moral</td>
</tr>
<tr>
<td></td>
<td>Production Issues</td>
<td>Subject Matter Development&lt;br&gt;Media Production&lt;br&gt;Courseware/Software Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social Dimension</td>
<td>Social Interaction and Perspective&lt;br&gt;Visual Culture&lt;br&gt;Language</td>
<td>Media Theory</td>
<td>Political Motives and Values</td>
</tr>
</tbody>
</table>

Table 14.5 Summary of relationship between the Knowledge Framework and the fifth phase of the Design Process indicating relevance and general order priority given to the knowledge areas.

### 14.4 MLEs for humanistic learning

This work has taken a constructivist learning perspective (as described in Chapter 4), where the process of learning involves the building and elaboration of knowledge and skill through action upon the world, reflection and the development of experience. A case has been put forward for the development of multimedia learning resources that are a closer approximation to the learning encountered outside of the formal classroom or training course. From the designer's perspective, this kind of learning not only involves the representation of environments and social situations, but also the emotional, intuitive and decision making processes that are a part of humanistic learning. The task of the designer is to create learning materials that provide vicarious experience to promote reflection, initiate discussion of choices and options, enable rehearsal within a safe environment and produce enough knowledge of the situation or problem to support informed choices and action.

The academic research and practical design activities carried out in the project have created a wealth of ideas and possibilities to pursue in the field of multimedia learning technology and in other connected areas. At the core of this work, is the design of
MLEs as integrated multidimensional spatial and social environments, populated by characters and engaged with by users. The concept of mental models has been adopted as a means of articulating the knowledge, skills and composition of a particular domain to form the structure and content of a MLE. Evaluation of the design process has suggested that there is value in taking this approach, however there is still much to be discovered through the development of more complete learning solutions and the improvement of design methods through improved practice and further research. The influence of more sophisticated technology is also likely to affect the way in which MLEs are developed and delivered.

14.5 Interactive drama

Theory drawn from the world of theatre provides a basis for the interpretation of the interpersonal and spatial relationships between characters. Drama can use social and cultural norms to structure and identify the situation as familiar, yet use the scripted story and emotional interplay between actors to draw out a personal experience for the audience. The key feature, for drama that supports learning, is that it begs the question: "What would I do?" Interactive drama can enable answers to this question, it can also interject supporting information that will help users (in this research parents) make decisions and satisfy their curiosity.

Interactive drama was chosen as way of creating humanistic learning experiences because of its ability to stimulate reflection upon personal values and situation, to spark discussion of decisions, and to generate emotional response. The development of effective interactive drama is the result of a set of complex thought processes and creative design activities that bring together dramatic performance, scripted narrative, programmed structures and environments. It can involve the creation, communication and interpretation of reality and social grouping from a number of different perspectives. As discussed in Chapter 3, Section 3.4, Dretske (1990) has identified the interpretation of visual media as being formed from a combination of perception, cognition and memory. We do not see a situation or event on a screen but a two dimensional image. It is through our imagination, interpretation of form, movement and colour that we place the image in context and recognise what it means. It is through our literacy of a particular medium that we learn how to read a story within the narrative and dramatic structure of materials.

The production of interactive drama to fulfil these characteristics involves a resource intensive and sophisticated process to deliver an acceptable experience. In this research it has not been possible to achieve such standards of production. However, the complex issues of interactive drama design and production have been described through participation in and analysis of the creation of prototype materials. It has been
shown how the script in combination with storyboards, schematic diagrams and rehearsals were employed as a model upon which to develop the video shoot and subsequent editing and production activities. It has also identified how relationships and social interaction can be portrayed from different perspectives and camera shots to exploit the impact of soap opera and other human interest drama. Whilst the accentuation of situations and dilemmas within a drama inevitably generate some stereotypes, the most able writers and designers are able to overcome this. They are able to create events, characters and situations within a drama to provide experiences that many people can empathise with. In this research, the characters are based upon the subject matter research and are meant to portray three different, but often encountered, sets of personal circumstances. Each character is intended to offer an individual that has one or more characteristics for users to identify with. This may be that they identify with appearance, age, personality, background, personal predicament or probably a combination of these. An evaluation of the effectiveness of the interactive drama has been completed through focus groups, as described in Section 13.4. The potential impact of interactive drama has been confirmed, through review of soap opera, human interest drama and prototype materials developed for the research. Its value has been both as a means of entering into situations that cannot otherwise be entered into, and as a means of reflection and learning. As has been suggested in Section 6.1, the development of parasocial involvement and the gratification received from drama involves more than simple enjoyment as a passive viewer. Interactive drama offers the possibility for users to focus their attention on particular areas of interest, reflect upon their own viewpoint in relation to a character’s situation, and develop an experience through their own decisions and choices for character actions. In this process the spect-actor paradigm has emerged as an appropriate paradigm for conveying humanistic learning.

14.6 Reflection and the directions of future work

The information structures underlying the interactive drama provide the balance for informed decision making and the detail to enable individual questions to be answered. To fulfil the promise of humanistic learning through the creation of interactive drama and MLEs described in this research will inevitably require further research activity, the gathering of further experience in design practice and interactive media production, and the exploitation of new and alternative forms of technology. In this penultimate section this research is considered as a foundation for future work.
14.6.1 Review of the project: a medical practitioner's view

In drawing together the conclusions to this research, the project was reviewed by a member of the Perinatal Research Group to reconsider the issues raised at the beginning of the design project. During the course of the discussion, the midwife made a number of suggestions on how this research may be taken further as a learning product for prospective parents.

As described in earlier chapters, empowerment and responsibility are an important factor for both medical professionals\(^4\) and parents\(^5\) alike. Having reviewed the project, the midwife emphasised the many possibilities that she could see for such learning materials as part of a wider process of advice, consultation and information provision.

From the perspective of the medical practitioner, the concerns of the medical professions for providing consistent information were raised. Although it was recognised the issue of impartiality could never be completely resolved, it was felt that the use of interactive media could at least develop a basic information structure to help people receive basic standards of advice and guidance. The use of technology could also be used to get over issues of personal preferences of medical practitioners conflicting with those of their patients. It was also said that many practitioners find it difficult to talk about personal issues and decisions effectively. An extensive research exercise would be required to gather all the necessary information for such a system, and to obtain general agreement on the information content needed.

It was suggested that there is an opportunity to select specific experiences, problems or issues, within pregnancy that parents need to make difficult decisions over or have difficulty in understanding. A number of examples were suggested for topic based projects:

- The opportunity to identify the salient features of a medical test, and the issues raised by different choices would be one topic of great benefit to parents and practitioners. The decision not to have a test (such as Amniocentesis) has implications for some parents, as would the risks of having a test and the outcome of the test whether it is positive or negative. The chances of an inaccurate result my also be a factor to consider.

---

\(^4\) The issues and guidance offered by medical practitioners are described in Chapters 1 and 10.

\(^5\) The concerns and learning needs of parents are identified in Chapter 10, and evaluation of the prototypes from parents' viewpoint are described in Chapter 13.
• The physiological and psychological changes experienced in pregnancy. For some women morning sickness is a very unpleasant experience. It was suggested that using the experience of others, supported by factual information on physical developments of mothers would provide otherwise unavailable experiences.

• The pressures on NHS resources have also been experienced in the provision of government funded childbirth classes. It was suggested that a multimedia product would have the potential for improving impact and enjoyability of childbirth classes. This could be used at the classes and made accessible in an extended format for use at home.

• In the labour room, people (often the father) find difficulty in understanding the monitors that are used to check a baby’s condition. There is a need to explain what monitors are for and why mothers and babies are connected to them. Whilst they are intended to support the medical practitioners, they can be disconcerting for parents. A multimedia product that explained the equipment used and the measurements would provide some reassurance for parents before the birth. It may also be possible to link the product with information for parents during the birth, but the ethical and medical implications of this would need to be considered through carefully constructed research. This would help with emotional preparation for labour before entering hospital, and is likely to reduce stress and adrenaline levels, resulting in improved chances for an uncomplicated birth.

All of the above examples have an emotional factor from the parents’ perspective and involve important decision making. It would also be appropriate to consider and compare the impact and effectiveness of other representational models as alternatives or complements interactive drama, such as documentary, or simulation. Further research could discover how the conceptual design model needs to be adapted to accommodate these needs. It was also said that women tend to become more passive during pregnancy and accepting of advice or decisions placed upon them. There is a need to ensure that pacing and the volume of information accessed at any one time is presented in a way that does not overwhelm them.

Finally, the limitations of the technology should be recognised. Good practitioners will assess the ability of each patient to take in advice and make decisions, based upon their personality, emotional state, body language and other factors. An interactive media system will be limited in its ability to do this. Different kinds of multimedia experience should be available to address different needs, but the involvement of people to
support parents through their experiences should be paramount. Research into ways that technology can better accommodate and communicate such subtleties would provide opportunities for exploring to support humanistic learning.

14.6.2 Interface Technologies

During this project a number of issues have arisen related to the technology which are used to hold, deliver and interact with the multimedia resources. The two most important are the methods of interaction and the platform for delivery of the MLE and interactive drama.

In Section 13.2, Simon Turley raised a concern about the conflict between the suspension of disbelief and the use of a computer mouse to interact with a MLE. The need to stop and search for a button or hyperlink holds the potential for disruption to their comprehension of the narrative or loss of understanding for the plot. It would seem that there could be a discord between the flow of the story and the need to interact, search for information or make decisions through interaction. This means that the user must learn about the mechanisms used to enable interaction, navigation and link with associated information resources, the design of which must become essentially transparent after a short learning process. Additionally users must also develop a model of the structure and expectations they have for the unfolding story.

One of the challenges for a designer is to create an interface and structure that maintains the suspension of disbelief for the user. There is much work to be done in understanding the media literacy involved in the use of interactive drama. This work has only been able to make a very limited study of interface design possibilities. Further research is needed to review and evaluate other products, understand the possibilities created through technological innovations, and further develop possibilities of interactive drama through creative practice.

The issues concerned with interface design are closely connected to the issues of delivery platform. This research has highlighted the preference for TV and video over the use of computer screen as a platform for interactive drama and multimedia learning environments. Negroponte has raised similar concerns about the limitations of the desktop personal computer, in context of the early developments of speech recognition:

“We also overlooked the value of speech beyond words. For example, computers today demand your absolute and full attention. Usually, you must be seated. You must attend, more or less exclusively, to both the process and content of interaction. There is almost no way to use a computer in passing or to have it engage in one of several conversations. Speech will change this.

Being able to use a computer beyond arm’s length is also very important. Imagine if talking to a person required that his or her nose always be in your face.”

(Negroponte, 1995, p138)
In contrast Morace has commented on the adoption of the TV remote control as an effective mechanism for interaction:

"Within a short space of time, zapping has become the most powerful metaphor defining the identity of the post-industrial individual, who is characterised by alternative and impulsive strategies of choice. Sociologists and psychologists have devoted rivers of ink to this phenomenon, and it will be sufficient for us here to point out that it has added a crucial new dimension to the relationship between the television and social reality."

(Morace, 1995, p15)

The ease of use of the remote control represents the kind of transparency in interface hardware that is needed for mass adoption of interactive drama based learning environments. The comments of Plowman (1991) have already been noted, in Section 7.2.3, of how the structure, content and motivational elements of interactive video are important, and that features such as the use of a trackerball can encourage turn taking, co-operation and discussion. A number of developments have begun to make such interaction more available. They include the developments in digital cable and satellite TV, the introduction of DVD technology, Web-TV and improvements in portable computing power. Take as an example the latest Apple Powerbook G3 laptop computer, which offer new capabilities for portability and use of interactive media.

"...The 400Mhz model includes a 2x DVD drive (which operates as a 20x CD-ROM) and there's DVD decoder hardware built onto the motherboard. DVD movie playback appeared to be virtually flawless, with a clear, smooth display and excellent sound. [...] And we can report that, given the battery life improvements, it's possible to watch a whole movie and still have time to catch up with your work using just one battery."

(Martin, 1999, pp68-73)

Such portable computing power, with up to five hours of battery life, the simplicity of the 'tracker-pad', and the ability to run full screen video, and connect with the Internet offers new modes of computer use. Such advances in technology could, for example, create a more intimate, less technological, environment for the interaction with a MLE by a couple discussing the choices and decisions important to them. Alternatively, it could enable a teenager to use a MLE based on pregnancy and childbirth (or another humanistic learning application) in the privacy of their own bedroom, overcoming the concerns of confidentiality and scrutiny voiced in Section 13.4. Such changes in the social setting and interconnectivity of computer and media technology could offer new avenues for research.

14.6.3 Computer mediated communication (CMC)

In Section 13.3 the possibilities for using Internet and CMC technology was suggested as a possible way of exploiting the spect-actor paradigm within a MLE. The fact that a user selects their own narrative and experience with an interactive drama, and gives it their own interpretation based upon their experiences, inevitably opens the issues for discussion. Indeed that is an intention of the materials in this project. It is suggested
that this is likely to generate the types of activity that occur on the back of TV soap operas, as described by Baym (1993) in Section 6.1.1. It would also extend the ideas contained in this research, and epitomised by the comments of Mantovani (1996) in Section 1.3.1, to the development of networked humanistic learning communities.

Perhaps one of the criticisms of the work undertaken in this research, is that the analogy with soap opera breaks down because of the long-term existence of characters in the stories. An audience may come to know a character over months and often many years. One way to resolve this, and develop a spect-actor based learning community, would be to create an Internet drama based on a humanistic learning issue over an extended period in which characters, drama and narrative may be developed over the expected life cycle of an experience. This could be used for many different learning experiences and interactive drama stories, such as:

- a year covering pregnancy, birth and postnatal care;
- several years in the development of a business;
- years following the experiences of parents as they bring up their children;
- a single day in which a single problem relating to the success or failure of a relationship is uncovered, explored then resolved.

The ultimate design paradigm for interactive multimedia is, according to the report by Gistics, the (1995, p30) "live improvisational theater of digital objects". This refers to the creation of CD-ROM titles that can connect to remote Internet sites or cable channels to access on-line data, update plots or add to the product. It also allows for interaction between users at remote sites. Rudge (1995, p249) also foresees a range of commercial interactive services related to entertainment, education, home-shopping and banking, and professional consultations (e.g. legal, medical, etc.). Similar trends and applications will also be found in the business world, with sales, accounting, design, engineering and information services occurring across a computer network. This is being made possible by the convergence of telecommunications, computing, video and consumer electronics. So that early in the next century, the division between each technology will be difficult to identify, and will result in the creation of a single "infosphere" (Rudge, 1995, p248).

Whilst the live improvisational theatre scenario has yet to be achieved, the use of computer mediated technology adds a whole range of interesting questions to the design of MLEs. These include the extent to which the actions of one user affects the experience of the other(s), the designation of roles to different users and privilege of information, interaction between users, objects and virtual characters, and continuity...
control (such as in recognition of users by virtual characters in different parts of the product) and how users may enter and leave an environment.

14.6.4 Virtual reality (VR)

The field of virtual reality (VR) still requires significant computing power to run effectively. Pearson and Cochrane (1995, p316) suggest that the next twenty-five years will see this fledgling technology come to widespread use in the home, and that video walls and three dimensional virtual conferences will become reality. They also predict that voice recognition and other forms of sensory sensors as capable of matching human senses will be available.

Such future gazing is well beyond the bounds of this research. However based upon estimates of the pace of technological innovation Pearson and Cochrane (1995, p313) have put into context the changes that are possible. VR technology began as a scientific and technological tool for research, design and simulation. It has moved towards the entertainment market in the form of games, and its progress into mainstream education and entertainment would seem inevitable.

Many of the design problems and challenges yet to be resolved for VR will need to draw upon the experience of multimedia developers. Also, the human, emotional and social experience of reality has yet to be addressed in VR. If it is to have mass appeal as a resource for education, games, or entertainment the ability to represent such features will become a creative necessity for the technology to serve. Work at MIRALab looking in developing lifelike virtual characters provides some of the most promising work in this field (Thalmann et al, 1997; Thalmann, 1997; MIRALab, 1999). However there is much research that could be done to exploit VR systems as a dramatic virtual environment at the level of interaction and realism proposed in this research. It is suggested that further research could look at how the models of drama and issues of humanistic learning may be integrated into VR environments.
14.7 Closing Discussion: Future Research Questions

Each new media form has a theoretical perspective that has been developed from academic research and the experiences of design, production and use. As Davis describes, the problem of how to create structures of information that are engaging and meaningful has been an issue for as long as there has been communication media.

"Today the computer is making it possible to combine all the media types present in our electronic world. Television, radio, animation, and print in the forms of video, audio, graphics, and word processing can be manipulated by software to perform together like a "memory theater". Around 516 BC Simonides invented the "art of memory". He equated the methods of classical poetry and painting and taught that these forms, acted upon by memory, were intense visualization. In order to demonstrate this, spaces were designed with visual details that would elicit lines of poetry to the initiated. Carefully placed windows and small openings would direct light onto these details. The seminar topic of 516 BC was "Visual Education and Memory Theater Technology."" (Davis, 1991)

Future development of multimedia theory, will inevitably draw upon the conventions and techniques of other media, and the capabilities of other technologies. It will then adapt them to communicate in new ways. Designers will seek contexts and validation for their ideas, work methods and styles through reflection upon their practice. The conceptual design model, developed in this work, provides a foundation for MLE design and practice to develop around humanistic learning applications and the use of interactive drama. It is a model that will evolve with progress in research, evolution in design knowledge, and the completion of new MLE projects.

This research has brought together theory from different disciplines. It has identified the sophisticated nature of such design activities and the many kinds of expertise, technical and creative skills that need to be drawn upon to successfully meet the needs of a TV literate learning audience. In conducting this research many questions and issues have been explored, however many remain to be investigated. Given the many opportunities that have presented themselves during this research it is appropriate to end this work by identifying a number of questions for future research.

As said in section 14.6.3 this research has not considered the use of CMC and network technology during the design and development work. The physical characteristics of a VR environment discussed in section 14.6.4 also present interesting questions about the sensory and perceptual qualities that can be introduced into humanistic learning and interactive drama. The rapid developments in Internet and interactive digital TV broadcasts make this an obvious area to extend the research. By including means to communicate and interact with designers and actors of and with widely dispersed audience members a new aspect to the design model may emerge. The interface between the audience and MLE becomes less defined and the relationships between
audience members, actors and designers may possibly be changed. How each audience member is able to represent themselves within the environment will affect their perception of the environment, the presentation of the media, and their interaction with other participants. They are also likely to present themselves in terms of the information they divulge, the attitudes they communicate and their emotional responses. The interpretation of objects and participants as being either programmed or conscious will also affect the experience. How the concept of virtual presence as avatar or what Vesna (1998, p129-136) calls “Information Personae” affects the user could have a significant effect on MLE and interactive drama design.

A number of these issues have been discussed in work by Tuomola (1998) and Tuomola and Leskinen (1998) for their interactive drama web site “Daisy’s Amazing Discoveries”, however their focus is upon entertainment rather than learning. There is much work to be done to understand how humanistic learning may be understood, captured and represented within multimedia learning environments. Further research should seek to answer the questions:

- “What possibilities and opportunities does CMC offer the design of interactive drama and MLEs designed for humanistic learning purposes?”
- “How do the concepts of avatar and information personae influence the design and use of MLEs for humanistic learning?”
- “How can virtual physical and social environments, made possible through Internet and VR technologies, enhance humanistic learning within an interactive drama environment?”
References.


Basic Skills Agency (1994) Basic Skills in Everyday Life. London: Adult Literacy and Basic Skills Unit.


BBC (1992) The Late Show Special: Michael Powell.


BBC (1997a) Bookmark: Sam Shepard, Stalking Himself. Teale/Otmoor production for BBC in association with Thirteen/WNET.

BBC (1997b) Face to Face: Jeremy Isaacs talks to Alan Parker.

BBC (1998a) Scene by Scene: Martin Scorsese. BBC Scotland.


Ekinsmyth C & Bynner J (1994) The Basic Skills of Young Adults. London: Adult Literacy and Basic Skills Unit.


APPENDICES:

APPENDIX A. FILMOGRAPHY

APPENDIX B. REFERENCES EMPLOYED IN THE DEVELOPMENT OF SUBJECT MATTER MATERIALS

APPENDIX C. CHARACTER PROFILES

APPENDIX D. INTERACTIVE DRAMA SCRIPTS

APPENDIX E. EXAMPLE SUBJECT MATTER NOTES STORYBOARDS, DESIGN SKETCHES AND DIAGRAMS

APPENDIX F. SLIDE PRESENTATION USED IN EVALUATION

APPENDIX G. INTERACTIVE DRAMA MATERIALS PRESENTED ON THE INTERNET

APPENDIX H. WEB EVALUATION FEEDBACK

APPENDIX I. CONTRIBUTORS TO THE RESEARCH PROJECT
Appendix A. Filmography

The following films and television productions have been included in the text as examples of particular genres or techniques, or discussed in relation to the work of the people who contributed to their creation. Source of references: the Movie Guide, (http://www.tvgen.com/movies/mopic/pictures/), the Internet Movie Database (http://uk.imdb.com/), and individual film credits.


Appendix B. References employed in the development of subject matter materials

References used in subject matter research

References of factual information employed:


References from TV programmes:


Links to WWW pages:

In addition to printed materials, a variety of Internet based health resources were consulted. These included:

- Health Education Authority. http://www.hea.org.uk/

References from newspaper and magazine articles

Parent's web pages

Example Home pages I visited during the subject matter research:

- **The Barbieri Family**

- **The Berkinsky Family**

- **The Godfrey Family**
  Home Page: http://www.turing.toronto.edu/homes/migod/
  http://plg.uwaterloo.ca/~migod/

- **The Kienzle Family**

- **The Prichard Family**
  Home Page: http://members.home.net/gibson/

Some special interest pages are also published that provide an insight into the perceptions and experiences of pregnancy and childbirth. For example:

- Emotions in Pregnancy - Childbirth.org
  http://www.childbirth.org/articles/pregnancy/emotions.html

Special Interest Groups

There are many groups with their own perspective on the needs of women during pregnancy and childbirth. These include those with a particular agenda, such as natural childbirth or active childbirth, or a commercial context such as those providing specialist pregnancy services. Such organisations provide their own perspectives on options for care.

Links to:


- UK Central Council for Nursing, Midwifery and Health Visiting.
  http://www.healthworks.co.uk/hw/orgs/UKCC.html

- National Childbirth Trust, Forth Valley South Branch: http://www.nct-fvs.org.uk/
Appendix C. Character profiles

The following notes were used to introduce scriptwriter, Simon Turley, to the ideas and types of character that would be appropriate to the development of the interactive drama materials.

1. Introduction

The general aim of the product is to offer a multimedia learning environment that is thought provoking, leads to discussion, and enables parents to make informed choices about the care and treatment that they wish to receive. This guidance process not only involves the assimilation of knowledge, but also rehearsal of decision making processes, and the realisation of possible outcomes.

It is not the intention of this kind of product to give advice nor to eliminate contact with medical professionals, but rather to improve the quality of consultation and communication between professional and parent(s). Also, to provide an appropriately realistic and safe learning environment that stimulates the intuitive, reflective and socio-communicative aspects of learning.

The factual information, and specific medical information related to pregnancy and childbirth will primarily be delivered within documentary materials of text, audio narrative, graphics and video sequences. These will be available to parents as move through the product. The dramatic case studies are intended provide primary means access to the subject in an easily assimilated format, and is in effect form a backbone for the product. Their prime purpose is to address the sensitive, emotional, and controversial issues that commonly arise during childbirth and maternity care. These issues, although common, may seem unimportant at the time because of lack of experience or because they simply are not be apparent. The users should be able to identify with the characters they see, and use them to prompt “What if ?” type questions. These questions and issues would probably be difficult to draw out of interviews with parents, and would not have the immediacy nor impact of a dramatic representation.
2. Case Study Guidelines

The case studies that we use are open to interpretation and alteration by the people involved in their development. Part of our research is to look at ways in which drama can be used to raise sensitive issues and confront the users understanding and opinions of them.

The pregnancies represented need to be perceived as moving, without being unduly distressing. As a learning product, it is important that the case studies do not portray pregnancy as a series of traumatic events; neither should they include all the worse complications imaginable. That does not mean that negative emotions are taboo, but the emphasis needs to be on how to deal with them. Information on specific difficulties can be explained by documentary and other supporting information outside of the case studies.

The interactive nature of the product means that there will be multiple story lines, and depending on the route chosen the outcome of the character's decisions may be different. However, not every character can – or should – be able to cover every option. What I intend is that we should have an appropriate variety of opinions, motivations and choices to give the user a learning experience through a number of characters. It may involve multiple outcomes for one or more characters, whilst others may be used to look at specifics of interest to a minority, or to portray alternative viewpoints.

2.1. Story

The stories of the characters will focus primarily upon the period between (say) 12 to 20 weeks of pregnancy, as this is the period during which decisions of where to have the baby will be made. It also has the advantage that the pregnancy is only just beginning to show by this time.

It may also be useful to show flash-backs (and flash-forwards) in the case-studies, to show how people have fared in different events and situations. Examples would be to review the decision to have the baby, antenatal classes, what happens in an emergency. Medical procedures and childbirth itself can be shown using documentary footage of other mothers.
2.2. Plot

To introduce the case studies and the prototype, it is suggested that we use a scene in which a variety of expectant mothers are together (e.g. antenatal clinic, mother's keep fit, or other social event etc. ...). All following scenes will link from this one, and be linked to the time line concept. Issues drawn out of the story will relate to:

- physiological and emotional changes of the mother;
- foetal development;
- relationships and support;
- medical support;
- social and economic changes.

The plot covers the lives of a number of women, their partner's, family and friends as they make the choices for the birth of their babies. The product users will be able to follow a character of their choice in some places, and be presented with different information in response to entry of personal information in others. There will inevitably be sections common to all users.

For the prototype, the conclusion for the characters (and the users) is the choice of where they want to have their babies, who will deliver them, and what care they receive during the childbirth.

2.3. Narrative

The narrative form is open to debate, but inevitably there will be sections in which the women (and others) tell their story from a personal perspective, and others where the viewer has an external viewpoint to the dialogue.

2.4. Individual Scenes

Need to be relatively short and to the point - say around five minutes maximum.

2.5. Sets and Location

The use of built sets will have to be kept very simple, due to constraints of budget and facilities at the TV studio. We will hopefully be able to exploit the hospitality of Derriford for some scenes. The university itself may offer other location - beyond that ... help!
2.6. Atmosphere

INTELLIGENT SOAP? Advice and ideas needed and welcome.

2.7. Actors

The actors we use will depend upon the scripts, limits of time and money, and the scenarios developed. We need a mix of parents with different ages, educational, cultural and social background.
3. **Characters for the Case Studies**

I am suggesting a pro forma type of description for the characters should be developed, so that we all have a common reference to discuss and create the characters. I envisage that these documents will go through a series of changes during the design and production cycle. I think they will be useful to maintain continuity and character profile.

- Name and Age
- Background (Spending Power/Income, Education)
- Personality (Intelligence, Emotional Make-Up, Temperament)
- Physical Appearance
- Obstacles & Problems
- Motivations
- Setting (Home, Lifestyle)
- Relationships
- Other Personal Information (Miscellany)

The following are intended as suggestions for the type and breadth of characterisation that I think we could use. They can be used or discarded in part or whole.
3.1. A 'Typical ' Mother

This couple are fairly essential, in that they will fulfil the central roles of representing a normal pregnancy in terms of physiological development of mother and baby, emotional changes, relationships, and antenatal care and treatment, and childbirth.

They would be characters that we could use to follow common or routine events that most couples experience.

3.1.1. Name and Age

Female: Caroline Knight Age: Late 20s
Male: Ray Knight Age: Late 20s

3.1.2. Background

Caroline is a clerical officer in local government, working full time. Ray is a maintenance fitter in a local factory. They own their own house, and in a well founded and growing relationship.

They have been married for about four years. This is a planned pregnancy. Both parents are fit and well, and looking forward to the birth of their first child. The pregnancy was confirmed about a week ago.

At the beginning, the couple assume they are going to have a hospital birth, but will explore different alternatives as time goes along.

3.1.3. Personality (Intelligence, Emotional Make-Up, Temperament)

Both are bright and have a fair degree of common sense. Caroline left school at 16 and has a few 'O' Levels and BTEC qualifications. Ray has CSE's and served a craft apprenticeship with the company he works for.

Caroline is the more articulate of the two, but they are able to discuss problems. Caroline is quite sentimental about things and wants the pregnancy to be the most fulfilling and enjoyable experience possible. Ray is a bit more temperamental, and tends to bottle his feelings up for a while. As with any long-term relationship, they have differences of opinion and see things differently on occasions, but they trust and like each other.

3.1.4. Physical Appearance

Nothing out of the ordinary ...
3.1.5. Obstacles & Problems

The main obstacle that this couple need face is that they have yet to discover the important factors in making their experience of childbirth as comfortable and rewarding as possible. This will mean coming to terms with their roles as prospective parents, agreeing their own concerns, needs and desires, as well as making choices for the care and treatment they want.

Inevitably this process will involve guidance from medical experts\(^1\), but it will also be assisted and impeded by advice and comment from parents, friends, and media (e.g. mother & baby magazines).

3.1.6. Motivations

This couple are good at rectifying problems, and perhaps more importantly they make their relationship work by sharing things (e.g. time, emotions, thoughts, fun). Their main motivation is to look after their unborn child and to sustain their relationship.

3.1.7. Setting (Home, Lifestyle)

Suburbia - a small-ish family home on an estate. Domestic bliss ... Ford Sierra/Vauxhall Cavalier ... holidays in Majorca etc.

3.1.8. Relationships

Changing relationships with parents, family, friends and neighbour, etc. can be explored. Contact with health care professionals.

3.1.9. Other Personal Information

---

\(^1\) Whilst it I'm happy with the use of actors to portray doctors and midwives, the main source of information and opinion on medical matters will come from real midwives, and will be separate from these case studies.
3.2. The Young Mother

This case study would be to look at some of the specific concerns and problems of young (teenage) women. Young women are normally recommended to have a hospital birth.²

3.2.1. Name and Age

Female: Denise Finch  Age: 16 or 17
Male: David  Age: Year older

3.2.2. Background

Still living at home with her parents, who are less than happy with news of the baby pressures all round. She is either taking 'A' levels or a BTEC course at the local CFE, so is short of money and would find it very difficult if she had to cope on her own.

Her boyfriend of 14 months is doing the same academic course.

3.2.3. Personality (Intelligence, Emotional Make-Up, Temperament)

Denise is fairly bright and well balanced, but is currently in turmoil over what is happening. Whilst trying to maintain a normal relationship with her parents, things can become emotionally tense very quickly.

Although good friends, communications about the important things in a relationship have never really been discussed enough …

3.2.4. Physical Appearance

A youthful appearance, rather than a mature teenager may emphasise some of these issues.

3.2.5. Obstacles & Problems

Denise is in a failing relationship with her boyfriend a deterioration accelerated by news of the baby.

She not ignorant of contraception and the consequences of its failure, but her inexperience of life and ignorance of pregnancy and childbirth are all too clear.

² Young teenage women sometimes have difficulty because their pelvis has not developed fully, so making for a difficult birth. Their babies statistically are smaller than older women, because they use more minerals and vitamins to sustain their own growth and because they tend to eat more junk food.
David just hasn't thought about it …

3.2.6. Motivations

Denise has made the decision to have the baby, and her main aim in life is to make it through the pregnancy. To do this, she will undoubtedly rely on her mother.

As the pregnancy is not planned, she has little idea about the care she needs, and the options that are available to her.

She also realises that having a baby has significant effects on her ability to study, her career prospects, and her lifestyle. She needs to resolve some of these issues.

David probably hasn't thought about it …

3.2.7. Setting (Home, Lifestyle)

Denise lives in her parents semidetached or terraced house, her parents both work. She has (or had) normal teenage interests, and has her own room. Whilst not in poverty, the family is not tremendously well off. She is an only child, there is a small spare room.

David comes from a similar family setting.

3.2.8. Relationships

As already said, there are already tensions between the main characters.

There is also opportunity to explore relationships with her friends, and with medical carers.

3.2.9. Other Personal Information

Suffer's from asthma
3.3. Alternative Lifestyle

These characters could provide a way to explore some health care alternatives, such as community care, independent midwives, relaxation techniques, homeopathy, NCT etc....

As a Mother over thirty-five, the issues of being an older Mum can also be looked at, as can the effects on older children.

3.3.1. Name and Age

Female: Rosie Age: 35 to 40  
Male: Bob Age: 40 to 45

3.3.2. Background

This is a second marriage for both Rosie and Bob. Rosie has teenage children from her marriage one away at university and one living with her. This is their first child together after 12 months of trying.

Rosie is an ex-primary school teacher, who has recently started working part-time from home as a freelance illustrator, and is also working for an OU degree. Bob is a principal lecturer in the Environmental Science department at the University.

3.3.3. Personality (Intelligence, Emotional Make-Up, Temperament)

Rosie has an air of serenity, but is very independent. Her first marriage was very conventional and she sees her new lifestyle as being a new start, with opportunities of her own making. Having a baby is part and parcel of this, and she intends to make sure that she makes the right choices now that she has the benefit of hindsight.

Bob gives all the impressions of being a new man, although he isn't always convinced. He's a little nervous about the prospect of becoming a father for the first time, and unsure what pregnancy and childbirth really means for (and to) him. Bob has a gift for assembling masses of information, and alternative viewpoints, but a weakness when it comes to making personal choices.

3.3.4. Physical Appearance

Rosie could be slightly alternative, new age kind of 2CV car and floral dungarees.

Bob is an academic ... ???
3.3.5. Obstacles & Problems

The main problem is the dissatisfaction with the hospital environment, Rosie was happy with the treatment she got from the hospital with her previous children, but she now wants to make the birth of her new baby a more *natural* experience. She also feels that a male dominated obstetrics department *might* be wrong for her.

Rosie has to try and find out what alternatives she could have, and then make the choice that suits her. She is also aware of the fact that she is considered elderly by mainstream medicine.

Bob is unsure whether he should offer an opinion on these matters, and feels he may be intruding. However, underneath it all he is a scientist, and he has an underlying belief that technology is the best way to find out and get results, in most complex situations.

3.3.6. Motivations

For Bob the main motivation in his personal life is to make Rosie happy.

Rosie wants to make her new life match her dreams and fit in with all her expectations of her new marriage and lifestyle.

3.3.7. Setting (Home, Lifestyle)

They live in a semi-rural or small town environment (e.g. Tavistock), with a large detached house and land. They are financially comfortable, but not rich by any means.

3.3.8. Relationships

The important relationships here are between Rosie & Bob, and with Rosie's children.

3.3.9. Other Personal Information
3.4. Career-Oriented Business Woman

This case will focuses upon the changes that pregnancy imposes, and how lifestyle can affect the choice of care and place of childbirth.

3.4.1. Name and Age

Female: Jayne Hargreaves Age: 36  
(DoB 20/10/58)

Male: Chris Age: 38

3.4.2. Background

Jayne is a business woman, working as a senior sales executive for a computer software company. She has a hectic lifestyle, visiting clients in the South West of England.

She is in a relationship and lives with her partner, but didn't intend to have children. It came as a bit of a shock, putting the early symptoms down to anything but a baby. Her pregnancy was diagnosed relatively late in term 3 or 4 months.

Chris is an ex-flight engineer in the RAF, and is currently three months into a two year contract in the Middle-East.

The changes in her lifestyle will be fairly traumatic, as she lives 250 miles from her family, and has only one or two close friends living locally.

3.4.3. Personality (Intelligence, Emotional Make-Up, Temperament)

She is very bright and career centred. She joined the company after completing a language degree, and has worked up to her present post in the space of seven years. Although she has yet to work out all the implications of the new arrival, she feels that like everything else that she has taken on she will find a way to manage.

Emotionally, she is fairly stable, but as a good sales-woman working in a competitive environment, she has learnt not to give away her feelings, unless it suits her to do so. She is capable and assertive, and makes decisions on what she wants very positively.

Underneath it all, she is probably quite concerned on how she will look after the baby and how it will affect her career.
3.4.4. Physical Appearance

Quite the sophisticated business woman.

3.4.5. Obstacles & Problems

She desperately wants to continue her career, but isn't sure how news of the baby will be received by her employers.

Coming to terms with the side effects of pregnancy may be difficult, as will the realities of becoming a mother, although she would not do anything other than have the child.

Making time to receive care, and go through labour, are things that she has pencilled into her diary. They don't seem real yet.

3.4.6. Motivations

To learn how to accommodate the pregnancy into her life, yet maintain her career and hectic work schedule.

To find the most efficient way of having the baby and get back to work.

To avoid becoming ill, and causing harm to herself, the baby and her career.

3.4.7. Setting (Home, Lifestyle)

Lives in a plush flat, one that is neither intended nor suitable as a family home. She currently lives by microwave and frozen ready-made meals. When not working or travelling, she plays squash and does aerobics at least three times a week.

Although her marriage has been marked by her husband's absence, and her extensive travelling, their marriage is good. However Chris will only be home once during the pregnancy, and is unlikely to be at the birth.

3.4.8. Relationships

Support and friendship with one or two close female friends will be important here.

3.4.9. Other Personal Information

Secretary's name: Micky (female)

GP's Name: Dr. Mansfield, the Dunn Health Centre.

Past medical problems: Refers to past instances of cystitus, last case 12 months ago.

Shoe size: Five ... and a half.

Jayne's employers: Nautilus Software
3.5. Dealing with Medical Complication

This is a fairly normal pregnancy with the exception that Karen has a disability or medical problem\(^3\) – say diabetes – that could affect childbirth.

3.5.1. Name and Age

<table>
<thead>
<tr>
<th>Gender</th>
<th>Name</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>Karen</td>
<td>20's</td>
</tr>
<tr>
<td>Male</td>
<td>Ken</td>
<td>20's</td>
</tr>
</tbody>
</table>

3.5.2. Background

Karen works in retail industry, as a full-time shop assistant. She has suffered from insulin-dependent\(^4\) diabetes from childhood. Although, this plays a significant part in her lifestyle, she has tried not to let it undermine her achievements nor her independence. She controls the drug with insulin injections.

Karen is married to Ken, who has always supported his wife and tried to make sure that she looks after herself. However his attention sometimes becomes overbearing.

3.5.3. Personality (Intelligence, Emotional Make-Up, Temperament)

Karen has a generally happy personality and enjoys life, but has a strong independent streak, which sometimes brings conflict with Ken. This has caused some problems during the early stages of the pregnancy.

She has been finding out how her pregnancy is affected by diabetes, and taking advice from her medical practitioner. However, she has a secret desire to have her child at home as her older sister did 18 months ago.

---

\(^3\) Possibilities include: renal failure, heart defect, liver problems, spinal injury, epilepsy, diabetes, genital herpes … etc.

\(^4\) Affects people before the age of 30, and involves treatment by injections to replace insulin.
3.5.4. Physical Appearance

Diabetes can create complications during pregnancy\(^5\) and birth. Doctors often suggest induction for safety reasons.

Outward signs of diabetes are not always obvious.

3.5.5. Obstacles & Problems

To come to a decision of how her medical complications and her desire for birth at home can best be accommodated.

3.5.6. Motivations

They're both primarily interested in having a healthy baby.

Rosie would like to be seen as much a successful Mum as her older sister.

3.5.7. Setting (Home, Lifestyle)

Well-furnished Barret home or Victorian Terrace, this is their first home and they have now settled into it and are looking forward to it becoming a family home.

3.5.8. Relationships

Her relationship with her husband is generally good, but the roles of parenthood are just being established. There are inevitable strains as the two learn how to accommodate each other's needs and desires.

Karen's relationship with her sister has always been close, and there are small jealousies for Ken to come to terms with as he sees his sister-in-law's increased influence that comes from her experiences as a mother.

3.5.9. Other Personal Information

---

\(^5\) Babies often have breathing problems - lack of surfactant mean that air sacks in the baby's lungs do not inflate properly. Intubation may be necessary. Few hours sometimes days care in a special care unit is necessary.
3.6. Dealing With Life Pressures

3.6.1. Name and Age

Female: Terri Age: 26
Male: ?

3.6.2. Background

A factory worker

3.6.3. Personality (Intelligence, Emotional Make-Up, Temperament)

Terri is someone who lives for today. She is always spending on frivolous things and responds to whims rather than plans. She is emotionally immature, and something of a tough facade crumbles when she gets herself into personal difficulty.

3.6.4. Physical Appearance

She enjoys both drinking and smoking - advice to stop either is something of an irritation.

3.6.5. Obstacles & Problems

Her pregnancy is totally unplanned and the result of a quick fling. The father is less than interested in the baby, and is likely to do little to respond to his responsibilities.

Terri has always lived for today, and seldom has the money to last until the next pay-day. She has some bank debts.

She has never really had any close contact with babies, the idea of having one of her own is unnerving to say the least.

She tries to cope by taking everybody's advice, and getting wound up and confused over problems and complications she hears or reads about; for example neural tube defects.

3.6.6. Motivations

To get through the week.

---

6 Sewing Machinist, Assembly Line Operative ... ??
7 Neural tube defects: Spina bifida - incomplete spinal development; Hydrocephaly - excess of cerebro-spinal fluid on brain; Anencephaly - incomplete formation of brain and skull.
3.6.7. Setting (Home, Lifestyle)

She lives in a shared house and has a bed-sit. She moved away from home at the age of 16, and her closest relative is 50 miles away.

3.6.8. Relationships

Friends are her main source of support.

3.6.9. Other Personal Information
Appendix D. Interactive drama scripts
<table>
<thead>
<tr>
<th>Time Slot</th>
<th>Visual Representation</th>
<th>Script</th>
<th>Navigation &amp; User Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>T000</td>
<td><img src="image" alt="Image of the scene" /></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Physical space of the scene. Can be explored (posters, table etc.)

The interior of a health clinic. There are chairs arranged around the walls. The windows are net-curtained. There is a table with untidy piles of magazines in one corner; the occasional house plant. Walls are well-endowed with health posters: Drugs, Smoking, H.I.V., Alcohol Abuse, Contraception, Pregnancy.

**Sound:** Background noise. Conversation emanating from reception.

---

1 ➤ This symbol indicates interactions within a time slot and the 'spatial' environment.

2 ➤ This symbol indicates navigation between time slots and scenes.

Oct-98 University of Plymouth Interactive Media Group

Tom Rogers
<table>
<thead>
<tr>
<th>Time Slot</th>
<th>Wide Shot</th>
<th>Normal</th>
<th>Close-Up</th>
<th>Script</th>
</tr>
</thead>
</table>
| T010      | ![Image](#) | ![Image](#) | ![Image](#) | **Sound:** The opening of a door. Power dressed footsteps on the lino.  
**Action:** Enter Jayne. Smart suit. Attaché case. She stands in the centre of the room looking all around. |
| T020a     | ![Image](#) | ![Image](#) | ![Image](#) | Mutterings of how long this is all going to take, and how she should be working.  
**Camera:** Focuses on her expression, it is cold and disdainful. She is checking her watch and begins to pace.  
**Action:** Takes out some cigarettes, looks at no smoking sign ... frustrated she puts them away. At the end of the scene she is pacing towards the door when ... |
| T020b     | ![Image](#) | ![Image](#) | ![Image](#) | **Camera:** Close up of Jayne's face. Her expression is cold and disdainful. We see her focus shift - she winces slightly.  
**Cut to:** Over the shoulder shot of Jayne looking at poster. The poster showing a heavily pregnant woman. The poster will morph to show Jayne in a few months time, and equally pregnant.  
**Cut to:** Jayne's face.  
**Jayne:** Oh, God. That's it ...  
**Action:** Turns toward the door as if to leave. |
<table>
<thead>
<tr>
<th>Time Slot</th>
<th>Wide Shot</th>
<th>Script</th>
<th>Navigation &amp; User Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>T030</td>
<td></td>
<td><strong>Action:</strong> Jayne stops in her tracks. Caroline opens the door, tentatively putting her head round to see if it looks like the right place.</td>
<td>➔ Select Jayne or Caroline to follow character.</td>
</tr>
<tr>
<td></td>
<td><strong>Character 1:</strong> Jayne</td>
<td></td>
<td>➔ Go to T040a/ T040b</td>
</tr>
<tr>
<td></td>
<td><strong>Character 2:</strong> Caroline</td>
<td></td>
<td>➔ Go to T040a/ T040b</td>
</tr>
<tr>
<td>T040a</td>
<td></td>
<td><strong>Caroline:</strong> Sorry. Am I late? Am I the only one? Shopping ... dreadful cues everywhere. I thought I'd left enough time as well ... Ah well ... the best laid plans and all that ...</td>
<td></td>
</tr>
<tr>
<td>T040b</td>
<td></td>
<td><strong>Camera:</strong> Jayne's perplexed face. <strong>Sound:</strong> Jayne's mobile. <strong>Action:</strong> Jayne jumps. Smiles with relief. <strong>Jayne:</strong> Excuse me.</td>
<td></td>
</tr>
</tbody>
</table>
Jayne: Micky? Ah ... good girl ... hang on, hang on, it's a dreadful line ... Can you make sure that the IEM contract details are on my desk when I come in ... and have a copy for him ... And, can you ring Steve Bowers ... tell him I'll see him late p.m. about the RTP ... I'll be in ASAP ... OK? Bye.

Cut to: Caroline looking around the room and selecting a seat. The camera follows her as she arranges the shopping on the floor and sits.

Sound: Indistinct sound of Jayne's conversation with Micky.

Caroline: Oh ... Sorry, I thought you were the doctor waiting to see me.

Action: Embarrassed, she reaches for magazine & begins to flick through.

Jayne takes a seat in the same row as Caroline, and opens her briefcase to get her organiser.

Select Jayne or Caroline to follow character.

Go to T070.
<table>
<thead>
<tr>
<th>Time Slot</th>
<th>Character 1: Jayne</th>
<th>Character 2: Caroline</th>
<th>Character 3: Denise</th>
<th>Script</th>
<th>Navigation &amp; User Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>T070</td>
<td></td>
<td></td>
<td></td>
<td>Action: The door opens. Denise enters: trainers and jeans, a dark sweatshirt. She is a young-looking sixteen. We track her as she goes straight to a chair opposite Caroline's encampment. She sits and stares down at her shoes to avoid eye contact with anyone.</td>
<td>Go to T080</td>
</tr>
<tr>
<td>T080</td>
<td></td>
<td></td>
<td></td>
<td>Wide shot..</td>
<td>Select character of interest</td>
</tr>
<tr>
<td>T080a</td>
<td></td>
<td></td>
<td></td>
<td>Caroline: Damn...</td>
<td>Go to T090</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Action: One of the carrier bags sags, and apples roll out across the floor. Caroline looks embarrassed, and retrieves the fruit.</td>
<td></td>
</tr>
<tr>
<td>T080b</td>
<td></td>
<td></td>
<td></td>
<td>Action: Looks over at Denise, weighing her up ... is she really as young as she looks.</td>
<td>Go to T090</td>
</tr>
<tr>
<td>T080c</td>
<td></td>
<td></td>
<td></td>
<td>Action: Denise looks across at the two older women with a tinge of hostility. Trying to remain composed she holds her arm across her body ... partly defensive, partly as a comfort.</td>
<td>Go to T090</td>
</tr>
</tbody>
</table>
Interactive Drama Script

Waiting Room Scene

T090

Caroline: Um ... Would anyone like an apple?

T100a

Jayne: No, but thanks for the offer.

T100b

Action: Denise puts on an extremely sour expression.
Denise: (dully) No thanks.
Caroline: Never accept things from strangers ... quite right too.
Denise: It's not that ... It's just that apples make me puke just now.
Action: Jayne smiles a little.
Caroline: I just thought ... I've got other stuff, if apples aren't any good. Oranges ... and Kiwi ...
Denise: I can only manage bananas now ...
Action: Caroline rummages in her bag and retrieves another paper bag, and passes over a banana.
Caroline: Bananas are great. Lots of potassium and zinc. You need them ... and vitamins ...
Denise: Thanks
Caroline: (joking) Don't be silly ... after all ... we're all in the same club.

T110

Jayne: You're married.
Caroline: That obvious, is it?
Jayne: I didn't mean it was bad or anything.
Caroline: You aren't? (Open question to both women)
Interactive Drama Script

Waiting Room Scene

T120a

Jayne: No ... never went in for that kind of thing really."

Select
Jayne or
Denise
Go to
T120b or
t130a

T120b

Action: Denise smiles, almost embarrassed ...
Denise: Course not ... boyfriend init.

Select
Jayne or
Denise
Go to
T120a or
t130a

T130a

Sound: (Doctors' intercom):
"Miss Jayne Hargreaves to Room 1 please".
Jayne: That's me!

Select
Jayne to
follow to
antenatal
interview
Select a
topic for
discussion
between
Jayne and
Caroline —
available
throughout

T130b

Jayne: Thanks for the apple ... good luck...

Select
Denise or
Caroline to
learn more
about them
Go to
T140

Exits
<table>
<thead>
<tr>
<th>Time Slot</th>
<th>Wide Shot and Links to guidance points</th>
<th>Close Up Shots: Caroline</th>
<th>Close Up Shots: Denise</th>
<th>Script</th>
<th>Navigation &amp; User Interaction</th>
</tr>
</thead>
</table>
| T140a     | From T130 topic selection              |                          |                         | Stay in surgery to find out more about Caroline & Denise.  
Camera Shot from the door of Caroline and Denise looking up and smiling - one warmly, one sheepishly.  
Sound: The door shutting  
Caroline: So you've a boyfriend ... What's he called?  
Denise: Dave. (pause) We've been going out for about a year, now.  
Caroline: You've known him for quite a long time then.  
Denise: Yeah - ever so long, really. He was in the year above me at school. Lives a couple of streets away. | ➤ Select Caroline 140c or Denise T140b |
| T140b     | Dialogue about their respective pregnancies and partners. Selecting a character produces a dialogue biased towards their circumstances and concerns. |                          |                         | Caroline: You've told him about the baby ... Dave?  
Denise: Too right. Had to put up with me going mental, didn't he.  
Caroline: Not planned, then.  
Denise: Not much ... it's alright. I want the baby ... it's just the shock and everything.  
Caroline: I know. | ➤ Select Caroline 140d or Denise 140e |
| T140c     |                                         |                          |                         | Denise: Was yours a shock, then?  
Caroline: Well — not in the same way, maybe. We've been planning a long time. But it's still a bit of a shock when you find out for real, of course. | ➤ Select Caroline 140d or Denise 140e |
Denise: What's his name, your husband?
Caroline: Ray.
Action: Caroline opening the bag and producing the photo.
Caroline: I've a picture of him here. Somewhere ... here we are
Action: Denise take the photo to look more closely.
Denise: He looks kind of nice.

Caroline: This is Ray. That was taken in our garden ... we do the garden together ... sounds sort of soppy, I know.
Denise: No, it doesn't. It's nice. That's how it sounds ... nice.
Cut to: Profile of both women – we are beside Caroline, so we see Denise's face full when she turns to speak to her.
Action: Caroline takes the photo and replaces it in her bag.

Denise: Have you got any other children?
Caroline: No. This is our first.
Denise: But you seem to know what you're doing.
Caroline: Not really – I've just read a lot about it ... I'm shaking like a leaf here.

Select Denise or Caroline to go to T150 or select a new topic.

From T140 or topic selection

Selection of each character gives a view of them discussing medical issues—giving opportunity to see their expressions and reactions to the conversation. Non selection presents wideview only.

Select Denise or Caroline for close up shots and to lead the chat.

Go to T150b
Denise looks worried, as she knows the next call could be for her...

Denise: I don't even know what's happening today...

Caroline: ... With the doctor? Today?

Denise: Yeah.

Caroline: Well ... it's just a general chat about things, I expect. He'll check your medical history ... if you've got any serious illness, or ever had one -

Denise: - I get asthma.

Caroline: That's the kind of thing ... that's the kind of thing they'll want to know.

Denise: I'll be well in when it comes to that "pant like a puppy" malarkey.

Caroline: (laughing) Well, we'll not be doing any of that today. I hope; there'll be other things - height and weight. Blood pressure ... and an internal.

Denise: Oh...

Caroline: You ever had one?

Denise: Yes. The other day. Our doctor ... to confirm it. I hate that.

Caroline: No fun for anyone, is it. Never mind. It won't take all that long.

Denise: No.
**Interactive Drama Script**

**Waiting Room Scene**

**Cut to:** Headshot of Caroline.

**Caroline:** Don't go worrying. You'll be fine. But it's important this. They'll give you like health tips - diet, and stuff like that. You make sure and ask him, if there's anything you don't understand. That's what he's there for.

**Denise:** I don't like to ask questions ...

**Caroline:** But you must.

**Denise:** I don't really like talking about it ...

**Caroline:** Sorry, I'm blathering on.

**Denise:** You're alright ... It's helpful.

**Caroline:** Is there no one else you can talk to about it? How about your mum?

**Denise:** Probably ... eventually ... But she's like in shock right now.

**Caroline:** Don't exclude her. She's been through all of this ... in some ways she knows more than the doctor.

**Denise:** I spose so ...
<table>
<thead>
<tr>
<th>T170d</th>
<th>Caroline: It's natural to worry. It's natural to be scared and everything ... but you'll be alright.</th>
<th>Go to T199</th>
</tr>
</thead>
<tbody>
<tr>
<td>T199</td>
<td>Sound (Doctors' intercom): &quot;Mrs Caroline Knight to Room 3 please.&quot; &quot;Miss Denise Finch to Room 2 please.&quot;</td>
<td>Select Caroline/ Denise to follow to antenatal surgery (Not produced in research [project]) End Scene</td>
</tr>
<tr>
<td>LOCATION</td>
<td>IMAGE</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>EXTERNAL</td>
<td><img src="image1.jpg" alt="EXTERNAL Image" /></td>
<td></td>
</tr>
<tr>
<td>HALL</td>
<td><img src="image2.jpg" alt="HALL Image" /></td>
<td></td>
</tr>
<tr>
<td>LIVING ROOM</td>
<td><img src="image3.jpg" alt="LIVING ROOM Image" /></td>
<td></td>
</tr>
</tbody>
</table>

Oct-98

University of Plymouth Interactive Media Group

Tom Rogers
It is the afternoon of the same day as Denise's first antenatal visit.

**Exterior:** Denise Approaches the house

**Interior:** The hallway of Denise's parents' house. A view up the passageway towards the glazed front door. The television is audible from the front room; early evening news - middle of the main story.

_Note:_ Arrows indicate links to and between narrative routes.
Denise seen through the distorting glass of the door - fitting her key into the lock. She opens the door, carefully. She enters the house quietly - not secretly, just in a soft, self-absorbed state. She shuts the door.

**Mother:** (off) Denise?

**Action:** Denise stands still, looking ahead.

**Cut to:** View of the doorway to the living room. Mother appears, framed in the door.

**Mother:** Denise? There you are.

[Silence]

Everything alright? Was it okay?

**Denise:** Is he back yet?

**Mother:** No. Overtime - he rang in the day.

**Action:** Denise's back appears in the shot as she moves forward. Her mother moves to one side as Denise passes her into the room.
Cut to: The sitting room. Three-piece suite - TV on, family photos on the shelves. Denise sits wearily on the settee.

Mother: There's tea in the pot...
Action: Denise looks - with a sad smile - at her.
Mother: Sorry. I keep forgetting.
Denise: I know.
Mother: I can't get used to it ... your being off tea.

Denise: You can't get used to anything -
Mother: - that's not fair, Denise. It's all been so sudden and everything...
"I mean ... we never expected that this would ... well ... you know ...
Denise: That you'd be a granny one day?
Mother: Well ... there's no need to put it like that.

Denise: You can't get used to anything, really ... can you mum.
Mother: I am trying, Denise. It's all been so sudden and everything ...
"I mean ... we never expected that this would ... well ... you know ...
Denise: That one day you'd be a grandmother?
Mother: Well ... Of course I did ... But not quite yet ... that's all.
Denise: God!
Mother: Denise! don't -
Denise: Don't what! don't talk about it? Is that it? Well why not! there's a lot that needs talking about. What you saying? That we pretend I'm still a virgin or something.
Mother: Denise!

Denise: It's not an angel that did this to me you know.

Denise: Well, it is now ... (gently mocking) So, are you going to be able to cope?
Mother: Denise! don't -
Denise: Don't what? don't talk about it? Is that it? But why not! there's a lot that needs talking about. And we can't even start doing that if you're going to insist on pretending that I'm still a virgin or something.
Mother: Denise!

Denise: It's not an angel that did this to me you know.
Mother: Well he may not be our choice, but there's things I like about David ....
Denise: You never said.
Mother: You never asked. You kind of took our disapproval for granted.
Denise: Sorry. I think maybe I've had you tarred with the brush I should keep for Dad.
Mother: Give him time ... He'll come round.
Mother: (pause) Are they kind?
Denise: What?
Mother: At the clinic place ... I mean, do they look after you right?
Denise: It's fine.
Mother: I remember them as being cold ... and distant.
Denise: Oh ... you were pregnant yourself then ... once.

Mother: Are they kind, then, nowadays?
Denise: What?
Mother: At the clinic place ... I mean, do they look after you right?
Denise: It's fine.
Mother: I remember them as being cold ... and distant.
Denise: Oh ... so you were pregnant yourself then ...
Action: Eye-contact between them - hurt from mother ... anger going to shame from Denise, who looks down.

Denise: (low) Sorry, but you won't seem to accept me having this child. And cold and distant ... that's what you've been giving me. And I don't need that right now, mum. I don't need cold and distant.

Mother: (soft) Denise. I'm sorry.

Action: Denise and Mother remain distant and awkward with each other.

Action: Eye-contact between them - hurt from mother ... brittle mockery going to shame from Denise, who looks down.

Denise: (low) Sorry. It's just that you won't seem to accept me having this child. And, I know it's not what you mean to do ... but, cold and distant ... that's what you've been giving me. And I don't need that right now, mum. I don't need cold and distant a whole lot.

Mother: (soft) Denise. I'm sorry. Truly I am if I've not been any help. And we're talking now, aren't we?

Action: Mother stands up and moves towards Denise. Denise turns to her for a hug.
Denise: Go on ...
Mother: What about?
Denise: Go on about what it was like for you.
Mother: Oh ... I don't know ...
Denise: Try to remember ... You never told me about it ... ever.
Mother: Long time ago, now ... wasn't it.
Denise: Not that long

Denise: Sorry ...
Mother: You're nice to hug, you are .... I'd forgotten.
Denise: It's nice to be hugged.
Mother: When you were a little girl you use to cling ... like a monkey. It took my breath away sometimes.
Denise: I don't remember.
Mother: Always looking to be carried ... And your father always giving in and picking you up.
Denise: He used to sit me on his shoulders.
Mother: You remember that right enough.
Denise: Well it felt so high up .... A good kind of frightening. (pause) Go on ...
Mother: What about?
Denise: Go on about what it was like for you - in antenatal clinics of the Dark Ages.
Mother: Oh ... I don't know ...
Denise: Try to remember ... You never told me about it ... ever.
Mother: Long time ago, now ... wasn't it.
Denise: Not that long
**Mother:** And everything's changed, I dare say.

**Denise:** Not everything ... It's still the woman who carries the baby.

**Mother:** Well ... if I am going to talk to you - no back chat alright?.

**Sound:** The phone starts ringing

**Denise:** Let it ring.

**Mother:** What if it's your Dad ... 

**Denise:** I'll get it then.

**Mother:** No taking the micky, then ... if I am going to talk to you.

**Sound:** The phone starts ringing

**Denise:** Let it ring.

**Mother:** What if it's your Dad ...

**Denise:** Alright ... I'll go. I'll go.
<table>
<thead>
<tr>
<th>LOCATION</th>
<th>IMAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HALL</td>
<td><img src="image1.jpg" alt="Image" /></td>
</tr>
<tr>
<td>PHONE BOX</td>
<td><img src="image2.jpg" alt="Image" /></td>
</tr>
<tr>
<td>LIVING ROOM</td>
<td><img src="image3.jpg" alt="Image" /></td>
</tr>
</tbody>
</table>

*Note:*

Arrows indicate links to and between narrative routes

Oct-98

University of Plymouth Interactive Media Group

Tom Rogers
<table>
<thead>
<tr>
<th>Ref No:</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>T51000</td>
<td><strong>HALLWAY</strong></td>
<td><strong>Action:</strong> Denise enters the hall way. We see her hand pick up the receiver, taking it out of view. Camera moves up the flex in its own time, until we are close up on Denise’s face.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Denise:</strong> Hello .... Hello?</td>
<td></td>
</tr>
<tr>
<td>T51010</td>
<td><strong>EXTERIOR PAY-PHONE</strong></td>
<td><strong>Cut to:</strong> Exterior - of a phone box. In it we can see David, receiver shrugged to his ear, unlit cigarette clamped in his mouth, doing auto-body-search for a light.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>David:</strong> (clenched - semi-audible) Hang on, love.</td>
<td></td>
</tr>
<tr>
<td>T51020</td>
<td></td>
<td><strong>Cut to:</strong> Denise, quizzical at the phone.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Denise:</strong> Dad?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Mother:</strong> (off) Everything alright?</td>
<td></td>
</tr>
</tbody>
</table>
**T51030**

**Cut to:** David. He tucks the cigarette behind his other ear, tetchy.

**David:** Denise, it's me. Hang on a minute, will you.

**Denise:** (over phone) Dave. At last ...

**Action:** He produces a box of matches and strikes one. Forgets for a moment that the cigarette isn't in his mouth.

He locates the cigarette and gets the match to it.

**Cut to:** Denise as before.

**Denise:** (a kind of soft scolding - warmth) ... the absolute limit. I never knew anyone who makes a phone call and then starts by saying "Hang on".

**David:** (over phone - yelp of pain)

**Cut to:** David. Frantically trying to get the money into the slot. Money drops into slot.

**David:** Denise, it's me. Hang on a minute, will you.

**Denise:** (over phone) Dave. At last ...

**Action:** He produces a box of matches and strikes one. Forgets for a moment that the cigarette isn't in his mouth.

He locates the cigarette and gets the match to it.

**Cut to:** Denise as before.

**Denise:** (a kind of soft scolding - warmth) ... the absolute limit. I never knew anyone who makes a phone call and then starts by saying "Hang on".
**T51040**

**Cut to:** David, throwing down match and shaking his hand.

**Denise:** (over phone) What's the matter.

**David:** Burnt myself innit.

**Action:** He inhales deeply and sighs it out again.

**David:** Denise. This is an emergency. Listen carefully. Have you got that assignment for Dawson? I hope you have, cos I like need it right away. Walked slap bang into him, didn't I? And I run out of excuses and everything last week ... so I promised him I'd go and get it now.

**Cut to:** David. Looks incredulously as money drops, but nothing happens.

**Denise:** (over phone) What's the matter.

**David:** just getting a ciggie.

**Action:** He inhales deeply and sighs it out again.

**David:** I just thought I'd call syou now, 'cause I want to go to five-a-side with Lee.

---

**T51050**

**DENISE IN HALL**

**Cut to:** Denise. Bleak, sad look.

**David:** (over phone) So don't tell me that you haven't done it. I'm relying on you.

**Denise:** Well you shouldn't ....

**Cut to:** Denise. Bland look ... nobody there so puts the phone down.

**Cut to:** Denise. Bleak, sad look.

**David:** (over phone) Didn't I tell you?

**Denise:** (Silence)

---

**T51060**

**PAYPHONE**

**Cut to:** Interior of the phone box, close up of David's face. Concerned.

**David:** Not rely on you? Of course I must. I have to. How can I lie to him if I can't rely on you. Don't do this to me ...

**Cut to:** Interior of the phone box, close up of David's face. Concerned.

**David:** Denise?

---

**T51070**

**DENISE IN HALL**

**Cut to:** Denise. Tight close up of her sad face.

**Denise:** You've forgotten about today ... I thought you'd made a choice ... but no ... It wasn't even a choice. You just forgot.

**David:** (over phone) Forgot? Forgot what?
T51080
PAYPHONE
Cut to: David, in close up. Angry.
David: Look I'm banking on you. If I don't get Dawson the assignment he'll fail me... He'll fail me on the next test. I'll fail the test.
Denise: (over phone) You just did.
Sound: pips on the phone.

T51090
David: What are you on! Denise.

T51100
Cut to: exterior of the phone box to bystander waiting for phone call.
Action: David opens the door a tad and pokes his head out.
David: Haven't got a ten p you could lend us, could you mate?
**Cut to:** Denise. The receiver hovering a little away from her face in a slackened hand.

**David:** (over phone) Denise?

**Sound:** Dead tone on the line.
Action: This snaps Denise back into life. She heads past the camera.

Father stands framed in the front door way, looking up the stairs - he says nothing. Mother appears in the shot - looks from Father to Denise’s room.

Mother: You’re here then.
Father: Yes.
Mother: They didn’t keep you long.
Father: What?
Mother: The overtime.
Father: Changed my mind, didn’t I. (pause) Got to talk to that girl.
Establishing shot of Father in hallway, heading towards Denise's bedroom.
<table>
<thead>
<tr>
<th>LOCATION</th>
<th>IMAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HALL</td>
<td><img src="image1.jpg" alt="Hall Image" /></td>
</tr>
<tr>
<td>BEDROOM</td>
<td><img src="image2.jpg" alt="Bedroom Image" /></td>
</tr>
<tr>
<td>EXTERNAL</td>
<td><img src="image3.jpg" alt="External Image" /></td>
</tr>
</tbody>
</table>

Note:

Arrows indicate links to and between narrative routes
<table>
<thead>
<tr>
<th>Ref No: T53000</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DENISE IN BEDROOM</strong></td>
<td></td>
<td>Cut to: Denise in her bedroom. She is sitting on the bed. Posters - Nirvana. Books and folders on the small desk. <strong>Action:</strong> Denise flicks through a leaflet on teenage pregnancy/antenatal services. <strong>Action:</strong> Denise closes her eyes in frustration.</td>
</tr>
</tbody>
</table>
Denise: This is my room
Father: Granted. But it has four walls, a floor and a ceiling that seem to be part of my house.
Denise: For God's sake.
Father: I've only come to ask you about today.
Denise: (pause - suspicious) You?
Father: Yes, me. Why not. I'm concerned. (pause) You were down the clinic today.
Denise: Yes.

Denise: Not just now, Dad ... Eh?
Action: He smiles and shakes his head and steps further in.
Denise: This is my room.
Father: Granted. But it has four walls, a floor and a ceiling that seem to be part of our house.
Denise: Blank stare
Father: I've only come to ask you about today.
Denise: (pause - softly incredulous) You?
Father: Yes, me. Why not. I'm concerned.
Denise: I'm sorry ... I didn't mean -
Father: - Forget it. You're bound to be touchy ... I think we've all been a bit touchy, if it comes to that. (pause) You were down the clinic today.
Denise: Yes.
Father: And everything's alright, like ... with the baby.
Denise: So far as they can tell, yes.
Father: So they don't know.
Denise: They can't know.
Father: Right. (pause) Of course.
Denise: You can have these tests, though. They do this scan thing.
Father: Scan?
Denise: Ultra sound, it's called. And it shows up the baby ... in your womb.

Father: And everything's alright, like ... with the baby.
Denise: So far as they can tell, yes.
Father: So they don't know.
Denise: They can't know.
Father: Right. (pause) Of course. (pause) To tell you the truth, I'm pig bloody ignorant, me. It just scares the living daylights out of me all this sort of thing. It was the same when your mother ... well, you know. (pause) So what's the next thing that happens?
Denise: You can have these tests. To see how the baby's doing. They do this scan thing.
Father: Scan?
Denise: Ultra sound, it's called. And it shows up the baby ... in your womb.
Father: They'd have a right laugh looking at mine.
Cut to: Mother at Denise's doorway.
Father: I've been thinking, Denise. (pause)
Action: Mother slowly enters the room. She sits beside Denise.
(pause) Thinking hard about this whole thing.
Denise: Dad ... don't ...
Father: No. I want my say. And this is the time to say it. Before it's too late.
Denise: I thought it was already "too late" isn't that the problem.
Father: Just hear me out ... that's all I ask. Hear me out.
Mother: Jack -
Father: - Both of you. (pause) How I see it ... It's like this. Denise. You're seventeen. You're a child.
Denise: Child!
Father: Don't fly off .... Alright ... a girl ... A young woman is all you are. You're just in the middle of this course and everything ... No where near finished your education -
Denise: - And I've got my whole life in front of me.
Father: Well, alright, yes. It's the truth. You have. Okay. So there's this thing that's happened. This blessed boy has come along and there's been a mistake.
Denise: A mistake!
Father: Well it wasn't planned was it! And I haven't exactly heard golden bollocks thanking his lucky stars he's going to be a dad, have I!
Mother: Jack! That's enough -
Father: - No it isn't. I haven't finished.
Denise: Don't say it ...
Father: (pause - low) I've got to, love. I've got to. No one is talking sense about this business. And I'm thinking and thinking and thinking and all I can come up with is this.
Denise: I won't do it.
Father: You haven't even thought about it.
Denise: How dare you!
Father: You haven't...

Mother: Jack!
Father: (to Denise) Have I?
Denise: No.
Father: So, I've been thinking.
Denise: Don't say it ...
Father: (pause - low) I've got to, love. I've got to. No one is talking sense about this business. And I'm thinking and thinking and thinking and all I can come up with is this.
Denise: I won't do it.
Father: But have you really thought about it?
Denise: How can you know.
Father: I'm your father! (pause) I know you. You've got some fantasy notion about this. I'm not an expert, but even I know that baby's are different from dolls .... That's not tiny tears in there.
Denise: You're the end.
Father: I'm just trying to be the beginning. The beginning of something sensible happening for once. (pause) I've made a couple of phone calls today. (pause) You can go private. It'll cost a bit. But it's an investment. That's how I see it. An investment in your future.
Denise: No.
Father: (low) Abortion.
Father: Your mother and I have talked it over.

Denise: What!
Father: And we've decided it's for the best.
Denise: What the hell do you know about the best.
Mother: We did talk about it.
Denise: (soft) No.

Denise: Yes. I did. Even before I told you and mum.
Father: (low) So, you'd've gone off and got yourself seen to ... on your own.
Denise: It didn't come to that. I know I want the baby.
Father: Well ... That's good enough for me, then. Just so long as you've looked at the options. It's your life - you've got rights too.
Sound: The telephone.
Mother: I'll go.
Denise: No. It'll be for me.
**T53070 HALLWAY**

**Cut to:** Denise stands and walks through the room - past the camera, which stays put. Her mother gets up off the bed and stops Father's instinctive move to follow. Denise runs through the hallway and then the opens and slams shut of the front door.

**Father:** She's got to be told.

**Mother:** I don't know.

**Sound:** The phone ringing

**Father:** She has. She's got to be told.

**Mother:** I'll get it.

**Action:** She heads for the door.

**Father:** If that's him, I want to speak to him.

---

**Cut to:** view from the door to Denise's bedroom. Denise stands and walks through the room - past the camera, which stays put.

**Mother:** That's that then.

**Father:** Well ... so long as she's thought it through ... At least she does think.

**Denise:** (off) Dave?

**Father:** Which is more than can be said for some.

**Denise:** (off) Oh, sorry. (calls) Mum! It's Brenda!
External: David can be seen running towards the door and knocking insistently on it.

Hallway: view along the passageway to the glazed door.
EXTERNAL: Denise opens the door. He hugs her before she can say a word and eases her outside the house.

David: I'm sorry ... I'm a complete plonker. No point in lying about it. I forgot.

Denise: I'm not the one you lie to anyway ... remember that.

David: Eh?

Denise: Dawson - thinning hair, dreadful tie, and harassed look. That's the one you lie to. Not me.

David: You're right.

Denise: I know I've not been maybe looking my best at the moment - but I still don't think you should have a problem telling us apart.

David: Why are we talking about Dawson?

Denise: You owe him an assignment ... remember? ... I dare say you were expecting me to come up with the goods.

David: Assignment?

Denise: Yeah.

David: I got it sorted last week. Forget it.

Denise: I thought that was your job.

David: No, I've been thinking.
David: We'll need money.
Denise: We?
David: It's my kid too. We'll need money ... so I'm looking for a job. In fact I've got one.
Denise: You what?
David: Well ... good as...
Appendix E. Example subject matter notes
storyboards, design sketches and diagrams
By this stage the foetus will have filled the amniotic sac, with very little room to move. When relaxed – say in the bath – the mother will be able to see the foetus move around in her abdomen move, she may also feel the baby's hiccups.

2.1.4. Late Pregnancy - Third Trimester

2.1.4.1. Week 28

"The uterus almost fills the abdominal cavity, reaching to just bellow your ribs. Practice contractions, when the uterus hardens and then relaxes, become stronger and more noticeable. You may feel the uterus 'drop' if your baby's head engages in the pelvis, and this will make breathing easier. Pressure on your stomach from the heavy uterus may cause heartburn, especially when you lie flat. Your pelvis expands, and some discomfort in the joints at the back of the pelvis or in the pubic joint is common."9

2.1.4.2. Week 29

2.1.4.3. Week 30

The placenta will now have grown to 450g (1 lb) in weight, and be between the umbilicus and breast bone.

By this time three out of four babies will have moved around with their head towards the cervix. With twins and premature births, breech birth is more likely with the second twin. Breech birth is also more likely for premature babies10

---

10 See section on childbirth for more information on different delivery presentations.
2.2.3.3. Week 16

The palm and foot prints are developing.
The eye muscles have developed, and eyes are becoming sensitive to light. Shining a bright light on the Mother's abdomen may cause the baby to move away from the light source.

A fine down-like covering of hair, called lanugo, begins to grow around the eyes and upper lips, eventually spreading all over the body.

A greasy white substance, called vernix caseosa, forms from skin cells and sebaceous secretions from skin glands. It appears first on the back, scalp and skin folds. In the next two weeks it covers the whole body to protect the skin through the remainder the birth. It will mostly be absorbed back into the skin before birth.

2.2.3.4. Week 17

2.2.3.5. Week 18

2.2.3.6. Week 19

2.2.3.7. Week 20

Lanugo now covers most of the body, it will later disappear to be replaced by secondary hair follicles.

The inner ear is now fully formed and the foetus is responsive to sound, it will hear both the sounds of the mother's heart, lungs, voice etc. and noises from the world outside. Loud noises, especially high frequency will reacted to most.

2.2.3.8. Week 21

2.2.3.9. Week 22

2.2.3.10. Week 23

The foetus's grip reflex will develop sometime around the 23rd week.

Muscles and internal organs continue to develop.

The parts of the brain involved in conscious thought mature in the following weeks. The foetus will have developed a sleep pattern, with REM sleep (dreams) being most frequent.
2.1.7. The experience of Birth

**Occipito Anterior**

Foetus is head down and facing the mother's naval. The occipito bone (back of the foetal head) is facing towards the mother's spine.

"If the reason for the presentation is disproportion, your next baby is likely to be occipito posterior too. However the stretching of the tissues and pelvis ligaments that occurs during a first birth usually makes subsequent ones easier."

---

**Occipito Posterior**

---

**Breech**

Various kinds:
- foot first \( \downarrow \) baby is known as a *footling*
- knee first \( \downarrow \) baby is known as a *kneeling*
- buttocks & feet first \( \downarrow \) baby is known as a complete *breech*.

---

2.3. Medical Care

Medical care for a pregnancy can begin prior to conception, and is of particular benefit where there is a history of complications, congenital or genetic disorders, or some other physical or social difficulty that may hinder the success of a pregnancy. Some would argue that a good standard of health in both parents in the months prior to conception will assist in the birth of a healthy baby, and reduce risks of congenital disorders. Pre-conception counselling is a definite requirement in cases where infertility treatment is being undertaken.

When attending the GP to confirm a pregnancy, general health, medical history, and wellbeing of the mother (and in some cases the father) may be discussed. There may be need to consider medical problems, or it may be that there has been some pre-conception counselling for a planned birth. It is really from this point on that medical care will begin to influence parents for decisions on the birth environment that they want.

2.3.1. Types of Antenatal Care

The style of antenatal care offered, parents experience of that care and the advice offered them will inevitably have some effect on their choices and decisions for the environment in which they wish to have their baby.

Options for antenatal care are as follows:

- **Shared care** between GP and Hospital;
- **Midwifery care** in the community;
- **Hospital based care**;
- **Independent midwifery care**;
- **No care** (although not recommended there is no laws to make a mother go for antenatal checks).
“Not all Health Authorities and Health Boards provide a wide selection of alternatives and it is better to sort out what is on offer in your area, and what you want before you commit yourself. ...

<table>
<thead>
<tr>
<th>Type of booking</th>
<th>Possible varieties of antenatal care</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP unit birth</td>
<td>Local GP’s surgery or midwives’ clinic</td>
</tr>
<tr>
<td>Consultant unit birth</td>
<td>Hospital antenatal clinic</td>
</tr>
<tr>
<td>Shared-care birth</td>
<td>Hospital antenatal clinic</td>
</tr>
<tr>
<td></td>
<td>Local GP’s clinic or midwives’ clinic</td>
</tr>
<tr>
<td></td>
<td>At home</td>
</tr>
<tr>
<td>Domino delivery</td>
<td>Local GP’s surgery or midwives’ clinic</td>
</tr>
<tr>
<td></td>
<td>At home</td>
</tr>
<tr>
<td>Home birth</td>
<td>Local GP or midwives clinic</td>
</tr>
<tr>
<td></td>
<td>At home</td>
</tr>
</tbody>
</table>

If you want a type of care that is not available in your area you will have to decide whether or not you are going to argue and insist that it is provided.”

2.3.2. The Antenatal Care Process

Unless there are complications to a pregnancy, antenatal care usually starts at about 10 to 12 weeks with a full health assessment and physical examination. The up until 28 weeks a monthly check is usually advised, reducing to two weeks, then finally once a week for the last four to five weeks. After the birth, there follows a period of post-natal care lasting about six weeks.

It is at the first antenatal check that parents will probably be asked to think about — and in some cases book — the location and type of birth they would like.

2.3.2.1. The First Antenatal Check-Up (The Booking Visit)

At the first antenatal check, a range of questions will be asked about a mother’s general health and medical history. There will also be a number of These will include at least the following:

---

2.3.2.1.1. Mother’s Medical History

- **Height** (<5ft and vaginal delivery is more likely to be a problem);
- **Weight** (low weight and obesity can cause difficulties);
- **Age** (<17 or >35, are considered to be greater risks in childbirth);
- **Shoe size** (sometimes asked, as it is supposed to be relative to pelvic size and an indication of potential delivery problems);
- **History of menstrual function**;
- **Heart defects**;
- **Renal problems** (e.g. Kidney failure/transplant);
- **Urinary infection**;
- **Liver problems** (e.g. hepatitis, sclerosis);
- **Lung disease** (e.g. Tuberculosis (TB));
- **Epilepsy**;
- **Diabetes**;
- **Genital herpes**;
- **STD’s** (e.g. Syphilis, HIV/AIDS);
- **Drug, Alcohol, Solvent Dependency**;
- **Any other past illness or operations**;
- **Medication**;
- **Mental health and emotional problems**;
- **Physiological Incapacity** (e.g. back problem).

2.3.2.1.2. Previous Pregnancies

The occurrence of complications in previous pregnancies may have implications for the care and location of birth in any subsequent pregnancies. Experiences that may be cause for concern, include:

- A history of miscarriage or still-birth;
- Premature or early labour;
- Multiple births;
- High blood pressure;
- A combination of large baby and small pelvis;
- Retained placenta;
- **Rhesus Disease**. Rh- Mother has Rh+ antibodies in blood stream (see below).

---

1 Height and Weight: The Q Index.

Height and weight are important for both parents before conception. During pregnancy, a low weight is more likely to lead to a small baby, whilst overweight can lead to other medical problems because of poor fitness and large babies. Both may indicate poor diet.

Q Index (or Quetelet Index) is used to assess healthy weight for pregnancy.
2.3.2.1.3. Family History

There are a range of genetic problems that can be inherited by a baby, whilst they may not have immanent implications at the birth, their presence and the stress that may derive from them could influence parents in their choice of birth environment. The following are a few examples for which parents should receive general counselling before conception or early in the pregnancy.¹

- Downs Syndrome (Parents age);
- Muscular Dystrophy;
- Haemophilia;
- Sickle Cell Anaemia
- Thalassaemia;
- Cystic Fibrosis.

Concerns for parents with hazardous work environments may also need to be talked about — e.g. chemicals, farming, nuclear industries (?).

2.3.2.1.4. This Pregnancy

Any known high risk-factors or complications that have developed during the course of the pregnancy so far. See section 2.3.2.2.1.

2.3.2.2. Antenatal Checks

During antenatal care a number of checks and tests will be encountered, to ensure the health of mother and child. They can be grouped into two kinds: routine checks and special screening tests.

2.3.2.2.1. Increased Risks During Pregnancy

During any pregnancy it is possible that increased risk factors or complications will affect the decision about where a birth should take place. Such events will affect the advice given by health care professionals and/or influence the choice of parents. These would be found, discussed and acted upon during the course of antenatal care.

- This is the first pregnancy;
- The mother has had at least four previous pregnancies;
- Foetus considered small for dates;
- Baby is late for dates (2 weeks overdue).
- Baby is large in comparison to the mother's pelvis;
- Multiple birth discovered;
- The baby remains in the breech position;

¹ This list is not complete. Also, we need more advice on these issues to be sure of their implications. Literature is vague on these topics in the context of their effects during or after childbirth.
• **Placenta Praevia** (placenta is attached low down in the womb, and impedes the babies exit);

• **Blood pressure** increases and remains high;

• **Pre-eclampsia** (high blood pressure, fluid retention - oedema, proteins in urine) or onset of **eclampsia** (convulsions caused by swelling in the brain), or a history of pre-eclampsia in past pregnancies or amongst family members;

• **Rhesus Disease.** Rh– Mother has Rh+ antibodies in blood stream (from previous pregnancy, miscarriage, termination or amniocentesis) and baby is Rh+. Condition is now rare because of treatment using Anti-D injection within 72 hours of previous birth.

• **Rubella virus** has been diagnosed in first 18 weeks of pregnancy;

• Mother has an active **genital herpes** infection;

• **Congenital problem** (e.g. neural tube defects, Downs Syndrome) discovered from **antenatal tests**;

• **Regular antenatal checks** suggests complication (e.g. poor foetal heart beat or low foetal movement).

**2.3.2.2.1. Routine Checks**

• Questionnaire on **personal lifestyle** and **medical history** etc. ... (see section 2.3.2.1. above);

• **Internal physical examination**, to check that the woman is pregnant, to confirm the estimated progress, and to ensure the woman has no physical abnormalities.

• **Diet and nutrition** (good diet can help prevent some of the unpleasant side effects of pregnancy);

• **Height**

• **Weight** (every antenatal visit);

• **Blood pressure** (every antenatal visit);

• **Urine Sample** (every antenatal visit)
  - tests for sugar in urine\(^1\) (indicator for diabetes),
  - protein (pre-eclampsia),
  - urinary infection;

• **Cervical smear test**, usually taken at the first antenatal visit, to check for pre-cancerous cells;

• **Physical check of spine and pelvis**;

---

\(^1\) +ve test will lead to Glucose tolerance (blood) test.
• **Blood samples** are taken for a variety of tests ...
  - blood group,
  - haemoglobin\(^1\),
  - folic acid\(^2\) deficiency,
  - Rhesus factor,
  - Rubella antibodies\(^3\),
  - syphilis,
  - hepatitis,
  - HIV/AIDS.

2.3.2.2.2. Special Screening Tests

• **Ultrasound** scans are usually completed at least once, at 16 to 18 weeks, more may be done to make checks on progress or if there is concern for the baby's health. The can be used for a variety of reasons ...
  - miscarriage,
  - ectopic pregnancy,
  - detection of multiple birth,
  - early assessment of foetal development,
  - neural tube defects,
  - urinary tract abnormality in the foetus,
  - as an aid to performance of amniocentesis and foetoscopy,
  - to check for placenta praevia,
  - to check for placental abruption,
  - breech presentation late in the pregnancy,
  - maternal problems (fibroids, tumours, kidney/gallstones);

• **Blood samples** are taken for a variety of tests ...
  - syphilis,
  - sickle cell trait,
  - sickle cell disease and thalassaemia,
  - glucose tolerance (diabetes);

---

1 The red blood cells that carry oxygen around system. A low count <10mg per 100mg of red blood cells indicates anaemia. Usually checked early and in last 10 weeks of pregnancy).

2 Aids in iron use and avoiding anaemia.

3 Indicates whether the woman has been immunised.
Ultrasound Tests

- Uses of Ultrasound
- Safety of the Test
- Decisions + Choices.
TO 10.
Enter Jayne.

Sound:
Door Opening
Power Dresser steps on line

TO20a
Click on Jayne
Take out some cigarettes
Sees no smoking sign

TO20b
CO Poster
Morphs to Jayne at 6 mitts.
Steps back shocked at her thought
turns toward door when -.
Enter Carodie weighty down by shopping.

Open door tentatively peers over 2 to see if looks like the right place.
The two smile grudgingly at each other.

C.O. Carodie

Sorry am I late etc.

Phone Rings - shutes my reason to answer.

Micky?

(click on tape)
TO 506
Caroline decides where to sit.

TO 60
Jayne takes a scarf off her bag case to retrieve filofax
Caroline embarrassed reaches for her filofax
Jayne "Sorry I thought you were a secretary today..."

TO 70
ENTER DENISE
TO80a
Click on Caroline + bag falls over

TO80
Click on Jayne - she looks over at daish. It's very young!

TO80b
Click on Denise - she looks embarrassed - kids her age - for reasons...

Caroline instigates conversation: would anyone like an apple?

C.O. Jayne
No but thanks.
Jayne: No never went in for that kind of thing.

Denise: Course not my friend cut!

Jayne: That's me——
130b
Co Jayne follows her into the surgery - scene 2

140a
Caroline: So you've got a boyfriend then...

Denise: Dave (pistol)
We've been going out for about a year now.

Caroline: You've known him for quite a long time, then?

Denise: Yeah, ever so long...

140b
Caroline: Was yours a shock then?

Caroline: Well not in the same way.

What's his name? Your husband?

Caroline: Ray.
"Mrs. Caroline Knight to room 3 please"
"Miss Denise Finch to Room 2 please"
waiting room scene shots

TWO. The interior of a Health Clinic
waiting room scene shots
waiting room scene shots
waiting room scene shots
waiting room scene shots
### Prop & Equipment List

**Scene Title:** The Antenatal Waiting Room  
**Location:** Waiting Room (Uni: Kirkby Place)

#### Action Props:
- Attache case
- Personal organiser
- Watch
- Cigarettes
- Mobile phone
- Groceries: apples, oranges, kiwi, bananas

#### Dressing Props:
- No smoking sign
- Leaflets
- Poster of pregnant woman

#### Equipment:

#### Documentation:

#### Notes:

"Still Clean by [date]"
Text Descriptions for Web Pages

T000
The interior of a health clinic. There are chairs arranged around the walls. The windows are net-curtained. There is a table with untidy piles of magazines in one corner. The occasional house plant. Walls are well-endowed with health posters: Drugs, Smoking, H.I.V., alcohol abuse, Contraception, Pregnancy.
Sound: Background noise. Conversation emanating from reception.

T010
Sound: The opening of a door. Power dressed footsteps on the lino.
Action: Enter Jayne. Smart suit. Attaché case. She stands in the centre of the room looking all around.

T020a
Mutterings of how long this is all going to take, and how she should be working.
Takes out some cigarettes, looks at no smoking sign ... frustrated she puts them away. At the end of the scene she is pacing towards the door when ...

T020b
Close up of Jayne's face. Her expression is cold and disdainful. We see her focus shift - she winces slightly.
Over the shoulder shot of Jayne looking at poster. The poster showing a heavily pregnant woman. The poster will morph to show Jayne in a few months time, and equally pregnant.
She has had enough turns toward the door as if to leave ... when ...

T030
Jayne stops in her tracks. Caroline enters, heavily weighed down by shopping. She tentatively puts her head round the door to see if it looks like the right place.
The two smile gingerly at each other.

T040a
Caroline: Sorry. Am I late? Am I the only one?
Shopping ... dreadful cues everywhere. I thought I'd left enough time as well ... Ah well ... the best laid plans and all that ...

T040b
Jayne's mobile rings, avoiding the need to say something. Jayne reaches into her briefcase and pulls the phone out to answer the call.

T050a
Jayne: Micky? Ah ... good girl ... hang on, hang on, it's a dreadful line ... Can you make sure that the IEM contract details are on my desk when I come in ... and have a copy for him ... And, can you ring Steve Bowers ... tell him I'll see him late p.m. about the RTP ... I'll be in ASAP ... OK? Bye.

T050b
Caroline looking around the room and selecting a seat. She arranges her shopping around her and sits.

November 7, 1998 4:40 PM
Scene No: 1
Caroline: Oh ... Sorry, I thought you were the doctor waiting to see me.

Embarrassed, she reaches for magazine & begins to flick through.

Jayne takes a seat, and opens her briefcase to get her organiser.

The door opens. Denise enters: trainers and jeans, a dark sweatshirt. She is a young-looking sixteen. We track her as she goes straight to a chair opposite Caroline's encampment. She sits and stares down at her shoes to avoid eye contact with anyone.

One of the carrier bags sags, and apples roll out across the floor. Caroline looks embarrassed and retrieves the fruit; checking each one for bruising.

Jayne makes a long sideways glance at Denise, weighing her up ... is she really as young as she looks?

Denise looks across at the two older women with a tinge of hostility. Trying to remain composed she holds her arm across her body ... partly defensive, partly to comfort herself.

Caroline: Um ... Would anyone like an apple?

Jayne: No, but thanks for the offer

Action: Denise puts on an extremely sour expression

Denise: (dully) No thanks.

Caroline: Never accept things from strangers ... quite right too.

Denise: It's not that ... It's just that apples make me puke just now.

Jayne: You're married.

Caroline: That obvious, is it?

Jayne: I didn't mean it was bad or anything.

Caroline: You aren't? (Open question to both women)

Jayne: No ... never went in for that kind of thing really."

Action: Denise smiles, almost embarrassed ...

November 7, 1998 4:40 PM
Design Document
Denise: Course not... boyfriend init.

T130a

Sound: (Doctors’ intercom): “Miss Jayne Hargreaves to Room 1 please”.

Jayne: That’s me!

Follow Jayne to the antenatal interview and supporting information
Stay with Denise and Caroline to find out more about their respective pregnancies. (Select a topic from key words to follow(options available throughout).

- T140 About their pregnancies
- T150 Medical Matters
- T160 Caroline’s advice
- T170 Denise’s nerves and concerns
- T199 Exit Scene

T130b

Jayne Exits to anatenatal interview.
Jayne: Thanks for the apple... good luck...

T140

Dialogue about their respective pregnancies and partners. Selection of different character gives different dialogue--biased towards user’s interest in chosen character. Non-selection presents T140 in wide view.

T150

Uses similar dialogue for both characters, but enables the user to see characters expressions and reactions in close-up. Selection of keyword subtitles enable user to focus on portions of dialogue (T150a-e). Non-selection presents T150 in wide view.

November 7, 1998 4:40 PM
Scene No: 1
Design Document

Select Caroline

Close-Up

T150a

Select Denise

Close-Up

T150b

Close-Up

T150c

Close-Up

T150d

Close-Up

T150e

T150f

T160

Close-up of Caroline. Illustration of key point being presented by a character. Caroline chosen as the more mature and worldly wise of the women.

T170a

Mediation of views and development of consensus between the two women. Non-selection presents T170 in wide view.

Select Caroline

T170b

Select Denise

T170a

T170d

T170e

T199

The scene ends and the character exits.

Sound (Doctors' intercom): “Mrs Caroline Knight to Room 3 please.”

“Miss Denise Finch to Room 2 please.”

November 7, 1998 4:40 PM

Scene No: 1
Example 2 - Waiting Room Scene

Purpose/Goals:
- Character and Vast Study Establishment
- Using Camera Angles and Viewpoint
- Relating Interactions to other Informational Settings/Support

Information Support
Scene No: 5

Scene Title: Denise Returns from the Antenatal Check

Location: Denise's house

Script Ref: T50000 - T50020

Notes:
- T50000 Mum Off camera
- T50010 Long Shot of House
  External Shot of Denise
  Internal through hallway
- T50020 Internal of hall/living room

Notes:
- Need Pan shots of Hall, Living Room, Bedroom.
Scene NO:  5
Scene Title:
Denise Returns from the Antenatal Check

Location:
Denise's House

Script Ref:  T50030
Notes:
T50030
Internal of living room:
wide & pan of room;
mid & c/u of Denise & mum;
(c/u of family photos etc ?)

T50030 "There's tea in the pot ..."

T50030 "Sorry I keep forgetting"
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise's House
Script Ref: T50040
Notes: T50040 mid & c/u of Denise & Mum

T50040 "You can't get used to anything ..."

T50040 "that you'd be a granny ..."

T50040 "Sorry I keep forgetting"
Scene No: 5
Scene Title:
Denise Returns from the Antenatal Check
Location:
Denise's House
Script Ref: T50050
Notes:
mid & c/u of Denise & Mum
Scene NO: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise's House
Script Ref: T50060
Notes: mid shot
c/u of Denise & Mum
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise’s House
Script Ref: T50070
Notes: mid shot
c/u of Denise & Mum

T50070 "Are they kind?"

T50070 "I remember them being cold and distant"

T50070 "Oh you were pregnant ..."
Storyboard Notes

Scene No: 5
Scene Title:
Denise Returns from the Antenatal Check

Location:
Denise's House

Script Ref: T50070
Notes:
mid shot
c/u of Denise & Mum

T50070 "Denise, I'm sorry."
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise's House
Script Ref: T50080
Notes: mid shot c/u of Denise & Mum
Scene N0: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise's House
Script Ref: T50090
Notes:
mid shot
c/u of Denise & Mum

T50090 "Go on ..."

T50090 "What about?"

T50090 "And everything's changed ..."
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise's House
Script Ref: T50090
Notes: mid shot c/u of Denise & Mum

T50090 "not everything ... It's still the w. & an who has the baby"
Scene No: 5

Scene Title: Denise Returns from the Antenatal Check

Location: Denise's House

Script Ref: T50100

Notes:
mid shot
c/u of Denise & Mum
wide and pan to follow Denise out to phone.
c/u of Mum as she sits in living room

T50100 "... no back chat alright"

T50100 "Let it ring."

T50100 "I'll get it then."
"The Argument": T51000

Use the feel of this argument scene for the telephone conversation. Employ a notion of eye contact between the two characters at the end of telephone line.
Some camera shot angles for the pay-phone scene?
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise's House
Script Ref: T51000
Notes: Denise enters the hall way, we see her hand pick up the receiver...
Close-up on Denise's face.

Date: 27/6/96
Time: 18:21
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Payphone
Script Ref: T51010
Notes:
David, receiver shrugged to his ear, unlit cigarette clamped in his mouth, doing auto-body search for a light.

Pan from David to Yob + Back.
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check

Location: Denise’s House

Script Ref: T51020
Notes: Denise quizzical on the phone.

Date: 27/6/96
Time: 18:22
Scene No: 5

Scene Title: Denise Returns from the Antenatal Check

Location: Payphone

Script Ref: T51030

Notes: NT51030 & PT51030
David tucks the cigarette behind his ear.
UT51030 Frantically trying to get the money in the slot.

T51030 "Hang on a minute, will you."

Date: 25/6/96
Time: 8:34
Interactive Media Group

Storyboard

Scene No: 5
Scene Title: Denise Returns from the Antenatal Check

Location: Payphone

Script Ref: T51040

Notes:
NT51040 Throws down match ... inhales deeply...
UT51040 Looks incredulously as the money drops.
PT51040 Denise: (over phone) What's the matter.

Date: 25/6/96 Time: 8:34
Interactive Media Group

Storyboard Notes

Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise's House
Script Ref: T51050
Notes:
Denise bleak look.

T51050 David over phone: So don't tell me that you haven't done it. I'm relying on you

T51050 "Well you shouldn't ..."
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Payphone
Script Ref: T51060
Notes: Close up of David's face looks concerned.

Date: 25/6/96
Time: 8:36
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise's House
Script Ref: T51070
Notes: Denise. Tight close-up of sad face.
You've forgotten about today...

Date: 27/6/96
Time: 18:25
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: payphone
Script Ref: T51080
Notes:
NT51080 David looks angry
NT51090 What are you on! Denise.

Date: 25/6/96
Time: 8:37
Scene No: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Denise's House

Script Ref: T51110
Notes: Denise. The receiver hovering a little away from her face in a slakened hand.
Scene NO: 5
Scene Title: Denise Returns from the Antenatal Check
Location: Dads House - Payphone

Script Ref: T51110
Notes: Denise. The receiver hovering a little away from her face in a slakened hand.

T51090 "What are you on! Denise."

Date: 24/6/96
Time: 19:25
Examples → Rising Issues → Information Structure

- Multiple Narrative → "Denise returns home"
- Spatial Differences → "Denise Returns Home"

Use Structure Diagram

Jane's Demo → Final Look

Inner Thought: can we...

Validation of the work...

NB Example 1 & 2 become
Experiments 2 & 1. — for
Coherent narrative + structure
Development of Interactive Drama Scenario

Two Lines Through → Antenatal Room → emphasis on talking + scripting...

→ Bedroom Scene → emphasis on rehearsal & video...
Example 1: Device at Home => Alternative Navigation Routes

Powers control

Representation of Spaces - physical, social, interpersonal, contextual
learning, communication, etc...

Location:

Scene Structure

Panoramic View of Location (GVR?)

Scene Structure

Relationship Script

On screen a
statement and
Next
Last statement
Response to scene
Appendix F.  Slide presentation used in evaluation
Design models for multimedia learning environments based on interactive drama

PhD Project
Tom Rogers

Aims of this presentation

◆ Brief review of the project and its development
◆ Theoretical perspective
◆ Look at the design process that has been covered
◆ Feedback the usefulness of the design activities in practice
Little research has been completed to explore the design of MLEs that deliver everyday or 'humanistic' learning experiences.

The originality for this research comes from the identification and description of interactions, between the different disciplines and bodies of knowledge, that contribute to and emerge from the design process. It has also come from the cooperation and input of different creative and technical design expertise.
Humanistic Learning

In certain episodes of common human experience the learning process can be profound

Humanistic learning experiences involve:

- gathering of facts
- building of concepts
- adoption of rules
They also involve a complex assembly of perceptions and experiences from our:
- interactions with the physical world
- interpersonal relationships
- situation within social groups and cultures
- intuitive decision making

May involve decisions and choices that are:
- onerous in nature
- have long-term implications and consequences
- need to be made quickly
- need to be made under considerable competing pressures
Pregnancy and childbirth is one such area of experience ...
Pregnancy and childbirth is one such area of experience ...
Key issues:

- interpretation of complex data, information and, professional opinion
- the handling of new experiences
- selection of personal preferences
- involvement in social or cultural conventions

We have developed some prototype multimedia learning materials around the subject of pregnancy and childbirth to develop a better understanding of design models and methods that may be used in the creation of humanistic learning experiences.
Aims of the MLE are to enable users to:

- explore the issues important to their own circumstances
- rehearse decision making processes and emotional conflicts
- reflect upon the relevance of experiences portrayed in drama based materials supported by factual information
The Design Process

- Subject matter research
- Interface development
- Script development & pre-production
- Rehearsals & media production
- Formative evaluation

Formal project plan

Review Phase
- Literature Review
- Definition of Problem
- Identify Goal & Specific Aims
- Decide on Subject Matter

Design Phase 1
- Feasibility Study
- Knowledge Elicitation & Specification
- Storyboard & Script Development
- Prototype Development
- Media Production
- Courseware Implementation
- Summative Evaluation
- Formative Evaluation

OUTSIDE OF RESEARCH GOALS

PHD Thesis Write-up Period
Further research & development work

Current Activities
Mental model/Conceptual design

Social - Family Influences
- Peer Group Influences
- Personal/Economic Circumstances
- Employment
- Status

PERSONAL PROFILE

Clinical - Personal Health and Welfare
- Health care Professionals
- Health Service Organisation

Foetal Development
- Physiological and Emotional Changes
- Relationships & Support
- Medical Care
- Economic & Social Changes

V = VIEWPOINT

Special Topics & Guidance Points

What will influence my birth choice of
where the baby will be born?

Why is an ultrasound scan useful?
Are there any risks to it? Is there a
failure?

Who should I choose for care
and treatment?

What medical tests will I be offered?
Are they all necessary?
Interface development

Filter questions and user decision making controls navigation and manipulation of objects.

Primary interface: interactive drama

Experiments in navigation & interaction
Experiments in navigation & interaction

Functional Prototypes
Script development & pre-production:

Rehearsals
Media production Exp 2

Media production Exp 3
Formative evaluation:

- ‘Walkthrough’ techniques
- Looked at potential of humanistic learning
- Examples from conventional media
- Prototypes & interactive drama

Summary & Final Comments

- Completed a full range of design activities
- Developed models for ID-MLEs based upon sound theoretical base, reflective practice, and formative evaluation
- Now have presented design method to you

What do you think?
Appendix G. Interactive drama materials presented on the Internet
A number of experiments or trials have been completed to explore the design of interactive drama for MLEs. The purpose of these trials has been to consider the main issues and possibilities that designers need to accommodate in their own conceptual models of subject matter and design activities. This includes the structural, chronological, representational and creative design issues.
The development of the interactive drama experiments.

This process involved an iterative process of elaboration and refinement of ideas and design materials. The interplay between thought processes and creation of tangible representations would seem to be an essential element to the realisation of a satisfactory design. Completion of each step was determined by a number of things, that included:

- a sense of coherence in the materials that provided
- a need to articulate or capture new ideas that were initiated in the creative process
- provision of enough information to enable subsequent stages
- interrelated needs that demand parallel development of the design constituents
- time factors and pressures that forced decisions and action.

This work adopted an approach akin to rapid prototyping. It was not a simple linear progression, but involved a combination of incremental progression, revisiting materials to strengthen materials and in some instances blind leaps of faith into the next stage. Sometimes a number of activities would be developing in parallel and in others there would be a concerted effort upon a single aspect of the creative process. In many instances the interaction with collaborators and people involved in evaluation highlighted weaknesses or opportunities to exploit different approaches.

The creation of the interactive drama began with the use of subject matter research to generate character profiles and scenarios for the drama. Co-operation with playwright Simon Turley to create scripts, and their adaptation for interactive multimedia. The script in combination with storyboards, schematic diagrams and rehearsals were then used to build the basis for the final video shoot and subsequent editing and production activities. This process is illustrated below.
### Design Activities - Interactive Drama Design

**Case Study Scenarios | Structural Design | Script and Storyboard Development | Rehearsal and Direction | Experiments in Video Production | Summary of Findings**

**Experiments in Video Production | Early Development | Experiment 1 | Experiment 2 | Experiment 3**

#### Experiment 1: Denise returns home

This experiment represents how a set of alternative routes through an interactive narrative can be constructed. It shows the relationship between physical spaces, chronological ordering, and interpersonal spaces.

<table>
<thead>
<tr>
<th>Time</th>
<th>House external</th>
<th>Hall</th>
<th>Living room</th>
<th>Pay phone</th>
<th>Denise's bedroom</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T5000</strong>&lt;br&gt;(script refs)</td>
<td>Denise enters the house</td>
<td>Denise &amp; mum in hall</td>
<td>Denise and mum talk about pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>T5100</strong></td>
<td></td>
<td>Denise talks to Dave</td>
<td>mum waits in living room</td>
<td>Dave at college payphone</td>
<td></td>
</tr>
<tr>
<td><strong>T5200</strong></td>
<td>Dad puts key in door</td>
<td>Denise heads to her room</td>
<td>Dad enters the house</td>
<td>Dad asks mum where Denise is</td>
<td>Denise on bed browsing magazine</td>
</tr>
<tr>
<td><strong>T5300</strong></td>
<td></td>
<td>Dad enters bedroom</td>
<td>mum follows Denise</td>
<td>Denise goes to the phone/door</td>
<td>Dad and Denise talk</td>
</tr>
<tr>
<td></td>
<td>Dave greets Denise</td>
<td>Denise and Dave talk.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each of the locations in the above diagram are linked to panoramic views that illustrate the various locations within the scene.

Each time slot links to a timeline with multiple routes that follow the unfolding story, enabling the user to focus upon individual characters and respond to their emotive response by moving between negative, neutral and positive narrative routes.

The interactive script for this scene can be downloaded here.

QuickTime digital video of the positive narrative and negative versions of the script can be downloaded here (approx 7mb each):

- **Positive scenario**
- **Negative scenario following Denise**
- **Negative scenario following Father (Jack)**

You can download the full interactive script for experiment 1 Adobe Acrobat (.pdf files)

T5000 - T5100 - T5200 - T5300
External of house

Action: It is the afternoon of the same day as Denise's first antenatal visit.

Action: Denise is climbing the steps to her front door and knows that her parents will want to talk to her.
The hallway of Denise's parents' house. A view up the passageway towards the glazed front door. The television is audible from the front room: early evening news - middle of the main story.
Denise talks to mum about pregnancy

Mother sits and waits for Denise to return from the antenatal clinic. She is still somewhat stunned by her daughter's pregnancy. She is unsure how to handle the situation. Her approach is to try and be supportive, whilst keeping the peace within the family. This usually means taking a subordinate (mute) role when her husband is around.

Denise enters the house quietly - not secretively, just in a soft, self-absorbed state. She shuts the door.

**Mother:** Denise?

**Denise:** You can't get used to anything.

**Mother:** That's not fair, Denise. It's all been so sudden and everything...

"I mean... we never expected that this would... well... you know...

**Action:** Denise and her mother continue their chat. The atmosphere is somewhat prickly.

Depending upon the inclination and feeling of the user, the conversation becomes more confrontational or harmonious.

The user is following the Denise character and is responding to her situation, through input of a simple positive/negative decision.

**Denise:** (gently mocking) So, are you going to be able to cope?

**Mother:** Denise! Don't!

**Denise:** Don't what? Don't talk about it? Is that it? But why not? There's a lot that needs talking about. And we can't even start doing that if you're going to insist on pretending that I'm still a virgin or something.

**Mother:** Denise!

**Action:** The scene ends with some antagonism or accord between mother and daughter. It ends through the interruption of a phone call, that takes Denise to a new episode.

The characters are either left feeling at a loss or more settled in a difficult point of their relationship.
Denise on the phone to Dave

Action: Denise enters the hallway. We see her hand pick up the receiver. Three possible scenarios unfold. The neutral has her boyfriend (Dave) unable to get his money in the phone. The negative has Dave consumed by his own petty self interest, and Denise feeling emotionally deliriated and very alone. The positive begins with Dave rambling about his own but eventually he realizes his mistake. However Denise is still left feeling somewhat alone.

This episode sets up an emotional context for the user based upon their own selection.
Mum waits in living room

Action: Mother in living room reflects on her conversation with Denise
Payphone

Action: Pay phone, where we see David, receiver shrugged to his ear, until cigarette clamped in his mouth, doing auto-body-search for a light.

David: (clenched - semi-audible) Hang on, love.

Sound: The phone going dead.

Cut to: Denise. The receiver hovering a little away from her face in a slacked hand.

David: (over phone) Denise?

Sound: Dead tone on the line.
Dad returns home

Denise's father makes his way home from work earlier than expected.

Obviously preoccupied with "the problem", he feels that he has come up with the only feasible way out of the situation. How he responds is dependent upon the control of the user.
Denise heads for her room

Action: The dark shape of Father can be seen at the glazed front door. The key scrapes, and the door opens.

Action: Denise stands still beside the phone. This snaps Denise back into life. She heads past the camera and her foot steps can be heard on the stairs.
Action: Father stands framed in the front door way, looking up the hallway - he says nothing. Mother appears in the shot - looks from Father to the stairs.

Mother: You’re here then.
Father: Yes.
Mother: They didn’t keep you long.
...
Father: Changed my mind, didn’t I. (pause) Got to talk to that girl.

Action: Establishing shot of Father heads towards Denise’s bedroom.
Denise on bed browsing magazine

Action: Denise has heard the front door open. Listening to the muffled voices, she waits pensively waiting for what happens next.
Dad asks mum where Denise is

Father enters Denise's bedroom...

...and the next episode
Dad enters bedroom

**Action:** ... the door-handle turns. .... and father enters.
Dad and Denise talk

Action: Denise in her bedroom. Posters, books and folders etc. identify this as a teenager's room. She flicks through a leaflet on teenage pregnancy/antenatal services. Denise closes her eyes in frustration as the door-handle turns.

Denise: This is my room

Father: Granted. But it has four walls, a floor and a ceiling that seem to be part of my house.

Denise: For God's sake.

Father: I've only come to ask you about today.

Denise: (pause - suspicious) You?

Father: Yes, me. Why not. I'm concerned...

Action: The scene develops down two alternative routes. The negative develops antagonistically, where Denise is defensive and sees her father's questions as intrusive. Father gets irritated and tries to force through his view. The positive has Denise less defensive and Father trying to remove tension from the situation.

Father: And everything's alright, like ... with the baby.

...

Denise: You can have these tests, though. They do this scan thing.

Father: Scan?

Denise: Ultra sound, it's called. And it shows up the baby ... in your womb.
Action: Mother quietly enters the room. She sits beside Denise. Whilst she wants to be there for her daughter, she also wants to avoid conflict with her husband. She will only intervene when to try and cap conflict between father and daughter.
Dad and Denise talk

Action: Father moves to put forward his idea. It is obvious to him the option to terminate the baby solves the problem. The question is how willing is he to listen to his daughter and how will she respond. The negative conflict-based scenario is illustrated here.

Father: I've been thinking, Denise. (pause) Thinking hard about this whole thing.

Denise: Dad ... don't ...

Father: No, I want my say. And this is the time to say it. Before it's too late.

Denise: I thought it was already too late isn't that the problem.

Father: Just hear me out ... that's all I ask. Hear me out.

Action: Denise is not about to consider any imposed solution and realises that termination is not a 'simple' end to the matter. She is not about to be told what to do.

Action: Father's response to dissent is to try and control. He will have his idea heard and is trying to put his stamp on the situation.

Action: Denise can't believe that she is hearing this. Her emotions, thoughts, wishes are not even being heard let alone considered.
Father: I'm your father! (pause) I know you. You've got some fantasy notion about this. I'm not an expert, but even I know that baby's are different from dolls .... That's not Tiny Tears in there.

Denise: You're the end.

Denise: No.

Father: (low) Abortion.


Father: Your mother and I have talked it over.

Denise: What?

Father: And we've decided it's for the best.

Denise: What the hell do you know about the best.

Mother: We did talk about it.

Denise: (soft) No.

Action: Father sits and begins to realise that he's blown it ... but he can't lose face.

Action: Denise gets up and walks out in emotional turmoil. We hear Denise opening and slamming shut of the front door.

Father: She's got to be told.

Mother: I don't know.
Mum and dad discuss the situation.

Action: Donna gets up and walks out in emotional turmoil.
We hear Donna opening and slamming shut the front door.
Father: She's got to be told.
Mother: I don't know.

Action: Mother doesn't know what to do; feeling as sense of divided loyalties between husband and daughter.
Action: In the negative scenario, Denise runs through the hall. We see the door closing as she leaves the house.

Action: In the positive scenario, Denise answers the ringing phone. Provides a further avenue (not scripted) for further talking and listening.
Dave greets Denise.

Action: In the negative scenario, Denise runs away from the house alone and hurt.

Action: In the positive scenario, boyfriend Dave is approaching the house.

Action: He hugs her without speaking.
Dave and Denise talk

Action: He apologises to her and starts to placate her.
David: I'm sorry ... I'm a complete pukeur. No point in lying about it. I forgot.

Action: They sit and begin to talk about how they can meet the future with a baby on the way.
David: We'll need money.
Denise: Why?
David: It's my kid too. We'll need money ... so I'm looking for a job.
Experiment 2: Waiting room scene

The interior of a health clinic. There are chairs arranged around the walls. The windows are net-curtained. There is a table with untidy piles of magazines in one corner. The occasional house plant. Walls are well-endowed with health posters: Drugs, Smoking, H.I.V., alcohol abuse, Contraception, Pregnancy.

Sound: Background noise. Conversation emanating from reception.

This scene exhibits the use of alternative camera shots and viewpoints. It has been assembled to reflect three aspects of the design:

- To establish three female lead characters, and a relationship between them that allows comparisons and contrasts between them to be understood. The character profiles were developed to reflect three typical scenarios based upon the subject matter research.
- The latter half of the scene allows users to select information from a list of subtitled keywords, that take the user to specific topics of conversation between two characters, describing personal feelings and concerns about being pregnant.
- The delivery of information through a documentary style presentation of the antenatal interview with a midwife, that integrates video with supporting learning resources.

Download the full description of experiment 2 (Adobe Acrobat .pdf files)
Waiting room scene

In a fully implemented product, artefacts such as posters would be open to information search.
Waiting room scene

Search the picture for Hotspots to navigate through the scene.

Sound: The opening of a door. Power dressed footsteps on the lino.

Action: Enter Jayne. Smart suit. Attaché case. She stands in the centre of the room looking all around.
Waiting room scene

Search the picture for Hotspots to navigate through the scene

Action: Mutterings of how long this is all going to take, and how she should be working. Takes out some cigarettes, looks at no smoking sign E frustrated she puts them away. At the end of the scene she is pacing towards the door when E
Jayne's expression is cold and disdainful. We see her focus shift - she winces slightly.

Over the shoulder shot of Jayne looking at poster. The poster showing a heavily pregnant woman. The poster will morph to show Jayne in a few months time, and equally pregnant.

She has had enough turns toward the door as if to leave ... when ...
Waiting room scene

Jayne stops in her tracks. Caroline enters, heavily weighed down by shopping. She tentatively puts her head round the door to see if it looks like the right place.

The two smile gingerly at each other.
Waiting room scene

Enter Caroline, heavily weighed down by shopping. Smartish, loose sports clothes
Caroline opens the door, tentatively putting her head round to see if it looks like the right place.
The two smile gingerly at each other.
Caroline: Sorry. Am I late? Am I the only one?
Shopping... dreadful queues everywhere. I thought I'd left enough time as well... Ah well... the best laid plans and all that...
Waiting room scene

Caroline looking around the room and selecting a seat.
The camera follows her as she arranges the shopping on the floor and sits.
Waiting room scene

Jayne takes a seat in the same row as Caroline, and opens her briefcase to get her organiser.
Waiting room scene

Phone rings, avoiding the need to say something, Jayne reaches into her brief case and pulls out a mobile phone.
Jayne: Micky? Ah... good girl... hang on, hang on, it's a dreadful line... Can you make sure that the IEM contract details are on my desk when I come in... and have a copy for him... And, can you ring Steve Bowers... tell him I'll see him late p.m. about the RTP... I'll be ASAP... O.K.? Bye.
Jayne takes a seat across from Caroline, and opens her briefcase to get her organiser.
Waiting room scene

Action: The door opens. Denise enters: trainers and jeans, a dark sweatshirt. She is a young-looking sixteen year old. We track her as she goes straight to a chair opposite Caroline’s encampment. She sits and stares down at her shoes to avoid eye contact with anyone.
One of the carrier bags sags, and apples roll out across the floor. Caroline looks embarrassed and retrieves the fruit; checking each one for bruising.

Jayne makes a long sideways glance at Denise, weighing her up... is she really as young as she looks?

Denise looks across at the two older women with a tinge of hostility. Trying to remain composed she holds her arm across her body... partly defensive, partly to comfort herself.

Caroline: Um... Would anyone like an apple?
Waiting room scene

Jayne refuses an apple offered to her by Caroline.

Jayne: No, but thanks for the offer.
Waiting room scene

Action: Denise puts on an extremely sour expression
Denise: (dully) no thanks.
Caroline: Never expect things from strangers ... quite right too.
Denise: It's not that ... it's just that apples make me puke just now.
Waiting room scene

About their pregnancies
On medical matters
Caroline’s advice
Denise, nerves and concern
Exit scene

Jayne: You’re married.
Caroline: That obvious, is it?
Jayne: I didn’t mean it was bad or anything.
Caroline: You aren’t? (Open question to both women)
Jayne: No É never went in for that kind of thing really.
Action: Denise smiles, almost embarrassed É
Denise: Course not É boyfriend init.
Sound: (Doctors’ intercom): “Miss Jayne Hargreaves to Room 3 please”.
Jayne: That’s me!

Stay with Denise and Caroline to find out more about their respective pregnancies. (Select a topic from key words to follow: options available throughout)

Follow Jayne to the antenatal interview and supporting information
About their pregnancies

Dialogue about their respective pregnancies and partners. Selection of different character gives different dialogue—biased towards user's interest in chosen character. Non-selection presents events in wide view.

About their pregnancies

On medical matters

Caroline's advice

Dense, nervous and concerns

Exit scene
On medical matters

Basically same dialogue - but opportunity to see actions/reactions of characters.
Possibility of using keywords to select portions of dialogue a-e. Non-selection presents wide view only.

About their pregnancies

On medical matters

Caroline's advice

Denise, nervous and concerns

Exit scene
Presentation of important information / key point through "monologue" of a character.
Caroline chosen as more authoritative/mature/experienced of the two women.

About their pregnancies
On medical matters
Caroline's advice
Denise, nerves and concerns
Exit scene
Denise, nerves and concerns

Even more dialogue - mediation or negotiation of information following on from Caroline's advice - Lauzier's corners aturial model.

About their pregnancies
On medical matters
Caroline's advice
Denise, nerves and concerns
Exit scene
Exit scene

Characters: Exit, scene closes.
Sound: (Doctor's Intercom): "Mrs Caroline Knight to room 3 please" ... "Miss Denise Finch to room 2 please"

About their pregnancies
On medical matters
Caroline's advice
Denise, nerves and concerns
Exit scene
Jayne in surgery - Information structures

-- personal details (e.g. name & address, status, family support, living, circumstances, employment).
-- medical history (e.g. diabetes, heart, kidney, lung problems, drug use/misuse).
-- family history (e.g. genetic disorders, prevalence of twins, tuberculosis).
-- genealogical history (e.g. previous pregnancies, menstrual history).
-- current pregnancy (e.g. estimated due date, pelvic size, antenatal care choices, ultrasound test).
-- explanation of services & information pack
-- additionally short medical examination may be done
Ultrasound Simulation

Select one of three simulations

More Information
Explanation - Parents experiences

Back to Start
Jayne in surgery - Information structures

Click on the table to progress
Jayne in surgery - Information structures
Jayne in surgery - Information structures
Experiment 3: A Final Production Version

Shows the effect of casting and professional video shooting on the dramatic scenario. Feedback on the project has shown that people ignored the concern for design issues and methods, and that first impressions concerned the casting of characters and production quality of the drama. Work on the project by an undergraduate student redressed the balance on these issues.

Additionally to the option to learn the inner thoughts of characters is included. This provides the user with an insight into the reflections of the characters on the situation they find themselves in.
Denise watching TV
I've come to have chat with you
Final production version

No I need to have a chat
Final production version

here's your mum
Final production version

Now listen Denise I've been thinking
Come on, let's just get this straight.
Where's your money coming from
Now have you thought about it
Final production version

Yes dad I have thought about it
So you've been in and sorted it by yourself
Final production version

What the hell are we going to do
Final production version - inner thoughts
Appendix H. Web Evaluation feedback
Feedback via Research Web Pages & E-Mail

Research Method & Research Framework

*Questioning my method. Date Posted : 26/11/98 Tom Rogers*

This research is intended to open up the issues MLE (Multimedia Learning Environment) and Interactive Drama (ID) design to scrutiny. I am interested in the qualitative and intuitive elements of creating a product and relationship between theory and practice. To explore and understand the processes of design I have used a number of observational and reflective methods to understand the problems and issues of design. Has this resulted in an adequate exploration of the issues involved? Does this approach enable the exposure of the expertise and wisdom involved in design practice?

*Your Reflective Practice. Date Posted : 4/2/99. Participant 2*

I was wondering how you checked the insights you gained from your own reflective practice were widely applicable to other developers in other situations? I know you also observed Simon Turley and walked through your findings with other experts and practitioners. Or have you defined a narrow area of applicability for your findings?

*Validating My Research. Date Posted : 4/2/99. Tom Rogers*

I have worked through the processes of scripting, rehearsal and drama development with Simon Turley. This formed the basis to the development of the interactive drama. The literature research for the project also informed the process, as did my own experience in the creation of learning technology and multimedia. This is the area in which the originality of the research is based.

The development of learning technology content has been founded upon well known techniques (such as rapid prototyping), personal experience and literature review. As well as the interaction with a number of experts (e.g. parents) and multimedia producers. The feedback I get from these Web pages will also contribute in that respect. Formative evaluation sessions with a small focus group provides the users' viewpoint, and a seminar session with multimedia practitioners from the — involved in the development of the — the validation from the designer's perspective. The latter two will be reported in my thesis.
The research map was originally conceived from my literature search and own experience of multimedia design. It has been refined throughout our work ... both informing and evolving with the practical design project. The map is intended to present design as a truly interdisciplinary activity. Does the map cover the disciplines and theory that support and enable designers to practice? If not, what other areas would you include and how would you relate them to existing features of the map?

I liked the research map as a summary for describing the different elements of the research. It is useful to see how the different elements build the learning you have gone through and also the learning that prospective mothers will go through when navigating through the pages. I will add more feedback when I have gone through the pages in more detail.

Thank you for your comment, I think that the research framework also represents the knowledge and theoretical perspective that I take to a design problem. I am really interested to hear what other designers think ... and what they would include in their own representations of the knowledge they use in multimedia design.

I agree with the comment from Participant 5, the research map provides an excellent summary for describing the different elements of the research. For me it would be interesting to see how this could be used for participants on our courses to present their portfolios of information. It will take me sometime to digest the full content - although I have a clear picture of how it fits together. I seek the 2 page summary!

I realise this is a large site for you to look at. However the entry page at http://caiaiastar.soc.plym.ac.uk/starproductions/tomwww/ also has links to some summary information about the project.

My expectation was that people would read the summary, then enter the main pages to look at their own area of interest before giving some constructivism. Please do not feel you have to read everything!
**Design Activities feedback**

**Interactive Drama Design**

*Interactive Drama Design. Date Posted: 26/11/98 Tom Rogers*

Our work is intended to explore the opportunities for using interactive drama as a means to communicate learning issues, and encourage people to reflect upon decisions and choices. Is interactive drama an appropriate means to achieve this? Have we followed through the appropriate design method to create a useful experience for the user?

*Response to question. Date Posted: 1/12/98 Participant 1*

Yes, I do think this is an appropriate medium to use. Many soap operas broadcast on television use interactive drama as a way of presenting and addressing topical issues through their storylines. Whilst the storylines and characters are fictitious, they do allow those who watch, to experience the issues involved with that particular topic. This could then in some ways 'prepare' and inform people of the important factors relating to a particular topic which may be encountered in 'real life' at some point.

*What makes you think? Date Posted: 1/12/98 Tom Rogers*

I'm not sure that I understand your use of the term "interactive drama" ... I'm going to assume for the second that you're simply referring to drama that engages and inspires. If so ... what is it that keeps your attention. Is it the realism of the production the grime on the streets and the (imagined) smell of stale ale in the pubs. Or is it the situations that the characters find themselves in. Or the depth to the characters?

The second question is why do you empathise and relate to the stories that you see? Is it to do with personal experience, common (cultural, social) experience or the basic inquisitiveness that makes us want to see other peoples lives?

My third question is ... if you were able to direct your view and ability to search a drama what would stimulate inquisitiveness? We have used: location and chronological episodes (experiment 1), different narrative routes with different outcomes (experiment 1), viewpoint based upon camera shot and character (experiment 2) and inner thoughts (experiment 3). We have also built in underlying information resources to balance the emotional content and tension of the drama with learning resources, and enable search of more detailed knowledge.

Is this enough to draw the user into a world that encourages them to search, build their understanding, reflect and initiate a decision to unravel a new episode?
What I think is ... Date Posted : 4/12/98 Participant 1

You asked me a number of questions in relation to my response to you the other day. Here are my answers to some of them. You asked me what keeps my attention. I think there are a number of factors here. As you watch a soap opera, which you feel portrays an element of realism, you become interested in how the storyline will progress and how it will be presented. In some instances presented this maybe because the viewer has already encountered similar situations and be interested to find out what alternatives there are for dealing with that situation. Having the ability to actually decide in the future how different scenarios may unfold as a result of interactive TV will allow the learning issues involved to become more developed for the individual. I don't know if in the future it will be possible to have a scenario tailor-made as it were for individuals where relevant demographic information can be input to a program and the likelihood of certain outcomes presented in relation to certain parameters. This sounds akin to some computer programs that are played, but for it to have a sense of realism, then the medium of interactive drama may fit the bill.

Your interesting thoughts ... Date Posted: 7/12/98 Tom Rogers

You are bringing up some really interesting and highly relevant issues here! So I am asking you to expand upon them ... What makes drama realistic for you? Is it the location (look, feel, 'smell' of the East-end or Manchester borough), the characters? Or is it your imagination and sense of empathy to the scenarios and stories? Would the same story be as effective in the theatre? How would you compare the two?

And there's more ... Date Posted: 7/12/98 Tom Rogers

You mention about the viewer relating to similar situations that they have encountered? How does this work? I would be interested to know of any literature that you have come across in this area. Does it mean that you have to be a parent to understand the problems of bringing up children? Or are you able to relate to problems in other ways ... for example, can you relate to a story about a parent with an alcoholic child by drawing upon different experience (how similar does it have to be?) or does your child have to be alcoholic to really understand? DO you feel that you are able to learn from watching soaps/drama? And what kind of satisfaction or gratification do you get from watching soaps/drama?
demographic filters ... Date Posted: 7/12/98 Tom Rogers

You ask about the possibility of using demographic information to enable storylines and information to unfold according to situation and interests of the user. That is certainly feasible. We have considered this in the development of our conceptual model, and suggested that the collection of personal information should be used to highlight important issues. Is that appropriate, for example should we use age or an assessment of individual sensitivity to censor out (say) video of childbirth. Such technology is available in various platforms, for example Internet sites can gather demographic information from registration information. DVD technology can enable different censor ratings to enable different versions of the same film to be displayed to different audiences. Would the possibility of purchasing or using a multimedia learning environment that could be used by a 7 year old, 15 year old or an 18+ be more attractive. Or one that created an experience specifically aimed at issues important to a "high risk" older woman concerned about having a child with genetic problems. What dimensions would be important to you as a user?

Expanding upon my answers. Date Posted: 7/12/98 Participant 1

1. I think there are many factors involved here. It may be easier if I draw out some comparisons between some of the soaps I watch and know of. Comparing Eastenders (E) with Coronation Street (CS). I find the characters who are portrayed in Eastenders have more depth to them than those in CS. The situations and scenarios that are presented in E appear to me to be more realistic and represent real life issues. Reactions and the emotions that are expressed and portrayed are often very intense and very believable. I think I am quite an empathetic sort of person and do find it easy to empathise with the characters in some of the situations they find themselves in.

Eastenders has televised several episodes where only two characters have had a dialogue, set in a particular scene. On each occasion I have watched these I have found this style of drama to be quite effective in allowing you to become really immersed with the particular situation. The episodes in question have usually been a result of a well developed storyline which has reached its climax. This way of using drama is quite a gripping one and has held my attention throughout.

One of the episodes I remember involved Dot Cotton and her son, Nick. This particular storyline had been running for quite a while, being re-visited from time to time and in this particular episode, it reached its climax. Nick had slowly been poisoning his mother and she had become more and more poorly, but he dissuaded her from going to the doctors. In this episode, she confronted him with her suspicions. Throughout the 30 minutes, a range of emotions were expressed by both characters. For example
anger, denial, disbelief, fear, submission, contempt and resignation. I am not aware of any similar episodes in Coronation Street, but what I do find with CS is that the characters are less credible and the storylines are therefore less convincing.

With teenagers in the house, I often find myself watching Hollyoaks (HO), Heartbreak High (HH) and Neighbours (N). Hollyoaks is a soap opera centred around a group of young adults and their respective families. HH is an Australian soap opera also centred around teenagers in the final years of their school. To me Hollyoaks has captured whatever it is that holds my attention and draws me to finding out what is going to happen in the next episode. In this programme as with Eastenders, the producers are not afraid to deal with contentious and socially taboo topics. These are often dealt with from a number of different perspectives and, I think, sensitively whilst still managing to present the hard facts of what can potentially happen in some circumstances.

HH and N don't have the same affect on me. For me, neighbours is light entertainment—something to unwind to. I think part of this may be a cultural issue whereby I do not specifically relate to their particular lifestyles. Also the depth of the characters is not there and they are less credible. Whereas with E and HO, I sometimes come away with something from watching these particular soap operas based on the depth of characters, plot and narrative.

One of the other main factors I feel makes a difference in whether or not the soap opera holds my attention is the credibility of the storyline especially from the viewpoint of timescales. With CS, it is easy to predict what is likely to happen next. This is also very true of Neighbours. However, with E and HO, the timescales are more realistic and a story is developed over time with the unexpected twist to retain your interest. This is achieved by the way they bring in different perspectives.

So for example, in HO a recent storyline is that one of the characters was abused by her father both in the past and more recently. This was developed and different characters feelings and perspectives were presented, e.g. the mother/wife, brother/son, boyfriend of the abused and of course the daughter herself. The matter was reported to the police and

whilst one might have assumed that the case was 'clear cut' and had to be resolved in court, the added dimension of the father being let out on bail was perhaps unexpected under the circumstances. Interest was retained in seeing how the family dealt with that issue.
2. I'll answer these questions in relation to the programmes I have mentioned in response to your other question.

I don't think anyone can really understand what something is like until they have experienced it for themselves. I have had certain opinions about issues which have changed quite drastically when I have found I have had to deal with those issues myself. Like many people I have thought I would never find myself in certain circumstances only to find that life is full of surprises, both negative and positive. So I think raising issues in soap opera raises awareness and allows the individual to consider how they might deal with it.

As I mentioned before, the different characters in the soap operas provide the viewer with the different perspectives and emotions they experience as a result of that viewpoint. In doing this, I feel you can learn what is involved and how the situation can affect different people in different ways and the interactions occur as a result of that. Having to face that situation in real-life, you will inevitably deal with it in your own way, but just being aware of the issues involved allows you to make a balanced decision.

Re: Demographic filters. Date Posted: 15/12/98 Participant 1

I think both have their merits as it would depend on what information you required and who needed it. If, for example, I had a child who was experiencing problems related to drug abuse, having a MLE where I could find out what they were experiencing and what factors may be contributing to their problem would help me to understand and maybe address the problem more adequately. For example as a fifteen year old they may have to deal with peer group pressure, issues to do with self-esteem etc. which unless I had had direct experience, would not necessarily have any concept of. Therefore being able to immerse myself in those issues and experience them as it were through a fifteen year olds eyes would provide me with valuable insights. However, an MLE which was able to be 'customised' would be really valuable allowing the user to hone in on the relevant issues pertinent to their medical history or whatever.

You talk about censorship in relation to MLE's and I think this is a good idea and vital too. A fine balance would have to be made between presenting enough information to certain ages groups so that they are aware of the seriousness of the topic and the possible implications without stimulating too much interest or putting the fear of God into them. Thought as to how to present the material to different age groups would also need to be addressed.
Development of Conceptual Design Model

Mind’s eye view? Date Posted: 1/12/98 Tom Rogers

For me, the conceptual development of a design is where the creative possibilities and opportunities become apparent. Where the designer creates his/her goal and the foundation for a coherent MLE. In many ways it is here that I feel the theory of mental models and the visualisation process become very close. And an understanding of mental models and how the mind works supports the designers' creative and productive powers. To enable this design project, I feel that my internal model relates to the subject matter, the production and use of the media, and the thought processes that this involves. Can we make ourselves better practitioners by becoming theorists? Or is it simply a process of practice ... practice ... practice?

Interactive? Date Posted: 26/1/99 Participant 3

Thank you Tom for the link to this fascinating research. My own perspective on the subject leads me to ask that you more clearly define the concept of interactivity. Clearly all media is interactive if you're able to turn the page, change the channel, leave the theatre. All it means in this too-broad sense is that any action by the user alters the information flow. What I presume you're striving for is that action by the user is specifically prompted by the content and triggers predetermined changes in the information. The world-wide success of the video/computer game industry (at present about ten times larger than the feature film business in gross revenues) demonstrates the appeal of an entertainment application of this style of "learning". I believe the keys to the effectiveness of this medium are subjectivity and immersion. It does not take much imagination to see that the best way to teach about pregnancy would be to have the subject actually experience it (the modus operandi behind numerous programs now in place that use body appliances and surrogate babies to familiarize teenage girls with the real-life realities of the process). While objective drama in a multimedia application can include numerous decision gates that can illuminate consequences of behavioural choices, and allow for discussion and easy linkage to linear information resources -- and this is certainly a fruitful direction for any kind of instructional material -- I feel that any undertaking seeking to maximize the educational potential of electronic media must recognize the inevitability of a "virtual reality" approach.
Response to Participant 3's Comments. Date Posted: 28/1/99 Tom Rogers

We are indeed trying to look at ways in which emotional responses, behavioural responses, and curiosity can be exploited to engage the user in a subjective experience. And more to the point to create a learning experience that is holistic linking medical and developmental issues with the emotional, and presenting decisions and choices in an authentic context.

I think your comments about the use of body appliances (I have a poster of a pregnancy simulator from a US midwifery journal on my wall) and surrogate babies are really interesting. However, it would take me away on a completely different line of research. One for the future may be! I also think that there may be a cultural thing here—by the responses to my poster—we English are too reserved to consider such ideas.

Your description of interactivity covers much of what I would use for my definition. Our work has been intended to open up these issues and try to establish models and methods for future research and practice of multimedia production. I think what we are looking for is the creation of interfaces that enable users to intuitively search for answers to their questions and interests in naturalistic ways. I think that the mechanical interaction with a computer or other media technology is one level, but that there is also the cognitive and emotional engagement with the media that creates a flow of consciousness and immersion into the story or drama, a further level is the social interaction that may occur through some activities (e.g. watching a film).

The reason we chose to go down the multimedia was that (when this project began) CD-ROM was really taking off, and the exploration of it's possibilities as a learning medium had not yet been explored. Also because VR technology had only just made its way into PC technology and really showed no sign of being useful as medium to support our goals. Even now I think it would have it's limits. Since then we have seen the huge growth in the WWW, and now in the UK digital TV, web-TV and DVD are beginning to come in to use. This, in some senses has brought us full circle in our ideas and goals. What we soon came to realise is the barrier that many people find in the concept of using a computer keyboard, mouse and windows software. We have constantly been considering how this barrier can be lowered or removed. A "TV" rather than "Windows" interface metaphor would seem to offer great potential in this respect.

Another reason for keeping with multimedia is that one of our goals was to consider everyday learning processes in general. So instead of pregnancy, we could use similar principles to take people through the experience of buying a house or finding a job. For more general applications the naturalistic imagery, supported by information, 3-D models etc., seems a better option. We can engage a user through the use of drama and
a good story, and provide (more objective) information through text descriptions, expert comments, and simulations.

I think that any platform or medium will have its advantages in terms of interactivity and the portrayal of personal situations and experience. For example, some adventure games have complex environments for free exploration and full immersion, but interaction with characters is limited to multiple choice questions that require analysis rather than intuition. I'm guessing that your creation of the Mood Bar was motivated by this — least that's what makes Mode and Midnight stranger work for me.

I think that, given the target audience for our MLE design (reaching out to some of least advantaged and lowest educational achievers), we wanted to create a product that they could associate to, and use in an environment that would relate directly to their experiences and values. And perhaps just as importantly create an emotional response. A video based product, with analogies to TV drama and soap opera seemed to be the best vehicle. In this context, interactive drama can be used as a simple story presentation with multiple routes, with a sub-structure of information and activities that can gradually be discovered as the product is used. I acknowledge, however, other platforms and presentational forms offer a great deal of visual and emotional impact. For example in the course of my research I found a couple of Web sites designed as photo-essays (URLs: http://www.intac.com/~jdeck/tahra/Tp1.html and http://www.intac.com/~jdeck/habib/) that tell such stories simply but effectively.

A brief 'study' of TV watching habits shows the advantages offered by giving people a remote control, that sits comfortably in the palm over a mouse which must be used formally on a tabletop. I think this is a metaphor that we will seek to pursue in future research. Another point is the communal nature of the TV metaphor, versus the assumptions of single user of a computer. The idea of discussion and interpersonal dimension of such learning is important to us. This could be the deep discussions that occur between parents, families or friends. I'm not sure that e-mail or discussion group networks could fulfil the intuitive and emotional interactions to the same level!?

Finally, I think it is fair to say that there also needs to be a multi-disciplined approach to the creation of good quality interactive drama. The response of an audience to a drama or story is reliant upon a story that is believable, acting performances that engender empathy and curiosity, a navigational structure that can manage time and space (the equivalent of editing and narrative flow in a movie?), production that provides an appropriate atmosphere and style, and technology that fulfils expectations of the audience.

I welcome any feedback or ideas around these issues ... what do you think?
Compilation of Subject Matter

Is informal learning possible? Date Posted: 1/12/98 Tom Rogers

In reviewing existing subject matter and talking to people (especially parents) about the events and learning involved in pregnancy we became very aware of the experiential issues involved. The emotional and interpersonal dimension to learning emerged from interviews and discussion with parents. It would seem difficult to deconstruct "pregnancy" into a formal curriculum without losing the power of the experience. As a result of these findings we developed our ideas as serving an 'everyday' or 'informal' learning need. Is it possible to create materials that serve the needs of informal learning? What are the characteristics that define it? Have we described them adequately (see the theory section on learning) in this project?

Informal learning Date Posted: 3/12/98 Participant 7

This is mainly a test and to let Tom know that somebody out there is looking! I've not read much so far so here's a simple reply on 'informal' learning: What about models from open learning? If your users feel it is difficult to achieve the appropriate level of meaning and content via formal means then perhaps less structured open learning methodologies might apply. You then have to work out whether learner motivation is high enough to maintain interest and engagement. Anyway I'd better go and read what you've already said on the matter!

On informal learning. Date Posted: 7/12/98 Tom Rogers

I accept what you say about the possibilities of using open learning methodologies. And to some extent I think that our approach draws upon the concept. However, there are a number of concerns that I have. Existing parent classes provide much of the formal information about medical care, and many books are available in shops and libraries on the topic of pregnancy and childbirth, but they are less able to address the emotional and personal issues of prospective parenthood. However, your second point on motivation, and also the fact that there is a significant difficulty for some parents to understand the information presented to them, creates a barrier to learning.

What we are proposing is that the presentation of drama based situations can draw out the issues for parents in a way that presents them with issues and questions. And that more objective fact based learning materials, linked in to the drama can provide a more objective viewpoint. The idea is that parents could either use facilities at a clinic or through cable or CD/DVD format use a multimedia learning environment in their own home. The issue of access, I would extend to include the ability for two parents (and/or family or friends) to use the product together and draw out the issues through watching, making choices and decisions in an interactive drama environment and most importantly
developing conversation. Is this ill-conceived or too optimistic ... let me know what you think?

Received Via-Email

Referenced in Chapter 13 as "Participant 6":

X-Sender: mennis@mail.wesleyan.edu
Mime-Version: 1.0
Date: Sat, 22 May 1999 22:09:45 -0400
To: Tom Rogers <tomr@soc.plym.ac.uk>
From: MaryLouise Ennis <mennis@mail.wesleyan.edu>
Subject: Re: Access to my Research Web pages

Dear Tom Rogers,

Many thanks for your incredibly informative project. I am especially grateful for your Research Map (for I am a "visual" thinker) and for its thorough discussion of theoretical models.

For me, your analyses put into perspective why the basic MLE's that I've been in my French lit courses using have been successful. Nothing fancy here, just interactive course syllabi with links to background texts, student PowerPoint presentations and online forums for structuring knowledge and facilitating peer learning.

In short, you have given me the necessary background to think more critically about my pedagogy with respect to constructivist and objectivist paradigms. I look forward to exploring your site in more detail.

Yours sincerely,

MaryLouise Ennis, PhD
reply to: ML. Ennis@aya.yale.edu
Appendix I. Contributors to the research project

Peter Jagodzinski, Reader in Human Centred Systems Design, Director of Studies

Peter, has been responsible for the management of the research project, and provided advice, support and ideas from the field of human centred systems design (HCSD).

Mike Phillips BA, Second Supervisor

Mike, MediaLab Arts (MLA) Programme Manager, has given technical, media theoretical and creative advice and ideas to the development of the project.

Simon Turley, Theatrical Playwright, Director and Drama Teacher

Simon has written the dramatic scenarios for the project that have been developed into interactive drama designs. He also acted as director in rehearsals, coaching actors in the development of the interactive drama and subsequent video trials, and providing guidance on drama theory. He is head of the drama department at Eggbuckland Community College in Plymouth,

Web Page Producers

Chris Brown and Neil Dare-Williams built the structure and links for the Web pages used in evaluation of the Research Framework, design process and interactive drama prototypes.

Jane Roberts, MediaLab Arts Student, Graduated 1996

Jane undertook a final year project on a similar theme to this research. One of the results it yielded was an example of the interactive drama scenarios that was shot using a professional cameraman and actors. This is used to demonstrate the final look and presentation of the learning materials.

Advisors and additional support:

Perinatal Research Unit, Post Graduate Medical School
Derriford Hospital

Members of the Perinatal Research Unit at Derriford Hospital, have provided useful advice on the selection of a topic and focus for the MLE. They also gave insight to the viewpoint, interests, and needs of the medical professions toward their patients.
Parental contributions

A number of parents have given their experiences, opinions, and ideas in the development of subject matter and MLE design.

Members of the MLA team

Throughout this work, members of the MLA team have given valuable insight and advice that have greatly helped the progress of the project. They have a range of expertise related to the theory, design and production of creative art, conventional media and multimedia. The group are: Dan Livingstone, Chris Speed, James Norwood, Mic Cady, and Jeff Cox. Past member Paul McGuire also provided advice and ideas in the early phases of the research.

Interactive Drama and Video Production

Under the direction and support of Simon Turley; Roberta Russell, Rachel Cheney, James Allwood, Matthew Barrand and Ellie Cheney provided the acting skills to make my research possible. They also let me observe their rehearsals and patient enough to work with me on the video shoot.

The Cheney family were kind enough to allow the use of their home as a location for some of the video sequences.

Materials contributed through the final year project of Jayne Roberts, include the acting performances of Sally Fellows, Glynis Morgan, John Walmsley and Tracey Manning.